EXAMINING THE ACADEMIC PERFORMANCE AND RETENTION OF FIRST-YEAR STUDENTS IN LIVING-LEARNING COMMUNITIES, FRESHMEN INTEREST GROUPS AND FIRST YEAR EXPERIENCE COURSES

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by

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DEDICATION

I would like to take this opportunity to thank my wife, Lynda, for without her ardent and steadfast support this dream could never have been realized.

I also sincerely appreciate the sacrifices Brianna, Michelle, and Marina (and Lynda) have made these past six years as a result of the time and energy I have chosen to devote to this endeavor. It is not lost on me that Marina has never known a time when her dad didn't have "homework".

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EXAMINING THE ACADEMIC PERFORMANCE AND RETENTION OF FIRST-YEAR STUDENTS IN LIVING-LEARNING COMMUNITIES, FRESHMEN INTEREST GROUPS AND FIRST YEAR EXPERIENCE COURSES

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ABSTRACT

Based on Tinto's (1993) theory of student departure and Astin's (1993) Inputs-Environments-Outputs model, this dissertation presents the findings of a single-institution study into the effect participating in a living-learning community (LLC), Freshmen Interest Group (FIG) and First Year Experience course (FYE course) had on the academic performance and retention of first-year students. Multiple regression was conducted on institutional data covering a three-year period. After controlling for entering characteristic (i.e., high school GPA, ACT score, sex, race, and family income level) and environmental characteristics (i.e., initial major, residence hall living, and Greek membership) the researcher found that students who participate in FIGs did earn higher grades (standardized $\beta = .02$, $p < .01$). Students in LLCs and FYE courses did not. This same dataset was analyzed using logistic regression to determine if, after controlling for these same variables plus the co-variable of first-semester GPA, participating in LLCs, FIGs and FYEs increased the odds of being retained. Participating in a FIG increased students' odds of being retained by 18% (Exp(β) 1.18, p. <.05), but no change in odds was found for students in LLCs or FYE courses. The results of this study reinforce current research regarding the efficacy of FIG programs, but draw into question the benefits students gain from participating in an LLC or FYE course offered on this campus.

Chapter One

OVERVIEW

Introduction

An increasingly vitriolic barrage of reports published over the last 20 years have all made the same basic point; the quality of undergraduate education in this country is unacceptably low. A 1984 report declared that the USA was being underserved by higher education and called for "*demonstrable improvements* in student knowledge, capacities, skills, and attitudes between entrance and graduation" (Study Group on the Conditions of Excellence in American Higher Education, 1984, p. 15, original emphasis). This theme is repeated ever more stridently in documents such as: *College* (Boyer 1990), *The Student Learning Imperative* (ACPA, 1994), *Returning to Our Roots: The Student Experience* (Kellogg Commission, 1997), *Reinventing Undergraduate Education: A Blueprint for America's Research Universities* (Boyer Commission, 1998), *Greater Expectations* (AACU, 2002), and the recent documentary *Declining by Degrees* (Merrow & Tulenko, 2005). One of the more frequently cited reports, *An American Imperative* (Wingspread Group, 1993), states that the American people need their colleges and universities to dramatically improve in terms of access, retention, graduation, and the quality of education leading to a baccalaureate degree.

The most recent installment in this seemingly endless stream of reports is entitled *A Test of leadership: Charting the future of U.S. higher education* (U.S. Department of Education, 2006) commissioned by Margaret Spellings. As with the previous reports mentioned above, the panel of business, political and educational leaders expressed grave concern about the current and future state of higher education in the U.S. The

commission asserted that "most colleges and universities don't accept responsibility for making sure that those they admit actually succeed" (U.S. Department of Education, 2006, p. xii), and the authors decried the "lack of clear, reliable information about the cost and quality for information" (p.xii) regarding student learning and institutional quality. The report recommended that improvements were required in six areas: access, cost and affordability, financial aid, learning, transparency and accountability, and innovation. One of the fundamental conclusions one can draw from this reports is that unless dramatic changes are made in the way U.S. higher education is structured, delivered and assessed, it can be expected that the economic standing of the U.S. in the world and the quality of life in this country will erode.

One area of higher education that has proven problematic, even though it has received a great deal of attention, is the retention of first-year college students. The drop-out rate of first-year students in the United States is reported to range from roughly 33 percent (Barefoot, 2000) to 50 percent (Merrow & Tulenko, 2005). Specifically at four-year institutions, most studies report only 72 to 79 percent of first-year students persist to the second year (Pascarella & Terenzini, 2005). Academic courses specifically designed to help incoming students effectively adjust to the rigors of the undergraduate experience (and thus more likely remain enrolled) have over a 100-year history within American higher education (J. Gardner, personal communication, March 10, 2006). Beginning in the 1970s these courses became commonly referred to as First-Year Experience (FYE) courses and they have been repeatedly demonstrated to improve both retention and academic achievement (Barefoot, 2000). More recently, learning community programs such as Classroom-based Learning Communities, Living-Learning Communities, and

Freshman Interest Groups (FIGs) have been widely heralded as programs that not only improve retention but also the quality of undergraduate education (Gabelnick, MacGregor, Mathews, & Smith, 1990; NSLLP, 2004; Schroeder & Mable, 1994; Pike, Schroeder & Barry, 1997; Pike, 1999; Shapiro & Levine, 1999; Inkelas & Weisman, 2003). However, learning communities are relatively new programs that vary significantly in how they are designed and implemented (Shapiro & Levine, 1999), and the amount of institutional resources (both human and financial) they require to operate (Knight, 2003). Compared to FYE courses, the research literature on learning community programs is in an early stage of development (Pascarella & Terenzini, 2005).

According to Barefoot (2000) most colleges and universities have some form of transitional support program in place for first-year students, but she laments that "only a small fraction" (p. 13) are effectively assessed. There is clearly a need for high quality research regarding the effectiveness of these programs. The clarion calls to improve undergraduate education continue and as of yet there remains insufficient 'demonstrable improvements'. Colleges and universities cannot afford to spend time and money on programs that are not producing improvements in academic performance and persistence (i.e., accountability), nor can they afford not to communicate those improvements (if they are in fact being made) to both internal and external constituencies (i.e., transparency).

This chapter will now present a brief summary of the literature reviewed in Chapter Two including the theoretical framework guiding this study and the current research regarding first-year student persistence and academic performance. The chapter will continue with the purpose of the study, the research questions, the research design,

definitions of relevant terms, the limitations of this study, and conclude with a chapter summary.

Literature Review

Student persistence/attrition has been the subject of empirical inquiry for over 70 years (Braxton, 2000), and although many questions remain unanswered we have learned a great deal. According to Berger and Braxton (1998), Tinto's theory of voluntary student attrition has reached "near-paradigmatic status" (p. 104) in the literature. The essence of Tinto's (1993) theory is that when students choose to leave college it is primarily due to a lack of social and academic integration. Astin's (1993) Inputs-Environments-Outputs (I-E-O) model is one of the most commonly used to study student outcomes such as academic performance, retention and graduation (Inkelas & Weisman, 2003). Astin's (1993) model posits that student outcomes (Outputs) are a function of the environment they experience as undergraduates (Environmental characteristics) and their entering characteristics (Inputs). Applying the Inputs-Environments-Outputs model illuminates that when studying an outcome such as retention or academic performance (Outputs) one must take into account each student's inputs (entering characteristics such as previous academic performance, sex, race/ethnicity, etc.) and the environment they experience (environmental characteristics such as membership in a Greek organization, living on campus, being in a FIG, etc.) that might influence those outcomes. The current higher education literature regarding first-year student performance and persistence is briefly summarized below and more fully presented in Chapter Two.

Variables Contributing to Persistence

After reviewing the literature on first-year student persistence Ishler and Upcraft (2005) concluded that the most salient student input characteristics are: prior academic achievement, socioeconomic status, sex, age, race/ethnicity, familial support, and initial commitment to obtaining a degree. One of the most comprehensive and respected studies in this area is that of Astin (1997) who concluded that "[f]our variables [student's high school grades, admissions test scores, sex, and race] account for the bulk of the variance in retention *that can be predicted from entering freshmen characteristics*." (Astin, 1997, p. 649, emphasis added).

There are two levels of environmental characteristics; institutional level environmental characteristics (e.g., institutional type) and individual level environmental characteristics (e.g., living arrangement, Greek membership). The most salient institutional characteristics are: selectivity, type (two-year or four-year), racial composition, sex composition, control (public or private), and size (Ishler & Upcraft, 2005). Students who attend more selective institutions, students who attend four-year institutions, African-American students who attend Historically Black Colleges or Universities, students who attend single-sex institutions, and students who attend smaller institutions are all more likely to persist beyond the first year even after controlling for entering characteristics (Pascarella & Terenzini, 2005).

Many individual-level environmental characteristics also play a role in the retention of first-year students. Those that have been found to be most powerful include: first semester academic performance, time commitments, interaction with faculty and peers, satisfaction, campus climate, financial aid, initial major, first-year experience

courses, and living-learning communities. All of these are reviewed in Chapter Two; only First Year Experience (FYE) courses, living-learning communities (LLCs), and Freshmen Interest Groups (FIGs) are discussed here.

Ishler and Upcraft (2005) report that participation in a course specifically designed to help students transition into college successfully (generically referred to as 'First-Year Experience (or FYE) seminars') has been repeatedly demonstrated to increase persistence. In fact John Gardner, who developed the FYE program at the University of South Carolina in the late 1970's, founded the National Resource Center on the First Year Experience, and is now widely recognized as one of the foremost experts on the first year of college, recently claimed that FYE seminars have been the most thoroughly and rigorously scrutinized college course ever taught and the evidence gathered regarding their efficacy on first-year student persistence is undeniable (John Gardner, personal communication, March 10, 2006).

The benefits of living in residence halls for undergraduate students (especially first-year students) have been well documented for decades (Pascarella & Terenzini, 1991, 2005). Multiple studies have found that compared to students who live off-campus or at home, students who live in residence halls are more satisfied with- and more involved in- the undergraduate experience, interact more frequently with faculty and staff, perform better academically, and are more likely to graduate (Pascarella, Terenzini & Blimling, 1994; Terenzini, Pascarella, & Blimling, 1999). Many suggest that these benefits are even more powerfully achieved by students who live in living-learning communities (LLC) as opposed to traditional residence halls (National Study of Living-Learning Programs, 2004; Pascarella & Terenzini, 1991, 2005; Schroeder & Mable,

1994; Pike 1996, 1999; Pike, Schroeder & Berry, 1997). Both FIGs and LLCs will be examined in this study; these two terms will be specifically defined below and discussed in chapter two.

Tinto's (1993) theory of voluntary student departure serves as the conceptual foundation for this study. Tinto theorizes that students are in a constant state of evaluating whether to continue or leave an institution based on their level of integration into the academic and social systems of the institution. Inkelas and Weisman (2003) point out that living-learning communities (and FIGs) are intentionally designed to enhance first-year students' academic and social integration through fostering: 1) involvement with academic work, 2) involvement with faculty, 3) involvement with student peers, and 4) student engagement. Current research (e.g., Astin, 1993, 1996; Tinto, 1993, 1997; Inkelas & Weisman, 2003; Stassen, 2003) would suggest that FYE courses, LLCs, and FIGs will have varying degrees of success in creating the conditions known to enhance student learning and retention. Given the amount of resources being devoted to LLCs and FIGs (Knight, 2003) and the largely unsubstantiated claims (National Study of Living-Learning Programs, 2004) higher educational administrators continue to make about the efficacy of these programs, it would be useful to find out the degree to which living-learning communities, Freshmen Interest Groups and First-Year Experience courses improve academic performance and retention.

The purpose of this study, the research questions, and the research design chosen to examine those questions will now be presented.

Purpose of Study

The purpose of this study is to examine the academic performance and retention of first-year students who participate in three transitional support programs (i.e., FIGs, LLCs, and FYE courses) at a large, more selective, four-year, public, research-extensive institution in the Midwest. Specifically, this study seeks to discover if participation in these programs or courses is correlated with earning higher grades and/or increasing the odds of persisting into the sophomore year.

Research Questions

R1. After controlling for entering and environmental characteristics, do first-year students who participate in a FIG, LLC or FYE course achieve higher levels of academic performance compared to students who do not participate?

R2: After controlling for entering and environmental characteristics, are first-year students who participate in a FIG, LLC or FYE course more likely to persist to the sophomore year compared to students who do not participate?

Research Design

Data collected from institutional records was analyzed for this quantitative study. The independent variables in this study will be entering characteristics such as high school GPA, ACT score, sex, ethnicity, and parental income, as well as environmental characteristics such as initial major, Greek affiliation, living in a residence hall, and participation in FIGs, LLCs and FYE courses. The dependent variables will be the GPA

earned the first semester (which will serve as a proxy measurement of academic performance) and whether or not each student persisted into the sophomore year.

The outcome variable for research question one is continuous and thus the analysis will be conducted using multiple regression. Since the outcome variable for research question two is dichotomous, logistic regression will be used. Logistic regression allows the use of both categorical and continuous independent variables to measure their relationship to a binary dependent variable and is one of the most appropriate analytic tools for studying outcomes such as retention (Dey & Astin, 1993). Logistic regression computes the odds a person in an independent variable (in this case participating in a FIG, SLC, or FYE course, or none of these) will be in either of the outcome conditions (in this case leaving prematurely or persisting into the sophomore year) and reports those as the *change in odds* between the levels of the independent variable. An in-depth review of the research methods used in this study will be provided in Chapter Three.

Definitions

A few of the terms used in this study (especially living-learning community) have widely varying definitions across higher education institutions and within the higher education literature. The terms Living-Learning Community (LLC), Freshmen Interest Group (FIG), First-Year Experience course (FYE course), retention, and academic performance, as they are used in this study, are defined below.

Within the field of higher education the term 'learning community' is used to describe a wide variety of curricular and co-curricular structures and multiple definitions have been offered in the literature. Shapiro and Levine (1999) put forth an inclusive

typology of the learning community models currently in use: paired or clustered courses, cohorts in large courses or freshmen interest groups, team-taught courses, and residentially based programs (also known as living-learning communities). Even though there is tremendous variety among learning community programs and the institutional types in which they are situated, they all have one thing in common: each is an attempt to at least partially redesign the undergraduate experience. Both FIGs and LLCs are attempts to make the undergraduate experience more "seamless" (Kuh, 1996), and "integrated" (Gabelnick, MacGregor, Mathews, & Smith, 1990) as opposed to a series of unconnected (and therefore less educationally powerful) experiences (Cross, 1998).

Living-Learning Community (LLC)

For the purposes of this study a living-learning community (LLC*)* will refer to a residence hall floor(s) dedicated to an academic major/discipline or an educationally-relevant theme such as "women's leadership" or "community service". In these LLCs residence life staff work with faculty and academic support staff to develop programmatic offerings that are relevant to the theme. LLCs range in size from a single floor of roughly 50 students to a whole building of 300+ students. Some residence halls consist of multiple LLCs. However, there is no direct curricular component to the LLCs on the campus being studied and these residential communities house both first-year students and continuing students.

Freshmen Interest Group (FIG)

The term Freshmen Interest Group (FIG) refers to a modified version of an LLC. Each FIG consists of a small group of students (typically 15-25) who live on the same residence hall floor and are co-enrolled in four courses together. Three of these courses

meet general education requirements and are relevant to the theme of the FIG. The fourth course is specifically designed to assist in the first-year transition process and is co-instructed by an advanced undergraduate student (who also serves as the student staff member on the residence hall floor the FIG lives on) and a faculty or other academic affairs staff member. Each FIG is built around a theme (e.g., community service, leadership) or academic field (e.g., Nursing, Engineering), and many FIGs are housed within a similarly themed LLC.

First-Year Experience (FYE) course

First-Year Experience course (FYE course) refers to a specific course offered on the campus being studied (i.e., SSC 1150). This is a two-credit, graded course typically co-instructed by two academic staff members (e.g., academic advisors, librarians). Some sections also have an upper-division student peer instructor and a few sections are instructed by a faculty member or advanced graduate student. The course is overseen by the Vice Provost for Undergraduate Studies and focuses on learning strategies, career and major exploration, diversity, money management, and other topics intended to help first-year students transition successfully. SSC 1150 is offered both winter and fall semesters, but for the purposes of this study only students who enrolled during their first semester will be included. This course has been offered on the campus being studied for over 15 years, and is based on the well-proven model originally developed by John Gardner at the University of South Carolina (M. Bixby, personal communication, July 17, 2004).

Retention and Academic Performance

The term retention will be used in this study to mean being enrolled at the same institution the fall semester subsequent to the fall semester the student first enrolled (i.e.,

first-year to second-year persistence). The GPA each student earns during his or her first semester of college will be used as a proxy variable for academic performance.

Limitations

Focusing a study within one institution limits the ability to generalize its findings beyond other institutions with similar characteristics. However, it also avoids another limitation of most other studies within this area of research: inter-campus variability in program design. Learning communities and transitional support courses vary widely across institutions, which makes finding comparisons across multiple campuses very difficult. Because this is still a relatively new area of research it is difficult to know what the most salient elements of these programs are, and thus it is difficult to be sure one is truly comparing acceptably similar programs. The trade-off in this study is that while caution will be required when seeking to generalize these results, one can be confident in knowing the three programs being compared are truly distinct from each other.

Summary

The need to improve higher education in this country has been clearly articulated. Many institutions have put forth significant effort to improve student learning and success, but questions regarding the effectiveness of these programs remain unanswered. This study will contribute to the student persistence literature and the relatively new but rapidly growing body of literature regarding living-learning communities and Freshmen Interest Groups. The study will also have implications for institutional practice. A thorough review of the relevant literature and the significance of this study follow in Chapter Two.

Chapter 2

LITERATURE REVIEW

Introduction

One of the more vexing problems within higher education has been the unacceptably high number of first-year students who do not persist into the second year. A recent American College Testing (2000) report indicates that the freshmen to sophomore drop-out rate from 1983 to 1999 ranged from 47.7 percent at two-year public colleges and 46.6 percent at open admissions institutions to 16.8 percent at private doctoral/research institutions and 8.8 percent at highly selective institutions. However, the vast majority of students attend institutions with the highest attrition rates. Research has yet to fully explain why some students succeed and others do not, or why retention rates vary so dramatically across institutions, even though student persistence/attrition has been the subject of empirical inquiry for over 70 years (Braxton, 2000). In fact, the national attrition rate has hovered around 45 percent for over 100 years (Tinto, 1982). Tinto's (1975, 1993) theory of voluntary student departure has reached "near paradigmatic stature" (Braxton, Sullivan, & Johnson, 1997), and remains the dominant theory in the quest to understand student attrition (Braxton, Hirschy & McClendon, 2004). This chapter will begin with a discussion of the theoretical frame for this study. This will be followed by an overview of the current literature on college student departure/persistence with special attention paid to studies regarding FIGs, living-learning communities, and FYE courses. The chapter will conclude with a statement of the significance of this study and a chapter summary.

First-Year Student Retention

This first section will provide an overview of the theoretical and conceptual frameworks most often used in this area of research and what has been found to effect first-year student retention which includes student characteristics, institutional characteristics, and environmental characteristics.

Theoretical Frames

The two most commonly used theories in this area of research are Astin's (1993) Input-Environment-Outcomes (I-E-O) model and Tinto's (1993) theory of voluntary student attrition. Astin's (1993) model is elegant in its simplicity; it posits that student outcomes (O) are a function of the environments they experience (E) and their input characteristics (I). Astin posits that to understand why students remain enrolled, or earn grades that place them on academic probation, or any other outcome one must take into account both the entering characteristics of the students and what they experience during college.

According to Berger and Braxton (1998), Tinto's model of voluntary student attrition has reached "near-paradigmatic status" (p. 104) in the literature. The essence of Tinto's (1993) theory is that when students choose to leave college it is primarily due to a lack of social and academic integration.

> Broadly understood … individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution.

> The individual's experience in those systems, as indicated by his/her intellectual (academic) and social (personal) integration, continually modifies his or her intentions and commitments (Tinto, 1993, p. 114-115).

According to Tinto (1993), the decision to persist or leave an institution in not a one-time decision point; rather students are engaged in an on-going process of becoming more or less committed to an institution as a result of the degree to which they feel integrated into the academic and social systems of the institution.

Although the academic system refers primarily to what happens in the classroom, laboratory or other traditionally defined instructional space, it also includes all other academic activities such as faculty office hours, study groups, and campus lectures. The social system primarily refers to "the daily life and personal needs…of the students" (Tinto, 1993, p. 106) which includes formal and informal social organizations, clubs, and friendship networks. Tinto theorized that the more a student perceives him or herself as being successfully integrated into the academic system and the social system of the institution the more committed he or she will be to the institution.

Tinto (1993) specifies that students interact with both the academic and social systems simultaneously and the interactions in one system have repercussions in the other system. For example, social and academic systems that positively reinforce each other will increase student commitment such as when students are part of a peer group that also serves as a study group. A variety of factors have been demonstrated to influence integration and thus student departure including: entering characteristics, goals and commitments, institutional experiences, quality of effort, and educational outcomes (Tinto, 1997). This section will now turn to an overview of what has been found from

research based on Astin's and Tinto's theories regarding student persistence and academic performance.

Student Input Characteristics

After reviewing the literature on first-year student persistence Ishler and Upcraft (2005) concluded that the most salient student entering characteristics are: prior academic achievement, socioeconomic status, sex, age, race/ethnicity, familial support, and initial commitment to obtaining a degree. Some of these variables seem to have a greater impact on retention than others. One of the most comprehensive and respected studies in this area is Astin's (1996) multiple regression analysis of a national longitudinal retention database of 52,898 students attending 365 baccalaureate-granting colleges and universities. He concluded that "Four variables [student's high school grades, admissions test scores, sex, and race] account for the bulk of the variance in retention that can be predicted from entering freshmen characteristics." (Astin, 1996, p. 649). Each of these four variables will now be discussed.

Not surprisingly, the entering characteristic which has the most influence on retention is prior academic achievement (Ishler & Upcraft, 2005). The metrics typically used to measure prior academic achievement are standardized tests (Astin 1993; Pascarella & Terenzini, 2005), and high school GPA (Astin 1993; Pascarella & Terenzini, 2005). Astin (1997) has suggested that of all the metrics readily available, high school GPA is the most useful in predicting retention; performance on standardized tests does not add much to what can already be predicted based on high school GPA. He found that high school GPA accounted for 8.6 percent of the variance in student retention, and that including SAT scores only increased the amount of variance accounted for to just

over 10% (Astin, 1997). Robbin's (2004) recent meta-analysis of 109 studies also found that high school GPA is a better predictor of persistence compared to standardized test scores. However, performance on standardized tests may be more important to take into consideration when seeking to predict the retention of students from some minority groups (Zwick & Sklar, 2005; Schwartz & Washington, 1999).

Sex and race/ethnicity are also important entering characteristics. Female students tend to remain enrolled in statistically higher numbers than male students (Astin, 1993; Ishler & Upcraft, 2005). Although the role a student's race/ethnicity plays in retention has been widely studied, the results to date have been difficult to interpret (Ishler & Upcraft, 2005). Both Ishler and Upcraft (2005) and Stage and Hossler (2000) point out that racial/ethnic identity is a very difficult variable to cleanly assess due to the confounding interactions that occur between it and many other variables. For example, Stage and Hossler (2000) point out that students of color who attend predominantly White institutions are typically less likely to be retained than their White peers at those same institutions or their peers at predominantly Black institutions, even after controlling for entering academic ability. However, Astin (1997) has found that sex only explains about 2% of the variance in retention, and race/ethnicity only explains another 1% of the variance. One possible explanation for these seemingly conflicting findings may be that some characteristics, such as race/ethnicity, play a more influential role in some institutions and that the effect of this characteristic becomes masked when data from multiple institutions are combined.

Although the four preceding variables may be the most salient, there are other entering characteristics which also influence persistence. For example, Warburton,

Bugarin, and Nufiez (2001) found that first-generation college students (i.e., those from families where neither parent has graduated from college) are less likely to be retained compared to students who had at least one parent with a college degree. Stage and Hossler (2000) suggest that parental educational attainment and yearly income are related to retention. Drawing directly on the work of Tinto (1993, 1997), Braxton (2000) and Braxton, Hirschy and McClendon (2004) point out the importance a student's level of commitment to obtaining a degree has on their persistence. Although it may seem obvious that something like 'commitment level' plays a very important role in how successful a student is likely to be, as with race/ethnicity, parent's education, parent's income, and all the other elements that are often lumped together into one variable euphemistically termed "socioeconomic status", initial commitment to completing a degree might also be subject to confounding interactions with other variables shown to be meaningful.

Ishanti and DesJardins (2002-2003) have recently taken a new look at persistence by taking into account the passage of time. Using a multi-institutional sample of almost 3400 students Ishanti and DesJardins (2002-2003) used event history modeling and found that over time the degree of influence most variables had on student persistence change. For example, students who were in the bottom quartile of family income not only were more likely to drop out of school, the likelihood they would leave school (as compared to students in the top quartile of family incomes) increased in the second year and again in the third year. In short, the importance of family income increases as the student progresses toward graduation.

Although there are still unanswered questions regarding what impact all of the different entering variables may have and how those variables may or may not be interacting with each other, there is no doubt that who a student is and what experiences he or she has before coming to college play a very significant role in their ability to achieve success during college. In fact, according to Astin (1997) "More than half of the variance in institutional retention rates can be attributed directly to differences in the kinds of students who initially enroll, rather than to any differential institutional effect" (p. 648); but that is no reason to simply accept the status quo. There is reason to believe not only that institutions can affect how many of their students are successful, but more importantly, that institutions can improve their ability to do so. Institutional characteristics are relevant when studying student persistence and these will now be presented.

Institutional Environmental Characteristics

In *How College Affects Students* Pascarella and Terenzini (2005) provide the most authoritative review of the literature on college student outcomes, and they report that one of the unequivocal conclusions within the literature is that a student's peer group plays a very powerful role in shaping the undergraduate experience. Peer-to-peer interaction, both inside and outside the classroom, has a tremendous influence on both learning and persistence (Astin, 1993; Pascarella & Terenzini, 1991, 2005). Astin (1996) succinctly states "the greater the interaction with peers, the more favorable the outcome" (p. 126). Astin (1996) argues that first-year students who are "living at home, commuting, attending part-time, being employed off-campus, being employed full-time, and watching television" (p.126) are less likely to persist precisely because these

activities cause them to interact less with their fellow students and the faculty. The nature of the peer-to-peer interaction is fundamentally shaped by institutional characteristics, which might at least partially explain Ishler and Upcraft's (2005) findings that the most salient institutional characteristics are: selectivity, type (two or four year), racial composition, sex composition, control (public or private), and size.

The retention of first-year students does vary with selectivity and institutional type. The more selective an institution is, the more likely first-year students attending that institution will persist to the sophomore year even after controlling for entering characteristics (Ishler & Upcraft, 2005). Students who attend community colleges are less likely to persistent than those who attend baccalaureate colleges and universities (Ishler & Upcraft, 2005), but students who start at a community college and then transfer into a four-year school are just as likely to complete a degree as similar students who started at the four-year school (Pascarella & Terenzini, 2005). How much of the difference in retention is due to the socioeconomic status of students who attend a community college, as opposed to the characteristics of the institutions is difficult to say. A large portion of the reason students select to attend a community college as opposed to a four-year school is related to economics and their personal/family situation (Merrow & Tulenko, 2005). Clearly there are differences between community colleges and four-year schools, such as the availability of on-campus housing and full-time faculty who are more readily available outside of classes, which have both been shown to positively affect retention (Pascarella & Terenzini 1991, 2005). So, while one must acknowledge the research that indicates retention is higher at four-year schools, one must keep in mind a variety of variables that may likely affect these findings.

The racial composition of an institution is important to retention (Stage & Hossler, 2000). African-American students are retained at higher rates when they attend a predominantly Black campus (also known as HBCUs or historically Black colleges and universities) as opposed to a predominately White campus (Pascarella & Terenzini 1991, 2005). Other institutional differences, such as sex, control, and size have also been found to influence persistence. There is evidence that students who attend private institutions, female students who attend all female institutions and students who attend smaller institutions are more likely to be retained. However, these differences are small, perhaps confounded, and as with all of the institutional characteristics described above, usually beyond the control of a given institution to change (Ishler & Upcraft, 2005).

Given that institutional characteristics are so difficult to change, it is perhaps fortunate that there are relatively few that have been demonstrated to affect student persistence. Student characteristics are beyond the ability of an institution to change; institutions can only learn how to work with the students they have or try to enroll different students. However, there are many environmental characteristics which have been demonstrated to influence the persistence of first-year students, and although many of them are not easily changed, they are clearly within an institution's ability to change or at least minimize any negative effects they may have.

Individual Environmental Characteristics

Many individual environmental characteristics play a role in the retention of first-year students. However, the degree to which each characteristic has been found to influence persistence varies widely. As was the case with student characteristics, to cover the extant literature regarding all of the environmental characteristics is beyond the scope

of this chapter. Therefore, this section will primarily focus on those environmental characteristics which appear to have the most impact on persistence (i.e., first semester academic performance, time commitments, interaction with faculty and peers, satisfaction, campus climate, initial academic discipline, financial aid, first-year experience seminars, living-learning communities and Freshman Interest Groups).

As one would assume, academic performance (i.e., GPA) in the first semester (Belcheir, 1997) and subsequent semesters (Xiao, 1999, as cited by Ishler and Upcraft, 2005) of college appear to be the best predictor of student persistence. After reviewing the literature on student persistence, Pascarella and Terenzini (2005) conclude that the grades earned during the first year of college "may well be the single best predictors of student persistence" (p. 396), even after taking into account students' entering characteristics. Obviously students who are extremely unsuccessful academically are eventually asked by their institution to leave, but it should not be overlooked that the more academically successful a student is, the more likely they will persist (Stassen, 2003). Robbins (2004) conducted a meta-analysis of 109 studies and found that approximately 25 percent of the variance in the GPA first-year students achieve can be attributed to their high school GPA and SAT/ACT scores (which is more than two times as powerful of a relationship as that which Astin (1997) found between retention and high school GPA and SAT/ACT scores). The conclusions one can safely draw are that: 1) academic performance and retention are interconnected, and 2) both are within institutions' locus of influence. In short, while student entering characteristics are important, institutions can influence both the academic performance and retention of their students a great deal.

Students' time commitments play an important role in whether they will persist. One might assume that students' academic performance (and thus their persistence) would be improved if they enrolled for a relatively light load their first semester. However, the opposite is true. Szafran (2001) conducted a study using a random sample of 25% of the first-year students at Stephen F. Austin (n=487) to see if the number of credit hours taken and the level of course difficulty had any effect on students' GPA and retention. All of the students in the sample were enrolled for 12 to 19 credits. Even when controlling for entering characteristics (i.e., sex, ethnicity, high school class size, percentile rank in high school, and SAT score) and some environmental characteristics (i.e., having attended college orientation, and number of hours working on-campus), an Ordinary Least Squares (OLS) analysis revealed that the number of credits students enrolled for and their subsequent GPA were positively correlated (Szafran, 2001). Szafran (2001) examined this finding using GPA as both a continuous variable and a categorical variable (i.e., high, medium, low) with similar result. Unsurprisingly, Szafran also found that the level of course difficultly was negatively correlated with GPA. Szafran used logistic regression to test if earned GPA and course difficulty were predictive of one semester and one-year retention, and found that they both helped explain one-year retention (students who had higher GPAs and took fewer difficult courses were more likely to persist). Credit load and earned GPA had a high degree of collinearity, and when GPA was removed from the model Credit load became a significant predictor of retention, but when both were included the effect of credit load was not significant. Another interesting finding Szafran noted was that students took very similar credit loads in their second semester; those who took fewer credits in fall also

enrolled for lighter loads in the winter. Szafran's (2001) findings are consistent with those of Somers (1995) who found that those enrolled less than full-time are less likely to be retained, and Duby and Schartman (1997, as cited by Szafran, 2001) who combined data from two different campuses and also found that higher credit loads predicted higher earned GPAs.

Another widely held assumption is that academic performance (and thus persistence) would be improved if first-year students were not employed and thus able to devote more of their time to their academic work, but that is not the case either. Working up to 15 hours a week is positively related to retention (Cuccaro-Alamin & Choy, 1998 as cited by Ishler and Upcraft, 2005), especially when these part-time jobs are on-campus and relevant to the student's academic experience (Astin, 1993; Pascarella & Terenzini, 2005).

The conventional wisdom that faculty-student interaction both inside and outside the classroom improves persistence is supported in the literature; more and higher quality is better (Pascarella & Terenzini, 1991, 2005). For example Braxton, Milem and Sullivan (2000) combined responses from three different surveys (n=718) gathered from one campus and using both OLS regression and Structural Equation Modeling found that the more frequently students experienced faculty who employed 'active learning' techniques such as "discussion, questions faculty ask students in class, cooperative learning, debates, role playing, and the questions faculty ask on course examinations" (p. 571), the more likely they were to persist. Similarly, Braxton, Bray and Berger (2000) asked 696 first-time, full-time students (44.9% of the first-year students at a selective 4-year school) about their perceptions of the teaching skills of their faculty. Using a path analysis, they

found that students' perceptions of their faculty member's teaching skills had a positive impact on the student's intent to return. As described earlier in this section, Astin (1996) has been able to create what "is probably the most comprehensive longitudinal, multi-institutional database on college student development ever assembled" (p. 125-126). From that data he also finds support for the positive impact of 'cooperative learning' which is when "students basically work together on classroom material in small groups where they serve as teachers of each other" (p. 126).

As was mentioned briefly earlier in this chapter, peer-to-peer interaction both inside and outside the classroom plays one of the most powerful roles both for learning and persistence (Astin, 1993; Pascarella & Terenzini, 1991, 2005). Astin (1996) succinctly stated "the greater the interaction with peers, the more favorable the outcome" (p. 126). This may explain why being a member of a Fraternity or Sorority has been found to be positively associated with persistence to graduation (Moore, Lovell, McGann & Wyrick, 1998). Tripp's (1997) review of the literature specifically regarding the effect of Greek membership suggests that Greek students are more likely to be retained.

Although the evidence regarding peer-to-peer interaction and the other environmental characteristics presented so far is compelling, one must remember that student characteristics play a mediating role in perhaps every aspect of how the student experiences the environmental characteristics. Obviously things like prior academic preparedness mediate how a student will respond to various pedagogical techniques, and socio-economic variables might influence the effect of being Greek. In fact St. John, Cabrera, Nora, and Asker (2000) theorize that financial variables (such as the amount and type of financial aid received) could explain almost half of the variance in student

persistence. A student's socioeconomic status is an entering characteristic, but environmental characteristics (such as cost of tuition/fees and the amount and type of financial aid received) also influence the likelihood a student will persist. Ishanti and DesJardins (2002-2003) looked at financial aid (no aid, and four quartiles of aid amounts received) and found that the effect of financial aid is not constant throughout the undergraduate years; aid seems to be very important in the retention of second- and third-year students, but has very little effect on the retention of first- and fourth-year students. As would be assumed, the more aid a student receives, the more likely he or she will remain enrolled (Ishanti & DesJardins, 2002-2003).

Student satisfaction with the undergraduate experience, how supportive they perceive the campus climate to be, and what major they initially pursue have all been linked with retention. Although measuring how satisfied first-year students are with their experience is typically addressed through institution-specific assessments as opposed to theoretically-driven research on retention, research does exist which indicates that student satisfaction is positively correlated with persistence (Sanders & Burton, 1996). Similarly, another student perception that has a positive impact on retention is the degree to which first-year students perceive their campus to be supportive (P. Terenzini, Personal Communication, Dec. 2, 2004). The academic major a student elects to initially matriculate might have both direct and indirect consequences on retention. Science, math and engineering students encounter less welcoming and engaging classrooms compared to other students (Daempfle, 2003). Perhaps this leads to lower satisfaction and/or perceiving the campus to be less supportive; perhaps students in science, math and engineering are less likely to encounter 'active learning' in their first year. Whatever the

cause, Astin (1997) points out that "institutions enrolling many students in fields such as business, psychology, or other social sciences would be expected to have higher-than-expected retention rates, whereas those enrolling large numbers of students majoring in engineering would be expected to have lower-than-expected rates" (p. 654).

Many colleges and universities offer courses specifically designed to help students transition into college successfully (generically referred to as 'First-Year Experience seminars'), and participation in such course has been repeatedly demonstrated to increase persistence (Ishler & Upcraft, 2005). However, there is evidence to suggest that not all of these courses have the same impact. For example, Ryan and Glenn (2004) had the opportunity to study two distinct First-Year Experience seminars being offered simultaneously on their campus; one was focused on academic skill development and transitional support while the other focused on integrating students into the academic community. All entering first-year students (n=1499) were included in the study (77 students were in one course, 66 were in the other, and 1354 served as a control group). Ryan and Glenn (2004) note that while students self-selected into one of these courses, the decision regarding which course to take appeared to be driven by student's schedules as opposed to anything else, and since there were no statistical differences in the background characteristics of the students in the two courses, the authors convincingly argue that it is fairly safe to assume different results must be caused by differences between the two courses. Ryan and Glenn (2004) found that students who took the course focused on academic skill development were retained at higher rates that those who took the course focused on integrating students into the academic community, even after

controlling for entering characteristics (i.e., SAT score, high school percentile rank, sex, ethnicity).

The final individual environmental characteristic presented here is actually a combination of two characteristics that are typically addressed separately: participation in a learning community, and where a student lives. Within the past couple decades there has been a growing interest across the country to create learning communities (Gabelnick, MacGregor, Matthews, & Smith, 1990) and living-learning communities (Cross, 1998). The most widely cited definition of a learning community is that offered by Gabelnick et al. (1990), who specify the

> purposeful restructuring of the curriculum by linking courses that enroll a common cohort of students. This represents an intentional structuring of the students' time, credit, and learning experiences to build community, and foster more explicit connections among students, faculty, and disciplines (p. 5).

Vincent Tinto has conducted a number of studies regarding the effectiveness of curricular learning communities as they are defined by Gabelnick et al. (1990). Two of the most comprehensive and most frequently cited of these studies are discussed below.

Tinto and his colleagues (Tinto, 1997; Tinto & Goodsell-Love, 1993) argue that increases in student retention are partially due to the fact that restructuring the academic experience to form learning communities helps students learn better. Tinto and Goodsell-Love (1993) have found evidence to suggest that participating in a learning community makes one a better student, which in turn improves the quality of the interactions with other students in courses that are outside the learning community; learning communities

"enhance the classroom experience for all" (p. 15), even those who do not directly participate. Tinto (1997) provides a succinct example of his work and findings in this area by reporting the results of a study in which he used both qualitative and quantitative methods to examine the classroom experiences of students who were participating in a learning community. Tinto used logit regression to reveal that students in the learning community (n = 210) were more likely to be retained compared to non-participants (n = 307). Qualitative data (gathered through classroom observations, interviews with faculty and students, and document review) suggest that students in learning communities are more likely to persist because they are able to build supportive peer groups, engage in shared learning with their peers in such a way that it integrated their academic and social interactions, and realize they have a voice in the knowledge construction process (Tinto, 1997).

One of the more comprehensive reviews of the literature on learning communities was conducted by Lenning and Ebbers (1999) who determined

> extensive documentary evidence suggests … benefits for students include higher academic achievement, better retention rates, greater satisfaction with college life, improved quality of thinking and communicating, a better understanding of self and others, and a greater ability to bridge the gap between academic and social worlds (p.6).

In short, it may be the case that learning communities produce not only direct benefits to the students who participate in them, but these benefits might also increase the overall quality of the academic experience.

The positive effect of living in a residence hall (e.g., increased satisfaction, retention, GPA, peer-peer interaction, student-faculty interaction, cognitive development) has been well documented (Astin, 1993, 1996; Berger, 1997; Pascarella, Terenzini, & Blimling, 1994; Pascarella & Terenzini 2005). In recent decades there have been attempts to merge the benefits of on-campus living with the benefits of learning communities. These efforts have resulted in a variety of programs generically referred to as living-learning communities. The concept of living-learning communities is solidly grounded within the literature (Schroeder & Mable, 1994; National Study of Living-Learning Programs, 2004). Inkelas and Weisman (2003) point out that living-learning communities are intentional attempts by staff and faculty to create residential environments that foster the three types of involvement known to improve student achievement, namely "(a) involvement with academics (e.g., time spent studying, etc.), (b) involvement with faculty, and (c) involvement with student peer groups" (p.5). Initial research findings have tended to support the efficacy of living-learning communities; participating in them improves GPAs (Lenning & Ebbers, 1999), retention (Pike, 1999), involvement (Pike, 1999), satisfaction (Astin, 1993), and student-faculty interaction (Pascarella, Terenzini & Blimling, 1994).

Currently, the National Study of Living-Learning Programs (National Study of Living-Learning Programs, 2004) lead by Karen Inkelas is the first attempt to examine LLCs on a national scale; 34 institutions participated. Using an internet survey, data were collected from 12,236 LLC students and 11,673 students who lived in traditional residence halls on the same campuses. Individual survey items were assembled into constructs which had Cronbach alpha reliabilities ranging from .624 to .918. Inkelas and

her colleagues found that students in LLCs have more positive peer-to-peer interactions, perceive their residence halls to be more positive climates, and are more likely to be retained. Furthermore, students in LLCs report easier transition to college, higher academic achievement, higher levels of civic engagement, and lower levels of binge drinking.

> However, there are no significant differences between L/L students and their peers in key outcomes, including cognitive development, self-confidence, and appreciation of racial/ethnic diversity. It is possible that these higher order psychosocial and cognitive indicators become more evident as long-term outcomes, and since this sample is predominated by first-year and sophomore students, the impact of L/L programs is not yet perceivable (National Study of Living-Learning Programs, 2004).

The response rate for this instrument was only 33 percent (National Study of Living-Learning Programs, 2004). However, the findings provide multi-institutional data not previously available. A follow-up study is currently being planned (K. Inkelas, personal communication, Oct. 14, 2006).

Another recent example of a high quality study in this area is that offered by Stassen (2003). She used logistic regression to ascertain the effect on retention participating in one of three different residential learning communities had as compared to other first-year students who attended the same campus (total n=7883). She also used linear regression to examine any effect on GPA. All three learning communities were found to positively affect both first semester GPA and retention even after controlling for

entering characteristics (i.e., high school GPA, SAT score, sex, race/ethnicity) and one environmental characteristic (i.e., initial major).

Inkelas and Weisman (2003) examined 4,269 randomly selected residential students from one institution, 1,531 of which were in one of three living-learning communities. As with Stassen's (2003) study, differences were found between the three living-learning communities, but each of these experiences lead to positive gains over non-participants. Participants were more involved in academically relevant activities (e.g., interacting with faculty outside of class, discussing course material with peers outside of class, studying), perceived their residential environment to be more academically and socially supportive, and reported having a "smoother transition to college" (p.346). The researchers sought to control for the possible effect of entering academic ability, for they noted that students in living-learning communities tended to be from higher academic ability levels. Inkelas and Weisman (2003) re-conducted their analysis using only students who had earned an SAT score of 1310 or higher and found that the differences between living-learning students and non-participants remained.

A specific version of living-learning community, called a Freshmen Interest Group (or FIG), has recently begun to develop on college campuses. Tokuno (1993) conducted one of the initial studies specifically regarding the effectiveness of FIGs. Although he did not take into account student's entering academic ability, Tokuno (1993) found that FIG students who participated between 1988 and 1990 were retained at higher rates and earned more credits during their first year of college compare to non-participants. A more robust analysis was conducted by Tinto and Goodsell-Love (1993) who examined FIG students at the same institution from 1990 and 1991. After

controlling for entering academic ability and gender through the use of discriminate analysis and logistic regression, Tinto and Goodsell-Love (1993) found the FIG students earned higher grades (3.14 compared to 2.98) and were more likely to be retained (99 percent compared to 96 percent). Similar results were also found by Pike, Schroeder and Berry (1997), who also found that FIG students were more likely to be retained. Perhaps even more importantly, their study also indicated that students in FIG reported higher levels of social integration and institutional commitment.

The studies just presented examined all FIG students on a given campus. Two recent studies which focused on specific subsets of students have continued to indicate the positive effect of participating in a FIG. For example, Marrero and Beckett (2005) examined first-year engineering students and found that after controlling for entering academic ability those who participated in a FIG were more likely to be retained to the sophomore year (90 percent compared to 78 percent) even though they did not earn higher grades. Purdie, Williams, and Ellersieck (in press) took an even more narrow focus by examining a specific major (Animal Sciences) and found that after controlling for ACT score, high school GPA, sex, and ethnicity a logistic regression analysis revealed that participating in a FIG increased the odds of being retained by 70 percent (ExpB = 1.698).

The literature on first-year student persistence goes back decades. What has been presented here is an overview of some classic studies and more recent contributions to this ever-growing area of research especially as it relates to FYE courses, living-learning communities and FIGs. Braxton, Hirschy and McClendon (2004) "view the departure process as an interaction between the individual student and the college or university

attended" (p. 4). Thus, the preceding review provides insights into the more salient characteristics of students, institutions, and the interactions that occur during the first year. After examining the variety of findings within this area of research it is easy to see why Braxton, Hirschy and McClendon (2004) conclude that "college student departure is best characterized as an ill-structured problem" (p.2); the reasons students depart or re-enroll are complex and interrelated.

Significance of Study

This study will contribute to the small, but growing body of theoretically and conceptually grounded research into the effectiveness of living-learning communities and FIGs. While that area of research has begun to develop, little research has been conducted which comparatively examines living-learning communities, Freshmen Interest Groups (FIGs) and First Year Experience (FYE) seminars. Pascarella and Terenzini (2005) describe the existing research on the student outcomes associated with participation in living-learning communities as "in its nascent stages" (p.109), and "largely silent on the impact of these communities on student persistence and degree completion" (p. 422). Tinto (1997) wrote that "… at its core college is an educational experience and … conversations about persistence that ignore important questions of educational practice are conversations that are at best shallow" (p. 620). The present study is an examination of educational practice that should be helpful to faculty members and student affairs practitioners. Due to the relative dearth of research comparing living-learning communities, FIGs and FYE courses, practitioners are left to design and implement programs based their own idiosyncratic experiences and on extrapolations from research that is, at best, closely related. This study will compare the academic

performance and retention of students who participated in FIGs, living-learning communities, FYE courses, or none of these programs to determine if these programs positively affect student's GPAs and retention.

Summary

An unacceptably high number of people start a college education, but never complete it. While it is unrealistic to expect everyone will complete a degree, there seems to be no justification for the fact that nationally roughly half of all first-year students do not persist to the second year at the institution in which they originally enroll. Even though this "ill-structured problem" has been scrutinized for decades and we have learned a great deal along the way, we have yet to conclusively determine if programs such as living-learning communities and FIGs help first-year students earn higher grades and persist to the second year. This study provides evidence regarding the relative effectiveness of one university's living-learning communities, FIGs and FYE courses in this regard.

Chapter 3

RESEARCH METHODS

Introduction

Retention of first-year students into the sophomore year is far from a laudable goal. In fact John Gardner (personal communication, March 10, 2006) reminds us that retention is simply a lack of student failure when he refers to it as "merely the [student's] ability to fog a mirror"; student learning and success should actually be the goals. However, roughly half of all first-year students do not persist to their second year at the institution where they begin their undergraduate studies (Pascarella & Terenzini, 2005). While retention is certainly not the highest goal, if students do not persist past their first year they will be far less likely to realize the other goals of higher education. The purpose of this study was to examine the academic performance and retention of first-year students who participate in living-learning communities, FIGs and FYE courses. This chapter will detail the research methods used in this study including the research design, data source, population, collection method, variables used, and the methods of data analysis.

Research Design

This quantitative study used data provided by institutional records of a single institution to address two research questions. As stated in Chapter One, research question one asks if first-year students who participate in a FIG, LLC or FYE course are more likely to achieve higher levels of academic performance compared to non-participants. Research question two asks if first-year students who participate in a FIG, LLC, or FYE course are more likely to be retained compared to non-participants. As was discussed in

the review of the existing literature in Chapter Two, students' entering characteristics and experiences in college have been associated with both academic performance in the first year of college and retention to a second year. Furthermore, academic performance in the first year has also been found to influence retention. This study sought to discover any differences in initial college GPA and one-year retention based on participating in specific experiences (i.e., FIG, LLC, or FYE course) after controlling for relevant entering and environmental characteristics.

Data Source

Data for this study were from a public, land-grant, university in the mid-west. The institution has a total enrollment of over 25,000 students. The Carnegie Foundation for the Advancement of Teaching (2006) classifies this institution as a full-time, four-year, more selective, higher transfer-in institution. This classification indicates that at least 80 percent of the undergraduates are enrolled full-time, the standardized test scores of first-year students' are in the top 20% compared to those of students in other baccalaureate institutions, and transfer students make up at least 20 percent of entering undergraduates. The institution is also classified as an RU/VH, or very high research university, which puts it in the top bracket of research-focused universities with an average enrollment of over 25,000 students (Carnegie Foundation for the Advancement of Teaching, 2006).

Population

All "first-time" undergraduate students who matriculated to the institution during the fall semesters of 2003, 2004 and 2005 were included in this study (n = 14,049). As described below, steps were taken to clean and prepare the data for analysis which

resulted in a usable dataset of 13,932 students. The term "first-time" refers to students whose transcripts indicate they had not previously attended any institution of higher education prior to the term they first matriculated to this institution. However, students who earned dual-credit while in high school were included in this study.

Data Collection

This study was submitted for review by the Institutional Review Board (IRB) and approval to obtain and use data from institutional records was granted. Data for the study were obtained from records maintained by the institution's Registrar's Office and Office of Financial Aid. Student ID numbers were used by the institutional staff member who gathered the data into a single dataset, but were replaced by a random number to protect the identity of individual students. A description of the data collected is listed below.

Variables in the Study

A careful review of the current literature revealed that there are many variables which influence the academic performance and retention of first-year students (Pascarella & Terenzini, 2005; Ishler & Upcraft, 2005). Given the theoretical framework and research questions driving this study, the following variables were examined: entering characteristics (i.e., high school GPA, SAT/ACT scores, sex, race/ethnicity, family's yearly income), environmental characteristics (i.e., Greek membership, living on campus, and initial major), program participation (i.e., FIG, LLC, and FYE course), first semester GPA, and one-year retention.

Entering Characteristics

Astin (1997) has concluded that "[f]our variables [student's high school grades, admissions test scores, sex, and race] account for much of the variance in retention that

can be predicted from entering freshmen characteristics" (Astin, 1997, p. 649). Therefore, these four variables were included in the study.

The high school GPA of a small number of students (n = 150) was missing from the database. Given that this affected about one percent of the sample and there was no evidence that these cases were randomly distributed, "the most conservative option" (Tabachnick & Fidell, 2007) of substituting the mean high school GPA was selected. High school GPA was also transformed for data analysis, which is described in Chapter Four.

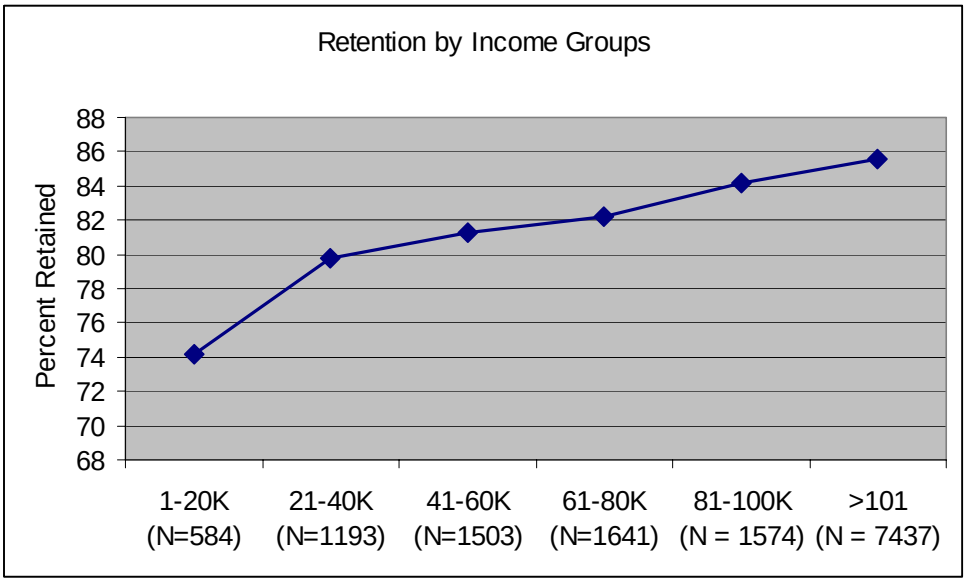
ACT scores were also included in the study. A small number of students did not have an ACT score (n = 463). Most of these students had an SAT score which the researcher converted to an ACT equivalent score using a conversion chart (College Entrance Examination Board, 1999). Those students without a high school GPA and without an ACT or SAT score were removed (virtually all of these were international and exchange students).

Students' sex and race/ethnicity were recoded as dummy variables and included in this study even though Astin (1997) found that these two variables explain less than 2% of the variance in retention. Sex was dummy coded so that male would serve as the reference category (female = 1, male = 0). The race/ethnicity data provided by the institution was converted into four categories, White, Black, Other Under-Represented, and No Data. International and exchange students do not participate in FIGs because FIG enrollment is done through the on-campus housing application process and these students go through a separate application process for housing. No international or exchange student was listed as having participated in the FYE course, and very few were listed as

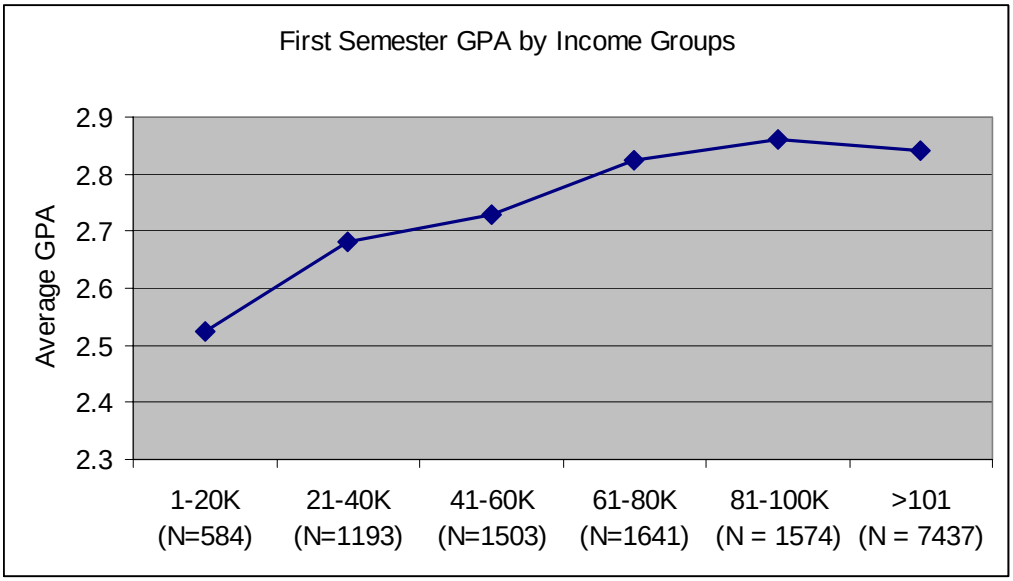
having participated in a living-learning community. Therefore these students were removed from the study. The race/ethnicity variable was dummy coded and White served as the reference category during analysis.

Based on their review of the literature and their own research, St. John, Cabrera, Nora, and Asker (2000) theorize that financial variables (such as family income level and the amount and type of financial aid received) could explain almost half of the variance in student persistence. Given the potential importance of financial matters, data was obtained from the Office of Financial Aid regarding each student's parent's adjusted gross income. These data are provided by students and their parent(s)/guardian(s) via the Free Application for Federal Student Aid (FAFSA) form. Given that 33 percent of the cases were missing income data, an exploratory analysis was conducted to better understand this variable. Recoding income data into ordinal categories (i.e. missing, $1 to $20,000, etc.) revealed that income had a strong positive linear relationship to many other variables in the dataset such as high school GPA, ACT score, participation in a FIG, 1st semester GPA, and one-year retention. The group of students for whom income was not provided was most similar to the highest income group. The most likely explanation for this pattern is that many students from high income families choose not to complete a FAFSA (perhaps because they believe they are less likely to qualify for financial aid). Therefore, the decision was made to include students who did not complete a FASFA in the highest income group. This decision made it possible to retain 33% of the original sample, and although the variable became skewed dramatically, it appears to reflect the actual population and was linearly related to first semester GPA and Retention as shown in the graphs below.

Graph 1. Comparing Retention Rates Across Income Groups



Graph 2. Comparing Average First Semester GPA Across Income Groups



Environmental Characteristics

Greek membership has been positively linked with retention (Moore, Lovell, McGann, & Wyrick, 1998; Tripp, 1997). This variable was especially salient for this study because students at this institution are able to join a fraternity/sorority prior to the first day of classes their first year and roughly 25 percent of the undergraduate students at this institution are affiliated with a fraternity or sorority (J. Basler, personal communication, April 7, 2006). Therefore, a dichotomous variable (1 = Greek member, 0 = not Greek) was included in the study. Only students who were members of a Greek organization during their first semester were coded as a Greek member because the FIG experience is only a first-semester opportunity and this study focused on first-semester experiences.

Living in a residence hall has been linked with retention (Pascarella & Terenzini, 2005), and Astin (1997) has found that living off-campus has a negative impact on retention. Thus it may be important to take into account where students live during their first year. The address information obtained from the University Registrar's office was used to create a dummy coded variable which indicted if a student lived in the residence halls their first semester (in res hall = 1, not in res hall = 0). The address information did not indicate whether a student who was not in a residence hall was living in a Greek house or was living at home with parents, in an apartment or other type of living arrangement, so no further distinction of this category was made.

The initial major students select has been shown to effect retention (Astin, 1993; Pascarella & Terenzini, 2005). However, the data provided by the institution revealed that incoming students were enrolled in over 100 majors/pre-majors and one of 11

academic divisions. Therefore some kind of clustering was required for data analysis. An initial review revealed that the divisions had varying degrees of similarity among the majors they offered and varied widely in the number of first-year students enrolled in them. The largest number of first-year students were enrolled in the College of Arts and Sciences (n = 5620), whereas the School of Human Environmental Sciences had only 315 first-year students. While it could be possible to create a smaller or larger number of clusters within this variable, this researcher sought to keep manipulation to a minimum. Students in Arts and Sciences designated as "pre-majors" of other divisions were coded into those divisions. Majors offered in the College of Human and Environmental Sciences (n = 315), the School of Health Professions (n = 476), and the School of Nursing (n = 369) were primarily science oriented majors and were combined into one group. Seven categories were thus created (i.e., College of Business, College of Education, College of Engineering, Other Science Divisions, School of Journalism, College of Agriculture, Food, and Natural Resources, and College of Arts & Sciences) and each individual category was dummy-coded as needed for analysis (e.g., College of Business = 1, not in College of Business = 0).

Program Participation

Institutional efforts such as FYE courses have been demonstrated to improve first-year student retention (Ishler & Upcraft, 2005), but the relative efficacy of programs such as FIGs and LLCs is not as well established (Pascarella & Terenzini, 2005). Data were obtained from the University Registrar's office regarding students' enrollment in the university's FYE course, FIGs and LLC's during the fall terms included in this study. Care was taken to ensure only students who were enrolled in the FYE course during their

first semester were coded as having taken the course. Three dummy coded variables were created: FYE (participant = 1, non-participate = 0), FIG (participate = 1, non-participant = 0), and LLC (participant = 1, non-participant = 0).

First-Semester GPA

Academic performance (i.e., GPA) in the first semester of college is one of the best predictors of student persistence (Belcheir, 1997). The GPA each student earned his/her first semester (which ranged from 0.000 to 4.000) was obtained from the university's Registrar office. This variable was used as a continuous dependant (or outcome) variable in answering research question one; does participation in these various programs help students earn higher grades their first semester. First semester GPA was also used as a co-variable when answering research question two; does participation in these various programs improve first-year student retention.

One-Year Retention

While simply retaining first-year students into their second year may not be a laudable goal, the number of students who do not persist beyond the first year is disturbingly high (Merrow & Tulenko, 2005; AACU, 2002). Data were obtained from the University Registrar's office regarding whether each student was enrolled the fall semester following his or her initial matriculation. This variable was dummy coded (1 = yes/retained, 0 = no/not retained) and served as the dependant variable for answering the second research question in this study.

Data Analysis

This study addressed two research questions using both categorical and continuous independent variables. The first step in the analysis was to examine the

profile and background characteristics of the students in this study by generating a set of descriptive statistics. The first research question was then addressed through the use of multiple regression and the second question was addressed through logistic regression. Both of these methods were conducted using the Statistics Package for Social Sciences (SPSS, 2007, version 15). A brief description of multiple and logistic regression is presented below.

Multiple Regression

The first model in this study used multiple regression to explain the possible effects of the independent variables (i.e., high school GPA, ACT score, sex, race/ethnicity, family income level, Greek status, living arrangement, initial major, and program participation) on first-semester GPA. Multiple regression provides the ability to measure the relationship of both categorical and continuous independent variables to a continuous dependent variable (Keith, 2006). Multiple regression allows researchers to explain the amount of variance or error of the independent variables regressed on the dependent variable.

Logistic Regression

The second model in this study used logistic regression to explain the effect each of the independent variables (i.e., high school GPA, ACT score, sex, race/ethnicity, family income level, initial major, Greek status, living on campus, first semester GPA, and program participation) on first-year to second-year retention. Given that this outcome variable (1 = retained, 0 = not retained) is dichotomous, logistic regression was an appropriate technique. Logistic regression allows a researcher to explain the effect of both categorical and continuous independent variables on a binary dependent variable;

Dey and Astin (1993) state that this is one of the most appropriate analytic tools for studying outcomes such as retention and graduation. An additional benefit of logistic regression is that the independent variables "do not have to be normally distributed, linearly related [to each other], or of equal variance within each group" (Tabachnick & Fidell, 2001, p. 517). Logistic regression computes the odds a person in a given category (in this case participating in a FIG, LLC, or FYE course) will be in either of the outcome conditions (in this case retain or not retained) and reports those as the *change in odds* between the levels of the independent variables.

Research Question One: First Semester GPA

Research question one asks if, after controlling for input and environmental characteristics, first-year students who participate in a FIG, LLC or FYE course are more likely than non-participants to achieve higher levels of academic performance. The dependent variable used to address this question was the actual GPA students earned in their first semester (a continuous, proxy variable for academic performance). A multiple regression analysis was conducted to determine if students who participate in a FIG, LLC or FYE course earn higher grades than non-participating students after taking into account each student's entering academic performance, sex, race/ethnicity, financial status, membership in a Greek organization, living situation, and initial major.

Research Question Two: Retention

Research question two asks if, after controlling for input and environmental characteristics, first-year students who participate in a FIG, LLC or FYE course are more likely than non-participants to be retained. A logistic regression was conducted using a dichotomous dependent variable (1 = retained, 0 = not retained) taking into account each

student's entering academic performance, sex, race/ethnicity, financial status, membership in a Greek organization, living situation, and initial major. Given the importance of first semester GPA to retention (Belcheir, 1997), the GPA students earned their first semester of college was also entered as an additional independent variable. One of the benefits of logistic regression is that it will report the relative importance (if any) of each independent variable (including program participation) on the dependant variable.

Summary

As stated in Chapter One, a reading of the existing literature on college student retention lead this researcher to question if participation in a FIG, Living-Learning Community or FYE course had similar effects on the GPA students earn their first semester of college and their subsequent retention. The research on FYE courses is quite clear; these courses typically improve grades and retention (Pascarella & Terenzini, 2005; Ishler & Upcraft, 2005). The literature on FIGs and living-learning communities is in an earlier stage and some studies report conflicting findings; fundamental questions regarding the efficacy of these two programs are currently inconclusively answered. (Pascarella & Terenzini, 2005; Ishler & Upcraft, 2005). The research methods outlined in this chapter provide evidence about the effect participation in a FIG, Living-Learning Community or FYE course had on the GPA students earn their first semester of college and their subsequent retention. The results of this study are presented in the following chapter.

Chapter 4

DATA ANALYSIS

Introduction

The data for this study were provided by the university and converted into a database in SPSS version 15 (2007). All students who first enrolled during the fall semesters of 2003, 2004, and 2005 were included in the original database (n = 14,049). Steps were taken to clean and prepare the data for analysis which resulted in a usable dataset of 13,932 students. Within this dataset 29.3 percent had been in a FIG (n = 4,087), 52.1 percent had been in a living-learning community (n = 7,256) and 6.2 percent had taken the FYE course (n = 858). The following section provides descriptive statistics regarding the rest of the variables used in this study and concludes with a table which provides the average GPA and retention rate associated with each variable.

Entering Academic Ability

Student's ACT score and high school GPA were used as proxies for entering academic ability. ACT scores (some of which were converted from SAT scores, see chapter Three) had a mean of 25.40 (SD = 3.555), and a comparable median (25.00) and mode (24.00). There was negligible Skewness (s = .143, se = .021), but considerable Kurtosis (k = -.514, se = .041). The sample mean for high school GPA was 3.347 (SD = .491) and the median was 3.40. However, the mode was 4.0 which explains the relatively high skewness (s = -.664, se = .021). Kurtosis (k = -.030, se = .041) was acceptable. Although Field (2005) points out that with very large datasets statistically significant levels of skewness and kurtosis should be expected and suggests it can be difficult to know when this creates problems during analysis, Tabachnick and Fidell (2007)

recommend transforming variables unless there is some compelling reason against it. Astin (1997) offered a regression formula to predict retention which required transforming high school GPA as follows: A = 8, A- = 7, B+ = 6, B = 5, B- = 4, C+ =3, C = 2, D = 1. This transformation was applied and created a new variable (High School GPA – transformed) which had a mean of 6.09 (SD = 1.53) and Median of 6.0. While the Mode was still the highest number in the scale (8), skewness (-.563, SE = .021) and Kurtosis (-.191, SE = .041) were reduced, and the distribution took on a more normal shape. As would be expected, high school GPA-Transformed and ACT scores were correlated (Pearson's r = .337, p < .001), but this did not create collinearity problems during data analysis.

Other Entering Characteristics

The students within this sample were coded into one of four race/ethnicity groups based on their self-reported data. The largest group was White (n = 11,924) followed by Black (n = 910), other under-represented (747), and No Data (351). With regards to sex, females make up 53 percent of the sample (n = 7407) compared to males (n = 6525). As was described in Chapter Three, family income was converted from a continuous variable into an ordinal variable ranging from 1 (< $20,001) to 6 (> $100,000). The mean was 4.78 (SD = 1.573), the median and mode were both 6.00. Skewness (s = -.968, se of s = .021) and Kurtosis (k = -.400, se of k = .041) were high.

Environmental Characteristics

According to university records, 23.8 percent of the first-year students in this sample (n = 3,314) joined a Greek organization at the beginning of their first semester and 86.2 percent (n = 12,009) lived in a residence hall. As was described in Chapter

Three, students were coded into one of seven academic areas based on the 11 organizational divisions of the institution this data was collected from. The number of students and percentage of first-year students in each division are provided in the following table.

Table 1. Initial Academic Division

	N	Percent
Business	2696	19.4 %
Education	803	5.8 %
Engineering	1246	8.9 %
Other Science Divisions	1160	8.3 %
Journalism	2519	18.1 %
Agriculture	1055	7.6 %
Arts & Sciences	4453	32.0 %

One-Year Retention and First Semester GPA

Table 2 below provides the one-year retention and average first semester GPA associated with each of the variables in this study; 83.6 percent (11,644 of the 13,932 students within this dataset) were enrolled the fall semester following their initial matriculation. With regard to the GPA students earned their first semester of college, the mean was 2.80 (SD = .858) and the median was 2.94. However, as with high school GPA, the mode was 4.00, and Skewness (-1.046, se = .021) and Kurtosis (1.089, se = .041) were high. Therefore the same transformation used on High School GPA was applied to first semester GPA with one minor modification; students who earned first semester GPAs lower than D (including 0.0) were coded as zero. This new variable (first semester GPA – Transformed) had a range of zero to eight, mean of 4.62 (SD = 2.177) and median and mode of 5.0. Skewness (-.294, SE = .021) and Kurtosis (-.846, SE = .041) were reduced and the distribution became more normal. The untransformed first

semester GPA was used as the outcome variable for research question one, and the transformed variable was used as an input variable for research question two.

Table 2. First Semester GPA and Retention

	1st sem GPA	Retained
Sex		
Female	2.94	84.3%
Male	2.65	82.7%
Race		
White	2.83	84.0%
Black	2.44	80.0%
Other	2.72	82.1%
Family Income		
1-20K	2.52	74.1%
21-40K	2.68	79.8%
41-60K	2.73	81.2%
61-80K	2.82	82.2%
81-100K	2.86	84.2%
>101	2.84	85.6%
Initial Major		
Arts & Sciences	2.74	81.0%
Agriculture	2.83	87.0%
Business	2.70	85.2%
Education	2.76	80.8%
Engineering	2.69	82.9%
Journalism	3.00	85.5%
Other Science	2.96	84.8%
Greek Membership	2.92	90.8%
Lived In Hall	2.84	83.9%
Program Participation		
FIG	2.94	86.3%
LLC	2.87	84.4%
SSC	2.46	80.4%
Total of All Students	2.80	83.6%

Research Question One

The first research question asked, "After controlling for input and environmental characteristics, "do first-year students who participate in a FIG, LLC or FYE course achieve higher levels of academic performance compared to students who do not participate?" As outlined in Chapter Three, SPSS was used to conduct a multiple regression on the entire prepared dataset (n = 13,932) to answer this question. Two continuous variables (ACT score), two ordinal variables (high school GPA – transformed, family income), and five categorical dummy-coded variables (sex, race/ethnicity, living arrangement, Greek membership, initial major, and program participation) were regressed on the continuous dependant variable (GPA earned first semester). In order to avoid perfect multicollinearity the "White" dummy code and the "College of Arts and Sciences" dummy code were not included in this analysis.

As part of the multiple regression analysis a number of diagnostic tests were run. This sample was unable to pass Kolmogorov-Smirnov and Shaprio-Wilk tests of normality of distribution. However, Field (2005) states that when sample sizes are large, tests regarding homogeneity of variance and normality of distribution will typically fail (return a statistically positive result) because small differences are amplified. A table of Pearson's correlations was examined as an initial check for problematic collinearity (see Appendix A). The highest correlation among the variables in this model was between ACT score and high school GPA - transformed (r = .337) which is well below what is typically viewed as problematic (Field, 2005). Collinearity statistics were also generated and examined. VIF scores ranged from 1.0 to 1.3 and tolerance scores ranged from .74 to .99 which further indicate it is safe to assume there are no problems with collinearity

within this regression model. To test the assumption of independent errors a Durbin-Watson statistic was generated. Given that the ideal Durbin-Watson static is 2.0, the 1.982 produced from this model indicates this assumption has also been met.

A review of the initial descriptive statistics and diagnostic tests indicate that some caution is warranted when interpreting the results of the multiple regression model, for one of the basic assumptions of regression (i.e., normality of distribution) may not have been completely satisfied. However, the fact that this dataset includes virtually all first-year students from a three-year period is a source of confidence in the results of this study. The results of the regression model are presented in Table Three which follows on the next page. This model explains 38.5 percent of the variance in GPA students earn their first semester at the institution being studied. The majority of the variance explained is associated with students' entering academic ability, as will be explained.

Table 3. Multiple Regression on First Semester GPA

	B	Std Error	Standardized *B*	Standard Deviation
(Constant)	-0.494	0.051		
High School GPA – transformed	0.28	0.004	.51***	1.530
ACT Score	0.05	0.002	.20***	3.555
Sex (female = 1)	0.02	0.013	.01	0.499
Family Income	0.04	0.004	.08***	1.573
Race				
Black	0.11	0.025	.03***	0.247
Other	-0.01	0.027	-.00	0.217
No Data	0.00	0.037	.00	0.157
Greek Membership	0.16	0.015	.08***	0.426
Lived in Res. Hall	0.13	0.019	.05***	0.345
Program Participation				
FIG	0.04	0.015	.02**	0.455
LLC	-0.01	0.013	-.00	0.500
SSC	0.01	0.025	.00	0.240
Initial Major				
Agriculture	-0.07	0.023	-.02**	0.265
Business	-0.00	0.017	-.00	0.395
Education	-0.00	0.026	-.00	0.233
Engineering	-0.23	0.022	-.08**	0.285
Journalism	0.11	0.017	.05***	0.385
Other Science	0.05	0.022	.02*	0.276

Note $R^2 = .385$, * $p < .05$, ** $p < .01$, *** $p < .001$

The standardized β allows for direct comparisons between all the other variables in the model; it provides the amount of change in the first semester GPA for every standard deviation in a given variable (standardized β of each variable * standard deviation of first semester GPA). For example, the standardize β for high school GPA - transformed is .51, which indicates that as a student's high school GPA increases by one standard deviation (1.530) a student's first semester GPA increases by .51 standard deviations *if every other variable in this model is held constant*. To extend this example, if we had two identically matched students in every respect except that Student #1 had a

high school GPA of 5 (a transformed B) and Student #2 had a high school GPA that was one standard deviation higher (5 + 1.530 = 6.530, which is between a B+ and A-), then we could expect that Student #2 would earn a first semester GPA that was 0.432 higher than student #1 (.51 * .858). If student #1 earned the average first semester GPA of 2.80, then student #2 would have earned 3.232. This same process can be used with regards to ACT score. As can be seen in the table, the standardized β for ACT is .20 which means for every 3.55 increase in ACT score a student's first semester GPA increases by only 0.172.

Although many of the remaining variables in the model have a statistically significant and positive effect on first semester GPA, their effect sizes are small. For example, all other things being equal, for every $31,460 increase in family income (one standard deviation) students earn a 0.069 higher GPA. Although a student's Race/Ethnicity had no practical significant effect on their first semester GPA, it is interesting to note that Black students earned higher first semester GPAs compared to White students when all other variables are held constant.

Although the effects of initial major are small, students in Engineering and CAFNR earned lower first semester GPAs when all other variables are held constant; students in the School of Journalism earned higher grades. The largest effect is for students in Engineering which had the same effect size (standardized β = -.08) as family income and Greek membership, but in the opposite direction.

The primary variable of interest for this research question was a first-year student's participation in a FIG, living-learning community or FYE course and any effect that may have had on their first semester GPA. As shown in the table above, being in a

FIG did have a positive effect on a student's GPA, but with a standardized β of .02 ($p < .01$) the effect is statistically significant but of no real practical significance. Participation in a living-learning community had no effect on first semester GPA (standardized $\beta = -.00$, $p > .1$), nor did participation in the FYE class (standardized $\beta = .00$, $p > .1$). The important point to remember is that the standardized β produced through multiple regression is the effect of that variable when all other variables are held constant. So for example, this multiple regression model indicates that if two students were equally matched in every way except that one of them was in an FYE class and one was not, there would be no difference in their first semester GPA.

Research Question Two

The second research question driving this study asked, "After controlling for input and environmental characteristics, are first-year students who participate in a FIG, LLC or FYE course more likely to persist to the sophomore year compared to students who do not participate?" As outlined in Chapter Three, SPSS was used to conduct a logistic regression on the entire prepared dataset (n = 13,932) to answer this question. One continuous variable (ACT score), three ordinal variables (high school GPA – transformed, First Semester GPA – transformed, and family income), and five categorical dummy-coded variables (sex, race/ethnicity, living in a residence hall, Greek membership, initial major, and program participation) were logistically regressed on the binary outcome variable (retained to second year). In order to avoid multicollinearity, the "White" dummy code and the "College of Arts and Sciences" dummy code were not included in this analysis.

Although logistic regression does not operate on the same set of assumptions which bind multiple regression "it is essential to test for collinearity" (Field, 2005, p. 259). Given that the variables in this logistic regression model are the same as those used in the previous multiple regression model (plus the addition of the dichotomous outcome variable) collinearity was not expected to be a concern (see correlation matrix in Appendix A). Indeed collinearity tests revealed that tolerances ranged from .598 to .993 and VIF ranged from 1.017 to 1.673, which indicate lack of collinearity. The.

One assumption required for logistic regression is linearity between each continuous independent variable and the dependant variable. Tests for linearity indicated that first semester GPA was positively related to retention, but in a curvilinear + linear fashion: a steep line initially which quickly became somewhat flattened. (Tabachnick & Fidel, 2007) suggest that a useful method for addressing this type of situation in Logistic Regression is to enter such a variable as a categorical variable. Given that many students actually earn a 0.0 GPA their first semester (some withdraw before the semester ends, some simply fail all their courses) and only six percent of these students are retained, comparing each level of GPA to zero would yield very inflated results. Therefore the first semester GPA – transformed variable was entered as a categorical variable using Reverse Helmert contrasts (called "difference coding" in SPSS). This reports the effect of each level of the variable compared to the average effect of all prior levels of the variable. For example, students who earned a B+ were compared to all students who earned less than a B+, students who earned and A- were compared to all student who earned less than an A-, and so on.

The logistic regression model passed the Hosmer-Lemeshow goodness-of-fit test (chi-square = 7.972, df = 8, p <.436). The model was able to correctly classify 96.4 percent of those retained, and 44.3 percent of those who were not retained. The overall percentage of the dataset which are correctly classified is 87.8. The log-likelihood statistic "is an indicator of how much unexplained information there is after the model has been fitted" (Field, 2005, p. 221) and is often reported as -2 log-likelihood (-2LL) so that is assumes a chi-square distribution. The -2LL was fairly high (9204.977). Although logistic regression can not yield an R^2 in the same way as multiple regression, SPSS does provide two analogous measures which indicate how effective the model is at predicting the intended outcome with the added benefit of taking into account sample size. These two statistics suggest this model is moderately effective (Cox and Snell's R^2 = .207, Nagelkerke's R^2 = .351).

Table four below presents the outcome of the logistic regression on retention. The two statistics which differ from the multiple regression presented earlier are the Wald and the Exp(β). The Wald statistic is an indication of how much a given variable contributes to the model's predictive ability. However, when the beta coefficients are high this statistic can become inflated, which has created on-going debate about the usefulness of the Wald statistic (Field, 2005; Tabachnick & Fidell, 2007). The most important statistic to understanding the results of logistic regression is the Exp(β) which is the *change in odds* for every unit increase in a given variable. When Exp(β) is equal to one, it means that variable does not change the odds (for this study the odds of being retained). The larger Exp(β) is from one, the more the odds change in a positive direction. When Exp(β) is smaller than one, that variable reduces the odds. A 95 percent

confidence interval for Exp(β) has also been provided. According to Field (2005) whenever this confidence interval includes 1.00 there is cause for serious doubt whether that variable is having any effect and the direction of that effect. Given the large sample used in this analysis, alpha was set at the .05 level. As was suggested by Fields (2005), variables for which the 95 percent confidence interval for Exp(β) straddle 1.0 failed to meet this statistical significance level.

Table 4. Logistic Regression on One-Year Retention

	B	Std. Error	Wald Statistic	Exp(β)	95% Confident Interval for Exp(β) Lower	Upper
(Constant)	.878	.291	9.10	2.41**		
Family Income	.079	.018	20.13	1.08***	1.045	1.119
Sex (Female = 1)	-.334	.065	26.73	.72***	.631	.813
High School GPA – Transformed	-.050	.022	5.07	.95*	.910	.993
ACT score	.010	.009	1.01	1.01	.991	1.028
Race			18.51			
Black	.457	.116	15.58	1.58***	1.259	1.981
Other	.179	.122	2.16	1.20	.942	1.518
No Data	-.183	.166	1.22	.83	.602	1.152
Greek Membership	.659	.078	70.80	1.93***	1.658	2.255
Lived in Res. Hall	.130	.091	2.04	1.14	.953	1.360
Initial Major			36.52			
Business	.289	.082	12.45	1.34***	1.137	1.567
Education	-.130	.116	1.27	.89	.700	1.101
Engineering	.240	.108	4.91	1.27*	1.028	1.571
Other Sciences	.033	.107	.09	1.03	.837	1.275
Journalism	-.078	.082	.91	.91	.787	1.086
Agriculture	.491	.121	16.43	1.63***	1.289	2.071
First Semester GPA – Transformed			1647.82			
D vs. lower	2.364	.239	97.58	10.64***	6.653	17.001
C vs. lower	2.978	.141	449.17	19.65***	14.920	25.881
C+ vs. lower	2.606	.117	499.71	13.54***	10.777	17.020
B- vs. lower	2.359	.108	481.32	10.58***	8.571	13.065
B vs. lower	2.148	.095	507.65	8.57***	7.110	10.333
B+ vs. lower	1.778	.101	312.42	5.92***	4.860	7.210
A- vs. lower	1.711	.110	241.70	5.53***	4.460	6.865
A vs. lower	1.739	.140	154.03	5.69***	4.325	7.490
Program Participation						
FIG	.165	.071	5.37	1.18*	1.026	1.356
LLC	-.071	.064	1.22	.93	.821	1.057
SSC(1)	.062	.116	.29	1.06	.848	1.335

Note Cox & Snell R^2 = .208, Nagelkerke R^2 = .351; -2 Log Likelihood = 9202.408
* p < .05, ** p < .01, *** p < .001

As is presented in Table Four, family income has a statistically significant and positive relationship to retention, but the change in odds is small (Exp(β) 1.08, p < .001).

A more practical way to express this is to compute what a student's odds of being retained are at one income level and what the odds become at the next income level. Hypothetically, assume a student's odds of being retained are 60 percent (which would mean his or her odds of leaving are 40 percent). This could be expressed as an odds ratio of .60/.40. According to this logistic regression model, when a student comes from a family that earns one income level (for example $40-59,000), and another student identical in every other way comes from a family at the next income level ($60-79,000) the odds ratio is 1.082. The probability associated with income level is thus 1.62 (or .6/.4 times 1.082). The new odds can then be found by solving for X in an odds equation (1.62 = x/(1-x)). If the odds for the first student were 60 percent, then the odds for the second student would be 61.9 percent. It is important to distinguish between the odds ratio (which is the change in the odds, reported in SPSS as "Exp(β)") and the actual odds (which in this example went up from a 60 to a 61.9 percent chance of being retained).

Although High School GPA (Transformed) was powerfully associated with first semester GPA in the multiple regression reported earlier, it is negatively associated with retention (Exp(β) .95, $p < .05$). However, the practical effect is negligible. ACT score does not appear to affect the odds of being retained. A student's sex is also associated with retention; being a female (Exp(β) .72, $p < .001$) reduces the odds. When all other variables are taken into account, if a male's odds of being retained were 60%, a female's odds would be 52%.

Among the racial classifications used in this study the increased odds associated with being a Black student were statistically significant and sizable (Exp(β) 1.58, $p < .001$). The odds of being retained increase by 58% for Black students. Again, comparing

a hypothetical pair of identical students, where the only difference is that one is not Black and has a 60 percent chance of being retained, the student who is Black would have a 70.3 percent chance of being retained. The other racial groups were not statistically relevant to retention.

The results of this logistic regression indicate that, when all other variables are held constant, the odds of a first-year student who joined a Greek organization being retained increases 93.4 percent (Exp(β) 1.934, $p < .001$). Put another way, all other things being equal, a Greek student is almost twice as likely to be retained as a non-Greek student.

Initial academic major is also associated with retention, some have a positive effect and others do not have an effect. The College of Agriculture, Food, and Natural Resources has the greatest positive effect ((Exp(β) 1.63, $p < .001$), followed by the College of Business (Exp(β) 1.34, $p < .001$) and the College of Engineering (Exp(β) 1.27, $p < .05$). The other majors are not related to retention in a statistically significant way.

All of these variables pale in comparison to the importance of the GPA first-year students earn during their first semester of college. As was noted previously, this variable was correlated to retention, but initial data analysis revealed that the slope flattened as GPA increased. Therefore this continuous variable was transformed and entered as a categorical variable using Reverse Helmert contrasts. This coding causes each level of the variable (other than the first level) to be compared to the average effect of the previous levels. The manner in which first semester GPA has been transformed and coded during analysis has been represented in the table through labeling each level of the variable (for example, "B- vs. all lower levels"). As one would assume, students who

earn a D average are more likely to be retained than students who earned less than a D (including a 0.0 GPA); all other things being equal, they are more than 10 times as likely to be retained (Exp(β) 10.64, $p < .001$). Students who earn a C are 19 times more likely to be retained (Exp(β) 19.65, $p < .001$) than students who earn Ds and Fs. The pattern of Exp(β) for each level of first semester GPA – transformed resembles a graph that could be produced if first semester GPA - transformed and retention are plotted together. However, the logistic regression analysis demonstrated the power of this relationship when all the other variables in the model are taken into account; every additional increase in grades is associated with being at least 5 times more likely to be retained as compared to all students who earn lower grades. Put into practical terms, if a student who earns less than a B has a 60 percent chance of being retained, and an identical student earns the average first-year GPA (which would have been transformed into a B), the second student's odds of being retained are 92.8 percent compared to the arbitrary 60 percent set for students who earn less than a B.

Although it would be ideal to be able to compare each level of GPA to only the preceding level of GPA, logistic regression does not allow for this. The only options are to compare each categorical level separately, or to the first level, or the last level, or all preceding levels, or all subsequent levels. When first semester GPA was entered as a continuous variable (transformed or untransformed) into the logistic regression model, the model failed the Hosmer-Lemeshow test, produced smaller R^2, and correctly classifies far few cases (primarily "not retained" students, which dropped from 44.3 percent to 31.2 percent). This is assumed to be a result of logistic regressions sensitively to the assumption of linearity. The important point to recognize is that even though the

amount of increase at the upper levels of this variable are smaller than at the lower levels, the increases reported are still far larger than for any other variable in the model. This means earning an A- instead of a B+ improves a student's odds more than is associated with having joined a Greek organization, what major is pursued, parental income, and every other variable being taken into consideration in this study.

Two variables were not demonstrated to be relevant to retention in a statistically significant way. The 95 percent confidence interval for the Exp(β) of ACT score and having lived on campus both included 1.00, which typically results in a Wald statistic which produces statistical insignificance. As was cautioned above, the Wald statistic is prone to type II errors (indicating insignificance when something is actually significant). Additionally, given that this sample includes almost the entire population, there is reason to question the need for a 95 percent confidence interval. Clearly ACT score has little or no effect (Exp(β) 1.01, p.05), but there is reason to question if living on campus (Exp(β) 1.14, p.> .05) might not have a positive, although small, effect.

The primary interest of this study was whether students who participate in FIGs, living-learning communities or FYE courses at the institution being studied are more likely to be retained once other variables previously shown to effect retention were taken into account. As is shown in the table above, only FIG participation (Exp(β) 1.18, p. <.05) has a positive, statistically significant relationship to retention. After taking all other variables into account, participating in a FIG increases the odds of being retained by a modest 18 percent. If the odds of being retained were normally 60 percent, participating in a FIG would increase the odds to a 64 percent chance of being retained.

Participating in a living-learning community (Exp(β) .93, p. >.05), and FYE course (Exp(β) 1.06, p. >.05), were not found to be related to retention.

Summary

As outlined in Chapter Three, this study used multiple regression to examine if participating in a FIG, LLC or FYE course helped students earn higher grades. Being in a FIG (standardized $\beta = .02$, $p < .01$) did have a positive, but negligible effect on the GPA students earned their first semester. Participation in a living-learning community (standardized $\beta = -.00$, $p > .1$) and the FYE class (standardized $\beta = .00$, $p > .1$) had no effect on first semester GPA. This study also used logistic regression to determine if participating in a FIG, LLC or FYE course increased the odds of retention. Again, being in a FIG (Exp(β) 1.18, p. <.05) increased the odds of being retained, while being in a living-learning community (Exp(β) .93, p. >.05), and FYE course (Exp(β) 1.06, p. >.05), were not found to be related to retention. These results will be further explored and discussed in Chapter Five.

Chapter 5

DISCUSSION OF RESULTS

Introduction

This quantitative study used data from institutional records of a land-grant, public research university in the Midwest to examine the academic performance and retention of first-year students who participated in a Freshmen Interest Group (FIG), Living-Learning Community (LLC) or First-Year Experience (FYE) course. This final chapter presents a discussion of the results of this study. The first section presents a brief overview of the study followed by a discussion of the input and environmental characteristics that were controlled for in the study. The next section presents the answers to the research questions which drove this study and connects them to the relevant literature and theory. The chapter will conclude with a discussion of the study's limitations and implications for future research and practice.

Overview of Study

The drop-out rate of first-year college students in the United States ranges from roughly 33 percent (Barefoot, 2000) to 50 percent (Merrow & Tulenko, 2005). Only 72 to 79 percent of first-year students at four-year institutions, such as the one examined in this study, persist to the second year (Pascarella & Terenzini, 2005). FYE courses have been repeatedly demonstrated to improve both retention and academic achievement (Barefoot, 2000). However, LLCs and FIGs are relatively new programs, and compared to FYE courses the research literature on them is in an early stage of development (Pascarella & Terenzini, 2005). Colleges and universities cannot afford to spend time and money on programs that are not producing improvements in academic performance

and persistence, nor can they afford not to communicate those improvements (if they are in fact being made) to both internal and external constituencies.

The purpose of this study was to examine the academic performance and retention of first-year students who participated in three transitional support programs (i.e., FIGs, LLCs, and FYE courses) at a large, more selective, four-year, public, research-extensive institution in the Midwest. Specifically, this study sought to answer two questions.

R1. After controlling for entering and environmental characteristics, do first-year students who participate in a FIG, LLC or FYE course achieve higher levels of academic performance compared to students who do not participate?

R2: After controlling for entering and environmental characteristics, are first-year students who participate in a FIG, LLC or FYE course more likely to persist to the sophomore year compared to students who do not participate?

Tinto's (1993) theory of voluntary student departure and Astin's (1993) Inputs-Environments-Outputs model served as the foundation for this study. Tinto (1993) theorizes that the more a student is integrated into the academic system and the social system of an institution, the stronger his or her commitment to persist at the institution will be. LLCs and FIGs are intentionally designed to foster both types of integration (Inkelas & Weisman, 2003). Astin (1993) points out that in order to determine the effects of a given institutional program (which is part of the environment) one must take into account the inputs (i.e., the student's entering characteristics) and environments (i.e. what the student experiences). As discussed in Chapter Three, multiple regression was used to determine if first-year students who participated in a FIG, LLC or FYE course earned

higher grades after controlling for the effects of input and environmental characteristics (i.e., high school GPA, ACT score, sex, ethnicity, parental income, initial major, Greek affiliation, and residence hall assignment). Logistic regression was used to determine if first-year students who participated in a FIG, LLC or FYE course were more likely to be retained after controlling for the effects of the input and environmental characteristics plus the addition of the GPA students had earned in their first semester of college.

Discussion of Results

As discussed in Chapter Two, the entering and environmental characteristics controlled for in this study have previously been found to effect academic performance and retention. Therefore this section begins with a discussion of the answers this study generated for each of the research questions and how they relate to the literature. The section concludes with a discussion of the effects of the entering and environmental characteristics on academic performance and retention.

R1. Do Students in a FIG, LLC or FYE Course Achieve Higher Academic Performance?

This study examined the academic performance of first-year students who participated in a Freshmen Interest Group (FIG), Living-Learning Community (LLC) or First-Year Experience (FYE) course. Each student's first semester GPA served as a proxy measurement of academic performance. The results of this study indicate that, after controlling for the entering and environmental characteristics included in this study, students in a FIG did earn higher grades. Although FIG students achieved statistically significant higher academic performance, there is not much (if any) practice significance to this difference. Participating in an LLC or FYE course did not have any effect (positive or negative) on first semester GPA.

This finding is in line with prior research (Tinto & Goodsell-Love, 1993; Stassen, 2003) which has attributed higher GPAs to participation in a FIG. Marerro and Beckett (2005) found that participating in FIG did not improve grades, but that study focused exclusively on Engineering students whereas the other studies examined all FIG students. Prior research has also found that LLCs (Inkelas & Weisman, 2003; Lenning and Ebbers, 1999) and FYE courses (Barefoot, 2000; Ishler & Upcraft, 2005) are associated with higher grades, but this study did not support those findings.

This study demonstrates the importance of using Astin's (1993) I-E-O theoretical model when examining an outcome such as academic performance. When averaged together, FIG students earn higher grades than other students, LLC students tend to earn average grades, and FYE students tend to earn lower grades, which might lead one to conclude these programs effect students' academic performance. However, after taking into consideration what are known to be important entering and environmental characteristics, this study revealed that on the campus these data were collected LLCs and FYE courses are not having any effect on GPA and FIGs are having a small, positive effect.

Effects of Entering and Environmental Characteristics on Academic Performance

Student's high school GPA and ACT scores were used as proxies for entering academic ability. Robbins (2004) found that approximately 25 percent of the variance in the GPA first-year students achieve can be attributed to their high school GPA and SAT/ACT scores. Consistent with prior research, this study also found that entering academic ability played an important role in the GPA students earned their first semester of college; in fact a student's high school GPA was the single most influencing variable

of first semester GPA. The standardized beta for high school GPA – transformed was twice as large of an effect size as the next most powerful variable, ACT score, which was the other proxy measure of entering academic ability.

A student's sex did not affect the GPA earned during the first semester of college, a finding that is not completely inconsistent with previous research which typically finds that females tend to earn just slightly higher grades (Astin, 1993; Ishler and Upcraft, 2005). Both Ishler and Upcraft (2005) and Stage and Hossler (2000) point out that racial/ethnic identity is a very difficult variable to cleanly assess due to the confounding interactions that occur between it and many other variables. Although the effect size on first semester GPA was negligible, being Black had a statistically significant and positive effect on first semester GPA. Given that these data were collected on a predominately White campus, this finding might be of great interest to those faculty and administrators. Yearly family income had a small and positive effect on first semester GPA. Although the direction of the effect of family income was congruent with other research (St. John, Cabrera, Nora & Asker, 2000), the effect size produced in this study was much smaller than expected. As discussed in Chapter Four, during the initial data preparation and generation of descriptive statistics the direct relationship of family income on first semester GPA was graphed. This graph suggested a much stronger relationship than was produced from the multiple regression model; perhaps family income interacts with other variables in the study.

Consistent with existing research, students who joined Greek organizations earned slightly higher first semester GPAs (Pascarella & Terenzini, 2005), as did students who lived in a residence hall (Astin, 1993; Pascarella, Terenzini & Blimling, 1994). As was

detailed in Table 2 in Chapter Four, the academic major students initially registered under also had a relatively minor effect on first semester GPA. Starting out as an Engineering student had the largest negative effect, while those in Journalism has the largest positive effect. Education and other sciences had no effect on first semester GPA.

The answers generated in response to research question one provide additional support to the basic conclusion presented by Astin (1993, 1997) and others (Pascarella & Terenzini, 1991, 2005); first-year students' academic performance is most directly affected by their prior academic performance. High school GPA was the most powerful predictor of first-semester GPA, followed by ACT score. After these two variables are taken into account the other variables included in this study were either insignificant or had minor effects. What this suggests is that even though participating in a FIG does contribute to a statistically significant higher GPA, the three programs being examined in this study are not having a meaningful effect on the academic performance of first-year student. This discussion now explore whether these programs are having an effect on first-year student retention.

R2. Are Students in a FIG, LLC or FYE Course More Likely to Persist?

This study also examined the retention of students who participated in a FIG, LLC, or FYE course. Logistic regression was conducted to ascertain the change in odds associated with each of the variables in this study. The results of this analysis indicate that, after controlling for the entering and environmental characteristics, participating in a FIG was associated with a statistically significant increase in the likelihood of being retained. As presented in Chapter Four, if the odds of being retained are normally 60 percent, participating in a FIG increases those odds to a 64 percent chance of persisting to

the sophomore year. Participating in a LLC or FYE course does not change the odds of being retained.

This finding is consistent with prior research which has also demonstrated that students in FIGs are more likely to be retained (Marerro & Beckett, 2005; Stassen, 2003; Lenning & Ebbers, 1999; Pike, 1999; Purdie, Williams, & Ellersieck, in press). No effect was found for students in LLCs and FYE courses which contradicts previous research (Pascarella, Terenzini, & Blimling, 1994; Ryan & Glenn, 2004; Ishler & Upcraft, 2005; Pascarella & Terenzini, 2005). However, as was noted in the definition section of Chapter One, it is important to remember that LLCs on the campus being studied are not consistent with living-learning communities offered on other campuses and examined in other studies (Inkelas & Weisman, 2003; Shapiro & Levine, 1999, Lenning & Ebbers, 1999) in that they lack a curricular expectation (i.e. there is no specific course or other academic activity associated with participating in an LLC).

The distinction just mentioned demonstrates one of the benefits of using Tinto' (1993) theory of academic and social integration. Although integration was not directly measured in this study, prior research has found evidence that programmatic structures such as FIGs do enhance academic and social integration (Tinto, 1997; Pike, Schroeder, & Berry, 1997). The FIG program on the campus these data were collected from seeks to create a "seamless connection" (Kuh 1996) between the out-of-class residential experience and the in-class academic experience. The results of this study indicate that first-year student retention is not improved by simply housing students with common academic interests together unless this also includes a curricular experience, for that is the

only meaningful difference between the FIG and the LLC programs on the campus being studied.

An unanticipated finding of this study was the lack of improved retention associated with participating in an FYE course. The basic structure of the FYE course offered on the campus being studied is consistent with the type of course Ryan and Glenn (2004) found to improve retention (M. Bixby, Personal Communication, July 17, 2004), and FYE courses have repeatedly been found to improve first-year student retention (Ishler & Upcraft, 2005; Barefoot, 2000; Pascarella & Terenzini, 2005). Although this is pure conjecture, it seems to this researcher that both Astin (1993) and Tinto (1993) provide possible explanations for this finding. As we know, a student's peer group and the nature of peer-to-peer interaction, both inside and outside the classroom, play pivotal roles both for learning and persistence (Astin, 1993; Pascarella & Terenzini, 1991, 2005). All three transitional support programs in this study are self-selected by students. However, many of the students in the FYE course are "basically tracked" into it by their academic advisor because they are "high-risk students" (M. Bixby, Personal Communication, July 17, 2004). Perhaps the peer environment that results from this practice does not have a positive effect on retention, or perhaps these students tend to have a lower level of initial commitment to the institution and this course actually causes more of them to stay than they would have otherwise. This point will be discussed later in this chapter, but now this discussion will turn to the effect of the other variables included in the study.

Effects of Entering and Environmental Characteristics on Persistence

Academic performance (i.e., GPA) in the first semester of college is one of the best predictors of student persistence (Belcheir, 1997, Pascarella & Terenzini, 2005). First semester GPA was not simply the best predictor of retention in this study; as was detailed in Chapter Four the effect size was dramatically larger than any other variable. As one would expect, students who earned a D grade point average were more than 10 times more likely to be retained compared to those who earned less than a .07 GPA; some of the student who earned below a .07 GPA may have left before the first semester even ended. What is surprising is that the effect size of first semester GPA remains the highest of any other variable, even when comparing students who earned an A to those who earned an A- or less. Students who earned a B were more than eight times more likely to be retained than students who earned a B- or less. Students who earned a B+ were more than 5 times more likely to be retained than students who earned a B or less. For a complete description of the effect size of each level of this variable the reader is referred to Chapter Four.

Astin (1997) found that high school GPA and ACT scores predicted retention more than any other input characteristic. This study found high school GPA was negatively associated with retention and ACT score was not related to retention in a statistically significant manner. These results indicate that once first semester GPA and all other variables included in this study are taken into account, students who earned higher grades in high school are slightly less likely to persist than students who earned lower grades in high school. Perhaps students who are used to earning higher grades are more negatively affected by a lack of academic success in their first semester, or perhaps

the parents of these students are less tolerant or patient of poor academic performance and decide to pull their child out of school. Again, the effect size of high school GPA – transformed on retention is negligible, so one must be cautious about reading too much into this finding.

As was detailed in Table 3 in Chapter Four, the academic major students initially registered under also had a relatively minor effect on retention. Starting out as an Agriculture student increased the odds of being retained more than any other major, followed by Business, and Engineering. Journalism students were not more likely to be retained, and Education and Other Sciences had no effect on retention. One important finding to recognize is that Agriculture students did not achieve higher grades, but they were more likely to be retained. Given the powerful effect of first-semester GPA, this study suggests that there might be something different either in the students who start out as Agriculture majors or in their experience.

Astin (1997) found that a student's race and sex were the third and fourth most important input variables (after high school GPA and ACT scores) although they only accounted for approximately three percent of the variance in retention. St. John, Cabrera, Nora, and Asker (2000) theorize that financial variables could explain almost half of the variance in student persistence. This study took into account the effect of students' race, sex and family income on retention. Given that this data was gathered from a predominantly White institution it was unexpected to find that being Black increases the odds of being retained by 58%. Other racial groups were not associated with retention. Another unexpected result of the logistic regression was that females were less likely to be retained. As explained in Chapter four, if a male's odds of being retained were 60%

then a female's odds were 52% after controlling for all other variables in this study. This is not a trivial difference, nor is it congruent with current research which often finds that females are more likely to be retained (Pascarella & Terenzini, 2005; Astin, 1993, 1997). Yearly family income had a small and positive effect on retention. As with first semester GPA, although the direction of the effect of family income was congruent with other research (St. John, Cabrera, Nora & Asker, 2000), the effect size was much smaller than was expected. During the initial data preparation and generation of descriptive statistics the direct relationship of family income on retention was graphed. This graph suggested a much stronger relationship than was produced from the logistic regression models; perhaps family income interacts with other variables in the study.

Students who joined Greek organizations were almost twice as likely to be retained after controlling for all other variables included in the study; a finding that is consistent with previous research (Moore, Lovell, McGann, & Wyrick, 1998; Tripp, 1997). Although this study did not directly measure social integration and logistic regression does not allow for determining causality, there is reason to believe that students who join a Greek organization achieve high levels of social integration which Tinto (1993) has theorized would lead to improved retention.

This study found that living in a residence hall had no statistically significant effect on retention; this is inconsistent with prior research (Pascarella, Terenzini & Blimling, 1994; Berger, 1997; Pascarella & Terenzini, 2005). There is no obvious cause for this finding; it seems implausible that living in a residence hall does not positively affect social integration, but perhaps Greek organizations foster meaningfully higher levels. A few things should be noted about this variable. Roughly 85 percent of the

sample lived in a residence hall their first year and more than half of these students also participated in a FIG or LLC. Furthermore, many of those who did not live in a residence hall were male Greek students, which was associated with increased retention.

Why this study found that after controlling for all other variables Black students and male students were more likely to be retained, high school GPA had a negative (although weak) effect on retention, and living in a residence hall had no effect on retention is not clear. Perhaps the source of these differences from other research findings might simply be something idiosyncratic to the institution the data were gathered from; this is why attempts to generalize findings from single institution studies are so readily questioned. Another possible source of these differences could be a function of the variables included and excluded from this study. For example, high school GPA was the most predictive variable for first semester GPA and first semester GPA was the most predictive variable for retention. However, if first semester GPA had not been included in the logistic regression model, it appears safe to assume high school GPA would have been a powerful and positive predictor of retention.

Perhaps variables that were not included in this study have significant effects on retention. Although financial income level was included, financial aid was not included, nor was participation intercollegiate athletics, on or off-campus jobs, and other programs designed to enhance the undergraduate experience of first-year students. Perhaps males or Black students were receiving more financial aid, or were more likely to be participating in other programs which helped retain them. Or, perhaps the male and Black students who attended this institution were more determined to succeed at this institution and female students and other racial groups were simply more willing to

transfer to other institutions. Given the powerful effect being in a Greek organization had on retention, part of the explanation for the increased likelihood of retention for Black students may be that they cannot join historically Black Greek organizations during their first semester at the campus this data was gathered (J. Basler, personal communication, April 7, 2006). While the effect of being in Greek organization was taken into account for other racial groups, it was not controlled for among Black students (unless they joined a historically White or other type of Greek organization), because Black students who joined historically Black Greek organizations had not yet done so when these data were collected.

Limitations of the Study

Although this study avoids a common limitation of many other studies within this area of research (inter-campus variability in program design), an important limitation of this study is that all data were drawn from one institution, which limits the ability to generalize these findings. One can be confident in knowing the three programs compared in this study (FIGs, LLCs, and FYE) are truly distinct from each other, but caution is warranted if attempting to generalize these results to other institutions unless they have similar characteristics.

A second limitation of this study is that many variables previously shown to influence retention were not gathered and included in the analysis. This limitation was born of a practical reality; many of these variables were not readily attainable. As was discussed previously, the inclusion of different variables would almost certainly produce different results. Perhaps the most important variables which were not included in this study were direct measurements of commitment to institution and commitment to

completing a degree. A core element of Tinto's (1993) theory is that a student's initial and subsequent commitment effects his or her decision to return to the institution. Any student can participate in a FIG, LLC or FYE course, but it might be the case that students who are more committed are more likely to participate in a FIG. Given that all three programs are marketed to students as ways to improve their learning and success, and that there is anecdotal evidence which suggests many students do not fully understand the difference between a FIG and LLC when they are signing up for the programs (A. Beckett, personal communication, January 27, 2007), it seems unlikely that initial commitment would differ. However, the lack of a direct measurement of commitment is obviously an important limitation of this study.

Another limitation of this study is that FIGs, LLCs and FYE course are lumped together into dichotomous dummy codes even though there are different foci among all three programs. There is a possibility that some LLCs have more positive effects than others, but when they are put together these differences are cancelled out. This could also be possible for the FYE course since all Business students who take the FYE course are assigned to specific sections, as are Biology students.

The statistical methods selected for this study do not indicate causality nor allow for identifying indirect effects among the variables included. Thus a limitation of this study is that one cannot explain why students in FIGs were more likely to be retained, nor why being Black had a greater effect than being in a FIG. An example of this limitation was evident when trying to understand the effect of being in a Greek organization and being Black. Logistical regression does not allow one to determine if being in a Greek organization helps students return to the institution or if students who are more likely to

be retained are more likely to join a Greek organization. Thus, this study does not provide a way to predict if retention of other racial groups would go down or remain the same if all students were not able to join a Greek organization until after their first semester, or if the higher odds of retention for Black students might have something to do with the fact that those who would join Greek organizations had yet to do so.

The logistic regression model was nearly perfect in predicting retention, but it was less than 50 percent accurate in predicting attrition. Given that the average retention of the entire sample was 83 percent, this model was an improvement in predicting retention. However, a limitation of this study is that the model is not nearly as useful for predicting attrition.

Implications for Future Research

The results of this study raise a number of intriguing questions. While it would be very useful to gain an understanding of why students who participate in FIGs are more likely to be retained even after controlling for important variables such as prior and initial academic performance and family income level, a far more intriguing question is why the FYE program at the institution studied is not producing results comparable to those consistently demonstrated on other campuses.

This study contributes to the growing body of conflicting literature regarding the efficacy of living-learning communities. The findings of this study suggest that the living-learning model currently in place at the institution studied does not improve students' academic performance (as measured by first semester GPA) nor improve their odds of being retained. Understanding why some living-learning programs have positive effects and others do not is an important line of inquiry worthy of pursuing. The first

(and currently only) national study of living-learning programs (National Study of Living-Learning Programs, 2004) has not yet produced any analysis regarding what elements or components of these programs are associated with which outcomes. The findings of this study suggest that programs with a curricular expectation are able to affect retention more than those which only offer co-curricular enhancements.

This study examined the effect of participating in a FIG, LLC or FYE course at the institutional level. However, there is reason to question whether some FIGs and LLCs might have different levels of effect. For example, are FIGs dedicated to Engineering or Journalism more or less effective than those dedicated to Agriculture or undecided students? Is every LLC equally ineffective, or is it the case that some have positive effects and others have negative effects which cancel each other out when analyzed as one group? Expanding the number of students in the sample would allow for disaggregating the data by FIG and LLC topic, which might yield very useful results.

As was discussed in the limitations section above, although collinearity was not found to be a problem during data analysis, this study did not provide evidence regarding any indirect effects or the presence and possible effects of interactions among the independent variables. For example, is it really the case the joining a Greek organization almost doubles the odds of being retained, or are there some other confounding variables or interactions among variables, which produced this result? Further analysis of this same data base using a different statistical method such as structural equation modeling would be useful for answering some important questions such as these. However, it would also be useful to pursue a robust program of qualitative studies in an attempt to address the questions presented in the previous two paragraphs.

Organizational Assimilation and the Theory of Managing Uncertainty

Calls have been made recently for a new theory to guide research into college student retention (Braxton, 2000; Braxton, Hirschy, & McClendon, 2004). Jablin's (1987) organizational assimilation model and Kramer's (2004) Theory of Managing Uncertainty (TMU) hold a great deal of promise for filling this need. Jablin's (1987) model consists of 4 stages: anticipatory socialization, encounter, metamorphosis, and exit. Jablin defines anticipatory socialization as the perceptions formed about the organization prior to joining it. Encounter refers to the "organizational entry period" (Jablin, 1987, p. 694). Metamorphosis is the "stage during which the newcomer acquires organizationally 'appropriate' attitudes and behaviors, resolves intra- and extra-organizational role conflicts, and commences efforts to individualize his or her organizational role" (Jablin, 1987, p. 694). Exit refers to voluntary turnover as opposed to involuntary dismissal. Jablin (2001) acknowledges that all organizational members do not go through a set of discrete and easily recognizable stages or phases. However, as long as one keeps in mind that the various processes described above are fluid and mutually interactive, stage models do provide a fairly accurate and useful conceptualization of the process of entering an organization, becoming a member, and exiting the organization. This model seems to be very descriptive of the process college students go through as they attempt to join and successfully complete a degree

TMU attempts to describe the variety of possible ways in which people might seek to manage uncertainty they experience, such as the uncertainty caused by joining a new organization, and the effect of managing or being unable to manage uncertainty. In brief, Kramer (2004) theorizes that when a person experiences uncertainty he/she might

engage in internal cognitive attempts to reduce it, or might engage in a variety of communicative behaviors to reduce it depending on how motivated they are to reduce the uncertainty compared to other competing motives. The basic premise this perspective suggests is that the more effectively new students are able to manage their uncertainty the more successful they will be assimilated as organizational members. First-year students face a wide variety of uncertainty, some of which might include: how to perform academically, determining how well they are performing academically, making new social connections, learning how to live more independently, etc. The conclusion that the more successful new students are in reducing the various uncertainties they face, the more effective they will be as students and the more likely they will persist seems intuitively sound. The theory suggested by Kramer (2004) and the organizational assimilation model put forth by Jablin (1987) provide two new and provocative lenses through which to examine the academic success and retention of first-year students. Understanding the degree to which programs such as FIGs, LLC or FYE courses help students reduce uncertainty would be a significant contribution to both the learning community literature as well as the student retention literature.

Implications for Practice and Policy

The results of this study call into question the practice of allowing first-year students to choose between FIGs, LLCs and FYE courses as equal options. Although this study does not provide causal evidence, it seems clear that participating in a FIG has positive benefits that participating in an LLC or FYE course does not provide. There may be other, very positive benefits of participating in an LLC or FYE course; retention and improved academic performance are not the only goals of these programs.

Furthermore, some LLCs and FYE sections might help with retention and/or academic performance and these effect might have been masked by analyzing these programs in the aggregate, so it is premature to consider discontinuing these programs. However, there is reason to consider expanding the number of FIGs so that every first-year student could begin his or her college career with the support of this program.

One of the more surprising findings of this study was the lack of effect for participating in an FYE course. The current literature consistently demonstrates the effectiveness of this program on other campuses (Pascarella & Terenzini, 2005; Ishler & Upcraft, 2005). However, as discussed in Chapter Two Ryan and Glenn (2004) studied two different versions of a First-Year Experience seminar (one was focused on academic skill development and transitional support, the other focused on integrating students into the academic community) and found that the version focused on academic integration had no effect. A thorough review of the FYE program at this institution, including the type of course being offered, would be prudent to pursue.

The fact that Black students were more likely to be retained, after controlling for the other variables in this study, is a point that could have a number of practical implications. Perhaps Black students who enroll at a large, public, predominately White campus in the Midwest have already learned through their K-12 academic experience how to be successful in a challenging environment, or perhaps efforts underway at the particular institution studied are having a positive effect. Whatever the case may be, the good news is that not only are Black students more likely to be retained, other racial groups are not less likely to be retained (i.e., Race did not have a negative effect on retention). Although some caution is advised, faculty and staff on this campus would be

justified in at least saying a student's racial background does not negatively affect his or her odds of being retained. This finding should be welcome news to practitioners who are working on this campus to ensure historically disadvantaged populations are successful.

Being a Greek student almost doubled the odds of being retained. Certainly this finding must be further explored, as mentioned in the previous section, to fully understand what is actually happening here. However, the findings of this study lend support to those who wish to continue the present practice of allowing first-year students to join a Greek organization before their first semester even begins. Concerns that this practice negatively affects retention were not supported by the results of this study.

Finally, this study draws into sharp relief the importance of academic success during the first semester of college; every increase in GPA increases the likelihood of being retained. Although this is so obvious it sounds cliché, the best way faculty and staff can help retain students is to do all they can to help students be as academically successful as possible their first semester. The practical implications of this are numerous, but they are not new. The literature is very clear regarding how colleges and universities can help students achieve academic success (Kuh, et al. 2005; Study Group, 1984).

Summary

This quantitative study used data from institutional records of a land-grant, public research university in the Midwest to examine the academic performance and retention of first-year students who participated in a Freshmen Interest Group (FIG), Living-Learning Community (LLC) or First-Year Experience (FYE) course after controlling for a the

effects of a variety of input and environmental characteristics. First-year students who participated in a LLC or FYE course did not earn higher grades, nor where they more likely to be retained. Students who participated in a FIG did earn higher grades and were more likely to be retained, even after taking into account input and environmental characteristics. While there are some important limitations of this study, it does contribute to the growing body of research which has often found that programs such as FIGs, which integrate the academic and residential experiences, improve first-year students' academic performance and retention.

APPENDIX A

Table 5 Correlation Matrix

		HS GPA	ACT	Female	Income	Race	Greek
HS GPA	Pearson Correlation	1	.337(**)	.234(**)	-.042(**)	-.078(**)	.023(**)
	Sig. (2-tailed)		.000	.000	.000	.000	.008
	N	13932	.337	13932	13932	13932	13932
ACT	Pearson Correlation	.337(**)	1	-.078(**)	.088(**)	-.069(**)	-.056(**)
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	13931	13931	13931	13931	13931	13931
female	Pearson Correlation	.234(**)	-.078(**)	1	-.030(**)	-.010	.123(**)
	Sig. (2-tailed)	.000	.000		.000	.242	.000
	N	13932	13931	13932	13932	13932	13932
income	Pearson Correlation	-.042(**)	.088(**)	-.030(**)	1	-.113(**)	.156(**)
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	13932	13931	13932	13932	13932	13932
race	Pearson Correlation	-.078(**)	-.069(**)	-.010	-.113(**)	1	-.106(**)
	Sig. (2-tailed)	.000	.000	.242	.000		.000
	N	13932	13931	13932	13932	13932	13932
Greek	Pearson Correlation	.023(**)	-.056(**)	.123(**)	.156(**)	-.106(**)	1
	Sig. (2-tailed)	.008	.000	.000	.000	.000	
	N	13932	13931	13932	13932	13932	13932
In Hall	Pearson Correlation	.087(**)	.057(**)	.260(**)	-.005	.019(*)	-.291(**)
	Sig. (2-tailed)	.000	.000	.000	.560	.024	.000
	N	13932	13931	13932	13932	13932	13932
In FIG	Pearson Correlation	.094(**)	.154(**)	.034(**)	.039(**)	-.018(*)	-.084(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.029	.000
	N	13932	13931	13932	13932	13932	13932
in LLC	Pearson Correlation	.086(**)	.137(**)	-.019(*)	-.002	.007	-.078(**)
	Sig. (2-tailed)	.000	.000	.028	.792	.423	.000
	N	13932	13931	13932	13932	13932	13932
in SSC	Pearson Correlation	-.123(**)	-.185(**)	-.038(**)	-.064(**)	.115(**)	-.012
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.157
	N	13932	13931	13932	13932	13932	13932
1st GPA	Pearson Correlation	.589(**)	.410(**)	.173(**)	.085(**)	-.054(**)	.065(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	13932	13931	13932	13932	13932	13932
1st Major	Pearson Correlation	.015	.046(**)	.129(**)	-.057(**)	.033(**)	-.065(**)
	Sig. (2-tailed)	.070	.000	.000	.000	.000	.000
	N	13932	13931	13932	13932	13932	13932

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 5 Correlation Matrix (cont.)

		In Hall	In FIG	in LLC	In SSC	1st GPA	1st Major
HS GPA	Pearson Correlation	.087(**)	.094(**)	.086(**)	-.123(**)	.589(**)	.015
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.070
	N	13932	13932	13932	13932	13932	13932
ACT	Pearson Correlation	.057(**)	.154(**)	.137(**)	-.185(**)	.410(**)	.046(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	13931	13931	13931	13931	13931	13931
female	Pearson Correlation	.260(**)	.034(**)	-.019(*)	-.038(**)	.173(**)	.129(**)
	Sig. (2-tailed)	.000	.000	.028	.000	.000	.000
	N	13932	13932	13932	13932	13932	13932
income	Pearson Correlation	-.005	.039(**)	-.002	-.064(**)	.085(**)	-.057(**)
	Sig. (2-tailed)	.560	.000	.792	.000	.000	.000
	N	13932	13932	13932	13932	13932	13932
race	Pearson Correlation	.019(*)	-.018(*)	.007	.115(**)	-.054(**)	.033(**)
	Sig. (2-tailed)	.024	.029	.423	.000	.000	.000
	N	13932	13932	13932	13932	13932	13932
Greek	Pearson Correlation	-.291(**)	-.084(**)	-.078(**)	-.012	.065(**)	-.065(**)
	Sig. (2-tailed)	.000	.000	.000	.157	.000	.000
	N	13932	13932	13932	13932	13932	13932
In Hall	Pearson Correlation	1	.176(**)	.277(**)	-.040(**)	.103(**)	.065(**)
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	13932	13932	13932	13932	13932	13932
In FIG	Pearson Correlation	.176(**)	1	.480(**)	-.103(**)	.114(**)	.025(**)
	Sig. (2-tailed)	.000		.000	.000	.000	.003
	N	13932	13932	13932	13932	13932	13932
in LLC	Pearson Correlation	.277(**)	.480(**)	1	-.053(**)	.088(**)	.040(**)
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	13932	13932	13932	13932	13932	13932
in SSC	Pearson Correlation	-.040(**)	-.103(**)	-.053(**)	1	-.108(**)	-.086(**)
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	13932	13932	13932	13932	13932	13932
1st GPA	Pearson Correlation	.103(**)	.114(**)	.088(**)	-.108(**)	1	.041(**)
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	13932	13932	13932	13932	13932	13932
1st Major	Pearson Correlation	.065(**)	.025(**)	.040(**)	-.086(**)	.041(**)	1
	Sig. (2-tailed)	.000	.003	.000	.000	.000	
	N	13932	13932	13932	13932	13932	13932

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

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VITA

John Purdie grew up in Lake Quinault, Washington. He earned a BA in Speech Communication from Western Washington University in 1991, and a Masters of Arts in Higher, Adult and Continuing Education from Michigan State University in 1994. While at WWU John earned First Place in the Communication Department Student Paper competition. While at MSU he earned the Louise C. Stamatakos "Outstanding Graduate Student in H.A.C.E." award. His career has been within on-campus housing with special emphasis on first-year students, assessment, and collaborating with faculty to improve the academic climate within the residence halls. Recently, Dr. Purdie returned to WWU as the Associate Director of University Residence for Residence Life. He intends to contribute to this field as a Scholar-Practitioner: serving both an institution as an informed practitioner and the field as a scholar who occasionally teaches graduate and undergraduate courses and contributes to the literature.