8-1-2011

Admissions Policies Governing the Declaration of Academic Major and Academic Advising Models Relating to Student Outcomes in Higher Education

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ADMISSIONS POLICES GOVERNING THE DECLARATION OF ACADEMIC MAJOR AND ACADEMIC ADVISING MODELS RELATING TO STUDENT OUTCOMES IN HIGHER EDUCATION

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Philosophy

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August 2011

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Title: Admissions Policies Governing the Declaration of Academic Major and Academic Advising Models Relating to Student Outcomes in Higher Education

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The purpose of this study was to analyze admissions policies pertaining to the declaration of academic majors for incoming students and structures of academic advising at American universities and how they relate to student outcomes. The student outcomes considered for the study were first to second year retention rates and graduation rates.

Students may not choose their major based on research or facts and allow external influences to guide their selection. Traditional aged college students are typically not developmentally prepared to undertake such self-directed decisions. The forced declaration of an academic major at the time of admission can impose a premature selection, potentially negatively impacting student outcomes. Nationally, institutions vary on their admission policy structures in regard to the declaration of academic majors.

Literature has linked academic advising with increased retention and graduation rates. Different organizational models of academic advising seem to be more or less influential on retention and graduation rates and vary depending on individual student characteristics.

The exploratory study used primary and secondary data sets. The primary data collected were from individual college websites to obtain admission policy structures and academic advising models. The secondary data were collected from the Department of

Education's Integrated Postsecondary Education Data System. Analysis of the data included analysis of variance measures to identify patterns and multiple regressions examined any predictive factors in the data.

The results of the study were not straightforward and patterns varied based on institutional characteristics, such as the composition of the student population. Two main themes emerged as a result of this exploratory study. Lower levels of academic major declaration structure and shared or decentralized academic advising seemed to mesh with the needs of the full-time, more traditional college students. The non-traditional and historically "at-risk" student populations appeared to benefit from high structure admission policies by declaring their academic major at the time of admission and also seemed to have better retention and graduation outcomes when exposed to decentralized academic advising. The findings for the study point to possible policy considerations for universities in reference to the declaration of academic major and academic advising models.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to all who have supported me during this challenging journey. I first and foremost need to thank Dr. J. Beth Mabry, Chairperson of my Dissertation Committee. Her patience, encouragement, and expertise saw me through this experience to completion. I also want to thank Dr. D. Alex Heckert and Dr. Holley A. Belch for taking their valuable time to be members of my Dissertation Committee.

My special thanks to Richard Shaffer, Director of Admissions at Penn State Altoona and Joann Shaffer, Senior Programs Coordinator in the Division of Undergraduate Studies at Penn State Altoona, both whom encouraged me to pursue this degree and opened the door to so many opportunities. Their experience and knowledge helped guide me in my work to explore the relationship between college admissions, academic advising, and student outcomes.

A sincere thanks is to my data coders. Kathryn Midgley, Joy Midgley, Kelly Lyons, and Lisa Anderson spent endless hours of searching through university websites and transferring data from the College Navigator site into huge spreadsheets.

Last, but certainly not least, I want to thank my husband, Alfred Midgley. He has been my biggest supporter and would not allow me to give up my goal of earning a Ph.D., even when I was not so sure of it myself. He is a wonderful husband, father, and friend.

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CHAPTER I

INTRODUCTION

Study Overview

Entering college students begin their collegiate career at varying stages of "decidedness" on an academic major program of study. Some first-year students are comfortable with being uncertain about choosing a major, while others feel varying pressures to commit to a field of study (Gordon, 2007). Nationally, universities vary in their policies regarding how students are admitted into academic programs or majors. Admissions policies governing the declaration of an academic major at the time of enrollment range from those that permit students to start their academic careers without declaring a major or "being undeclared," those that allow students to postpone declaring a major but that require them to select a college within which a major may later be selected, and those that require students to declare a major at enrollment. Students studying at baccalaureate liberal arts colleges are more likely to have their major selection postponed, while other colleges and universities have students at different levels of decidedness on a major (Policy Center on the First Year of College, 2002). Even when students select a major at the time of enrollment, either by choice or because the university requires them to do so, many are still unsure about whether they want to remain in the major they have declared and often are uncommitted to completing their degree in that major (Pascarella & Terenzini, 2005).

Traditionally, students are considered to be "undecided" on a major at the beginning of college. However, because some universities require students to declare a major when they enroll, up to 80% of students may be undecided on an academic major, but they have declared a major because of the structure of the institution (Gordon, 2007). The proportion of students

who change their academic major at least once in their collegiate career is high at approximately 75% (Gordon, 1995, 2007; Kramer, Higley, & Olsen, 1994). This trend suggests that students may need some time to explore their options before they can choose a major to which they are committed. The population of students who change their academic majors are at higher risk of dropping out of school than students who begin their college careers with a declared major to which they are committed (Gordon, 2007). Does allowing students to enroll in college *undecided on a major,* undecided but *declaring an academic college*, or *declaring a major* correspond to differences in student outcomes? That is, do different institutional admissions policies governing students' declaration of a major relate to differences in student retention and graduation rates?

Given the number of students who are entering colleges and universities undecided about their paths, academic advising practices are a consideration in aiding these students to become integrated into the environment (Miller & Woycheck, 2003). There are many different types of academic advising models depending on the institutional structure and overall mission (Kuhtmann, 2004). Academic advising is a service that all students receive and has been found to have a link with overall student retention (Habley & Gordon, 2000; Hale, Graham, & Johnson, 2009). Providing students with the opportunity to become positively engaged in an academic advising program can support students to stay in school and progress to degree completion (ACT, 2004).

The purpose of this study was to analyze admissions policies pertaining to the declaration of academic majors for incoming students and structures of academic advising at American universities and how they related to student outcomes. The study compared student outcomes (first-year retention and graduation rates) at universities with (1) different levels of

structure within admissions policies as they pertain to the selection of a major at the time of enrollment: (a) requiring incoming students to declare an academic major (high structure); (b) requiring students to declare an academic college but not a major (moderate structure); and, (c) permitting students to remain undeclared on an academic major when they enter the university (low structure); and (2) organizational structures of academic advising: (a) professional advisors and faculty advisors in one administrative unit (centralized model); (b) students are advised in academic departments (decentralized model); and, (c) combination of central and decentralized (shared model). Are there differences in student retention and graduation rates depending on the institutional policy regarding the declaration of major among incoming students and the structure of academic advising delivery? Implications of the study could inform college and university admission policies where they pertain to the declaration of academic major among incoming students and academic advising.

Significance of the Study

Student retention and, ultimately, graduation rates are important measures of institutional success for American colleges and universities. Institutional retention is defined "as the percentage of first-time, full-time freshmen that return to the same institution for the second term or second year of study" (Levitz, Noel, & Richter, 1999, p. 32). Retention rates constitute institutional measures of success. First to second year retention rates are closely tied with graduation rates. Students who do not persist into their second year are less likely to obtain a college degree in a timely manner (Terezini, Springer, Yeager, Pascarella, & Nora, 1996). Graduation rates are traditionally measured as the number first-time, full-time, degree seeking undergraduates who complete their program within 150% of normal time for completion (Integrated Postsecondary Education Data System, 2011).

Students admitted into universities enter in various structures for the declaration of their academic major. At the point of entry into a university, the traditional aged student may not be developmentally prepared to make a definitive decision on their major (Perry, 1999). Exploring how and when students declare their academic majors and the relationship to student outcomes could have positive implications for higher education policies that are aimed at improving retention and graduation rates. Through the understanding of the major declaration process, academic advising programs can support students during this process. The delivery of supportive academic advising programming has been linked to positive student outcomes (Gordon, 2007).

Many studies find that students who are unsure of their academic major at the time of enrollment are less likely to remain enrolled in college and persist to graduation (Galotti, 1999; Levitz & Noel, 1989; Legutko, 2007; Pascarella & Terenzini, 2005). Students who are not committed to a particular educational goal, a specific major, or to their institution are less likely to be retained (Graunke, Woosley, & Helms, 2006). At the point of entry into college, many students are likely to be undecided on a major. Entering as undeclared on a major can be a positive status, however, provided that students receive adequate counseling to move from uncertainty to certainty about a major (Tinto, 1993). Tailoring intervention strategies for undecided students, such as career counseling or academic advising, to the reasons that they are uncertain about the academic direction might improve retention and degree completion rates of students.

Students who are uncertain about a major when they enter college (whether or not they are required by their institutions to declare a major) may be uncertain for several reasons. The student might not be ready, developmentally, to make a decision and needs time to explore

options; the student may be under external pressure to declare, perhaps from parents or the college's admission requirements to make a choice; or the student may not have enough information to make an informed choice about an academic major (Beggs, Bantham, & Taylor, 2008). Therefore, the success of students who are undecided on a major may depend upon the type and intensity of the intervention(s) to aid them in identifying an academic area to which they feel committed (Gordon, 2007). Students who are undecided about a choice of an academic major need to receive interventions early in their first year of college because, left to flounder on their own, they are at risk for not being retained and not completing their degree (Leppel, 2001). Students who declare an academic major at enrollment (whether by choice or because they are required to do so) but who are uncertain about whether it is right for them may be at greatest risk for not receiving interventions because they may be perceived as already committed to a major (Steele, Kennedy, & Gordon, 1993) and not in need of additional advising or support.

Noel and Levitz (1985) indicate that students who are undecided about their major course of study are a significant source of attrition in higher education. Attrition is the antonym of retention, which can have various negative implications for students and the institutions (Levitz, Noel, & Ritchner, 1999). The entire campus plays a role in retaining students. The more students are involved and vested in their education, the more likely they are to remain enrolled (Astin, 1993). Retaining college students and seeing them through to graduation is a challenge that often utilizes a wide array of campus resources. Tinto (1993) estimated that less than half, approximately 44%, of students entering college complete their baccalaureate degree from the institution at which they started their collegiate studies. There are many different reasons why students leave college: voluntary withdrawal; dismissal by the

institution due to poor academic performance or disciplinary problems; and/or financial difficulties. When students drop out of school, they leave a particular university (Tinto, 1993), but these students may transfer to another institution and continue their education through graduation. Student persistence in higher education at more than one institution may hurt retention rates at the college or university that they leave, but is a reflection of success for the students who persist to graduation (Levits, Noel, & Ritchter, 1999).

Given that three-quarters of students change their major at least once during their undergraduate studies (Gordon, 1984, 1995, 2007), it seems that all students entering college could be treated as if they are not firmly decided on a major. First-year students are likely to experience uncertainty and some stress about either choosing a major or whether their declared major is right for them. Providing new students with support and opportunities for exploration may reduce some anxiety that students might feel about committing to a major (Gordon, 2007). Research suggests that it is helpful, even during the pre-college selection process, to encourage students to gather as much information as possible about their potential majors via interviews, job shadowing, and research (Rowh, 2003). Students receiving vocational counseling at the pre-college and introductory collegiate level also benefit from reassurance that being undecided about their academic major is an acceptable status (Legutko, 2007). Institutions that counsel all entering students under the assumption that they have some level of undecidedness about their major have seen increases in overall rates of retention (Noel & Levitz, 1985). Students who display commitment to their educational goals and the institution, regardless of academic major, may contribute to persistence to degree completion (Tinto, 1993).

Students who are undecided on or change their major need support and encouragement from the institution, and they need to hear the message that deciding to change their path is an

acceptable process (Gordon, 2007). Academic major selection may be the first important decision a young person makes about his or her future. Unfortunately, not all choices are well informed and thoughtful. There are many factors influencing students' choice of a major in college, including family, socioeconomic background, the students' maturity level, and gender (galotti, 1999; Simpson, 2003; Tinto, 1993). Given the various influences students encounter when choosing a major, it seems reasonable that sometimes the choice of a major will not be a good fit, increasing the probability of an academic major change. One study on academic major selection indicated that students often consider only a small number of choices as a result of a lack of information about majors at the university, curriculum, and potential vocational opportunities (Galotti, 1999). Students make their decisions about their academic major before they establish their own values, causing the situation of foreclosure (Miller & Woycheck, 2003). "Forclosure" can occur when students make decisions based on their limited past experience and close themselves off from exploring new options (Kimweli & Richards, 1999; Gordon, 1999). It seems that giving support and advising to students who are unsure about their major, or who are in transition between majors, may increase retention and graduation rates among students (Stele, Kennedy, & Gordon, 1993).

Providing new college students with an opportunity to explore their options in regard to a major, academic advising and support during this process may contribute to better informed choices, better fit, and greater commitment to the major. Research indicates that students who display a commitment to their choice of major and the university have a higher likelihood of persistence (Robbins, Allen, Castillas, Peterson, & Le, 2006). By taking ownership of their choice of major and feeling vested in the selection process, students may feel more committed to completing their degree. Admission policies at universities vary in the extent to which they

structure academic major selection at enrollment, which may affect students' opportunity to explore their options for a major. Policies that require students to declare a major or at least an academic college from within which they are likely to choose a major may be intended to assure the students are anchored academically within the university and linked with advisors and other resources to enhance retention. Policies permitting students to remain undeclared for some time may provide students the opportunity to explore their options in regard to choosing a major but may not adequately anchor students to key academic resources, such as advising, that are important to their success. Or, given that 75% of students change their major (Gordon, 1995, 2007; Kramer, Higley, & Olsen, 1994), admission policies regarding the declaration of a major may not play an important role in student outcomes at all. This study examined whether there is a relationship between the type of policy governing the declaration of a major for entering students (must declare a major, must declare a college, not required to declare a major or college) and academic delivery models (centralized models, decentralized models, and shared models) in relationship to students outcomes (retention and graduation rates) at universities.

Theoretical Framework

Holland's Vocational Choice Model (Pike, 2006), Tinto's (1975) Student Integration Model, Bean's (1980) Student Attrition Model, Astin's (1984, 1993) Theory of Involvement, Perry's (1999) College Student Intellectual Development Model, and Habley's (Cook, 2009) Advisement-Retention Model are the theoretical models that contribute to the framework of this study on college admission policies and academic advising structures in relation to student outcomes. The combination of the models are used to support the importance of students making choices about their academic major that fit with their interests and aptitudes, the

developmental period when students would be most ready to declare a major, the impact that being academically integrated into the environment, and the offering of congruent advising programs has on retention and student outcomes.

Holland's Vocational Choice Model is used to explain how students choose their academic major in reference to their personalities (as cited in Porter & Umbach, 2006). Allowing students to self-select their academic major is likely to result in choices that are compatible with their personality types (Pike, 2006). The timing of when to make the choice of academic major is important because of the developmental level of the student. Perry's (1999) model of intellectual development does not support that students entering into college are capable of making a decision that is best for the individual due to their dualistic frame of reference. Students in the dualistic stage base their decisions and thoughts on others who they consider to be knowledgeable, which could involve peers, teachers, and college administrators (Perry, 1999). As students progress through their developmental stages, they are more likely to base decisions on their individual viewpoints and experiences. The decision of their academic major is important for their connection to the institution. Students making incongruent decisions that are not a fit between their personality and environment are likely to experience adjustment challenges and are at risk for drop out (Astin, 1984, 1983; Bean, 1980; Tinto, 1993).

Academic advising programs have been identified as a means to curb the forces that can pull a student away from an institution (Habley, 1981). Since academic advising programming is a service students interact with consistently through their time in college, providing developmental services can support retention and commitment to degree completion (Habley, 1981).

Delimitations

The scope of this study on admission policies governing the declaration of a major and academic advising models and their relationship with first to second year student retention and graduation rates is not inclusive of all types of post-secondary institutions. The focus here is on both public and private baccalaureate degree-granting universities. Universities offer a hybrid of liberal arts education, technical skills, and professional degree programs (The Carnegie Foundation for the Advancement of Teaching, 2009). Community colleges and two-year degree granting institutions were not included in the study due to their more limited courses of study and academic major selection process. Associate degree granting institutions offer students a degree in arts or sciences, which are often transitioned into upper-division institutions to obtain a baccalaureate degree. Liberal Arts colleges have specialized missions, focus more on educating the whole person and the development of a well-rounded general education, and can be more attentive to the individual student than universities (Gaff, Ratcliff & Associates, 1997; Levine, 1978; The Carnegie Foundation for the Advancement of Teaching, 1977). Technical and specialized institutions attract students with very specific training and career goals established prior to enrollment (College Board, 2009). This study focused on universities since they serve the majority of American college students; approximately 79% of students enrolled in institutions of higher education are enrolled at baccalaureate degree granting universities (IPEDS, 2009).

Although they are related to student outcomes, this study did not consider campus support resources. Previous research already establishes that academic support and students' utilization of campus resources positively impact student retention and, ultimately, graduation rates (Lau, 2003). The exploratory nature of this study was to identify patterns related to

admission policies governing academic major declaration and academic advising structures in regard to first to second year retention and graduation rates.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

A variety of factors influence student retention and graduation including their pre-college preparation, parents' college experience, individual student characteristics, academic integration, and a sense of connectedness to campus (Astin, 1997; Pascarella & Terenzini, 2005; Tinto, 1993). Two potentially influential factors in student outcomes remain relatively unexplored: institutional policies governing the selection of a major and how academic advising is delivered. Students are at varying stages of decidedness about their academic plans at the time they are first entering college (Gordon, 2007). There are many factors that guide their choice of academic major, including their own thought processes and external influences. Often the choice about their academic major that students make at the onset of their academic career is not the area in which they will finish (Gordon, 2007). Guiding students through the process of academic major selection can be supported via academic advising programs. Academic advising services are the one campus resource that all students encounter during their time in college. The presence of supportive academic advising programs has been linked to increased student retention and degree completion rates (Habley & McClanahan, 2004).

Selection of Academic Major and Student Outcomes

Institutions of higher education have different policies regarding how students select their majors. Policies concerning declaration of academic major during the first year can range from not being permitted to declare through requiring students to declare (Policy Center on the First Year of College, 2002). Students attending baccalaureate liberal arts colleges are more likely to encounter less structure in major declaration early on, and not have to declare an

academic major until at least after their first year (Policy Center on the First Year of College, 2002).

The timing of academic major declaration is important to consider when examining the developmental stage of a young adult entering into college (Kimweli & Richards, 1999). Erikson's theory of identity suggests that this developmental process extends from adolescence into early adulthood (as cited in Kimweli & Richards, 1999). Students entering into college often are still forming their identity and may experience what is called "forclosure" in which they make decisions based on their limited past experience and close themselves off from exploring new options (Gordon, 1999; Kimweli & Richards, 1999). Perry (1999) created a model of college student development that is comprised of nine stages or positions. As students enter into college, they are "dualistic," where there is a right and wrong answer with no ambiguity, so they look to authorities for the answers (Gordon, 2007). Making decisions for traditional-aged first-year students often involves them turning to others to assist them in making decisions, many times including their academic major. Since young adult students entering college may not yet have developed a strong sense of self and definitive decision making skills, they may choose an academic major based on a limited scope of experience and knowledge that ultimately may not fit the student later in college.

Developmentally, college students might benefit from entering into an institution without being required to declare a major (Gordon, 2007). Micceri (2002) reported that students who begin college without a declared major are 15% more likely to graduate than students who declared a major at enrollment. Students who stayed in a major that they selected at the time they enrolled had a graduation rate of approximately 50% (Micceri, 2002). Students who change their major one time during their academic career have a graduation rate

between 70% and 85% (Micceri, 2002). A period between entering college and declaring a major may provide students with time to explore, develop, and, consequently, make more concrete, individualistic, and informed decisions about a major (Beggs, Bantham, & Taylor, 2008; Graunke, Woosley, & Helms, 2006; Kimweli & Richards, 1999).

Levels of structure in admission policies governing the declaration of an academic major at colleges and universities might be characterized as ranging from explorative to restrictive. Some institutions encourage students to make academic major decisions early and have restrictive policies about later changes in an academic major, thereby prompting students to make a decision before they may be truly ready (Beggs, Bantham, & Taylor, 2008). However, allowing students to enter into an environment that promotes exploration of potential majors might put institutional policies more in sync with the developmental stage of incoming students, thereby promoting students' overall institutional commitment and, ultimately, increased retention and graduation (Graunke, Woosley, & Helms, 2006).

Historical Perspective

The concept of a structured academic major that is commonly known today has not always been in existence. From 1636 into the 1800, students seeking post-secondary education were prescribed courses primarily in ancient Greek and Roman literature and Christianity studies (Gaff, Ratcliff, & Associates, 1997). Students saw changes in the late 1800 in higher education when teaching prescribed universal knowledge transitioned into a more free elective system (Gaff, Ratcliff, & Associates, 1997; Levine, 1978; Rudolph, 1977). The rise of the elective system allowed students more freedom in choosing their courses. More flexibility was given with no specialized direction. In the late 1800 the development of specialized and segmented courses of study were introduced, mapping out what would be considered academic

departments and academic majors (Gaff, Ratcliff, & Associates, 1997; Levine, 1978). The academic major/minor system blended the prescriptive methodology and the free-elective system developing a level of specialization for the baccalaureate degree recognized by the labor force (The Carnegie Foundation for the Advancement of Teaching, 1977).

Different types of majors evolved since the introduction of the specialized area of study. The most commonly recognized form of academic major is "disciplinary." Students enroll in a specific concentration or area through an academic department or academic school to obtain their baccalaureate degree (Levine, 1978; Gaff, Ratcliff, & Associates, 1997; The Carnegie Foundation for the Advancement of Teaching, 1977). Interdisciplinary degrees combine two or more academic disciplines to form the major, facilitating students' synthesis of knowledge into a blended subject area (Gaff, Ratcliff, & Associates, 1997). Students have the option of utilizing the interdisciplinary label, but formally declare a dual major or a minor. At some institutions, students may create their own academic major based on a set of criteria prescribed by the institution to meet graduation requirements, but the subject areas for their major are student driven (Levine, 1978). Students entering into college may have limited exposure to academic majors and will often make their choice based on their past experiences (Galotti, 1999). Since the "disciplinary" major is the most commonly recognized, students may not consider an interdisciplinary degree because they made a premature selection.

Academic Major Selection Policies

Students decide on their academic major at different times in their education, either by their choice or by institutional requirement. Some institutions have students declare at the point of entry in attempts to match a student with their academic interest early, which can provide logistical benefits by a balance with faculty loading and physical resources (Levine, 1978). If

students are required to specialize into an academic major prematurely, boredom and change in direction can occur (Gaff, Ratcliff, & Associates, 1997). Students can benefit from utilizing their general education requirements and electives to explore different potential majors early in their college career, to later make a more informed decision on an academic major (The Carnegie Foundation for the Advancement of Teaching, 1977).

Institutional admission policies regarding declaration of academic major vary among different colleges and universities. The structure of declaration of academic major at the time of enrollment can require students to enroll in their discipline specific major, enroll in the academic school or department, and/or delay the academic major enrollment until at least after the second year. The institutional policies concerning when students declare their academic major may vary in rationales. Institutions requiring students to declare a formal major at the time of enrollment often do so because they are leading students to becoming experts in their field of study and choosing a major at the outset of their post-secondary education facilities that goal. For example, Carnegie Mellon University requires students to declare an academic major at the point of entry, encouraging students to specialize in one of their focused disciplines (Carnegie Mellon University, 2009). There are colleges and universities that are not as structured in their admissions policies regarding academic major, but still require students to compartmentalize their academic area. Cornell University, for instance, requires students to declare an academic college, but not a major, to express their academic interest (Cornell University, 2009). Other institutions offer an alternative to declaring an academic major or an academic college at the point of enrollment: students may enter these colleges and universities as "undeclared" through a common enrollment unit within the school. For example, The Pennsylvania State University (PSU) has approximately 80% of its first-year

students expressing some level of uncertainty about their major, therefore PSU provides an academic enrollment unit to advise undecided students, allowing them time to explore their options (The Pennsylvania State University, 2011).

Theory Related to Academic Major Selection

Holland developed a theory of personality and environment to explain vocational congruence or incongruence (as cited in Tracey & Rounds, 1993). Holland's Theory of Vocational Choice is a respected model and has been influential in studying academic major choice (Pike, 2006; Porter & Umbach, 2006; Tracey & Rounds, 1993). Holland's theory divides people and environments into six types: realistic; investigative; artistic; social; enterprising; and, conventional (Tracey & Rounds, 1993). Holland (1993) theorized when people's personalities and environments are closely matched, they are more likely to experience a higher level of success and satisfaction in their occupational/academic pursuits. Holland has assimilated academic major choice into his personality/environment divisions (as cited in Porter & Umbach, 2006). Holland developed six model environments that he matched with academic disciplines: realistic environment with engineering; investigative environments with biology/mathematics/ sociology; social environments with education/health/philosophy; enterprising environments with business/communications/computer science; artistic environments with arts/architecture/music; and, conventional environments with accounting/data processing.

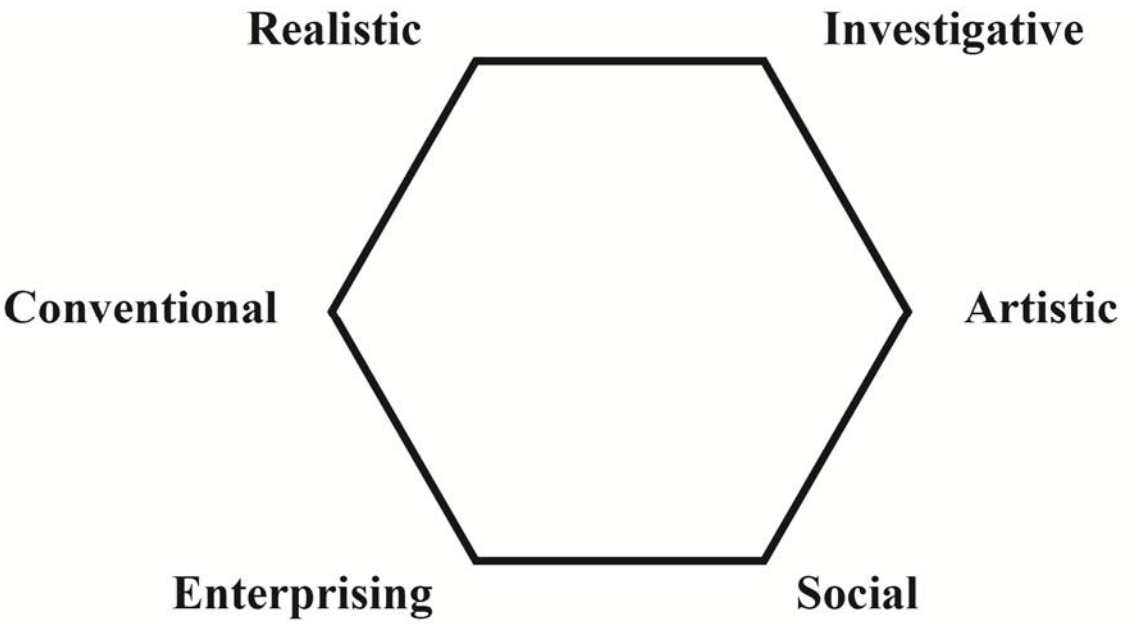


Figure 1. Holland's theory of vocational choice model (Pike, 2006).

When students enter college they have expectations about their upcoming experiences and how they are going to fit with their academic major choice and environment (Pike, 2006). Students will "self-select" their major based on their past experiences and interpretation of their own abilities (Pike, 2006). Counseling students on major choice can be challenging if they do not have a broad range of experiences and have not yet had much exposure to a variety of academic interest areas. College students choose academic majors based on factors such as their personalities, past experiences, familial input, and research (Galotti, 1999; Pike, 2006; Simpson, 2003). Choosing an academic major too early can result in a poor fit, academically or in terms of the student's own goals or sense of self. It seems that prematurely choosing a major could result in an incongruent fit between the student and the academic environment. When students experience mismatches, either academically or socially, they experience stressors that can result in institutional departure (Tinto, 1993). When students have a

disconnection between their expectations and what they are actually experiencing, satisfaction typically decreases, which can negatively impact achievement and retention (Pike, 2006). If students in college are struggling to adjust and find their fit, then a lack of integration, socially or academically, can impact their satisfaction and desire to continue at the university (Astin, 1993; Tinto, 1993). Integration, involvement, and having a sense of belonging, all encourage students to be retained at a university, and to ultimately persist in attaining a degree (Astin, 1993). Delaying the declaration of an academic major choice may encourage students to explore their potential interest areas in an attempt to make a thoughtful, informed, and congruent choice. Or, forcing students to choose a major or college, even knowing that they are likely to change majors, may connect them with academic advisors and other valuable resources.

Holland (1985, as cited in Porter & Umbach, 2006) theorizes that students choose an academic major that is compatible with their personality and individual characteristics. A challenge arises for students when they chose a major that is incongruent with their personality and they find that they are not compatible with their academic environment. When students experience this state of disequilibrium, they are in a state of transition and are in need of campus resources (Pike, 2006). Academic advisors and other campus staff should try to understand the individual student and his or her personality when counseling them about academic major choice (Porter & Umbach, 2006).

Factors Influencing the Selection of Academic Major

The choice of academic major has been reported to be a source of regret for some students upon graduation (Beggs, Bantham, & Taylor, 2008). Since academic majors are not always chosen based on sound research and matched with students' interests and aptitudes, it is

likely that some students will not be satisfied with their choice. Students may also enter into academic majors based on their gender or social stereotypes that put pressure on students to follow certain paths (Pritchard, Potter, & Saccucci, 2004). The fundamental decision making process of incoming students might be swayed by several factors, which may not be related to the actual subject matter of the academic major. Thus, requiring students to choose an academic major at the onset of their education could prove to be negative for students who have not made an informed choice.

Family support is an integral puzzle piece when trying to explain strategies for increased retention (Allen, 1999; Elkins, Braxton, & James, 2000). Family influences impact students' decisions to attend college, select a major, and persist to graduation (Simpson, 2003). Educational levels of parents and family experiences contribute to the decision-making process surrounding higher education (Simpson, 2003). The greater value families place on education, the more likely children are to pursue post-secondary education. Fathers seem to be more encouraging of technical majors such as business and engineering, while mothers seem to promote "people-oriented" majors such as education and social work (Simpson, 2003). The socioeconomic status (SES) of the family can be another factor that influences academic major selection for a student. The level of familial income impacts the location of the family residence, thus dictating the school district the child attends. Depending on SES, families may decide to send their child to private versus public primary/secondary schools (Muraskin & Lee, 2004). A student's learning opportunities and school resources have been linked to student achievement (Muraskin & Lee, 2004). Past experiences, both socially and academically have been linked to how students make decisions about their academic major choices (Pike, 2006). Students may base their academic major selections on earning potential and job status (Beggs,

Bantham, & Taylor, 2008). Financial concerns have also been linked as being an external contributor to student attrition from higher education (Allen, 1999; Braunstein & McGrath, 1997; Lufi, Parish-Plass, & Cohen, 2003). External forces can influence a student trying to choose an academic major, including institutional policies from the school that they will be attending (Leppel, 2001). Person-environmental match is important when considering student retention. Thus if students are making choices based on extrinsic motivators, their academic major selection may not be the best fit (Porter & Umbach, 2006).

An individual's learning style could also impact the direction a student will choose for an academic major (Amany, 2001). Students who tended to be right brain dominant gravitated toward arts/social sciences/education, while left-brain dominant students leaned toward math/sciences/business (Amany, 2001). Understanding a student's learning style assists the academic advisor in efforts to match the student's individual characteristics with their academic major selection (Amany, 2001).

Academic Major, Retention, and Graduation

Throughout the literature on retention of college students, the first year is critical in the likelihood of ultimate persistence (Allen, 1999; Astin, 1994; Gardner, 1986; Tinto, 1975-1993). There is a large body of research that exists surrounding the first year of college, supporting the theory that the first year of college is the time of the greatest student attrition (Levitz, Noel, & Richter, 1999; Pascarella & Terenzini, 2005, Tinto, 1975, 1993). First-year students may vary in level of commitment to their educational goals, academic major, and their institutional commitment. The selection of an academic major is an important process early in a student's collegiate career. There are mixed opinions as to how students' levels of uncertainty about an academic major may affect student retention (Graunke, Woosley, &

Helms, 2006). The decision making process to select an academic major is often not based on research and facts (Allen & Robbins, 2008). Theories and empirical research point to a number of critical factors relevant to retaining students from the first to second years of college (Gerdes & Ballinckrodt, 1994; Levitz, et al., 1999; Schnell & Doetkott, 2002-2003; Tinto, 1993) and institutions that place an emphasis on retaining first-year students improve their graduation rate by reducing freshmen attrition (Levitz, et al., 1999).

Student Retention and Graduation Rates

The question of how to retain and foster graduation among undergraduate students at institutions of higher education is a challenge that almost every college and university encounters (Lounsbury, Saudargas, & Gibson, 2004; Tinto, 1993). Nationally, college retention rates vary among different types of institutions. Traditionally, dropout rates from the first to the second years are higher at two-year institutions than at four-year institutions (ACT, 2008; Levitz, Noel, & Richter, 1999; Tinto, 1993). Dropout rates are also higher at public institutions than at private colleges and universities (ACT, 2008; Levitz, et al., 1999; Tinto, 1993). The variance in the dropout rates are attributed to a host of student-related factors, including their level of institutional commitment, academic preparedness, social integration, external circumstances, and the campus resources available to them (Astin, 1997; Levitz, et al., 1999; Tinto, 1975, 1993). American College Testing (ACT) (2008) found the national retention rate for four-year public institutions of higher education in 2008 was 65.7% and for private doctoral degree granting institutions the retention rate was 80.4%. Degree completion rates vary nationally between public and private institutions. The 2008 national degree completion rate for public institutions was 52.5% versus private doctoral degree granting institutions holding a degree completion rate of 63.4% (ACT, 2008).

Retention, Attrition, and College Impact Models

Three theoretical models of college student attrition and retention dominate the literature: Tinto's (1975, 1993) model focusing on the role of social integration in student retention; Bean's (1985) model of attrition based on theories of employment and worker commitment; and Astin's (1975, 1997) model emphasizing student involvement as a key developmental factor in student outcomes. All three models rely on students' connection with the college to account for student outcomes.

Tinto's student integration model. Tinto (1975, 1993) built a theoretical model of student retention with roots stemming from sociology, economics, and education. Tinto postulated his model from prior work done by William Spady, a fellow sociologist. Spady (1970, 1971) formulated an initial student attrition model based on the premise that students will succeed in college if they become socially integrated, thus increasing institutional commitment, resulting in student retention. Tinto and Spady utilized the fundamentals in Durkheim's theory of suicide trying to explain student attrition (as cited in Tinto, 1975, 1993). According to Durkheim's theory, as cited in Tinto's work, suicide may occur if an individual is lacking moral and social integration into the larger society (Tinto, 1975). Spady and Tinto adapted Durkheim's theory to parallel with student attrition from college, noting a key to student retention is social and academic integration into the institution (Tinto, 1975, 1993).

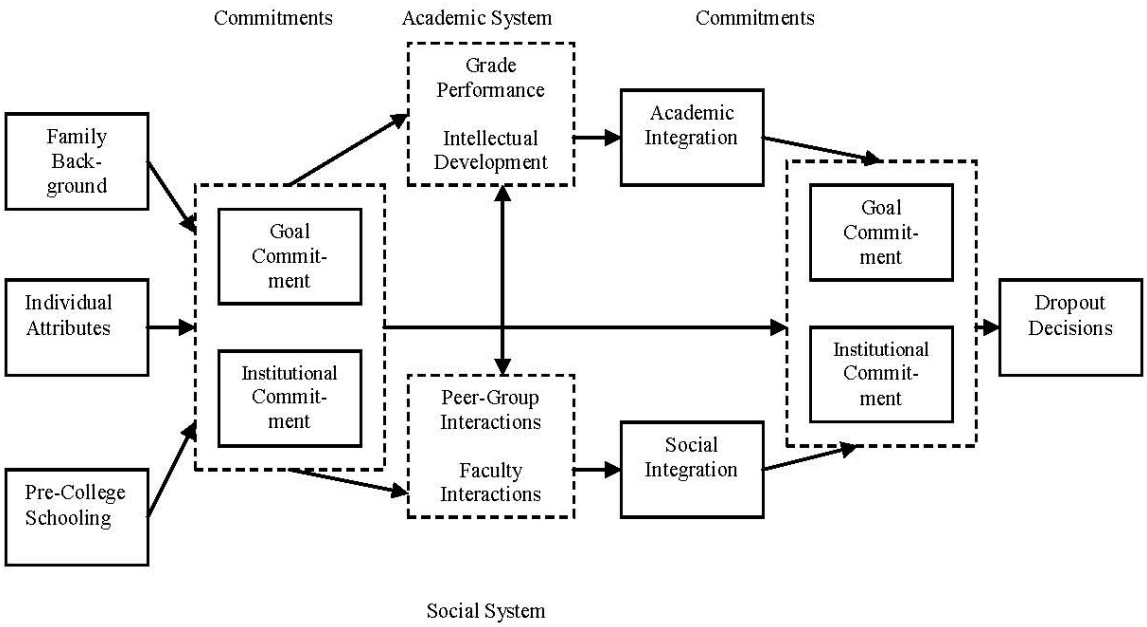


Figure 2. Tinto's institutional departure model (Tinto, 1975).

Tinto (1975, 1993) developed his longitudinal, predictive theoretical model from the descriptive nature of Durkheim's work (as cited in Tinto, 1975, 1993) by adding individual student characteristics and institutional factors to predict student movement in and out of college. Reasons that students may leave an institution of higher education are various and span across several dimensions. Tinto (1993) identified eight different factors that predict student departure from college: intention; commitment; adjustment; difficulty; congruence; isolation; obligations; and, finances (Tinto, 1993). Tinto (1993) identifies intention and commitment as key characteristics of entering students, with the next four factors becoming important to retention once students are enrolled, and the later two issues as external factors influencing students during their stay in college.

Students enter into college with varying intentions toward their future plans. Some students may not be looking for degree attainment or their goals change through the course of

their educational process. Intention can be measured at the onset of a student's collegiate career, but can remain "soft" as a student experiences educational life (Tinto, 1975, 1993). Commitment is another variable that can be assessed in the beginning of a student's journey in college, but can change as time progresses (Tinto, 1993). Goal commitment is related to individual dedication and institutional affiliation, thus influencing a student's decision to leave an institution (Tinto, 1975). Commitment and intention may be measured by year-to-year retention and graduation rates.

Once a student enters into college there is a transition phase that calls for adjustment into the new atmosphere. A student's ability or inability to adjust is usually evident within the first few weeks of the semester (Tinto, 1993). Adjustment to college life can be affected by personal characteristics along with institutional factors, which can support students' success or challenge them to the point of departure (Tinto, 1993). Students may encounter academic difficulty, which could be a precursor to departure, or lead to eventual integration into the campus community (Tinto, 1975, 1993). Integration encompasses both social and academic components. Tinto (1993) acknowledges that students can become independently engaged socially or academically and still leave the institution. The typical pattern for students who become overly involved socially is that they may not be successful academically, thus resulting in an academic dismissal. The opposite can be true for students who become completely submerged academically; they may voluntarily withdraw due to a lack of social integration (Tinto, 1993). When students find a balance socially and academically, they can experience congruence with the institution. If students are not meshing well into their new social and/or academic home and feeling isolated, they can experience incongruence, increasing their

likelihood of departure (Tinto, 1975, 1993). Isolation can be related to incongruence on campus, ultimately increasing the likelihood of the student leaving.

A gap identified in Tinto's theory was the incorporation of external factors that affect student persistence (Bean, 1985; Cabrera, Castaneda, Nora, & Hengstler, 1992). Tinto (1993) eventually incorporated external obligations and financial concerns to his theoretical model. Students may experience shifts in their education plans due to external obligations, such as family commitments, distance learning, and employment contributing to student dropout (Tinto, 1993). Financial constraints may cause students to voluntarily leave an institution, despite all other factors being congruent. Students may find themselves unable to continue in higher education altogether or be unable to remain at their current institution, thus still resulting in attrition.

Bean's student attrition model. Bean developed his theory of student attrition parallel to the research and literature surrounding employee turnover in the work setting (Bean, 1985). Bean built his model around a set of variables that were applied previously to an employee turnover model derived from research conducted by Price and Mueller in 1981 (as cited in Bean, 1985). In the so-called "industrial model" of student attrition, Bean identified 13 variables that would impact student dropout from college (Bean, 1985), that fall into three categories: satisfaction; environmental factors; and, background characteristics. Bean adapted his measures for use in higher education from a business context, making his student attrition model more relevant. Bean's student attrition model is similar to those of Spady (1970, 1971) and Tinto (1975, 1993) in that all three share the commonality of assessing a student's background and the degree to which interaction with the campus environment relates to student satisfaction and institutional commitment.

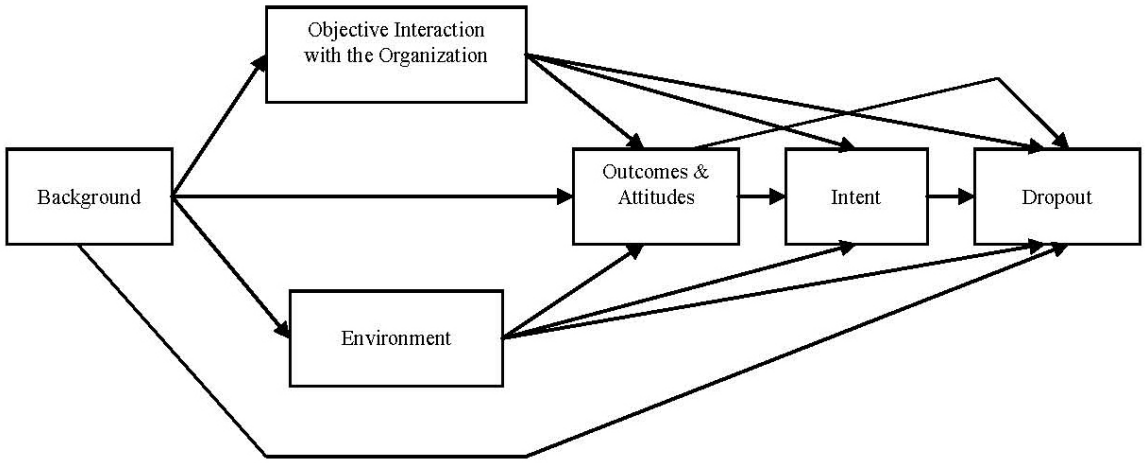


Figure 3. Bean's student attrition model (Bean, 1980).

Bean's model acknowledges that staying in college could be socially motivated, but his model strongly supports the premise that the decision to remain in college is psychologically motivated (Bean & Metzner, 1985). Students develop intentions about their desire to remain enrolled and at the same time, they are forming attitudes that influence their behavior (Bean, 2005). Psychological factors such as confidence and competence become linked with institutional fit and loyalty, ultimately influencing student retention (Bean, 2005). A student's "intent to persist" is one of the most influential factors in student's decisions to follow through to degree completion (Bean, 1983, 1985). Bean's (1983) model of attrition identifies external factors such as family approval, friend's views of education, and financial constraints as additional influences that can pull students from an institution and not graduate.

Astin's theory of involvement. Astin is the founder of a developmental theory in higher education emphasizing student involvement within a college community. Astin's theory of involvement has a direct link to student retention and degree completion. According to research conducted by Astin in 1975, situations in which students were involved in campus

activities increased the likelihood of retention at their current institution (Astin, 1984). Astin proposed several circumstances and examples of involvement that could foster retention efforts, such as living on-campus, holding a part-time job on campus, participating in extracurricular activities, and increasing interaction with faculty/staff (Astin, 1984, 1997).

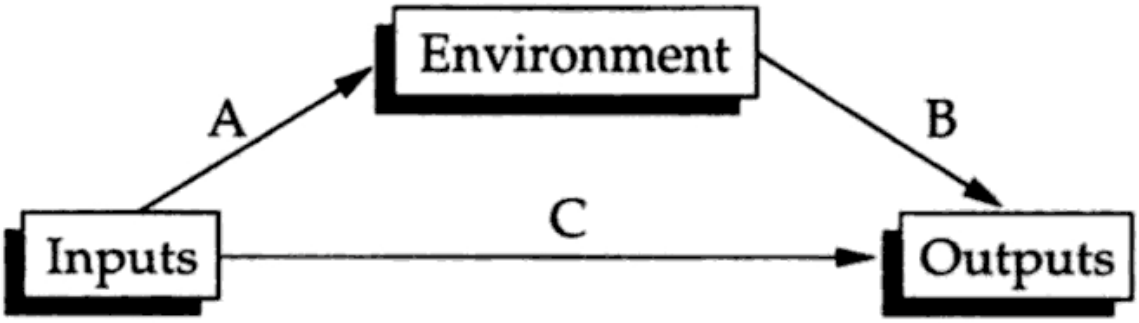


Figure 4. Astin's I-E-O model (Astin, 1984).

Astin's theory of involvement is behaviorally based as opposed to Tinto's interactionist theory (Astin, 1984, 1997; Lounsbury, Saudargas, & Gibson, 2004; Tinto, 1993. Astin's Input-Environment Outcome (I-E-O) Model outlines student's inputs, environment, and outcomes. Student inputs include pre-college experiences, expectations, and personal characteristics; environment encompass where a student lives in college, interactions with faculty, academic and social experiences; outcomes can be measured with overall satisfaction, retention, and graduation rates (Astin, 1993). The creation of a supportive educational environment is critical in producing positive student outcomes, while factoring in a student's personal characteristics (Astin, 1993).

Astin (1984) identifies motivation as a component of involvement, but indicates that what a student does in terms of actions is integral in becoming involved. Students themselves

are responsible for seeking opportunities to learn and become engaged with their surrounding environments, instead of allowing the outside world to dictate their level of involvement (Astin, 1997; Pascarella & Terenzini, 1991). According to Astin (1984, 1997), an emphasis on college campuses should focus on the behavior of students to encourage involvement. Academic settings that encourage student participation, interaction, and ultimately involvement can be viewed as positive learning environments (Astin, 1984, 1997). In conjunction with Astin's theory, campus administration should be most concerned with student time as the most critical resources on campus (Astin, 1984). Time allocated toward campus activities and resources can be equated with increased chance in retaining that student at their current institution (Astin, 1984, 1997).

Academic Major Selection, Retention, and Graduation Rates

Where should institutions place their efforts in supporting first-year students to enhance student outcomes and what role does selection of a major play in freshman retention? Theory and research points to two categories of characteristics that must be considered in attempting to answer these questions: student and institutional.

Student characteristics. To capture a picture of students in a holistic light, background characteristics of individuals are necessary when trying to predict student persistence (Tinto, 1975, 1993). According to Tinto (1993), individual student attributes such as sex, race, and aptitude are related to their ability to succeed in college. Students of varying ethnic and racial backgrounds may face challenges when entering into the college setting, depending upon the composition of the campus population (Elkins, Braxton, & James, 2000; Lang, 2001-2002; Tinto, 1993). Students' gender and race also influence how students select an academic major (Betz, Heesacker, & Shuttleworth, 1990; Song & Glick, 2004). A student's

pre-college academic experiences have predictive value in determining attrition: students displaying low high school grade-point-averages and standardized test scores are more likely to have academic challenges in their first year of college (Braunstein & McGrath, 1997; DeBerard, Spielmans, & Julka, 2004). Similarly, individual student background characteristics strongly influence degree completion rates (Astin, 1993; Pascarella & Terenzini, 1991) in the same manner as first to second year retention. Students will come to college with a range of academic abilities, pre-college experiences, family socioeconomic status, and being a first generation student, all of which impact how a student will perform in college (Pascarella & Terenzini, 1991). The inputs that a student will bring to college can have positive or negative impact on them as they attempt to integrate into their new environment (Astin, 1993). Research has supported that students not being academically prepared, coming from a lower socioeconomic background, and/or being a first generation student can all have negative reflections on student outcomes, including retention and graduation rates (Astin, 1993; Pascarella & Terenzini, 1991; Tinto, 1993).

In addition, students' personal characteristics and experiences shape their expectations and commitment to the institution (Tinto, 1975, 1993). Tinto (1993) indicates that it is the level of commitment that ultimately influences a student's decision to persist at the existing institution. Commitment can be assessed in two forms, commitment to the institution and to the goal of completing a college education (Tinto, 1993). For example, a student who is undecided about an academic major may not leave a school as long as the student is committed to personal educational goals and to the academic institution (Graunke, Woosley, & Helms, 2006).

Students may also have a difficult time in the transition from high school to college life. The challenges of college level course work, homesickness, loneliness, and stress may promote students to dropout if their coping skills are not adequate to adapt to their new environment (Gerdes & Mallinckrodt, 1994; Lau, 2003). When students are in an academic major that is congruent with their personality and goals, they may thrive and cope differently with adjustment stress than do students with incongruent majors (Eagan & Walsh, 1995).

Gender also is a factor shaping the manner in which students cope if they are in an incongruent environment. Gender role socialization leads some men and women to choose academic paths that fit with traditional gender roles (Galotti, 1999). Men and women choose majors in varying manners and for different reasons (Galotti, 1999; LeFerve, Kulak, & Heymans, 1992). Men and women have been found to pursue fields in order to avoid another field. Making a choice based on avoidance is not actively making an actual choice, but diverting away from a particular subject area (LeFerve, Kulak, & Heymans, 1992). Women are branching out into non-traditional majors at a higher rate than men entering female-dominated fields (Betz, Heesacker, & Shuttleworth, 1990). Gender imbalance in majors is a result of traditional gender role socialization (Porter & Umbach, 2006).

There are gender differences even in the selection of high school course work, which may affect future choice of college major. Trusty (2002) conducted a study and found that high school women who took more math intensive courses in high school were more likely to enter into technical majors in college. The courses students take prior to college are related to academic achievement in post-secondary education (Trusty, 2002). Women still are less represented in technical college majors (2002). In general, women seem to gravitate toward majors that emphasize language skills such as teaching and humanities, while men are more

concentrated in majors emphasizing mathematical skills such as business and engineering (Betz, Heesacker, & Shuttleworth, 1990; Eccles, 1994). Some women may even avoid majors that require a moderate amount of mathematical skills (LeFevre, Kulak, & Heymans, 1992).

Race and ethnicity also influence students' post-secondary education-related decisions (Song & Glick, 2004). Members of traditionally underrepresented populations may be influenced by factors other than academics when choosing a college or university, including financial aid and proximity to home (Kelpe Kern, 2000). A study conducted by Kelpe Kern with urban high school students indicated that minority students seem to choose institutions of higher education that are close to home (Kelpe Kern, 2000). The conclusion of Kelpe Kern's study pointed to the importance of environmental fit for the academic requirements, financial aid concerns, and recognizing the importance of location (Kelpe Kern, 2000). Asian-American students appear to vary in a different way than other racial groups: choice of academic programs with a higher earning potential is related to economic success among Asian-American students in the United States (Song & Glick, 2004). Song and Glick also found that Asian-American women are more likely to pursue a male dominated major/occupation than their Caucasian counterparts (Song & Glick, 2004). Variance in college major choices with women and minorities can encourage differentials in earning potential (Porter & Umbach, 2006). A student recognizing the earning differential may be influenced to choose an academic major that is not a true fit with their personality, but instead is swayed by external factors.

As a result of greater access to higher education, there are a wide variety of students present on college campuses. With increased access, focus on multicultural integration is a priority on campus (Lau, 2003). Some racial/ethnic minority students face challenges in

transitioning into college due to unpreparedness from high school, lack of family support, and financial stains (Lang 2001, 2002; Lau, 2003; Tinto, 1993). Students with physical and/or emotional challenges may also need additional support to promote academic and social success when entering into college (Tinto, 1993). Colleges and universities usually offer a variety of different types of services to promote student success, including transition programs, mentoring, counseling/advising services, academic support systems, and disability services (Lang 2001, 2002).

The number of part-time students also is growing on college campuses. The proportion of part-time students is nearly 40% at two-year and four-year institutions in the United States (Laird & Cruce, 2009). Part-time students bring a set of challenges for institutions of higher education with respect to their interactions and connections to the school. Part-time students are typically commuters and usually focus solely on the educational aspects, as compared to full-time students (Laird & Cruce, 2009). Retaining students that are not connecting to the institution socially and academically can be challenging (Tinto, 1993). Personal constraints of part-time students, such as jobs, financial limitations, and caring for families may stand as obstacles for this population in becoming fully integrated into the campus community (Laird & Cruce, 2009).

Students who do not have clear educational goals are at risk for not progressing past their first year of college and will not complete their degrees (Gordon, 2007). Types of academic programs that are designed to increase retention via working with students who are undecided on a major that have proven successful are freshman seminar courses, tutoring programs, and academic advising interventions (Habley & McClanahan, 2004). Assisting students to choose a major is a complex process that can be influenced by internal and external

sources. A mismatch between the student and his or her environment, in this case the college major, can result in an increased risk of attrition (Pike, 2006). Students choosing their academic major based primarily on what is expected of them, rather than what is of intrinsic interest to them, may experience a disconnection between their person and environment with a resulting increased risk of attrition (Leppel, 2001). Academic major outcomes are more ideal if there is a match between the person and the environment (Betz, Heesacker, & Shuttleworth, 1990).

Institutional characteristics. A key to student success in college is to have academic and social integration, which creates an atmosphere of belonging and connectedness (Astin, 1984; Tinto 1975, 1993). One proven method to increase student retention and degree completion is for the institution to promote a high level of involvement between faculty, campus resources staff, and students (Lau, 2003; Tinto, 1993; Pascarella & Terenzini, 1991). Student interaction can be facilitated through interactive classroom lessons, outside of the classroom activities, advising sessions, and research opportunities (Lau, 2003).

Involvement in campus life is critical to student persistence and increased retention, specifically in the first year of college (Astin, 1984; Levitz, Noel, & Richter, 1999; Schnell & Doetkott, 2002, 2003). At the institutional level, a diverse assortment of opportunities should be offered for the students to engage themselves socially. Involvement can take on many forms ranging from participating in athletics, clubs, student organizations, living on-campus, working on-campus, and working in collaboration with faculty (Astin, 1984).

First-year programmatic offerings at an institution of higher education can be advantageous for student retention. Students entering college may benefit from orientation programs to assist in their transition process into school (Gardner, 1986). Extensive evidence

shows that providing a first-year seminar course to all incoming students promotes increased retention from the first to second year of college (Gardner, 1986; Lau, 2003; Raymondo, 2003; Schnell & Doetkott, 2002, 2003; Siegel, 2003). Effective retention programs are long-term and involve the entire campus community to promote cohesiveness and seamless service (Levitz, Noel, & Richter, 1999). A leading researcher in studying first-year students, Gardner (1986) indicates that the first-year experience can dictate the success of a student through their collegiate career (Barefoot, 2004). The first year of college is a critical time of transition, which may distract students from their academic responsibilities. Supportive orientation programs and developmental academic advising may provide the structure needed for a student that is not decided on an academic major (Gordon, 2007).

Social and academic support services can be vital in the effort to retain students in college. Faculty and professional staff are involved with the retention of current students by providing varying levels of support, inclusive of academic, emotional, and/or personal (Lau, 2003; Raymondo, 2003). Supportive institutional personnel and campus services are also linked with higher rates of degree completion (Pascarella & Terenzini, 1991). Institutions of higher education assist students in becoming more integrated into the campus environment by providing counseling services to students that may be at risk for becoming isolated and uninvolved. Through campus support systems, students may be more likely to be retained at their institution due to an increased feeling of belonging and involvement (Astin, 1984, 1997). Academic advisors working together with students to solidify their academic major choice will further enhance the feeling of being connected to their academic major and the institution (Hale, et al., 2009). Academic advising programs that focused on supporting the developmental needs of the students can be an influencing factor for increased graduation rates

on college campuses (College Board, 2011; Muraskin & Lee, 2004). The structure of the academic advising delivery model with either via faculty or staff advisors does not seem to impact graduation rates, but the just the existence of a program is the influential factor (Muraskin & Lee, 2004).

The institution itself can be an influence on students' selection of an academic major. Universities vary in their admissions policies regarding the declaration of academic majors. Some institutions provide university divisions specifically designed to support students that are exploring their academic major choices (Gordon, 2007). In this type of structure, undecided students are easily identified and are provided a high level of support and supervision during their exploration process (Gordon, 2007). Gordon (1998) has identified two types of undecided students, the tentatively undecided and developmentally undecided. The tentative group seemed to be comfortable with being relatively unsure and was on the verge of making a decision; meanwhile the developmentally undecided students were not ready or able to decide (Gordon, 2007). The degree to which university policies structure students' declaration of an academic major is an important factor to consider because if students are not developmentally ready to declare a major but are required to do so, their choices may result in inappropriate academic major selections. Students are at different levels of decidedness when they enter college whether they are declared or undeclared on an academic major (Steele, Kennedy, & Gordon, 1993). If the admission structure is not flexible and forces a student to choose an academic major, some students will not go into the selection process well-informed, prepared, or mature enough to decide (Galotti, 1999). Alternatively, if the admissions policy is flexible, students will have time to explore and develop their academic major. However, if students are not taking advantage of university resources and advising centers, they may not become

connected with an academic area or the university at large if they are not forced to declare a major at the point of admission (Tinto, 1993).

Academic Advising and Student Outcomes

Academic advising on college campuses has evolved from simply providing academic guidance to a more comprehensive service focused on student development (Petress, 1996). The theoretical standpoint of engaging the whole student seems to place responsibility in the hands of faculty and student affairs administrators. Changes in student populations seem to be calling for more collaboration between faculty and administration to properly educate the unique students (Kuo, Hagie, & Miller, 2003; Tuttle, 2000; Wolf-Wendel & Ruel, 1999). With greater access to higher education, there is a more diverse population of students attending college campuses nationwide. Students vary in age, socioeconomic status, gender, race, ethnicity, personal experiences, and the like, which necessitates the importance of individualized attention from both faculty and administration to capture the diverse needs of today's college student (Syverson, 2007). Recognizing the campus culture and goals of the institution, academic advisement models can be adopted to fulfill the overriding mission.

Historical Perspective

Defining academic advising in broad terms is appropriate to understand the fundamental premise for academic advising organizational structures, delivery systems, and models. Actual delivery of academic advising services and programs can take a plethora of forms, but the fundamental definition of academic advising seems to have remained constant. O'Banion (1972) defined academic advising as "A process in which advisor and advisee enter into a dynamic relationship respectful of the student's concerns. Ideally, the advisor serves as a teacher and guide in an interactive partnership aimed at enhancing the student's self-

awareness and fulfillment" (O'Banion, 1972, p. 63). The National Academic Advising Association's (NACADA) current definition is:

> Academic advising is an intentional educational process that requires concern for and consideration of all these fundamental goals. Of particular importance to academic advising are: teaching students to understand the meaning of higher education; teaching students to understand the purpose of the curriculum; and fostering students' intellectual and personal development toward academic success and lifelong learning. Though it may vary from one context to another, in every setting academic advising is a multidimensional and intentional process, grounded in teaching and learning, with its own purpose, content, and specified outcomes. (NACADA, 2004)

The practice of academic advising, as we currently know it is relatively new. The acknowledged founder of academic advising programs, Charles W. Eliot from Harvard, appointed his first administrator to take charge of an advisement initiative in the late 1800 (Tuttle, 2000). During the same time, Johns Hopkins University developed a system of faculty advisors (Cook, 2009). In the early 1900s, college curriculums became more complex, which placed greater demand for specialization of counseling services into the categories of personal, vocational, and educational (Cook, 2009). From the initial establishment at Harvard, most colleges began to create advising programs by the 1930s (Tuttle, 2000).

As advising programs began to become more prominent, there was an emphasis placed on educating the entire student on aspects of life, academia, and social interactions. Students were to be educated holistically, providing a unique collegiate experience to each individual (Wolf-Wendel & Ruel, 1999). In the 1960s academic advising delivery models included

faculty, centralized advising centers, and paraprofessional advisors (Cook, 2009). O'Banion (1972) was the original theorist who transitioned academic advising from a prescriptive model to a more holistic developmental model form of academic counseling. At the same time, Burns Crookston was working independently to link theories of student development with academic advising (Cook, 2009; Habley & Gordon, 2000).

In the early 1980s Habley established the Advisement-Retention Model (Cook, 2009). The major emphasis in Habely's model was that academic advising was to be a developmental process and be student centered (Cook, 2009). Habley's model identified seven types of delivery models for academic advising (Habley & Gordon, 2009).

The NACADA was established in 1979 (Cook, 2009). NACADA has taken academic advising into the 21st century. NACADA was the organization that developed a set of core values for the profession of academic advising. Academic advisors have influence over student development at intuitions of higher education due to their regular student contact and encompassing institutional vision (NACADA, 1994). The core values for the profession of academic advising are recommended as a framework to be integrated into the institutional mission, advising delivery system, and individual advisor philosophy (NACADA, 1994). Academic advisors have many roles, not limited to their responsibility to students, assisting students in making informed decisions, promoting student development, acknowledging the campus environment/climate, serving as referral agents, and maintaining responsibilities to their institutions/higher education/community (NACADA, 1994).

Advising Models

The organizational structures of academic advising programs and how services are delivered vary depending upon the specific needs of a particular institution. Assessing

programmatic effectiveness of advising units, organizational structures and academic advisement models are considered in conjunction with the institutional mission, environment, and future goals (Kuhtmann, 2004; Pardee, 2004). When choosing the type of delivery system, an environmental scan is necessary to determine the type of programming that would be effective for the individual institution. There are seven types of advising structures: shared models (split, supplementary advising, dual, and total intake); decentralized models (satellite and faculty only); centralized model (self-contained) (Habley & Gordon, 2000; Kuhtmann, 2004; Pardee, 2004). The prevalence of each type of system varies depending on the size and type of degree granting institutions.

Shared models. Shared delivery systems combine centralized and decentralized to form an integrated model. Institutions implementing the shared system will have a centralized advising center along with faculty advisors from their respective departments (Pardee, 2004). There are several types of shared advising models: supplementary; split; dual; and, total intake are all forms of shared advising but vary in how students receive academic guidance.

Supplementary advising uses departmental advisors and an advising office to provide support to the individual departments (Kuhtmann, 2004). The advising center may also provide training, handbooks, and resources to the academic departments. Split advising models share advisees between department advisors and advising staff in a central administrative unit. It is common that students who have a declared major will be assigned an academic advisor in their academic unit and undeclared students will have an academic advisor in the advising resource center (Habley & Gordon, 2000).

Dual advising models have two academic advisors that are responsible for each student. One advisor is in a central advising unit and the other is a departmental advisor (Habley &

Gordon, 2000). Students who are not declared in an academic major will have their advisor in the advising center until they declare a major. Once a major is declared, students will then obtain their second advisor in their academic departmental home (Habley & Gordon, 2000).

Total intake advising models occur at institutions that require students to enter as an undeclared student. All students are assigned an academic advisor in an advising center until they declare an academic major, having a certain number of credits, firm grade point average, or completion of general education requirements (Habley & Gordon, 2000; Kuhtmann, 2004).

Decentralized models. A decentralized model is another option when designing institutional advising program. In a decentralized advising delivery structure, students radiate out into academic departments to receive academic advising services. Faculty are the most prevalent advisors in a decentralized model (Pardee, 2004). Habley identified two decentralized models; faculty-only and satellite (Habley & Gordon, 2000).

Faculty-only decentralized advising models have student receive advising solely from faculty advisors within academic departments. Students that have declared an academic major are advised by faculty in the same academic department as their declared major, while undeclared students are advised by various faculty within the institution (Kuhtmann, 2004).

Satellite advising models utilize advising offices within academic sub-units (Kuhtmann, 2004). Students may have a faculty academic advisor during their schooling, while the advising offices see the students at the time of enrollment and graduation (Habley & Gordon, 2000). Undecided students will often have an academic advisor in a central administrative unit at the university level (2000).

Centralized model. Centralized academic advising has only one model, which is self-contained advising provided through a central, administrative program. The self-contained

model utilizes faculty and professional advisors under one administrative unit (Pardee, 2004). Most centralized advising centers utilize professional advising staff in an advising center and rely on faculty only for assistance when specifically needed (Pardee, 2004).

Development of Academic Advising

A contribution made to academic advising in the 1970s shifted academic advising from clerical functions to become a more interactive process (Crookston, 1972). The general role of an academic advisor is to provide assistance to students through promotion of academic success and social integration. Some of the primary responsibilities of an academic advisor include advisement on degree completion requirements, general education options, referral services to campus resources, and maintaining current academic records for their advisees (Tuttle, 2000). Several reports (Crookston, 1972; Frost, 1991; Petress, 1996; Pisani & Stott, 1998) support the premise that providing only academic advice/instruction is not sufficient in educating the student holistically, uniquely, and successfully. Developmental academic advising differs from traditional/prescriptive academic advising, by offering a more encompassing service to students entering into higher education.

In general, academic advising is the one service that students are consistently exposed to during every semester while in college (Grites, 2001). The services, referrals, and support that academic advisement programs offer go underutilized (Girtes, 2001; Light, 2001). Winston, Miller, Ender, Girtes, and Associates (as cited in Girtes, 2001) pinpoint seven essential conditions needed for developmental academic advising to be delivered. Winston, et al. indicates that academic advising/advisors is/are “a continuous process, concerned with quality-of-life issues, goal-related, a caring human relationship, models for students to emulate,

integrate the expertise of both academic and student affairs professionals, utilize as many campus and community resources as possible" (Girtes, 2001, p. 128-129).

Developmental advising stresses the interaction between the student and their advisor. The ultimate result of developmental advising is for the student to become engaged in the learning environment inside and outside of the classroom (Crookston, 1972). Through creation of partnerships with faculty, a student will likely become more integrated into the campus community, which ideally produces a sense of belonging, congruency and contentment (Pisani & Stott, 1998). Research conducted by Astin (1984), Bean (1980, 1983), and Tinto (1975, 1993) show that retention and persistence to graduation is based on students becoming involved in their education, integrating academically/socially, and having congruency with the campus culture.

A comparison between developmental academic advising versus prescriptive academic advising uncovers many differences. A primary point at which the two advising structures diverge is in the manner that information is passed between advisor and advisee. Developmental academic advising creates an interactional learning environment, students and faculty engage in a power-with relationship and information is gathered utilizing the discovery method (Broadbridge 1996; Crookston, 1972; Frost, 1991; Kadar, 2001; Saving & Keim, 1998). Through the creation of a shared sense of responsibility between the advisor and student, the advisees take an active role in their decision-making processes, problem solving, and ultimately their own success. Research surrounding student persistence indicates if students hold an internal locus of control they are more likely to be committed to higher education and less likely to experience dropout (Lufi, Parish-Plass, & Cohen, 2003).

The utilization of developmental academic advising strategies could disseminate the traditional hierarchical power structure found in educational institutions by empowering students to be accountable and responsible for their own fate (Kreisberg, 1992). According to a study conducted by Broadbridge (1996), students seem to prefer developmental academic advising programs more than prescriptive approaches because of the level of support offered by the faculty, sense of empowerment created from the advisor/advisee relationship, and the increased academic integration. Students indicate a higher level of satisfaction with their advising relationships if the advisor implements a congruent advising style to the preferred advising style (Hale, et al., 2009). Their study examining advising preferences with advising styles indicates the majority of students surveyed preferred a developmental advising style (Hale, et al., 2009).

Traditional advising models are based on more prescriptive and authoritative methods of information transfers between the advisor and advisee. Students are uninvolved with the process, a top-down structure is supported, and the primary focus in the advising relationship is on academic progress, not assisting the student in their academic integration to campus (Braodbridge, 1996; Crookston, 1972; Frost, 1991; Hale, et al., 2009; Kadar, 2001; Saving & Keim, 1998). Traditional or prescriptive academic advising speaks to the traditional views in education, when information delivery is a means of power and control, which would oppose the foundation of developmental academic advising (Kreisberg, 1992).

Developmental academic advisors are resource providers, act as a student advocate, refer students for appropriate services, serve as a mentor, and take an active role in students' academic, personal, and social success (Frost, 1991; Petress, 1996). To deliver a developmental academic advising program that is focused on creating congruency for the

student, collaboration between the advisor and other departmental areas at the institution are essential (Grace, 2002).

The ideal result of offering a developmental academic advising program would be to encourage greater interaction between students and members of the campus, thereby encouraging student integration into the learning community (Astin, 1984). The more integrated students feel in the campus environment; the more likely they are to stay at their current institution (Astin, 1984; Kuo, Hagie, & Miller, 2003; Tino, 1975, 1993). Concentration on congruency with the campus environment resonates with enrollment management strategies to increase student retention rates, degree completion, and overall student satisfaction (Pisani & Stott, 1998; Hale, Graham, & Johnson, 2009).

Developmental academic advising structures require the shared responsibility to promote student success (Frost, 1991). Effective developmental advising programs consist of academic advisors who are committed to teaching and education (Pisani & Stott, 1998; Yarbough, 2002). According to research conducted by Yarbough (2002), some faculty view academic advising as a necessary part of their position, but do not always value the importance of the role. Organizational culture can dictate the delivery of services offered at an institution. For example, if academic advising programming is held with high esteem, effective services can be developed (Berger, 2002).

Linking Academic Advising with Student Retention and Graduation

Several higher education researchers examined the association between academic advising, student retention, and degree completion (Creamer, 1980; Habley, 1981; Miller 1985). Research links effective academic advising delivery and increased student retention and graduation rates (Creamer, 1980; Habley, 1981). Tinto (1975, 1993) and Astin (1984,

1997) stress the importance of students' becoming involved in campus life to assist in the integration process, with an ultimate goal of student satisfaction, increased retention, and higher rates of degree completion. Students can become involved in a plethora of different programs and/or activities while in college, but there is not one club, organization, intramural sport, or special interest group that reaches all students. Academic advising is the one primary function that will reach every student at the onset of his or her experience within higher education. Academic advising facilitates repetitive contact between students and faculty/staff, which can assist in the integration process and ultimately student satisfaction with a result of increased student retention and persistence (Braxton & McClendon, 2001-2001; Muraskin & Lee, 2004; Tinto, 1988).

Developmental advising programs that focus on social, academic, and personal integration into a college setting may ultimately increase the likelihood that a student will remain enrolled and complete their degree (College Board, 2011). Interaction with faculty and professional academic advisors and/or mentors can increase feelings of connectedness to an institution, thus creating the sense of congruence in attempts to decrease attrition (Shultz, Colton, & Colton, 2001). There are many avenues to promote increased student retention rates at institutions of higher education and academic advising is theorized to be a vehicle to assist in the task of decreasing student attrition (Lowe & Toney, 2000-2001).

The delivery of academic advising often depends on the institutional mission and campus resources (Habley & Gordon, 2000). The three different types of academic advising organizational models, shared, decentralized, and centralized differ in respect to the individuals and departments that deliver the academic advising. Shared advising models allow student to have exposure to both professional advisors in a centralized advising unit and also to major

specific advisors in academic departments. Introducing students to the opportunity of becoming engaged with two academic advisors could foster more connections between the student and campus resources. Developing relationships with faculty and staff is beneficial in increasing student involvement with an end result of increased retention and graduation rates (Habley & Gordon, 2000; Lau, 2003; Muraskin & Lee, 2004; Pascarella & Terenzini, 1991; Tinto, 1993). Shared advising models can cultivate both the academic connection through the advisor in the major department and also more global interactions with their advisor in the centralized advising center.

Habley (1981) developed the advisement-retention model based on the operational definition of academic advising as defined: "as providing assistance in the mediation of dissonance between student expectations and the actualities of the educational environment" (p. 46).

At the foundation of his advisement-retention model is the assumption that academic advising must be based in the developmental approach (Habley, 1981). Crookston (1972) first introduced developmental models of academic advising as interactive communication between advisor and advisee. Habley's (1981) second assumption states that there are several forces pulling a student away from an institution, therefore a retention program must be implemented that bolsters a student's desire to stay at the institution, such as an academic advising program.

The advisement-retention model has three basic elements: educational environment; reasons for leaving; and, reasons for staying (Habley, 1981). Educational environment consists of the overall experience at an institution of higher education, focusing specifically on institution match/mismatch, academic relevance/irrelevance, classroom stimulation/boredom, high/low concern for the student on-campus, high/low measurement of effort matched with

student ability to achieve rewards, health concerns, personal problems, and financial needs (Habley, 1981). A key to ensuring student retention and graduation is the delivery of appropriate academic services to students in conjunction with institutional needs (Muraskin & Lee, 2004). Habley's (1981)model of academic advisement, intended to increase student retention, takes into consideration student needs and the ability of the advisor to provide the student with the necessary information, support, and services to meet the student's expectations, match their ability, and thus produce reward.

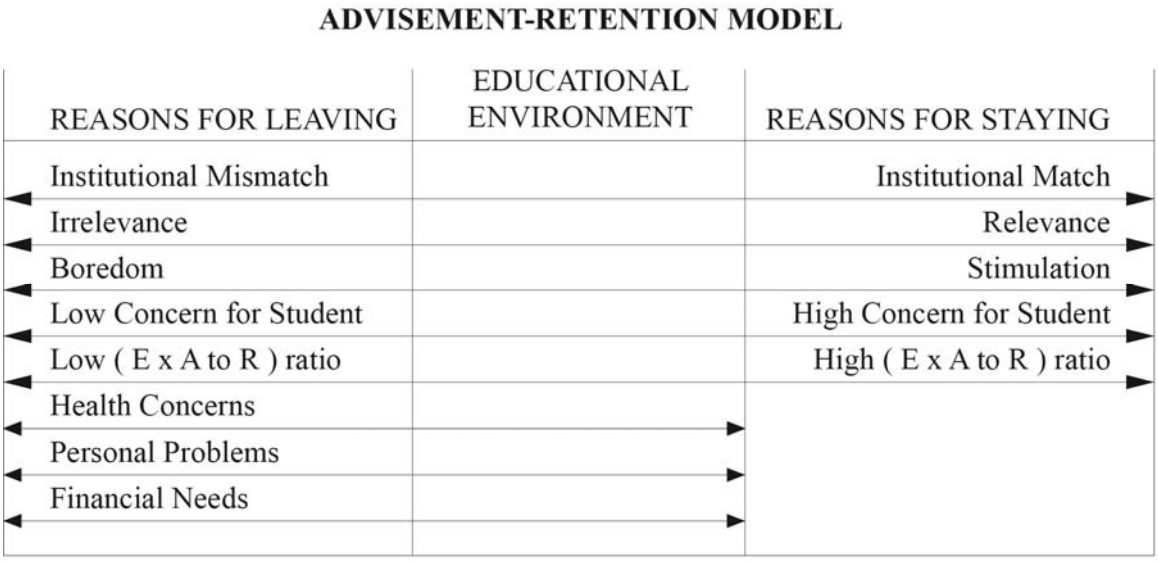


Figure 5. Habley's advisement-retention model (Habley, 1981).

Creamer (1980) argues that one of the primary reasons for the development of an effective advisement delivery system is to increase the student's desires to remain at an institution. A student's academic major may not be as important if they are committed to completing their degree and committed to the individual institution (Tinto, 1993). Creamer lays the groundwork for several fundamental elements to consider for effective academic advising

in relationship to student retention. Proper recruitment of students is the first step in the creation of an effective retention strategy (Creamer, 1980). Creamer (1980) indicates that proper training, high quality advisors, and meaningful interactions between advisor/advisee are pivotal in influencing students to remain at their institution and complete their degree (Muraskin & Lee, 2004). Academic advising is intended to stress the importance of academic achievement; therefore a match between student course/class/instructor selection and individual student ability is necessary (Creamer, 1980). Integration into the campus environment is crucial for positive results in relation to student retention and persistence; therefore academic advising should assist students in this process academically, socially and personally (Astin, 1984, 1997; Creamer, 1980; Tinto 1975, 1993). A final provision in the creation of an academic advising program that is focused on student retention is the need to match the student's advising style preference with the delivery mode of the academic advisor (Hale, Graham, & Johnson, 2009).

Summary

Literature supports the premise that a large number of students entering into college are undecided about their academic major, regardless of whether they have formally declared a major or not (Gordon, 2007; Pascarella & Terenzini, 2005). The methods students use to decide on their academic major vary widely and are not often based on sound research. From a developmental standpoint, students may not be prepared to make the complex decision of choosing an academic major at the point of entry into college (Gordon, 1999; Kimweli & Richards, 1999). Any degree of uncertainty when entering into college could prove detrimental to the student with regard to feeling connected and integrated into the campus community (Astin, 1984, 1997; Tinto, 1975, 1993). Therefore, whether a student is required to

choose an academic major, an academic college, or even be "undecided" on a major at the point of enrollment, they are likely to have some degree of uncertainty about their educational goal. University admission policies reflect different levels of structure regarding students' declaration of an academic major at the time of enrollment. Institutions have: (a) high structure--requiring students to declare their academic major at the time of enrollment; (b) moderate structure--requiring students to declare an academic college; and, (c) low structure--allowing students the option to declare an academic major or enroll as undeclared.

Models of academic advising and delivery methods of advising can also have an impact on student satisfaction, retention, and degree completion (Habley & Gordon, 2000; Hale, et al., 2009). Academic advising is the one service that all college students are exposed to at various points in their educational journey. Institutions have different types of organizational structures for academic advising: (a) centralized models--professional advisors and faculty advisors in one administrative unit; (b) decentralized modes--students are advised in academic departments; and, (c) shared models--combination of central and decentralized.

The purpose of this exploratory study was to examine whether there are any patterns and/or relationships between the levels of structure in admission policies regarding academic major declaration and academic advising models with student outcomes (retention and graduation rates). In this exploratory study, I expected to find that institutions possessing low-structure admission policies for academic major declaration in combination a shared academic advising model would display stronger retention and graduation rates than institutions with high level of admission structure in the declaration of academic major and a centralized academic advising structure. The anticipated results for the study were based on the literature pertaining to how students chose their academic majors, developmental factors, individual

characteristics, and institutional factors, students could benefit from being encouraged to explore their academic majors before being required to declare. Advising that fosters ties between students and an academic "home" on campus was important, even if students did not initially declare a designated major (Gordon, 2007). Other campus resources that may affect retention and graduation rates are beyond the scope of this study and therefore are not considered.

Hypotheses

First to Second Year Retention

Hypothesis 1. In light of Tinto's (1993) theory of student retention focusing on moving from periods of uncertainly to certainty about their academic major and Perry's (1999) developmental stages regarding how students make decisions, I expect that first to second year retention rates, for both full-time and part-time students, will be highest among institutions with the least structure in admissions policies concerning choosing a major for incoming students.

a. Institutions that require incoming students to select a major at enrollment will have lower first to second year retention rates than universities that require students to choose only a college or that do not require students to declare a major or a college.
b. Institutions that require incoming students to select a college, but not a major, at enrollment will have lower first to second year retention rates than universities that do not require incoming students to declare a major, but a higher first to second year retention rate than institutions that require incoming students to choose a major at enrollment.

c. Institutions that do not require incoming students to declare a major or a college at enrollment will have the highest first to second year retention rates.

Hypothesis 2. Based on Gordon's (2007) academic advising work with undecided students and Astin's (1993) Theory of Involvement to engage students by making an academic connection with faculty and staff, I expect that first to second year retention rates, for both full-time and part-time students, will be highest among institutions in which academic advising is delivered in a shared model with a centralized advising unit and in the academic department.

a. Institutions that use a centralized model of advising, in which academic advising occurs through a central administrative program, will have the lowest rates of first to second year retention compared with universities that use decentralized or shared models of advising.
b. Institutions that use a decentralized model of advising, in which academic advising occurs only within academic departments, will have higher rates of first to second year retention compared with universities using a centralized model, but lower than institutions using a shared model of advising.
c. Institutions that use a shared model of advising, in which academic advising is delivered through a combination of a central administrative program and within academic departments, will have higher rates of first to second year retention than universities that use a centralized or decentralized model of advising.

Graduation Rates

Hypothesis 3. Gordon's (2007) work with undecided students, Bean's (1980) Theory of Student Attrition, and Tinto's (1003) Theory of Student Retention, I expect graduation rates

will be highest among institutions with the least structure in admissions policies concerning choosing a major for incoming students.

a. Institutions that require incoming students to select a major at enrollment will have lower graduation rates than universities than require students to choose only a college or that do not require students to declare a major or a college.

b. Institutions that require incoming students to select a college, but not a major, at enrollment will have lower graduation rates than universities that do not require incoming students to declare a major, but a higher graduation rates than institutions that require incoming students to choose a major at enrollment.

c. Institutions that do not require incoming students to declare a major or a college at enrollment will have the highest graduation rates.

Hypothesis 4. With the support of Habley's (1981) Advisement-Retention Model, Pascarella and Terenzini's (2005) research on the effects of academic advising on student retention and persistence, and Astin's (1993) Theory of Involvement, I expect graduation rates will be highest among institutions in which academic advising is shared through a central administrative program and within academic departments.

a. Institutions that use a centralized model of advising, in which academic advising occurs through a central administrative program, will have the lowest rates of graduation compared with universities that use decentralized or shared models of advising.

b. Institutions that use a decentralized model of advising, in which academic advising occurs only within academic departments, will have higher graduation rates than

universities using a centralized model, but lower than institutions using a shared model of advising.

c. Institutions that use a shared model of advising, in which academic advising is delivered through a combination of advising through a central administrative program and advising within academic departments, will have higher graduation rates than universities that use a centralized or decentralized model of advising.

Combined Admission Policies Concerning Major Declaration and Advising Models

Hypothesis 5. The combination of Gordon's (2007) work with undecided students, Perry's (1999) stages of development in regard to decision making, Astin's (1993) Theory of Involvement, Tinto (1993) and Bean's (1980) work with student retention and persistence, and Habley's (1981) linking academic advising with positive student outcomes, I expect institutions that combine the most flexibility in admission policies governing selection of a major and academic advising shared between a central administrative program and within academic departments will have the highest retention and graduation rates.

a. Institutions that do not require incoming students to declare a major or a college at enrollment and that use shared advising will have the highest retention and graduation rates compared with other combinations of admission policies and advising models considered in this study.

b. Institutions that require incoming students to declare a major at enrollment and that use a centralized advising model will have the lowest retention and graduation rates compared with other combinations of admissions policies and advising models considered in this study.

Table 1

Combinations of Major Declaration Admissions Policies and Types of Academic Advising Delivery Models and Their Hypothesized Relationships to Retention and Graduation Rates

Level of Structure in Admission Policy Concerning Choosing a Major	Type of Delivery of Academic Advising	Retention Rates	Graduation Rates
Low	Decentralized	Highest	Highest
Low	Shared	Unknown*	Unknown*
Low	Centralized	Unknown*	Unknown*
Medium	Decentralized	Unknown*	Unknown*
Medium	Shared	Unknown*	Unknown*
Medium	Centralized	Unknown*	Unknown*
High	Decentralized	Unknown*	Unknown*
High	Shared	Unknown*	Unknown*
High	Centralized	Lowest	Lowest

Note. *These relationships will be examined and reported.

CHAPTER III

METHODOLOGY

To investigate how admission policies concerning designation of major and model of advising delivery may be related to key student outcomes of retention and graduation, I conducted an exploratory study using publicly available secondary data on institutions of higher education. The first goal was to identify whether there are variations in retention and graduation rates by the three different levels of structure reflected in admission policies governing students' declaration of a major at matriculation and by different types of academic advising models. The second goal was to examine ways in which combinations of these admission policies and advising models are related to retention and graduations rates. The third goal was to examine how these patterns, if any, may vary according to characteristics of the universities, such as size and public versus private funding source. As an exploratory study, the purpose is to identify any patterns that may exist and how the patterns vary according to the factors considered in this study.

Data and Sample

The data for this study cAme from a disproportionate stratified sample of 381 U.S. universities. The sample was selected utilizing U.S. Department of Education's National Center for Education Statistics (NCES) via the Integrated Postsecondary Education Data System (IPEDS). The 381 institutions selected for the study reflect a sample of 32.8% of the population of 1,162 universities considered: (1) very small public universities, n = 3; (2) very small private universities, n = 52; (3) small public universities, n = 59; (4) small private universities, n = 67; (5) medium public universities, n = 53; (6) medium private universities, n = 68, (7) large public universities, n = 51; and, (8) large private universities, n = 28.

IPEDS collects survey data from all colleges, universities, technical, and post-secondary institutions that are either participating in federal student financial aid programs (IPEDS, 2009) or are in the process of applying for aid. Post-secondary institutions are required to participate in the IPEDS surveys by Title IV of the Higher Education Act of 1965 if the institution is participating or applying for federal student aid programs (IPEDS, 2009). Among the 6,900 post-secondary institutions in the U.S. that are recognized by the U.S. Department of Education, 6,700 (97%) report to IPEDS each year because of their participation in federal aid programs (IPEDS, 2009). Information on institutions that report to IPEDS can be found utilizing the "College Navigator" web-based service through the U.S. Department of Education Institute of Education Sciences (IES). The College Navigator site allows users to select lists of post-secondary institutions by size, public versus private funding sources, and other criteria. For this study, the College Navigator web site through the U.S. Department of Education is used to identify the population of U.S. universities from which the sample was drawn.

The College Navigator website through the U.S. Department of Education was used to locate the schools based on their size, identify whether they are public or private, and to select only baccalaureate degree granting, four-year institutional criteria. Though there are different types of post-secondary education institutions, the sample consists only of universities. Liberal arts colleges, community colleges, and technical/specialized colleges are not included in the data sample. Students pursuing a liberal arts education receive a high degree of individualized attention and the scope of the educational offering is more concentrated in the humanities and social sciences (College Board, 2009). Community colleges and technical/specialized colleges typically prepare the student for a specific career path or trade. The limited offerings and focus

on preparing the students to enter directly into the workforce does not provide a broad enough context to examine academic major choice and selection processes (College Board, 2009).

Of the 6,700 institutions represented in the IPEDS database, the sample was taken from the 1,162 universities that grant baccalaureate degrees as well as post-graduate degrees. The population of 1,162 universities was stratified by size and funding source. The Carnegie Foundation for the Advancement of Teaching breaks institutions into different size categories, very small, small, medium, and large. Size of the institution is an important factor, relating to the structure, complexity, and culture of the institution (The Carnegie Foundation for the Advancement of Teaching, 2009). The Carnegie Foundation (2009) classifies the schools by size as follows: (a) "very small," fewer than 1,000 students; (b) "small," 1,000 to 2,999 students; (c) "medium," 3,000 to 9,999 students; and, (d) "large," more than 10,000 students. A second level of stratification is public versus private funding of the universities. Public institutions rely on regional, state, and federal funding streams, while private institutions are primarily funded through tuition dollars and donated endowments (IPEDS, 2009).

Of the 1,162 universities in the IPEDS database, 490 are public universities and 672 are privately funded. Following the Carnegie Foundation (2009) size classifications, 215 of the 1,162 universities are very small, 336 are small, 381 are medium, and 230 are large. Further stratified, the population of universities in the IPEDS database consists of 7 public and 208 private very small universities, 69 public and 267 private small universities, 212 public and 169 private medium universities, and 202 public and 28 private large universities. A numbered list of all institutions was generated representing the population for each of the eight categories based on public or private funding and institution size of very small, small, medium, and large. The sample of 1,162 institutions was broken into public/private, and four categories of very

small, small, medium, and large student populations. The universities were randomly chosen by a systematic method to ensure the institution unidentifiable.

According to the National Statistical Service (2009) randomly selecting 25% of a population of 1,162 universities should yield a sample with a sampling error of 4% at the 95% confidence level. Including a relatively large proportion of the population in the sample helps to decrease variability and reduce sampling error (Mertens, 1998). Using a table of random numbers, I selected every fourth case in each category (with the exceptions noted below) for a 25% sample from the population.

Because so few institutions fell into the following categories a disproportionate stratified sample was used: very small public institutions; small public institutions; and, large private institutions, I included 100% of the schools in those categories in the sample. There also were relatively fewer medium sized private institutions, thus the sample includes 40% of those schools (rather than just 25%). When 25% of the remaining population was sampled from the remaining categories, the resulting sample includes 395 universities as follows: (1) very small public universities, n = 7 ; (2) very small private universities, n = 52; (3) small public universities, n = 69; (4) small private universities, n = 67; (5) medium public universities, n = 53; (6) medium private universities, n = 68; (7) large public universities, n = 51; and, (8) large private universities, n = 28. The 395 institutions selected reflect a sample of 33.9% of the population of 1,162 universities of interest for this study. Once the data was collected for the study, two categories had a total of 14 incomplete cases; very small public institutions were reduced by 4 and small public institutions were reduced by 10. Replacement institutions were not available because the sample consisted of 100% of the schools in these categories. An institution was considered incomplete if statistics were missing on one of the

primary variables for the study, including first-to-second year retention rate and/or overall graduation rate. The final distribution of the sample resulted in the following: (1) very small public universities, n = 3 ; (2) very small private universities,
n = 52; (3) small public universities, n = 59; (4) small private universities, n = 67; (5) medium public universities, n = 53; (6) medium private universities, n = 68; (7) large public universities, n = 51; and, (8) large private universities, n = 28. The 381 institutions selected reflect a sample of 32.8% of the population of 1,162 universities of interest for this study.

Each institution selected for inclusion in the sample was assigned a random case number using a random number generator computer program. Once the data were collected from the institutions in the sample, all information that identified the university was removed to ensure confidentiality. The researcher did not maintain a key linking the identity of the universities with the random case number assigned, further ensuring that data cannot be linked with a specific university.

Variables and Measures

Dependent variable. For this study, the dependent variables reflect the student outcomes of first to second year retention rates and graduation rates. *First to second year retention rates* reflect the percentage of students who continue from their first year of enrollment at an institution to a second year. *Graduation rates* reflect the percentage of students who completed a degree program at an institution. IPEDS was utilized to collect data for the institutions selected for inclusion in the sample from the population identified through the College Navigator website where statistics are reported on percentages of students persisting from the first to the second year and completing of degrees (IPEDS, 2009). Data on

each individual school's first to second year retention and graduation rates were integrated into the database to study student outcomes.

Independent variables. The independent variables are the level of structure in students' declaration of a major at matriculation reflected in a university's admission policies and the type of academic advising model utilized to guide students through to graduation. Accordingly, the web sites of the universities that were selected for inclusion in the sample were searched to determine the *level of structure for declaration of academic major at admission* and coded as follows: (a) high structure—requiring incoming students to declare an academic major; (b) medium structure—requiring students to declare an academic college but not a major; and, (c) low structure—permitting students to remain undeclared on an academic major when they enter the university.

The same web sites were searched for the *type of academic advising model* used by the institution to assist students from their first year through graduation relating to academic choices and progress. Advising structures are categorized as follows: (a) centralized model—a self-contained model in which advising is delivered through one central administrative unit; (b) decentralized model—a model in which students are advised in academic departments and undeclared students are distributed throughout the university; and, (c) shared model—a system that combines a centralized advising center along with faculty advisors within academic departments.

Control variables. Keeping in mind that the unit of analysis in this study is the university, the control variables are *institution size* based on ranges of numbers of students, following the Carnegie Foundation (2009) classifications: (a) "very small," fewer than 1,000 students; (b) "small," 1,000 to 2,999 students; (c) "medium," 3,000 to 9,999 students; and, (d)

"large," more than 10,000 students. *Funding source* is categorized in the IPEDS data as either public or private and these classifications are used here. Variables controlling for institutional student population composition include *gender*, the proportion of students who are women; *non-white*, the proportion of students who are not white/Caucasian; *full-time*, the proportion of students enrolled full-time; and *non-traditional*, the proportion of the student population who are over age 25. Finally, data were gathered on each institution's incoming students' average SAT and ACT scores at the 25th percentile and in the 75th percentile, as reported by IPEDS in the College Navigator data base or in publicly available data provided by institutions' websites. Colleges have moved away from reporting the "average" standardized test scores for the SAT and ACT. College admissions and school counselors guide students in certain directions for their applications based on the average test score and treating the average more as a minimum (Syverson, 2007). The middle 50% ranges seem to depict a more accurate reflection of the distribution of sores and are more informative for students during the college admission selection process (Syverson). The test score variables were highly correlated, suggesting they may measure the same construct. Therefore, I conducted a Principal Components Analysis and examined the resulting screen plot which revealed a unidimensional construct. Accordingly, I combined the test score variables into a single composite variable (Cronbach's alpha = .85) that is the standardized (regression) factor score for each institution in the sample. Regression factor scores reflect "a multivariate procedure, which takes into account not only the correlation between the factors and between factors and observed variables (via item loadings), but also the correlation among observed variables" (DiStefano, Zhu, & Mindrila, 2009, p. 4. Results of the factor analysis are provided in Appendix A. There were 72 universities (18.9%) that do not require standardized test scores from applicants, so to control for this a *no test score*

required variable was created (1 = no standardized test scores required, 0 = test scores required).

Descriptions of study variables, measures and codings, as well as ranges and distributions in the sample are provided in Appendix B. This study does not control for student support programs that may impact student retention and graduation rates. Although research shows that various types of interventions positively impact retention and graduation rates (Pascarella & Terenzini, 2005), they are beyond the scope of this study. This study examines whether there are differences in student outcomes by the level of structure in admissions policies governing students' selection of a major and by types of academic advising delivery models. It does not attempt to explain these patterns, if they exist, by inclusion of intervening variables such as quality of advising, type of advising (developmental versus prescriptive, for instance), or the availability and use of academic support programs.

Data Collection

Data were accessed from the U.S. Department of Education database utilizing the College Navigator website and individual college websites. The data gathered were collected through the work of four individual coders. All data coders underwent training sessions to educate them on the purpose of the research, the variables, and how to accurately code data for this study. A group information session was held with all four coders to review how to code the level of structure for choosing a major in institutions' admissions policies, types of advising models, and in locating retention and graduation rates in institutional information. Three sample cases were used in the group training for discussion and a step-by-step application of the coding scheme.

Reliability and Validity

The data used for the study consisted of primary and secondary data sources. The collection of the primary data was done by coders searching individual institution websites for admission policy structure on the declaration of academic major and for the organizational models of academic advising programs. The secondary, institutional data for demographics, population statistics, retention and graduation rates, and standardized test scores were taken from the Department of Education, College Navigator website.

The group training session was held to provide the same preparation information to all coders in attempt to preserve construct validity (Mertens, 1998). Following the group training session, all coders received the same group of 10 randomly selected institutions for initial collection. To establish inter-rater reliability (Mertens, 1998), I compared the responses of the 4 coders on the 10 cases. The four coders coded the data the same way on the key variables in 95% of the cases. After the group training and test batch of data, the coders were randomly assigned institutions for data collection. I conducted periodic spot checks of the data coding as submitted by the coders and no systematic discrepancies arose. Once all data were collected, I randomly selected 25% of the cases and again verified appropriate and consistent coding and found only a small handful of corrections were necessary. Where corrections occurred, I further investigated the same coder's work to ensure accuracy and consistency.

The National Center for Education Statistics (NCES) is one of the most widely used sources of secondary data in higher education research (Thomas & Heck, 2001). The utilization of secondary data sources should be done with caution and examined for accuracy (Mertens, 1998). The NCES was chosen to obtain the secondary data due to the measures they have taken ensure greater reliability in their reported data. In an effort to improve the

comparability of data reported by universities, the common data set initiative was enacted through the College Board (Common Data Set, 2011). The common data set was developed in a collaborative effort with publishers of college guides, secondary and post-secondary administrators, and the NCES (Common Data Set, 2011). While the common data set is assisting in more consistency in reporting higher education statistics, caution should be used in drawing conclusions regarding the Integrated Postsecondary Education Data System data (IPEDS) in references to small observation categories. This is because NCES uses "perturbation" for data collected through the Integrated Postsecondary Education Data System (IPEDS): "Perturbation in this case means randomly altering the data in cells with a small number of observations to protect the confidentiality of personally identifiable data" (Association for Institutional Research, 2004). Some caution will need to be used in the interpretation of the results, especially in the small number cases.

Data Analysis

The statistical software package SPSS was used to compile a database of the variables for each of the institutions included in the sample and to conduct statistical analyses examining the research questions. Data analyses for this study took place in five phases. First, I used descriptive statistics to determine the distribution of study and control variables in the sample. Second, I used analyses of variance (ANOVA) to examine patterns and variations in student outcomes by level of structure in admission policies governing the declaration of a major and type of academic advising delivery models. Third, I examined the means for the nine different possible combinations of level of structure in admissions policies governing the selection of a major and types of advising delivery models and then ranked them for each student outcome variable for comparison. Fourth, to examine which variables are significant predictors of two

key student outcomes, first-to-second year retention and overall graduation rates, I regressed these dependent variables sequentially on control variables, then on level of structure in admission policies governing the selection of major with control variables, then on type of advising delivery model and control variables. I also looked for interactions between the independent and control variables in predicting these two student outcomes. Finally, I regressed each of the dependent variables in the study on the independent and control variables to examine whether and to what extent each of these are related to student outcomes when the others are simultaneously controlled.

CHAPTER IV

RESULTS

Descriptive Statistics

The main goal of the study was to explore potential relationships between student outcomes (first-to-second year retention and overall graduation rates) and (a) the level of structure in admission policies governing students' selection of a major and (b) types of academic advising delivery models. Table 2 presents the descriptive statistics for the study sample.

Variables

Dependent variables. The rate of *retention* of full-time students from first to second year in the sample ranged from a low of 19% to a high of 100% with a mean of 72.25% (s.d. = 14). Retention from first to second year of part-time students ranged from 7% to 100% with an average of 55.9% (s.d. = 25).

Overall *graduation rates* ranged from a low of 4% to a high of 98% with a mean of 50.3% (s.d. = 20). Four year graduation rates were lower, ranging from 0% to 90%, averaging 34% (s.d. = 21.9) in the sample. Six year graduation rates were similar to overall graduations rates (ranging from 5% to 98%, mean = 50.8, s.d. = 19.9). When examined by gender, graduation rates for men averaged 46.8% (s.d. = 21.4) and 53% (s.d. = 20) for women.

Independent variables. In regard to the *level of structure in choosing a major at admission*, 54.3% (n = 207) of the institutions in the sample have admissions policies that reflect a low level of structure concerning the selection of a major for incoming students in that they do not require students to declare either a major or a college. Nearly a third

Table 2

Descriptive Statistics of Study Sample (n = 381)

	Mean	(s.d.)
Dependent Variables		
First-to-Second Year Retention Rates		
Full-Time Students	72.3%	(14.1)
Part-Time Students	55.9%	(25.1)
Graduation Rates		
Overall Rate	50.3%	(20.0)
Four Year Rate	34.0%	(21.9)
Six Year Rate	50.8%	(19.9)
Men	46.8%	(21.4)
Women	53.0%	(20.0)
Independent Variables		
Level of Structure in Declaration of Major at Admission		
Low	54.3%	
Medium	32.1%	
High	13.6%	
Type of Academic Advising Model		
Centralized	37.2%	
Decentralized	35.4%	
Shared	27.3%	
Control Variables		
Institution Size		
Very Small (n = 55)	14.4%	
Small (n = 126)	33.1%	
Medium (n = 123)	32.3%	
Large (n = 77)	20.2%	
Institutional Funding		
Public versus Private (n = 166)	43.6%	
Composition of Undergraduate Population		
Proportion Women	57.6%	(8.3)
Proportion Non-White	28.5%	(24.4)
Proportion Full-Time	80.3%	(17.6)
Proportion Non-Traditional (age 25+)	23.7%	(19.6)
Admission Test Scores		
Standardized Composite Test Score	0.0	(0.9)
(Latent Variable Extracted from Factor Analysis*)		
SAT Critical Reading 25th Percentile	474.1	(69.4)
SAT Critical Reading 75th Percentile	581.9	(69.9)
SAT Math 25th Percentile	480.8	(76.2)
SAT Math 75th Percentile	590.0	(72.3)
ACT Composite 25th Percentile	20.3	(3.5)
ACT Composite 75th Percentile	25.3	(3.4)
ACT English 25th Percentile	19.0	(3.9)
ACT English 75th Percentile	25.2	(3.8)
ACT Math 25th Percentile	19.0	(3.7)
ACT Math 75th Percentile	24.9	(3.8)
No Test Scores Required for Admission (n = 72)	18.9%	

Note. See Appendix A for results of the factor analysis of the admission test score items.

of universities in the sample (32.1%, n = 122) have admission policies reflecting a medium level of structure wherein students must declare a college but not a major. Only 13.6% (n = 52) of the institutions in the sample have admission policies reflecting a high level of structure by requiring students to declare a major.

The *types of academic advising delivery models* were fairly evenly distributed in the sample. The most prevalent type of advising was a centralized model, in which advising occurs through one central administrative advising program, found at 37.2% (n = 142) of the institutions in the sample. A decentralized advising model, in which advising occurs within academic departments, is used by 35.4% (n = 135) of the universities in the sample. Less prevalent is the shared advising model, in which advising is shared by both academic departments and administrative programs, used by just over one-quarter (27.3%, n = 104) institutions in the sample.

Control variables. In regard to institutional characteristics, in terms of *institution size*, just 14.4% (n = 55) of the sample are very small universities of under 1,000 of students. One-third (33.1%, n = 126) of universities in the sample are small (between 1,000 and 2,999 students). Another third (32%, n = 123) are medium size (between 3,000 and 9,999 of students). One-fifth (20.2%, n = 77) are large institutions of over 10,000 of students. *Public funding*, versus private funding, is primary at 43.6% (n = 166) of the institutions in the sample.

In regard to student population composition, the mean proportion of women in the student populations of the institutions in the sample was 57.6% (s.d. = 8.3). On average, the universities in the sample had a non-white student population of 28.5% (s.d. = 24.4). Full-time students make up most of the population at the institutions in the sample, on average

comprising 80.3% of the students (s.d. = 17.6). The mean proportion of non-tradition students (those age 25 or older) was 23.7% (s.d. = 19.6).

The *standardized composite test score* is a standardized (hence a mean of zero, s.d. = .9) factor score extracted from factor analysis of the 10 admission test score reflecting the average SAT and ACT scores for students who comprise the 25^{th} and 75^{th} percentiles of admissions at the 309 universities in the sample that require applicants to submit standardized test scores. There were 72 institutions (18.9%) that did not require applicants to submit standardized test scores.

Comparison of Means

Hypothesis One

In order to identify whether retention rates vary by level of structure in admission policies governing choosing a major, I conducted analyses of variance comparing retention rates for both full-time and part-time students by the three levels of structure in admission policies governing the selection of a major for incoming students: low (no declaration of major or college); medium (students must declare a college but not a major); and, high (students are required to declare a major). Where significant differences in means occurred, because more than three categories are compared, I used post hoc tests to identify between which categories differences exist. Table 3 shows the results.

Table 3

Analysis of Variance of First-to-Second Year Retention by Independent Variables (n = 381)

Independent Variables	First and Second Year Retention	
	Full-Time Students	Part-Time Students
Level of Structure in Declaration of Major At Admission		
Low	72.1	55.2
	(13.3)	(24.7)
Medium	74.9	55.9
	(13.8)	(24.1)
High	66.7*	59.0
	(15.9)	(29.5)
Type of Academic Advising Model		
Centralized	69.9	53.4
	(14.7)	(24.1)
Shared	73.6	55.8
	(13.6)	(25.3)
Decentralized	73.7	58.6
	(13.4)	(25.9)

Note. Standard deviations are shown in parenthesis below means. *p <.05.

Hypothesis 1a stated that institutions that require incoming students to select a major at enrollment will have lower first to second year retention rates than universities that require students to choose only a college or do not require students to declare a major or a college. This hypothesis is supported in regard to full-time students, but not part-time students. The mean first to second year retention rate for full-time students among institutions with a high level of structure in declaration of major at admission was 66.7% (s.d. = 15.9), significantly

lower ($p < .05$) than the mean for universities with medium level structure (mean = 74.9%, s.d. = 13.8) and the mean for schools with a low level of structure (mean = 72.1%, s.d. = 13.3). There were no statistically significant differences in retention rates among part-time students by level of structure in declaration of major at admission.

There was no support for Hypothesis 1b that institutions that require incoming students to select a college but not a major at enrollment (medium level structure) will have a first to second year retention rate that is lower than universities that do not require incoming students to declare a major or a college (low level structure), but higher than institutions that require incoming students to choose a major at enrollment (high level of structure).

Hypothesis 1c also is not supported. Institutions with a low level of structure in their declaration of major admission policy do not have the highest first to second year retention rates. The schools that do not require students to choose a college or major (low level of structure) are not statistically different from schools that require students to choose a college, but not a major (medium level of structure).

Hypothesis Two

In order to identify whether retention rates vary by type of academic advising delivery model, I conducted analyses of variance comparing retention rates for both full-time and part-time students by centralized, shared, and decentralized advising models. These results also are shown in Table 3.

There was no support for Hypothesis 2a, in which I hypothesized that institutions that use a centralized model of advising, in which academic advising occurs through a central administrative program, would have the lowest rates of first to second year retention compared with universities that use decentralized or shared models of advising. Although in the overall

patterns of means, average retention rates for universities using the centralized model of advising are lowest for both full-time and part-time students, these means are not statistically different from those of shared and decentralized advising delivery models. Indeed, there were no statistically significant differences in average retention rates at all, so Hypothesis 2b, pertaining to shared advising, and Hypothesis 2c, related to decentralized advising, also are not supported.

Hypothesis Three

In order to identify whether graduation rates vary by level of structure in admission policies governing choosing a major, I conducted analyses of variance comparing graduation rates: overall rates, four year rates, six year rates, rates for men, and rates for women by the three levels of structure in admission policies governing the selection of a major for incoming students: low (no declaration of major or college); medium (students must declare a college but not a major); and, high (students are required to declare a major). Table 4 shows the results.

No significant differences in mean graduation rates occurred by level of structure in admission policies concerning declaration of a major at enrolment. So, Hypothesis 3a, Hypothesis 3b, and Hypothesis 3c are not supported. However, it is worth noting the patterns evident in the data: in each of the five graduation rates, institutions with a medium level of structure (students must declare a college but not a major) had the highest means; lowest structure had the second highest means; and, high structure has the lowest means.

Table 4

Analysis of Variance in Graduate Rates by Independent Variables (n = 381)

Independent Variables	Graduation Rates				
	Overall	Four Year	Six Year	Men	Women
Level of Structure in Declaration of Major at Admission					
Low	50.1	32.9	50.5	45.8	52.9
	(18.8)	(20.6)	(18.5)	(20.2)	(18.7)
Medium	51.6	36.3	52.5	49.0	54.0
	(22.1)	(24.5)	(21.8)	(23.0)	(22.1)
High	48.4	32.8	47.8	45.2	50.9
	(19.7)	(20.3)	(20.8)	(20.8)	(19.9)
Type of Academic Advising Model					
Centralized	47.5	31.9	48.0	44.3	50.4
	(19.8)	(20.4)	(19.7)	(20.3)	(19.9)
Shared	53.5*[a]	35.5*[a]	53.9	49.3	57.0*[a]
	(18.7)	(22.9)	(18.8)	(21.2)	(17.6)
Decentralized	50.9	35.0	51.3	47.3	52.6
	(20.9)	(22.6)	(20.8)	(22.2)	(21.5)

Note. Standard deviations are shown in parentheses below means. *p <.05. **p <.01. ***p <.001. [a]Shared advising is significantly different from centralized advising, but not from decentralized advising.

Hypothesis Four

In order to identify whether graduation rates vary by type of academic advising delivery model, I conducted analyses of variance comparing graduation rates by the three types of advising delivery models. Again, because more than three categories are compared, I used

post hoc tests to identify between which categories significant differences exist. These results are also shown in Table 4.

In Hypothesis 4a I speculated that institutions that use a centralized academic advising delivery model, in which academic advising occurs through a central administrative program, would have the lowest rates of graduation compared with universities that use decentralized or shared models of advising. There is partial support for this hypothesis: schools that use centralized advising have significantly lower overall rates of graduation (mean = 47.5%, s.d. = 19.8) and four year graduation rates (mean = 31.9%, s.d. = 20.4) than institutions that used shared advising models, but there are no statistically significant differences in graduation rates between centralized and decentralized advising. However, in each of the five graduation rates, universities using centralized advising have lower average rates than those using shared or decentralized advising.

In Hypothesis 4b I expected that institutions that use a decentralized model of advising, in which academic advising occurs only within academic departments, would have higher graduation rates than universities using a centralized model, but lower than institutions using a shared model of advising. There is no support for this hypothesis as average graduation rates for schools using a decentralized model did not differ significantly from those that use either a centralized or shared model. The pattern, though, reflects that universities using a decentralized advising model have mean graduation rates that fall in between those of schools using a centralized model (lower) and those using a shared model (higher).

Hypothesis 4c states that institutions that use a shared model of advising, in which academic advising is delivered through a central administrative program and within academic departments, will have higher graduation rates than universities that use a centralized or shared

model of advising. There is support for this hypothesis: schools using shared advising have, on average, higher overall graduation rates (mean = 53.5%, s.d. = 18.7); four year graduation rates (mean = 35.5%, s.d. = 22.9); and, graduation rates for women (mean = 57%, s.d. = 17.6) than those using centralized advising. However, there were no significant differences in average graduation rates between institutions that use shared advising and those that employ decentralized advising. The overarching pattern reflects that average graduation rates are highest among schools using shared advising.

Hypothesis Five

To examine whether institutions that combine the most flexibility in admission policies governing selection of a major and academic advising shared between a central administrative program and within academic departments have the highest retention and graduation rates, I assigned universities to one of nine possible categories according to the combination of level of structure in major declaration in admission policies and academic advising delivery model, calculated the category means for the retention and graduation rate variables, and compared them using analysis of variance. Table 5 shows the results. However, since there are more than six categories of the independent variable (the nine possible combinations noted above), it becomes difficult to interpret the results of the analysis of variance. Therefore I also provide graphic representations of the results in the figures below.

Table 5

Means for Retention Rates and Graduation Rates for Different Combinations of Major Declaration Admissions Policies and Types of Academic Advising Delivery Models

			First to Second Year Retention Rates			Graduation Rates			
Level of Structure in Admission Policy Concerning Choosing a Major	Type of Academic Advising Delivery	n	Full-Time	Full-Time	Overall	Four Year	Six Year	Men	Women
Low	Decentralized	32	72.8 (10.9)	61.2 (26.8)	50.6 (18.8)	33.9 (19.4)	50.3 (18.1)	45.3 (20.3)	51.3 (21.0)
Low	Shared	82	73.3 (13.2)	55.7 (25.6)	52.5 (18.8)	33.6 (22.3)	52.8 (18.8)	48.2 (21.2)	56.1 (17.6)
Low	Centralized	88	70.7 (14.2)	52.7 (23.1)	47.6 (18.6)	31.9 (19.6)	48.4 (18.4)	43.8 (19.4)	50.5 (18.7)
Medium	Decentralized	80	75.9 (12.7)	56.9 (23.8)	51.2 (21.7)	35.2 (24.0)	52.0 (21.7)	48.3 (23.1)	53.0 (22.0)
Medium	Shared	18	75.6 (13.9)	51.4 (23.9)	57.8 (19.5)	43.0 (25.0)	57.7 (19.7)	54.4 (21.7)	60.3 (18.6)
Medium	Centralized	20	70.7 (17.5)	56.0 (26.7)	47.8 (25.7)	34.8 (26.3)	49.8 (24.5)	46.8 (24.3)	52.2 (25.3)
High	Decentralized	18	66.0 (17.2)	62.5 (34.6)	49.8 (21.3)	36.0 (22.9)	49.4 (21.7)	46.2 (22.1)	52.6 (21.1)
High	Shared	2	59.3 (27.7)	71.3 (25.8)	50.0 (15.4)	40.5 (7.8)	58.5 (6.4)	44.7 (19.0)	54.0 (15.6)
High	Centralized	22	67.9 (14.1)	54.7 (26.6)	47.3 (19.5)	29.6 (18.6)	45.5 (21.1)	44.6 (20.9)	49.4 (20.0)

Note. Standard deviations are shown in parentheses below means.

In Hypothesis 5a I hypothesized that the institutions that do not require incoming students to declare a major or a college at enrollment (low level of structure) and that use shared (central unit and academic departmental) advising will have: (a) the highest retention; and, (b) graduation rates compared with other combinations of admission policies and advising models considered in this study. This hypothesis was not supported.

Summary of Mean Comparisons

Retention rates. As shown in Figure 6 rates of retention for full-time students were highest among schools using a *medium* level of structure in declaration of major admission policies (requiring students to choose a college) coupled with a decentralized model (n = 80, 21% of sample) or a shared advising model (both central and departmental delivery) (n = 18, 4.7% of sample).

Rates of first to second year retention for part-time students reflect a different pattern. As evident in Figure 7, the highest rates of retention (71.3%, s.d. = 25.8) occurred in institutions using a combination of high structure admission policies that require students to choose a major at enrollment in combination with shared advising. However, only two universities (.01%) have this particular admission policy and advising combination, so the results for this combination may be idiosyncratic to these schools. The other two policy/advising combinations with the highest average part-time student retention rates are those with high structure and decentralized advising (n = 18, 4.7% of sample) with a mean of 62.5% (s.d. = 34.6) and low structure and decentralized advising (n = 32, 8.3% of sample) with a mean of 61.2% (s.d. = 26.8).

Graduation rates. Universities with low structure in admissions policies concerning selection of a major in combination with decentralized advising also were not those with the highest graduation rates. In regard to overall graduation rates, as shown in Figure 8, schools with the highest rate (averaging 57.8%, s.d. = 19.5) were those using a combination of medium structure (students must choose a college but not a major) and shared advising (n = 18, 4.7% of the sample).

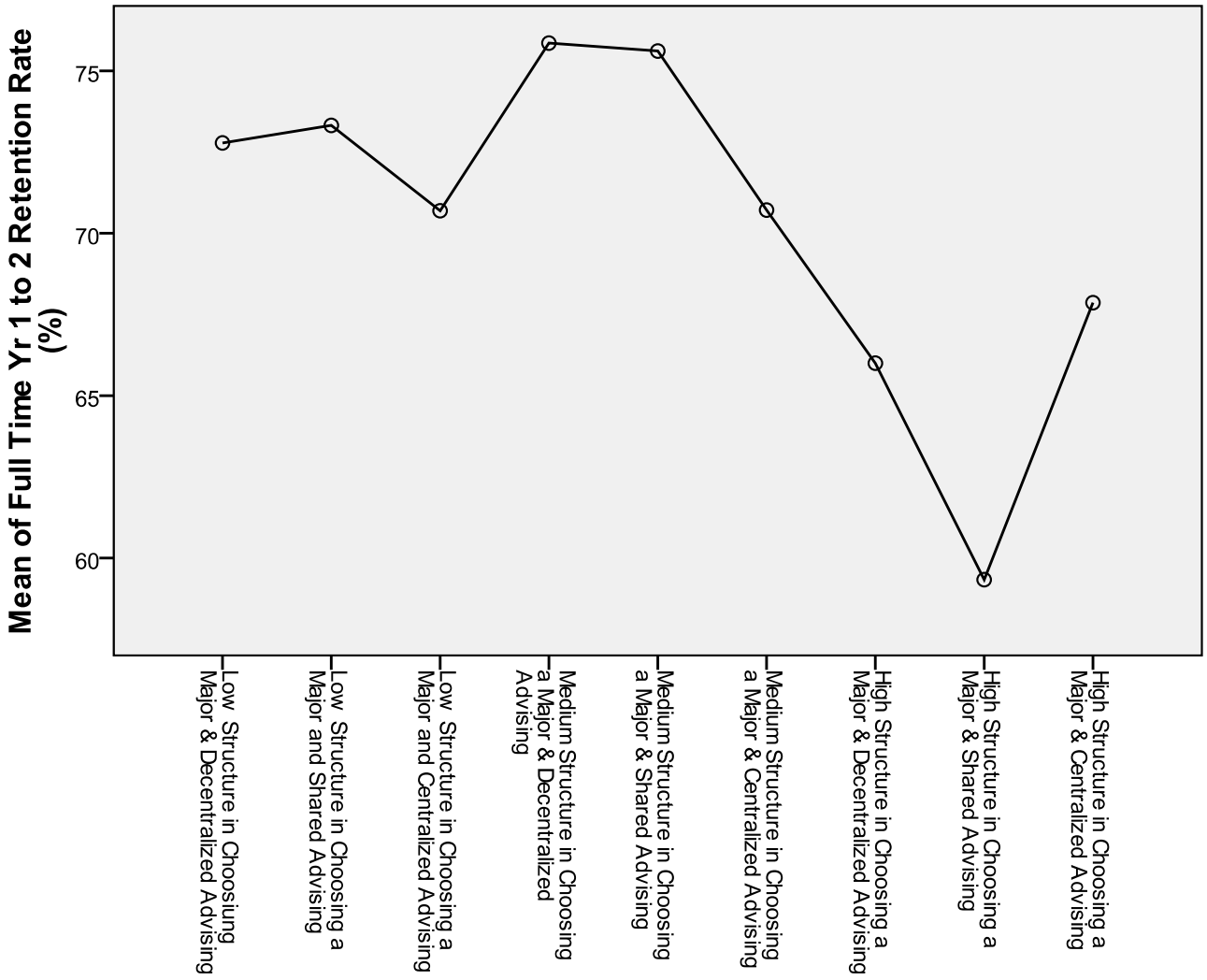


Figure 6. Means of full-time student first to second year retention rates by combinations of major declaration structure in admission policy and advising delivery model.

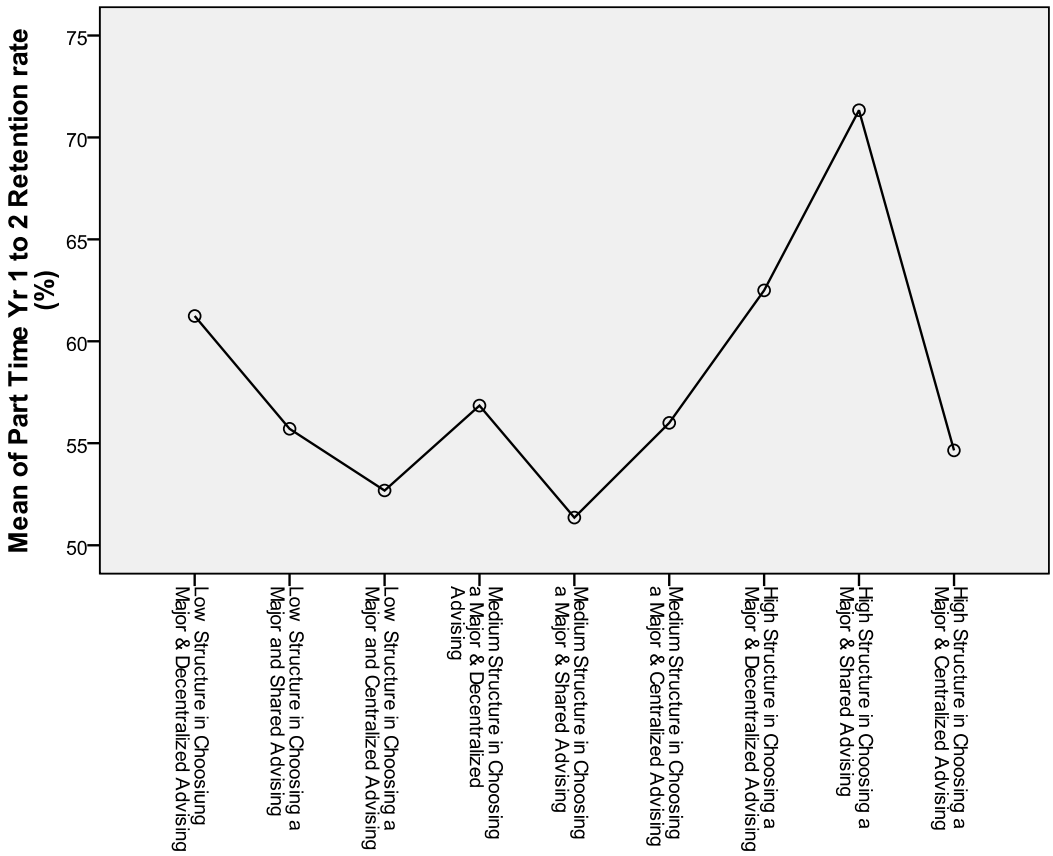


Figure 7. Means of part-time student first to second year retention rates by combinations of major declaration structure in admission policy and advising delivery model.

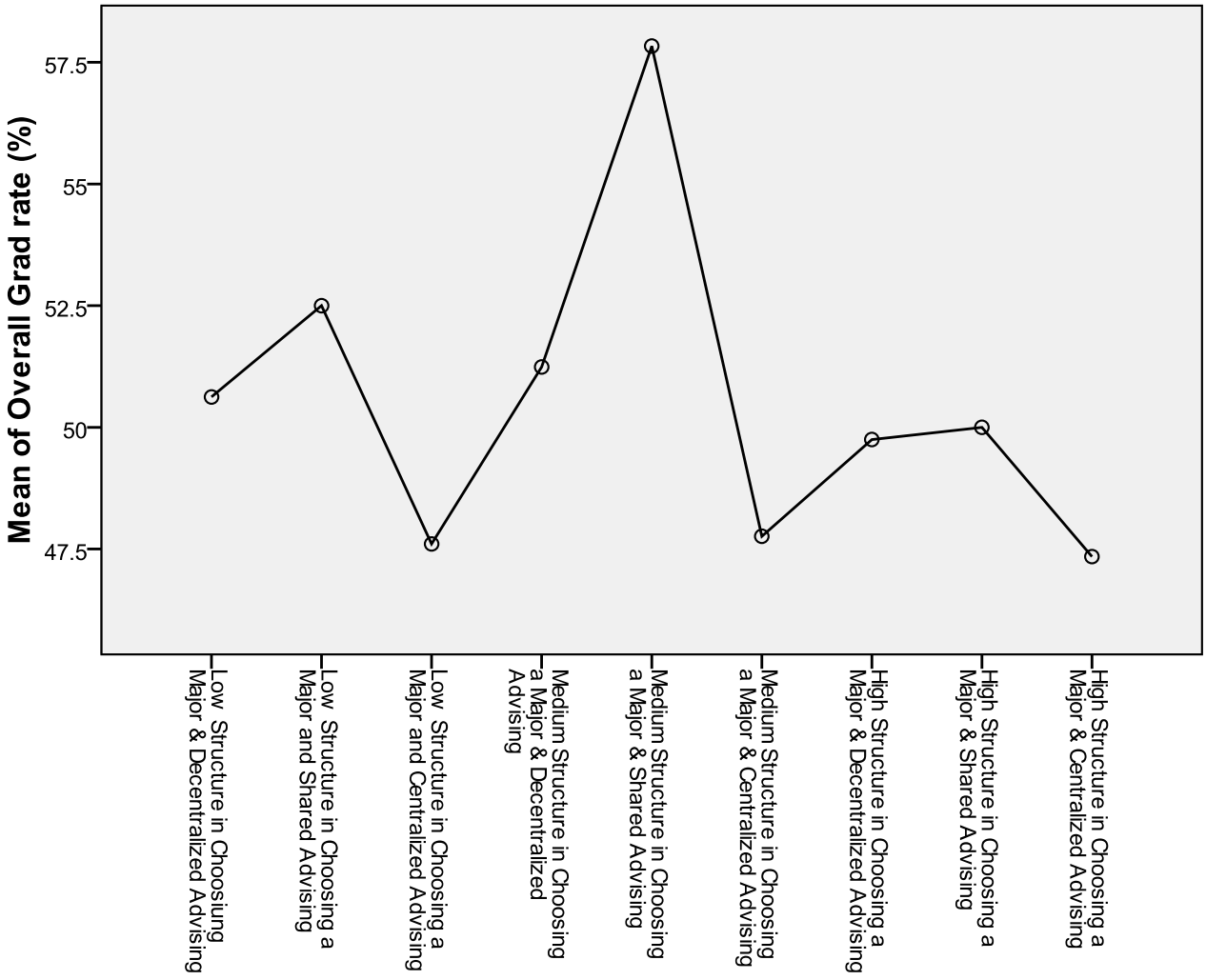


Figure 8. Means of overall graduation rates by combinations of major declaration structure in admission policy and advising delivery model.

Similarly, as depicted in Figure 9 four year graduation rates were highest (43%, s.d. = 25) among institutions using a combination of medium structure (students must choose a college but not a major) and shared advising (n = 18, 4.7% of the sample), followed closely by high structure and shared advising (but again, this combination is found in only two schools in the sample (.01%).

The pattern for six-year graduation rates is nearly identical to those for four year graduation rates. As evident in Figure 10 six year graduation rates were highest (58.5%, s.d. = 6.4) among institutions using a combination of high structure and shared advising (n = 2, .01% of the sample) followed closely by schools using medium structure/shared advising (n = 18, 4.7% of the sample) which had a mean of 57.7% (s.d. = 19.7).

In regard to graduation rates among men, illustrated in Figure 11 once again the highest rate 54.4% (s.d. = 21.7) was found among schools using medium structure/shared advising (n = 18, 4.7% of the sample), not the combination of low structure/shared advising that I hypothesized would have the highest graduation rates.

Finally, in examining graduation rates for women, the highest rates (60.3 %, s.d. = 18.6) were, again, among institutions using a combination of medium structure and shared advising (n = 18, 4.7 % of the sample), followed closely (56.1 %, s.d. = 17.6) by schools using a combination of low structure and shared advising (n=82, 21.5 % of the sample. These patterns are reflected in Figure 12.

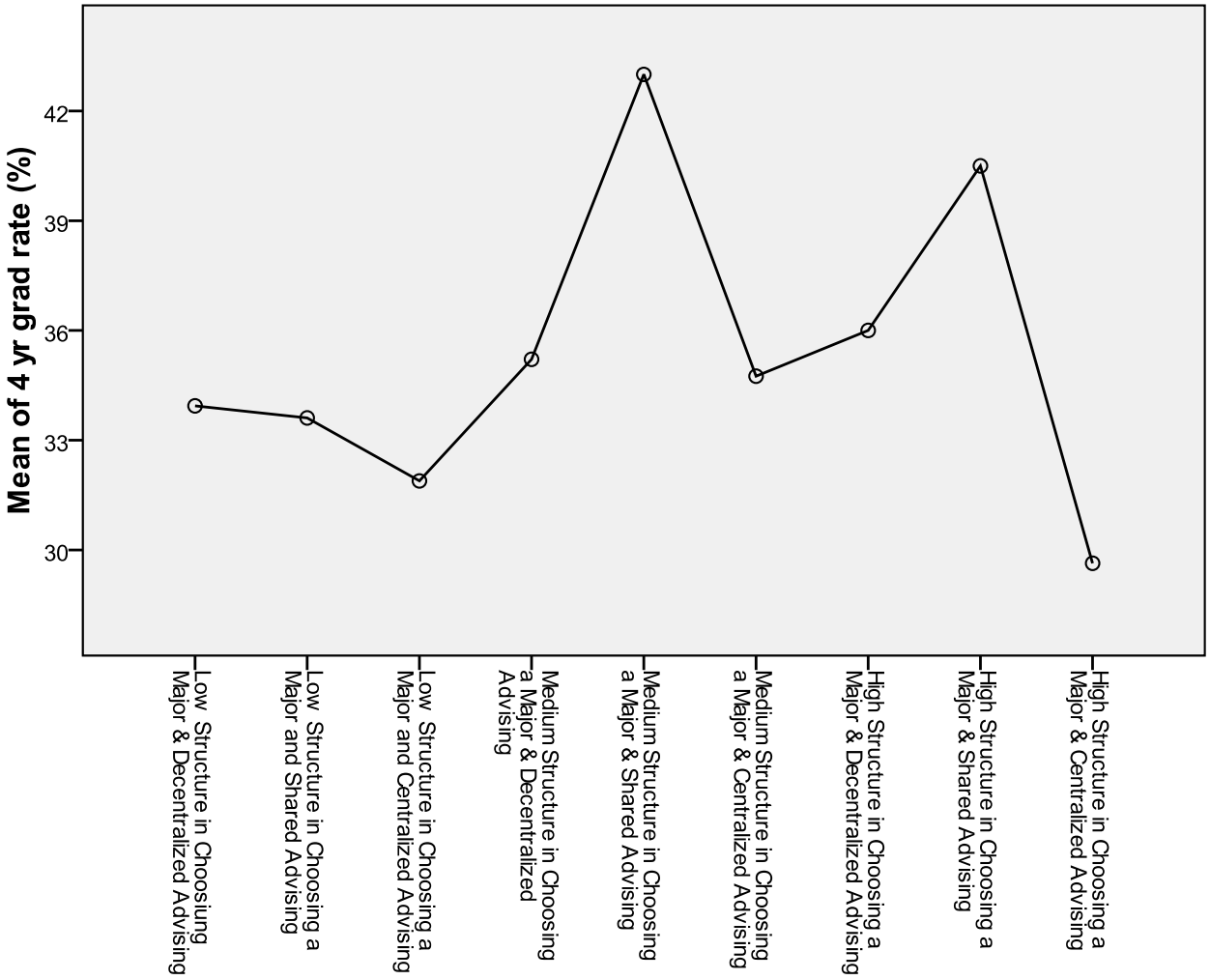


Figure 9. Means of four year graduation rates by combinations of major declaration structure in admission policy and advising delivery model.

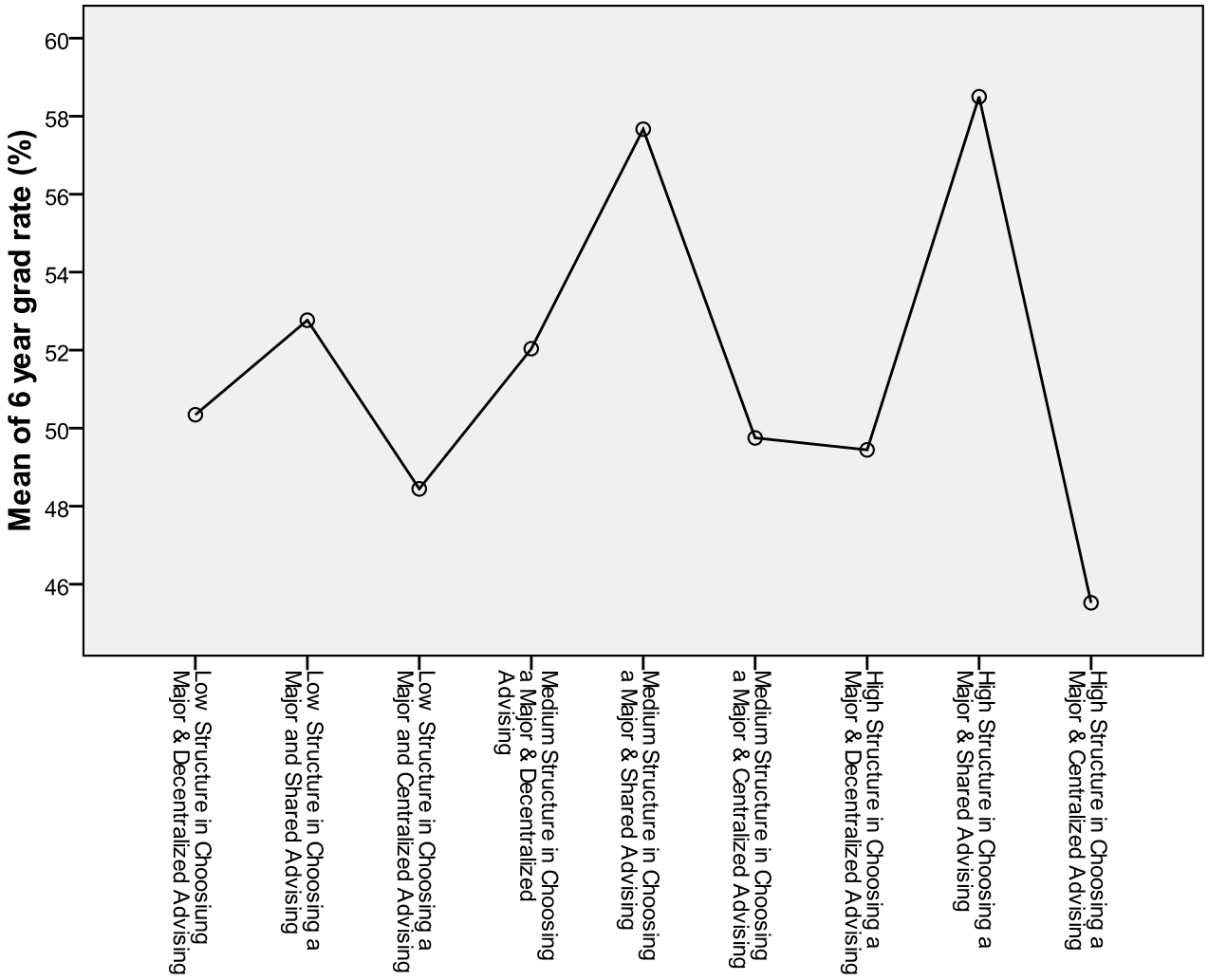


Figure 10. Means of six year graduation rates by combinations of major declaration structure in admission policy and advising delivery model.

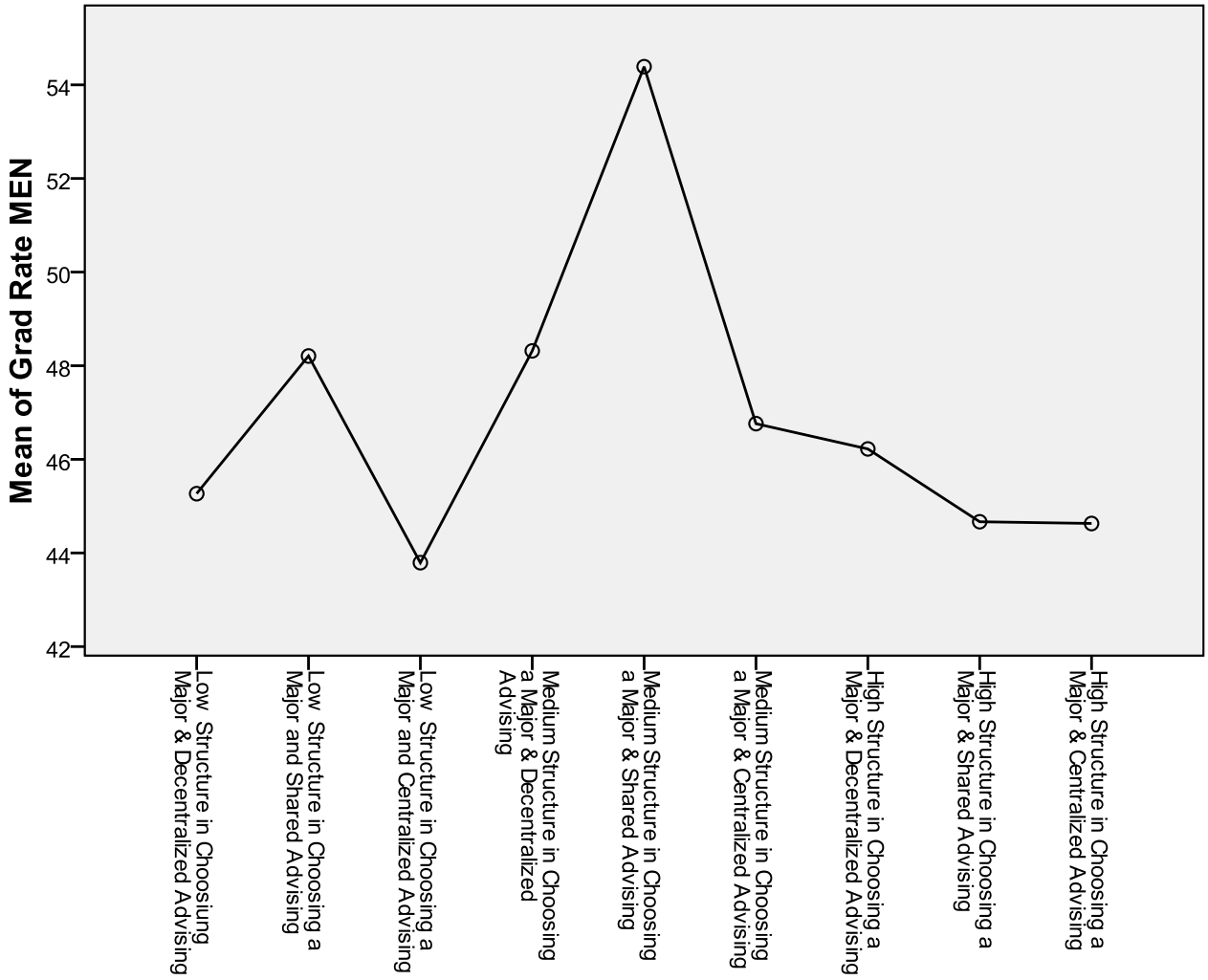


Figure 11. Means of institutions' graduation rates for men by combinations of major declaration structure in admission policy and advising delivery model.

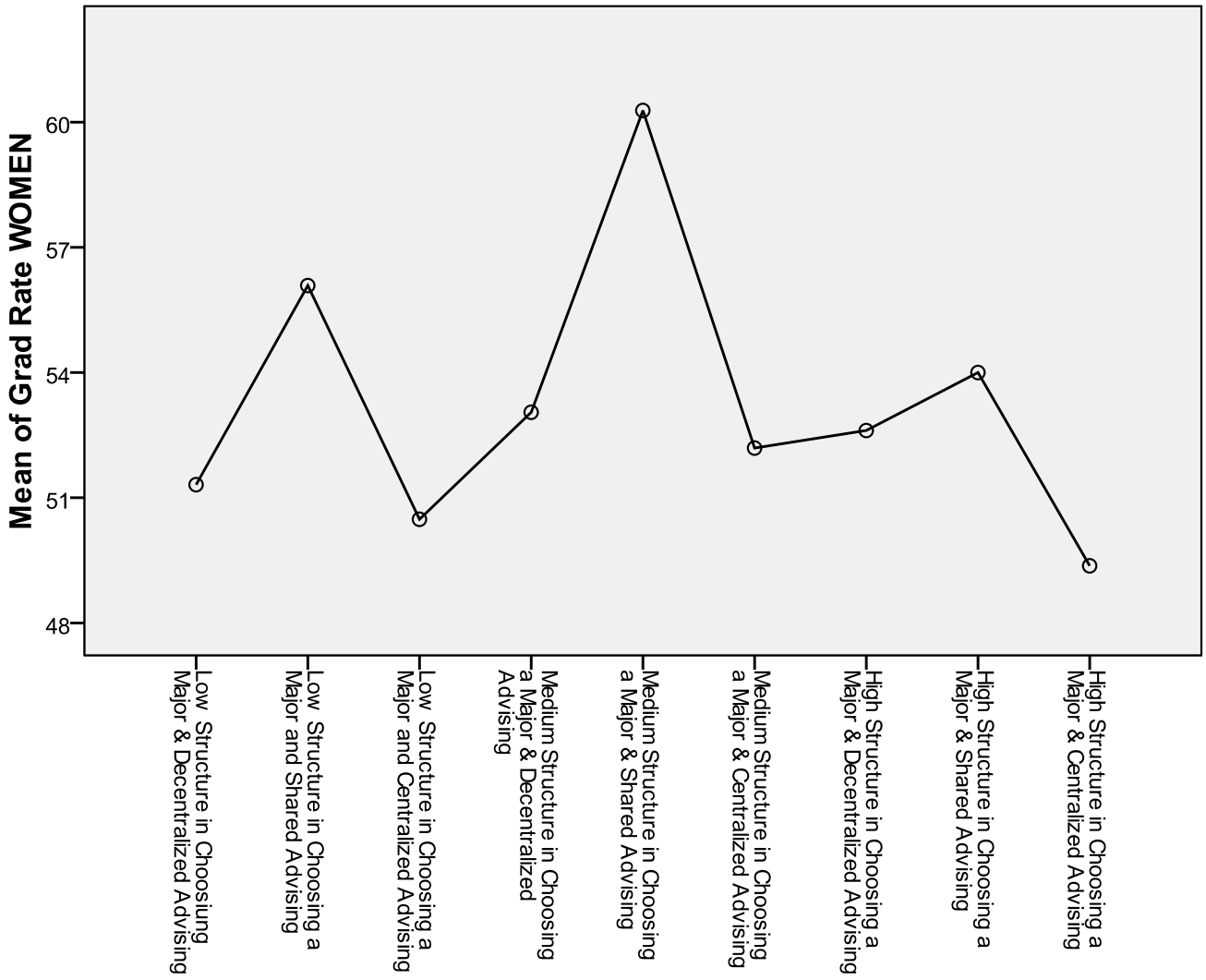


Figure 12. Means of institutions' graduation rates for women by combinations of major declaration structure in admission policy and advising delivery model.

Three admission policy/advising model combinations account for 65.6% of the sample: low structure/shared advising; low structure/centralized advising; and, medium structure/decentralized advising. Of these three, low structure/shared advising and medium structure/decentralized advising have similar mean graduation rates that run higher than the graduation rates of schools using the most prevalent combination, low structure/centralized advising, found in 23.1% of the sample.

Hypothesis 5b stated that institutions that require incoming students to declare a major at enrollment and that use a centralized advising model will have the lowest retention and graduation rates compared with other combinations of admissions policies and advising models considered in this study. This hypothesis is partially supported. In Table 6, I list the ranks of each of the nine possible admission policy/advising model combinations on each of the dependent variables. In regard to first to second year retention rates, high structure/centralized advising is not the lowest ranked combination, but this combination is in the bottom three ranks for both full-time student retention and part-time student retention.

High structure and centralized advising, as predicted, are the level of structure in admission policy governing the declaration of major and advising delivery model combination with the lowest graduation rates. Centralized advising dominates the lowest ranks of the graduation rates. Medium level of structure in declaration of major upon enrollment (requiring students to choose a college but not a major) in combination with shared or decentralized advising dominate the top ranks of all graduation rate categories (with the exception of the six year rate in which it was second to a combination with only two cases).

Table 6

Ranks of Combinations of Admissions Policies and Advising Models by Means of Retention Rates and Graduation Rates

	First to Second Year Retention Rates			Graduation Rates			
Rank	Full-Time	Part-Time	Overall	Four Year	Six Year	Men	Women
1	Medium & Decentralized	High & Shared[a]	Medium & Shared	Medium & Shared	High & Shared[a]	Medium & Shared	Medium & Shared
2	Medium & Shared	High & Decentralized	Low & Shared	High & Shared[a]	Medium & Shared	Medium & Decentralized	Low & Shared
3	Low & Shared	Low & Decentralized	Medium & Decentralized	High & Decentralized	Low & Shared	Low & Shared	High & Shared[a]
4	Low & Shared	Medium & Decentralized	Low & Decentralized	Medium & Decentralized	Medium & Decentralized	Medium & Decentralized	Medium & Decentralized
5	Low & Decentralized	Medium & Centralized	High & Shared[a]	Medium & Centralized	Low & Decentralized	High & Decentralized	High & Decentralized
6	Medium & Centralized	Low & Shared	High & Decentralized	Low & Decentralized	Medium & Centralized	Low & Decentralized	Medium & Centralized
7	High & Decentralized	High & Centralized	Medium & Centralized	Low & Shared	High & Decentralized	High & Shared[a]	Low & Decentralized
8	High & Centralized	Low & Centralized	Low & Centralized	Low & Centralized	Low & Centralized	High & Centralized	Low & Centralized
9	High & Shared[a]	Medium & Shared	High & Centralized	High & Centralized	High & Centralized	Low & Centralized	High & Centralized

Note. [a]Only two cases had this combination of high structure and shared advising; results related to this combination should be interpreted with caution.

Independent Variables and Variations in Institutional Characteristics

In light of the results related to the hypotheses, particularly the significant findings in regard to Hypothesis 1, that admission policies that highly structure incoming students' selection of a major, and in regard to Hypothesis 3, that the shared academic advising model was associated with higher mean graduation rates (overall, four year, and for women) than centralized advising, I wanted to examine whether these policies and advising models varied by institutional characteristics.

First, I explored relationships between institutional characteristics and the level of structure in admission policies governing the declaration of a major by incoming students. As shown in Table 7, level of structure in admission policy governing choosing a major varies significantly ($p < .05$) by institution size. The majority of the 381 schools in the study had a low structure admission policy wherein students need not declare either a major or a college. However, very small universities were nearly evenly split with 41.8% having a low structure policy and 40.0% having a high structure policy (incoming students must declare a specific major); and just 18.2% of these institutions had a medium structure policy (students must choose college but not major). Among small schools, 57.1% had a low structure admission policy, 30.2% had a medium structure policy, and 12.7% had a high structure admission policy concerning matriculates declaring a major. This pattern is closely mirrored among medium size institutions where 56.1% had a low structure admission policy, 38.2% had a medium structure policy, and just 5.7% had a high structure policy. Among large universities, 55.8% have a low structure policy, 35.1% had a medium level of structure in the admission policy on the selection of major at enrollment, and 9.1% have a high structure in this policy.

Table 7

Level of Structure in Admission Policies Governing Incoming Students' Declaration of Major at Enrollment by Institutional Characteristics (n = 381)

Institutional Characteristics	Level of Structure in Admission Policy Governing Choosing a Major: Low No Declaration Required (n = 207)	Medium Must Declare College (n = 122)	High Must Declare Major (n = 52)
Institution Size*			
Very Small (n = 55)	41.8%	18.2%	40.0%
Small (n = 126)	57.1%	30.2%	12.7%
Medium (n = 123)	56.1%	38.2%	5.7%
Large (n = 77)	55.8%	35.1%	9.1%
Institutional Funding***			
Public (n =166)	65.7%	28.9%	5.4%
Private (n = 215)	45.6%	34.4%	20.0%
Composition of Undergraduate Population			
Proportion Women	56.7	57.3	55.7
	(7.5)	(8.0)	(9.0)
Proportion Non-White	24.5	27.1	28.5
	(19.8)	(23.6)	(22.4)
Proportion Full-Time	83.1	82.7	87.7
	(14.3)	(14.6)	(10.4)
Proproation Non-Traditional (age 25+)	19.3 (14.6)	18.5 (14.0)	18.4 (16.3)
Admissions Test Scores			
Standardized Composite Test Score	-.09 (0.9)	.17 (1.1)	-.07 (1.1)
No Test Scores Required for Admission*** (n = 72)	41.7%	26.4%	31.9%
Test Scores Required (n = 309)	57.3%	33.3%	9.4%

Note. Standard deviations are shown in parentheses below means (where appropriate). Nominal by nominal and nominal by ordinal variable relationship significance levels determined using Cramer's V statistic. Ordinal by ordinal variable relationship significance levels determined using Somer's D statistic. *p <.05. **p <.01. ***p <.001.

A significant difference ($p < .001$) in level of structure in admission policy governing the declaration of a major exists between publicly and privately funded universities in this sample. The vast majority (65.7%) of public institutions have a low structure admissions policy when it comes to incoming students selecting a major while a minority (45.6%) of private institutions had a low structure policy regarding this issue. Public and private institutions appear similar in regard to medium structure admissions policies concerning declaration of majors, with 28.9% of public and 34.4% of private universities' policies reflecting this level of structure. However, the difference between public and private universities in high level of structure in admission policy, requiring incoming students to declare a major, is stark: just 1 in 20 (5.4%) public universities do so; but, 1 in 5 (20%) of private universities do so.

There were no significant differences in levels of structure in major declaration policies by institutional characteristics related to student population composition in regard to the proportion of women, non-white, full-time, and non-traditional students in the university populations, or in means on the composite standardized test score variable.

However, there is significant ($p < .001$) difference between institutions that do and do not require standardized tests for consideration in admission in the level of structure in admission policy governing choosing a major: A smaller proportion (41.7%) of schools that do not require test scores of applicants have a low structure admission policy compared with 57.3% of schools that require test scores. Just over one-quarter (26.4%) of universities not requiring test scores have a medium structure policy, mandating that students declare at least college but not necessarily a major, in contrast with a third (33.3%) of universities that require test scores. And, a greater proportion (31.9%) of institutions that do not require students to

submit standardized test scores for admission require students to declare a major at enrollment (high structure) than do schools that require test scores (just 9.4%).

Second, I explored relationships between institutional characteristics and the types of academic advising delivery models. As shown in Table 8, there were no significant differences in type of academic advising models by institutional characteristics for institutional size. However, patterns in the data reflect shared academic advising models are the minority across the 381 schools. Almost half, 45.5%, of very small schools have decentralized advising models, while they have 38.2% centralized models, and only 16.4% shared. Among small schools, 39.7% are centralized models, 34.1% are decentralized models, and 26.2% shared models of advising. Medium sized institutions are fairly evenly distributed in the type of academic advising models with 36.6% with centralized models, 32.5% have shared models, and 30.9% are decentralized models. Among large universities, 37.7% are decentralized, 33.8% are centralized, and 28.6% are shared.

A significant difference ($p < .05$) in type of academic advising model exists between publicly and privately funded institutions in this sample. Shared academic advising models were not the most prevalent at either public or private institutions. Publicly funded universities have more (36.7%) centralized advising models, over 33.7% shared models, and 29.5% decentralized models. While, privately funded institutions have a higher number (40.0%) decentralized advising models, 37.7% centralized models, and less than a quarter of the models are shared (22.3%).

Table 8

Types of Advising Models by Institutional Characteristics (n = 381)

Institutional Characteristics	Type of Advising Model		
	Centralized (n = 142)	Shared (n = 104)	Decentralized (n = 135)
Institution Size			
Very Small (n = 55)	38.2%	16.4%	45.5%
Small (n = 126)	39.7%	26.2%	34.1%
Medium (n = 123)	36.6%	32.5%	30.9%
Large (n = 77)	33.8%	28.6%	37.7%
Institutional Funding*			
Public (n =166)	36.7%	33.7%	29.5%
Private (n = 215)	37.7%	22.3%	40.0%
Composition of Undergraduate Population			
Proportion Women	56.8% (7.8)	56.9% (6.4)	56.7% (8.9)
Proportion Non-White	27.3% (24.0)	23.8% (19.3)	25.8% (21.2)
Proportion Full-Time	82.1% (16.0)	84.7% (10.8)	83.4% (14.5)
Proproation Non-Traditional (age 25+)	21.4% (16.5)	17.3% (11.9)	17.8% (14.1)
Admissions Test Scores			
Standardized Composite Test Score	-.15 (.86)	.01 (.96)	.15 (1.1)
No Test Scores Required for Admission	43.1%	19.4%	37.5%
Test Scores Required	35.9%	29.1%	35.0%

Note. Standard deviations are shown in parentheses below means (where appropriate). Nominal by nominal and nominal by ordinal variable relationship significance levels determined using Cramer's V statistic. Ordinal by ordinal variable relationship significance levels determined using Somer's D statistic. $*p < .05$. $**p < .01$. $***p < .001$.

There were no significant differences in the type of academic advising models by institutional characteristics related to the student body population of women, non-white, full-time, and non-traditional students. Similarly, no significant differences were uncovered in means of the composite standardized test score variable, the no test score required variable, or the test score required variable.

Two-Way Analyses of Variance

I conducted two-way analyses of variance (ANOVAs) to test for interactions between: (a) level of structure in admissions policies governing the declaration of a major; and, (b) advising models (centralized, shared, or decentralized) in predicting the dependent variables of first-to second year retention (of full-time students and of part-time students), and graduation rates (overall, four year, six year, men's and women's graduation rates). The dependent variables were normally distributed for the groups formed by the combination of admissions policies and advising models as assessed by the Shapiro-Wilk test. In addition, there was homogeneity of variance between groups in the dependent variables as assessed by the Levene's test for equality of error variances. First, I examined whether there were significant interactions between admissions policies and advising models in predicting the dependent variables for the entire sample. No significant interactions were detected. Second, I looked for interactions by institutional size, aggregating very small and small schools and comparing them with medium and large schools, collectively. Again, there were no significant interactions. Finally, I tested for interactions by funding sources, comparing public and private universities. No significant interactions emerged. Since there were no significant interactions, the results are not shown. However, I wanted to examine the possibility of interactions once institutional characteristics and student population composition were controlled, therefore I

conducted a series of regressions on each of the dependent variables that included interaction terms. The results are as follows.

Regressions

To specify whether, controlling for institutional characteristics, the level of structure in admission policies governing the declaration of a major and advising delivery models are related to the key variables of interest in this study, first to second year retention among full-time students and overall graduation rates, I regressed these dependent variables on the control and independent variables. I then tested for potential interactions between the independent and control variables in predicting the two student outcomes (first to second year retention among full-time students and overall graduation rates).

Table 9 shows the results for the series of regressions on first to second year retention. In Model 1 retention is regressed on institution size, public (versus private) funding, and the variables reflecting composition of the student population. Compared with medium size institutions, very small schools have a 14.4% lower retention rate ($p < .001$), small schools have a 6.2% lower retention rate ($p < .001$), and large schools have 3.9% higher retention rate ($p < .01$), controlling for funding type and student population composition. Publicly funded universities have a 6.4% lower retention rate ($p < .001$) than privately funded schools, controlling for institution size and the composition of the student population. And, all else being equal, for each % increase in non-traditional student enrollment, retention is .33% lower ($p < .001$). Model 1 accounts for 50% of the variation ($R^2 = .50$, $F = 45.55$, $p < .001$) in first to second year retention.

Table 9

Regression of First-to-Second Year Retention of Full-Time Students on Control and Independent Variables (n = 381)

Variable	Model 1 *b*	*SE b*	*B*	Model 2 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-14.37***	1.77	-.36	-8.05***	1.71	-.20
Small	-6.15***	1.29	-.21	-2.85*	1.2	-.10
Large	3.89**	1.5	.11	2.08	1.4	.06
Publicly Funded	-6.37***	1.15	-.23	-1.78	1.15	-.06
% Women	-.00	.07	-.00	.06	.06	.04
% Non-White	.06**	.02	-.10	-.01	.02	-.01
% Full-Time	.02	.04	.03	.03	.04	.03
% Non-Traditional	-.33***	.04	-.46	-.17***	.04	-.24
Standardized Test Scores				6.23***	.69	.40
No Test Score Required				-9.64***	1.48	-.27
Independent Variables						
Admission Structure[b]						
Low						
High						
Advising Delivery Model[c]						
Decentralized						
Shared						
Intercept	86.20***	5.80		74.94***	5.31	
R^2	.50			.60		
F	45.55***			55.27***		

Table 9 (continued)

Regression of First-to-Second Year Retention of Full-Time Students on Control and Independent Variables (n = 381)

Variable	Model 3 *b*	*SE b*	*B*	Model 4 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-8.16***	1.76	-.20	-8.30***	1.72	-.21
Small	-2.87*	1.22	-.10	-2.95*	1.21	-.10
Large	2.06	1.36	.06	1.99	1.36	.06
Publicly Funded	-1.59	1.16	-.06	-1.70	1.15	-.06
% Women	.06	.06	.04	.06	.06	.04
% Non-White	-.01	.02	-.02	-.01	.02	-.02
% Full-Time	.03	.04	.03	.03	.04	.04
% Non-Traditional	-.18***	.04	-.25	-.17***	.04	-.24
Standardized Test Scores	6.14***	.69	.39	6.13***	.69	.39
No Test Score Required	-9.69***	1.50	-.27	-9.59***	1.48	-.27
Independent Variables						
Admission Structure[b]						
Low	-1.37	1.05	-.05			
High	.07	1.61	.00			
Advising Delivery Model[c]						
Decentralized				1.61	1.10	.06
Shared				.20	1.19	.01
Intercept	76.10***	5.37	5.37	74.05***	5.35	
R^2	.59			.60		
F	46.24***			46.32***		

Note. **p* <.05. ***p* <.01. ****p* <.001. [a]Medium sized institutions are the omitted reference category. [b]Medium level of structure in admission policies governing selection of major is the omitted reference category. [c]Centralized advising delivery model is the omitted reference category.

Model 2 includes the same variables as Model 1, but also includes the composite standardized test score variables as well as the "no test scores required" dummy variable. The results indicate that, controlling for the other variables in the model, with each unit increase in the test score variable, retention increases by just over 6% (p <.001). Based on the standardized Beta value (.40), the standardized test score variable has the greatest influence on retention among the variables included in this model. Institutions that do not require standardized test scores have a 9.6% lower (p. >001) retention rate, on average, compared with schools that do require test scores for admission. When these two test score variables are included, very small and small schools still have significantly lower rates of retention than do medium size universities, though the size of these coefficients is reduced. Similarly, the negative relationship between the percentage of non-traditional students and retention remains significant but smaller. The relationships between large size institutions and retention and between public funding and retention are not significant once test scores are taken into account. The addition of the two variables related to test score improves the proportion of variance in first to second year retention explained to 60% (R^2 = .60, F = 55.27, p <. 001).

In Model 3, the independent variables related to the level of structure in admission policies governing the declaration of a major are included in the regression of first to second year retention on study variables. They are coded as dummy variables for low structure (0, 1) and high structure (0, 1), with medium structure as the omitted comparison category. Neither low nor high structure is significantly different from medium structure in their relationship with first to second year retention. Also, the inclusion of these variables in the model does not substantially change the coefficients of the control variables or the amount of variance explained (R^2 = .59, F = 46.24, p <. 001).

In Model 4, the independent variables related to advising delivery models are added to the control variables in the regression equation. They, too, are coded as dummy variables for decentralized advising (0, 1) and shared advising (0, 1), with centralized advising as the omitted comparison category. Once again, they are not significant and do not change any of the coefficients of the control variables in the model, and do not provide any improvement in the proportion of variance explained (R^2 = .60, F = 46.32, p <. 001).

To further examine first to second year retention for predictors, I created interaction terms between each of the control variables and the independent variables. Although the independent variables were not significant predictors of retention in the sample as a whole, they might interact with some institutional characteristics. If so, this would identify potential areas for intervention to improve retention.

This set of regressions tested for interactions between the levels of structure in admission policies governing the declaration of a major and control variables. Model 1 of Table 10 (the same model as present in Table 9, Model 4) provides the results of the main model to which interaction terms were added in a series of regressions to test whether each of the control variables X independent variables were significant. Five interactions were statistically significant, but they do not produce an improvement over the main model, as indicated by a lack of significant change in *R*-square and *F* scores.

Table 10

Regression of First-to-Second Year Retention of Full-Time Students on Control Variables, Level of Structure in Major Selection Admission Policy and Interactions (n = 381)

Variable	Model 1			Model 2		
	b	*SE b*	*B*	*b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-8.16***	1.76	-.20	-.61	3.12	-.02
Small	-2.87*	1.21	-.10	-2.96**	1.20	-.10
Large	2.06*	1.36	.06	2.17**	1.34	.06
Publicly Funded	-1.59	1.16	-.06	-1.92***	1.15	-.07
% Women	.06	.06	.04	.05	.06	.03
% Non-White	-.01	.02	-.02	-.01	.02	-.03
% Full-Time	.03	.04	.03	.03	.04	.04
% Non-Traditional	-.18***	.04	-.25	-.18***	.04	-.26
Standardized Test Scores	6.14***	.69	.39	5.91***	.69	.38
No Test Scores Required	-9.69***	1.50	-.27	-9.73***	1.48	-.27
Admission Structure[b]						
Low (no declaration of college major)	-1.37	1.05	-.05	-.37	1.09	-.01
High (must declare major)	.07	1.61	.00	.69	1.91	.02
Interactions						
Very Small Institution X Low Structure				-11.31**	3.61	-3.13
Very Small Institution X High Structure				-7.58*	3.72	-1.93
% Non-White X Low Structure						
% Full-Time X Low Structure						
% Non-Traditional X Low Structure						
Intercept	76.10***	5.37		76.55***	5.35	
R^2	.59			.61		
F	46.24***			41.18***		

Table 10 (continued)

Regression of First-to-Second Year Retention of Full-Time Students on Control Variables, Level of Structure in Major Selection Admission Policy, and Interactions (n = 381)

Variable	Model 3 *b*	*SE b*	*B*	Model 4 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-8.54***	1.75	-.21	-8.75***	1.75	-.22
Small	-3.02**	1.20	-.10	-3.09***	1.20	-.10
Large	1.92	1.35	.06	2.19	1.34	.06
Publicly Funded	-1.50	1.15	-.05	-1.75	1.15	-.06
% Women	.06	.06	.03	.07	.06	.04
% Non-White	.03	.03	.06	-.01	.02	-.02
% Full-Time	.03	.04	.03	-.06	.05	-.07
% Non-Traditional	-.17***	.04	-.25	-.19***	.04	-.26
Standardized Test Scores	5.98***	.69	.38	6.08***	.68	.39
No Test Scores Required	-9.56***	1.49	-.27	-9.73***	1.49	-.27
Admission Structure[b]						
Low (no declaration of college major)	1.32	1.49	.05	-13.46**	4.37	-.48
High (must declare major)	.01	1.6	.00	.21	1.60	.01
Interactions						
Very Small Institution X Low Structure						
Very Small Institution X High Structure						
% Non-White X Low Structure	-.10**	.04	-.15			
% Full-Time X Low Structure				.15**	.05	.45
% Non-Traditional X Low Structure						
Intercept	75.15***	5.34		82.72***	5.80	
R^2	.61			.61		
F	43.82			44.14***		

Table 10 (continued)

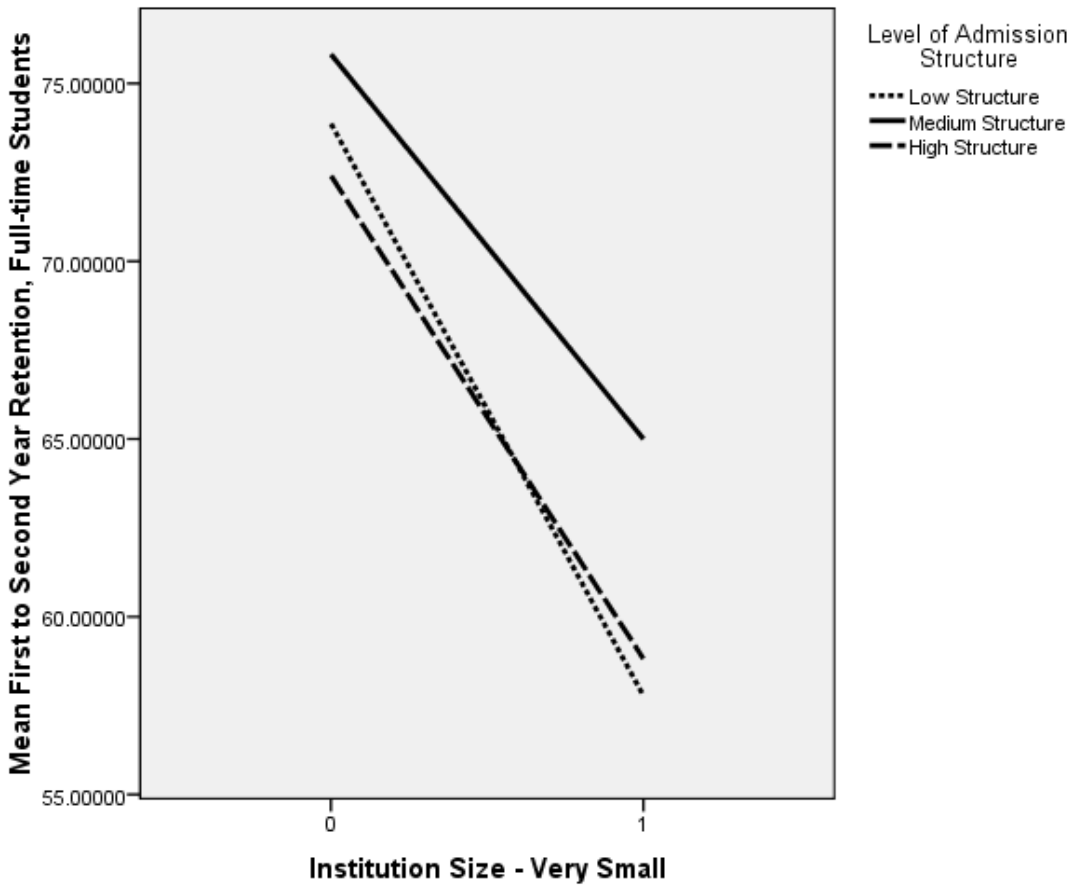
Regression of First-to-Second Year Retention of Full-Time Students on Control Variables, Level of Structure in Major Selection Admission Policy, and Interactions (n = 381)

Variable	Model 5 *b*	*SE b*	*B*
Control Variables			
Institution Size[a]			
Very Small	-8.25***	1.75	-.21
Small	-2.80*	1.20	-.09
Large	1.96	1.35	.06
Publicly Funded	-1.64	1.15	-.06
% Women	.05	.06	.03
% Non-White	-.01	.02	-.02
% Full-Time	.01	.04	.01
% Non-Traditional	-.14***	.04	-.20
Standardized Test Scores	6.09***	.69	.39
No Test Scores Required	-10.05***	1.50	-.28
Admission Structure[b]			
Low (no declaration of college major)	1.26	1.53	.05
High (must declare major)	-.23	1.61	-.01
Interactions			
Very Small Institution X Low Structure			
Very Small Institution X High Structure			
% Non-White X Low Structure			
% Full-Time X Low Structure			
% Non-Traditional X Low Structure	-.12*	.05	-.14
Intercept	77.19***	5.36	
R^2	.61		
F	43.63		

Note. *p <.05. **p <.01. ***p <.001. [a]Medium sized institutions are the omitted reference category. [b]Medium level of structure in admission policies governing selection of major (must declare college but not major) is the omitted reference category.

Therefore the significant interactions must be interpreted with caution and cannot be considered significant explanatory variables. However, they do suggest the possibility of interactive relationships that should be explored more fully in future research.

The first interaction suggesting a pattern for additional exploration is that very small institution size interacts with both low (p <.01) and high (p <.05) structure in admission policies pertaining to the declaration of a major. Both interactions are negatively related to first to second year retention. In addition, once these interactions are introduced to the model, there is no longer a significant difference between very small institutions and medium size institutions (the omitted comparison category) in retention; indicating that it is perhaps the prevalence of low structure (40%, not shown) and high structure (42%, not shown) of admission policies in very small schools that account for the difference in retention between very small schools (with the lowest average retention rates) and medium size schools (which have the highest average retention rates). The interaction between level of structure in admission policy governing the declaration of major and very small institution size is shown in *Figure 13*. This figure depicts the different slopes for retention by level of structure for very small schools compared with universities of other sizes.



Controlling for institution size; public (vs. private) funding; proportion of the student population who are women, non-white, full-time, and non-traditional; standardized test scores; and level of structure of major declaration policy.

Figure 13. Interaction between low of structure in admission policy governing selection of major and very small institution size in first to second year retention rates.

Model 3 in Table 10 shows the results of the regression of retention on control variables, the levels of structure in admission policies governing selection of a major, and the interaction between the proportion of non-whites in the student population and low structure in major declaration. This interaction indicated that for every percentage increase in the non-white student population there is a .10% decrease in first to second year retention (p <.01) for

universities using a low structure admissions policy compared with a medium structure policy. In addition, with the inclusion of this interaction term, the direction of the relationship between low structure and retention changes from negative to positive, although there remains no significant difference between low and medium structure.

In Model 4 shown in Table 10 the interaction between the proportion of students who are full-time and low structure are added to the control and admission policy structure variables. This interaction signifies that with every percentage increase in an institutions student population there is a corresponding .15 (p <.01) increase in first to second year retention. With the introduction of this interaction term, the coefficient for low structure becomes significant (p <.01), and quite large (b = -13.46). Since the interaction term tells us how low structure affects the mean retention rate for full-time students, the coefficient for low structure in this equation represents the affects for part-time students, indicating that the average retention rate for universities using the low structure admission policy will decline by 13.46%, compared with those using medium structure, for each one percentage increase in the part-time student population.

The last regression shown in Table 10, Model 5, includes the interaction between the percentage of non-traditional students and low structure in admission policies governing the declaration of a major. This indicates that for each percentage increase in the non-traditional student population there is a .12% decrease (p <.05) in the retention rate, on average, for institutions with a low structure, no declaration, policy compared with those that have a medium structure, declare just a college, policy.

In sum, low structure admission policies concerning selection of a major appear to be associated with lower retention rates for institutions with higher proportions of non-white

students, part-time students, and non-traditional students. However, in none of the models that included an interaction was there a substantial change in the amount of variance in retention explained as the R^2 was .59 for the main model and .61 for each model that included interactions. Again, the significant interactions must be interpreted with caution and cannot be considered significant explanatory variables because they did not result in a significant change in R^2 or improvement in the F value.

A third set of regressions tested for significant interactions between advising delivery models and control variables in predicting first to second year retention. Table 11 shows the results related to the six significant interactions that emerged from testing all of the potential interactions. Once again, though, the regression models that include interaction terms are not substantially better than the main model, as the changes in R^2 and F scores are not statistically significant. Indeed, in some cases, the F values decrease, rather than increase in the equations with the interaction terms. Therefore, interactions, although statistically significant in the regression equations, cannot be considered significant explanatory variables. They do indicate that there may be a meaningful interaction, and they should be examined in future research.

Table 11

Regressions of First-to-Second Year Retention of Full-Time Students on Control Variables, Advising Delivery Models and Interactions (n = 381)

Variable	Model 1 *b*	*SE b*	*B*	Model 2 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-8.30***	1.72	-.21	-11.95***	2.05	-.30
Small	-2.95*	1.21	-.10	-2.93*	1.19	-.10
Large	1.99	1.36	.06	2.19	1.34	.06
Publicly Funded	-1.70	1.15	-.06	-1.83	1.14	.07
% Women	.06	.06	.04	.07	.06	.04
% Non-White	-.01	.02	-.02	-.01	.02	-.01
% Full-Time	.03	.04	.04	.04	.04	.04
% Non-Traditional	-.17***	.04	-.24	-.18***	.04	-.25
Standardized Test Scores	6.13***	.69	.39	6.03***	.68	.39
No Test Scores Required	-9.59***	1.48	-.27	-9.51***	1.47	-.27
Advising Model[b]						
Decentralized (within academic department)	1.61	1.10	.06	.15	1.18	.01
Shared (department & central administration)	.20	1.19	.01	-.10	1.18	-.00
Interactions						
Very Small Institution X Decentralized				8.49**	2.67	.15
% Women X Shared						
% Non-White X Decentralized						
% Non-Traditional X Decentralized						
Intercept	74.05***	5.35		72.22***	5.28	
R^2	.60			.61		
F	46.32***			44.60***		

Table 11 (continued)

Regressions of First-to-Second Year Retention of Full-Time Students on Control Variables, Advising Delivery Models, and Interactions (n = 381)

Variable	Model 3 *b*	*SE b*	*B*	Model 4 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-7.80***	1.71	-.20	-8.30***	1.68	-.21
Small	-2.75*	1.20	-.09	-3.22**	1.18	-.11
Large	1.92	1.35	.06	1.93	1.33	.06
Publicly Funded	-1.78	1.14	-.06	-1.39	1.13	-.05
% Women	.15*	.07	.09	.08	.06	.05
% Non-White	-.01	.02	-.02	-.07**	.03	-.12
% Full-Time	.02	.04	.02	.03	.04	.04
% Non-Traditional	-.18***	.04	-.26	-.18***	.04	-.25
Standardized Test Scores	6.18***	.69	.40	5.96***	.68	.38
No Test Scores Required	-9.46***	1.47	-.26	-9.58***	1.45	-.27
Advising Model[b]						
Decentralized (within academic department)	1.58	1.09	.05	-3.21*	1.57	-.11
Shared (department & central administration)	19.88**	7.70	.63	-.13	1.16	-.00
Interactions						
Very Small Institution X Decentralized % Women X Shared	-.34**	.13	-.63			
% Non-White X Decentralized				.17***	.04	.24
% Non-Traditional X Decentralized						
Intercept	70.51***	5.48		75.22***	5.24	
R^2	.61			.62		
F	43.93***			46.03***		

Table 11 (continued)

Regressions of First-to-Second Year Retention of Full-Time Students on Control Variables, Advising Delivery Models, and Interactions (n = 381)

Variable	Model 5 *b*	*SE b*	*B*
Control Variables			
Institution Size[a]			
Very Small	-8.92***	1.69	-.22
Small	-2.69*	1.19	-.09
Large	2.42	1.34	.07
Publicly Funded	-1.90	1.33	-.07
% Women	.07	.06	.04
% Non-White	-.01	.02	-.02
% Full-Time	.04	.04	.05
% Non-Traditional	-.24***	.04	-.33
Standardized Test Scores	6.22***	.68	.40
No Test Scores Required	-9.70***	1.46	-.27
Advising Model[b]			
Decentralized (within academic department)	-3.02	1.62	-.10
Shared (department & central administration)	-.39	1.18	-.01
Interactions			
Very Small Institution X Decentralized			
% Women X Shared			
% Non-White X Decentralized			
% Non-Traditional X Decentralized	.19***	.05	.22
Intercept	74.83***	5.25	
R^2	.62		
F	45.46***		

Table 11 (continued)

Regressions of First-to-Second Year Retention of Full-Time Students on Control Variables, Advising Delivery Models, and Interactions (n = 381)

Variable	Model 1 *b*	*SE b*	*B*	Model 6 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-8.30***	1.72	-.21	-8.30***	1.70	-.21
Small	-2.95*	1.21	-.10	-2.92*	1.20	-.10
Large	1.99	1.36	.06	1.96	1.35	.06
Publicly Funded	-1.70	1.15	-.06	-1.68	1.14	-.06
% Women	.06	.06	.04	.05	.06	.03
% Non-White	-.01	.02	-.02	-.00	.02	-.00
% Full-Time	.03	.04	.04	.03	.04	.04
% Non-Traditional	-.17***	.04	-.24	-.17***	.04	-.24
Standardized Test Scores	6.13***	.69	.39	7.42***	.84	.48
No Test Scores Required	-9.59***	1.48	-.27	-9.76***	1.47	-.27
Advising Model[b]						
Decentralized (within academic department)	1.61	1.10	.06	1.63	1.09	.06
Shared (department & central administration)	.20	1.19	.01	.04	1.18	.00
Interactions						
Standard Test Scores X Decentralized				-2.75**	1.04	-.12
No Test Scores Required X Decentralized						
Intercept	74.05***	5.35		74.52***	5.31	
R^2	.60			.61		
F	46.32***			43.98***		

Table 11 (continued)

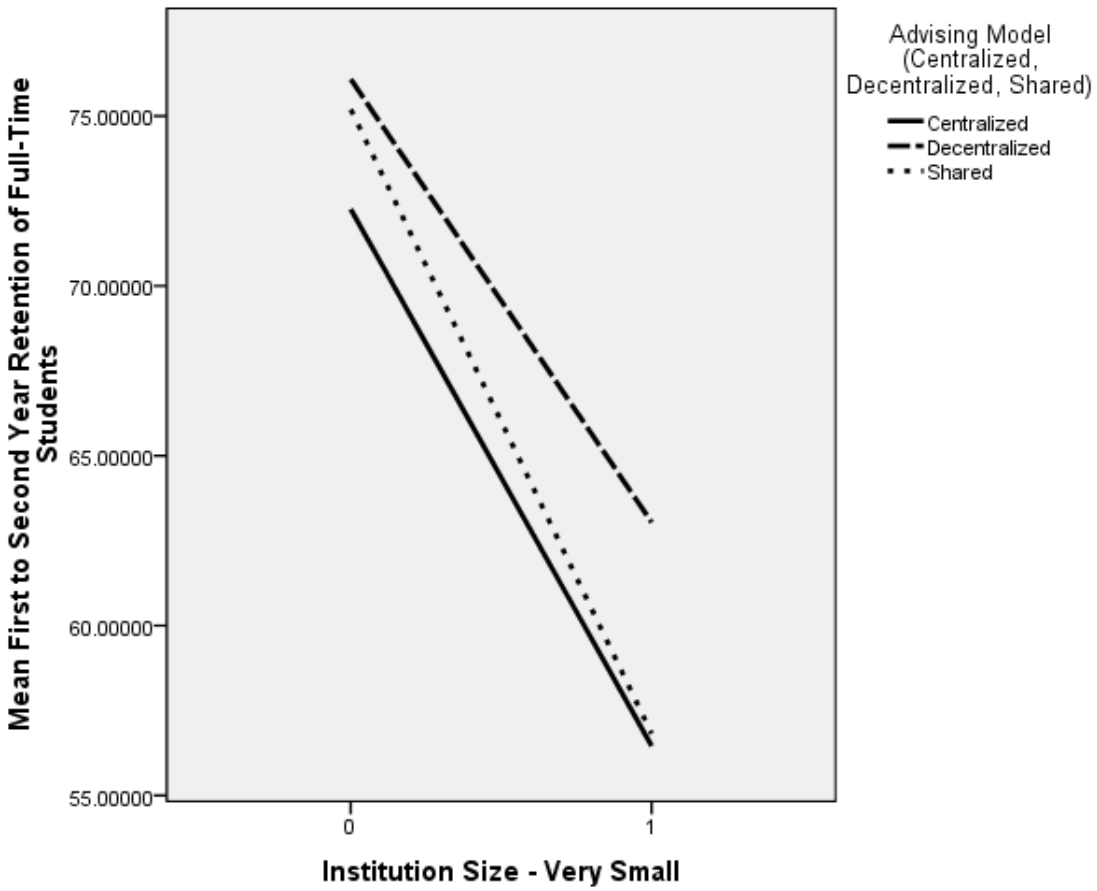
Regressions of First-to-Second Year Retention of Full-Time Students on Control Variables, Advising Delivery Models, and Interactions (n = 381)

Variable	Model 7 *b*	*SE b*	*B*
Control Variables			
Institution Size[a]			
Very Small	-8.51***	1.70	-.21
Small	-2.81*	1.20	-.09
Large	2.31	1.35	.07
Publicly Funded	-1.86	1.14	-.07
% Women	.07	.06	.04
% Non-White	-.01	.02	-.02
% Full-Time	.03	.04	.04
% Non-Traditional	-.18***	.04	-.25
Standardized Test Scores	6.10***	.68	.39
No Test Scores Required	-11.94***	1.69	-.33
Advising Model[b]			
Decentralized (within academic department)	.17	1.20	.01
Shared (department & central administration)	-.06	1.18	-.00
Interactions			
Standard Test Scores X Decentralized			
No Test Scores Required X Decentralized	6.86**	2.46	.13
Intercept	74.36***	5.30	
R^2	.61		
F	44.15***		

Note. *p <.05. **p <.01. ***p <.001. [a]Medium sized institutions are the omitted reference category. [b]Centralized advising is the omitted reference category.

As in Table 10, Model 1 in Table 11 provides the main model that included the control variables and the advising model variables (the same equation and results as discussed for Table 9, Model 4). The first interaction, shown in Model 2, is between very small institution size and decentralized advising (advising delivered within academic departments). The coefficient indicates that very small schools using decentralized advising (45%, not shown) will have, on average, an 8.49% higher (p <.01) retention rate than medium sized schools, in contrast with small universities using other advising delivery models (55%, not shown) which would have an 11.95% lower (p <.001) retention rate. The interaction between decentralized advising and very small institution size is shown in Figure 14. This figure depicts the different slopes for retention for different advising delivery models for very small schools compared with universities of other sizes.

The second significant interaction detected was between the proportion of the student population who are women and shared advising (advising delivered both within and external to academic departments). Here the coefficient (-.34) indicates that among institutions using a shared advising strategy, for every percentage increase of women in the student population, retention will be .34% lower (p <.01) than universities using other advising models. Interestingly, when this interaction is accounted for in the model, the coefficient for women (.15) becomes significant (p <.05), suggesting that aside from the shared advising mode, having a greater proportion of women in the student population is associated with higher retention rates. Also in this model, once the interaction between proportion of women and shared advising is controlled, the coefficient for the shared advising mode becomes significant (p <.01) and large at 19.88.



Controlling for institution size; public (vs. private) funding; proportion of the student population who are women, non-white, full-time, and non-traditional; standardized test scores; and advising delivery model.

Figure 14. Interaction between advising delivery model and very small institution size in first to second year retention rates.

The next significant interaction, reported in Model 4, with advising model is that between the proportion of non-whites in the student population and decentralized advising which is associated with a higher rate (.17, p <.001) of retention. Controlling for this interaction, the coefficient for the proportion of non-whites (-.07) become significant (p <.01), as does the coefficient for decentralized advising (-3.21, p <.05) compared with centralized advising, the omitted comparison category. These signify, respectively, that under advising delivery models other than decentralized, a greater proportion of non-white students is associated with lower average retention rates and that, aside from the positive effect on retention of decentralized advising with higher proportions of non-white student populations, decentralized advising is associated with lower retention rates than centralized advising.

Model 5 produces similar results but for an interaction between the percentage of non-traditional aged students in the population and decentralized advising. Again, decentralized advising is positively related to retention for non-traditional students (.19, p <.001), but when this interaction is taken into account, there is a larger negative relationship (from -.18 to -.24, p <.001) between proportion of non-traditional students and retention.

In Model 6, the interaction between the composite standardized test score and decentralized advising is included. This produces a negative coefficient (-2.75, p <.01), indicating that, at institutions using decentralized advising, for each unit increase in test scores, average retention rates decline by 2.75 compared with institutions using different advising models.

Finally, the interaction between decentralized advising and not requiring test scores is included in Model 7. Here the relationship is positive in that among universities that do not require standardized test score from applicant and that use a decentralized (academic

department based) advising model, the average retention rate is 6.86% higher (p <.01) than among schools that do not require test scores but that practice shared or centralized advising.

In sum, decentralized advising appears to be associated with higher retention for very small universities, at universities that do not require test scores for applicants, and at institutions with higher populations of non-white students and non-traditional students. The shared advising model may be less effective at universities with higher proportions of women in the student populations, and decentralized advising may not be optimal at institutions with students who have higher average standardized test scores. Again, though, the addition of the interactions did not result in a substantial change in the amount of variance in retention explained in these models as the R^2 was .60 for the main model and increased at most to .62 in models that included interactions. The lack of significance in the changes in *R*-square and *F* scores means that these interactions must be interpreted with caution and cannot be considered significant explanatory variables without further investigation.

To explore predictors of overall graduation rates in greater depth, I applied the same procedures: first, regressing overall graduation sequentially on control variables; then control variables and levels of structure in admission policies governing declaration of a major; then control variables and advising delivery models. I also tested for significant interactions between control and independent variables.

Table 12 reflects the results of the first set of regression analyses of overall graduation rates. In Model 1, overall graduation rates is regressed on institution size (with medium size institutions as the omitted comparison category), public (versus private) funding, and the demographic composition of the student population in terms of proportions of women, non-whites, full-time students, and non-traditional aged students. The result indicate that overall

graduation rates are lower among very small institutions (b = -14.85, p <.001) and small institutions (b = -8.45, p <.001), and higher among larger institutions (b = 3.86, p <.05) compared with medium size institutions. Publicly funded universities have lower overall graduation rates (b = -15.78, p <.001) than privately funded schools. Although the proportion of women in the institutions' student population is not significantly related to overall graduation rates, the proportion of non-whites, full-time students, and non-traditional students are. With each percentage increase in the proportion of non-white students, overall graduation rates are .17 lower (p <.001). With each percentage increase in the proportion of full-time students in the population, overall graduation rates are .18 (p <.001) higher. And, with each percentage increase in the proportion of non-traditional age students in the population, overall graduation rates are .40 (p <.001) higher. This model explains 62% of the variation in the overall graduation rate (R^2 = .62, F = 76.87, p <.001).

Table 12

Regression of Overall Graduation Rate on Control and Independent Variables (n = 381)

Variable	Model 1			Model 6		
	b	*SE b*	*B*	*b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	14.85***	2.18	-.26	-5.98**	2.00	-.11
Small	-8.45***	1.59	-.20	-3.94**	1.41	-.09
Large	3.86*	1.84	.08	.88	1.59	.02
Publicly Funded	15.78***	1.42	-.39	-8.61***	1.34	-.21
% Women	-.11	.08	-.05	-.02	.07	-.01
% Non-White	-.17***	.03	-.20	-.10***	.02	-.12
% Full-Time	.18***	.05	.16	.19***	.05	.17
% Non-Traditional	-.40***	.05	-.40	-.23***	.05	-.22
Standardized Test Scores				9.67***	.80	.44
No Test Scores Required				-7.85***	1.74	-.15
Independent Variables						
Admission Structure[b]						
Low						
High						
Advising Delivery Model[c]						
Decentralized						
Shared						
Intercept	67.69***	7.13		51.50***	6.21	
R^2	.62			.73		
F	76.87***			99.64***		

Table 12 (continued)

Regression of Overall Graduation Rate on Control and Independent Variables (n = 381)

Variable	Model 3			Model 4		
	b	*SE b*	*B*	*b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-7.17***	2.05	-.13	-5.76**	2.00	-.10
Small	-4.20**	1.40	-.10	-3.76**	1.41	-.09
Large	.70	1.58	.01	.98	1.59	.02
Publicly Funded	8.50***	1.35	-.21	-8.83***	1.35	-.22
% Women	.02	.07	-.01	-.03	.07	-.01
% Non-White	-.10***	.02	-.12	-.10***	.02	-.12
% Full-Time	.18***	.05	.16	.19***	.05	.17
% Non-Traditional	-.24***	.05	-.23	-.22***	.05	-.22
Standardized Test Scores	9.66**	.80	.44	9.73***	.81	.44
No Test Scores Required	-8.46**	1.74	-.17	-7.88***	1.73	-.16
Independent Variables						
Admission Structure[b]						
Low	1.07	1.22	.03			
High	4.64**	1.88	.08			
Advising Delivery Model[c]						
Decentralized				-.42	1.28	-.01
Shared				1.96	1.39	.04
Intercept	51.97***	6.25		51.48***	6.25	
R^2	.73			.73		
F	84.47***			83.55***		

Note. **p* <.05. ***p* <.01. ****p* <.001. [a]Medium sized institutions are the omitted reference category. [b]Medium level of structure in admission policies governing selection of major is the omitted reference category. [c]Centralized advising delivery model is the omitted reference category.

In Model 2, the variables pertaining to standardized test scores are added to the other control variables in Model 1. The results indicate that for each unit increase in the composite standardized test score variable, overall graduation rates are 9.67% higher (p<.001), and that institutions that do not require test scores from applicants have an average overall retention rate that is lower by 7.85% (p <.001) than schools that do require test scores. Also, the addition of these variables reduces the size of the coefficients for very small and small institutions by more than half, and accounts for the difference between large and medium size schools as the coefficient for large schools no longer is significant. The negative coefficients for the proportions of the student population that are non-white and non-traditional also are reduced, indicating that test scores account for part of the negative relationship between these student demographic characteristics and lower overall graduation rates. This model accounts for 11% more of the variance in the overall graduation rate as the R^2 value increases from .62 to .73 (F = 99.64, p <.001).

Model 3 includes the levels of structure in admissions policies governing the declaration of a major along with the control variables in Model 2. The results indicate that there is no significant difference in overall graduation rates between low and medium levels of structure. However, controlling for institutional characteristics, institutions with high structure in admission policies concerning students' declaration of major have 4.64% higher (p <.01) overall graduation rates, on average, than do schools with a medium level of structure. This model does not provide any improvement in the proportion of variation in overall graduation rates explained, though, as the R^2 value remains .73 (F = 88.47, p <.001).

Model 4 includes the advising model variables along with the control variables included in Model 2. The results show that there are no significant differences in overall

graduation rates between either schools with shared advising and those with centralized advising or schools using decentralized advising and those using centralized advising. The R^2 value remains .73 ($F = 83.55$, $p < .001$).

A second set of regressions tested for significant interactions between levels of structure in admission policies governing the declaration of a major and control variables in predicting overall graduation rates. Table 13 shows the results related to the four interactions out of all of the potential interactions that were significant. It is important to note that the regression models that include interaction terms do not produce an improvement over the main model, as indicated by a lack of significance in the changes in *R*-square and *F* scores. Indeed, the *F* values decrease, rather than increase, in the equations with the interaction terms. Therefore the significant interactions must be interpreted with caution and cannot be considered significant explanatory variables. However, they do suggest the possibility of interactive relationships that should be explored more fully in future research.

Model 1 serves as the main model (replicating Model 3 from Table 12) and includes the control variables and the level of structure variables. Model 2 includes the first significant interaction term, that between large institution size and low structure.

Table 13

Regressions of Overall Graduation Rate on Control Variables, Level of Structure in Major Selection Admission Policy and Interaction (n = 381)

Variable	Model 1 *b*	*SE b*	*B*	Model 2 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-7.17***	2.05	-.13	-7.41***	2.03	-.13
Small	-4.20**	1.40	-.10	-4.20**	1.39	-.10
Large	.70	1.58	.01	-2.92	2.15	-.06
Publicly Funded	-8.50***	1.35	-.21	-8.75***	1.34	-.22
% Women	-.02	.07	-.01	-.01	.08	-.00
% Non-White	-.10***	.02	-.12	-.10***	.02	-.12
% Full-Time	.18***	.05	.16	.19***	.05	.17
% Non-Traditional	-.24***	.05	-.23	-.23***	.05	-.23
Standardized Test Scores	9.66***	.80	.44	9.64***	.80	.43
No Test Scores Required	-8.46***	1.74	-.17	-8.27***	1.73	-.16
Admission Structure[b]						
Low (no declaration of college or major)	1.07	1.22	.03	-.32	1.34	-.01
High (must declare major)	4.64**	1.88	.08	4.23*	1.87	.07
Interactions						
Large Institution X Low				6.67*	2.72	.11
% Full-Time X Low Structure						
% Non-Traditional X High Structure						
No Test Scores Required X High Structure						
Intercept	51.97***	6.25		51.29***	6.21	
R^2	.73			.74		
F	84.47***			79.50***		

Table 13 (continued)

Regressions of Overal Graduation Rate on Control Variables, Level of Structure in Major Selection Admission Policy and Interaction (n = 381)

Variable	Model 3 *b*	*SE b*	*B*	Model 4 *b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-7.83***	2.04	-.14	-6.66***	2.01	-.12
Small	-4.44**	1.39	-.11	-3.69**	1.38	-.09
Large	.84	1.57	.02	.57	1.55	.01
Publicly Funded	-8.68***	1.34	-.22	-8.34***	1.32	-.21
% Women	-.01	.07	-.01	-.02	.07	-.01
% Non-White	-.10***	.02	-.12	-.10***	.02	-.12
% Full-Time	.09	.06	.08	.15***	.04	.13
% Non-Traditional	-.25***	.05	-.24	-.32***	.05	-.32
Standardized Test Scores	9.60***	.80	.43	9.51***	.79	.43
No Test Scores Required	-8.50***	1.73	-.17	-9.08***	1.72	-.18
Admission Structure[b]						
Low (no declaration of college or major)	-12.34*	5.09	-.31	.84	1.20	.02
High (must declare major)	4.80**	1.86	.08	-3.28	2.68	-.06
Interactions						
Large Institution X Low % Full-Time X Low Structure	.17**	.06	.35			
% Non-Traditional X High Structure				.26***	.06	.20
No Test Scores Required X High Structure						
Intercept	59.30***	6.76		55.81***	6.19	
R^2	.74			.75		
F	79.89***			82.52***		

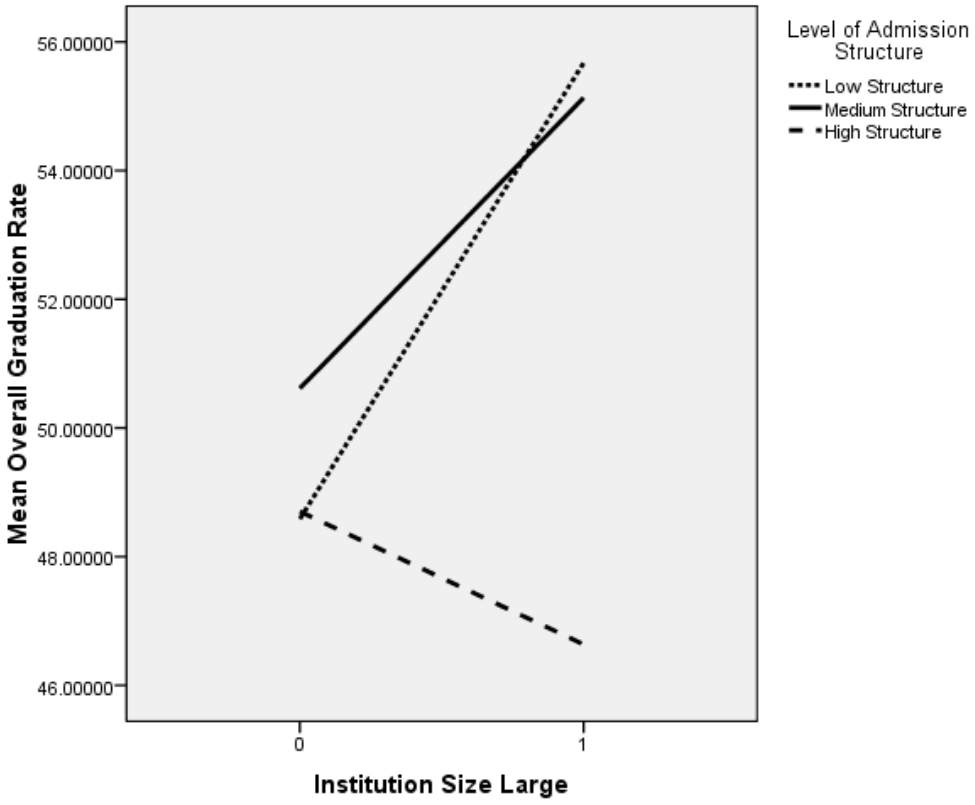
Table 13 (continued)

Regressions of Overal Graduation Rate on Control Variables, Level of Structure in Major Selection Admission Policy and Interaction (n = 381)

Variable	Model 5 *b*	*SE b*	*B*
Control Variables			
Institution Size[a]			
Very Small	-7.01***	2.02	-.12
Small	-3.95**	1.39	-.09
Large	.57	1.56	.01
Publicly Funded	-8.45***	1.33	-.21
% Women	-.03	.07	-.01
% Non-White	-.10***	.02	-.12
% Full-Time	.17***	.04	.15
% Non-Traditional	-.26***	.05	-.25
Standardized Test Scores	9.60***	.79	.43
No Test Scores Required	-10.66***	1.86	-.21
Admission Structure[b]			
Low (no declaration of college or major)	.98	1.21	.03
High (must declare major)	.76	2.24	.01
Interactions			
Large Institution X Low % Full-Time X Low Structure			
% Non-Traditional X High Structure			
No Test Scores Required X High Structure	10.47**	3.40	.13
Intercept	54.16***	6.22	
R^2	.74		
F	80.55***		

Note. *p <.05. **p <.01. ***p <.001. [a]Medium sized institutions are the omitted reference category. [b]Medium level of structure in admission policies governing selection of major (must declare college but not major) is the omitted reference category.

The coefficient (b = .67, p <.05) suggests that overall graduation rates are .67% higher at large schools with low structure (no declaration of college or major) than at large universities using medium or, especially, high structure admission policies. Figure 15 depicts the different slops in overall graduation rates for low levels of structure in admission policies at large institutions.



Controlling for institution size; public (vs. private) funding; proportion of the student population who are women, non-white, full-time, and non-traditional; standardized test scores; and level of structure in admission policy governing declaration of a major.

Figure 15. Interaction between low structure in admission policy governing the declaration of major and large institution size in overall graduation rate.

In Model 3, overall graduation rates are regressed on another significant interaction term, proportion of full-time students X low structure, along with the control variables. The coefficient for the interaction term (b=.17, p <.01) indicates that with each percentage increase of full-time students overall graduation rates increase by .17% among institutions with a low structure admission policy on students' declaration of a major, all else equal. Additionally, when this interaction is controlled, the coefficient for full-time students becomes non-significant and the coefficient for low structure becomes significant and large (b = -12.34, p <.05). This suggests that aside from the positive relationships between low structure for full-time students and overall graduation rates, low structure is associated with lower overall graduation rates.

In Model 4 the interaction term for the proportion of non-traditional students X high structure is included in the regression equation and the results indicate that overall graduation rates for non-traditional students at universities with a high level of structure in admission policies governing the declaration of a major are .26% higher (p <.001) than for non-traditional students at schools with medium or low structure policies. The coefficient for high structure becomes non-significant with the introduction of this interaction term suggesting that, on the whole, high structure does not relate to a different overall graduation rate than medium structure once the positive relationship between high structure and non-traditional students is controlled.

Finally, in Model 5, overall graduation rate is regressed on the interaction term for schools that do not require test scores from applicants X a high level of structure in admission policies governing the declaration of major along with the control variables from Model 1. The coefficient for the interaction term (b = 10.47, p <.01) indicates that overall graduation

rates are 10.47% higher for students at universities that do not require test scores which have a high level of structure in their admission policy concerning designating a major at enrollment compared with students at other institutions that do not require test scores which have a medium or low level of structure in these policies.

In sum, low structure is associated with higher overall graduation rates for larger schools and full-time students, while higher structure is related to higher overall graduation rates for non-traditional students and students at institutions that do not require standardized test scores for applicants. However, accounting for these interactions between control variables and level of structure in admission policies governing the declaration of a major do not explain a larger proportion of the variance in overall graduation rates than that explained by the main model (Model 1) as the R^2 value changes only from .73 to .74 or .75 in models that include interaction terms. Again a lack of significance in the changes in *R*-square and *F* scores means that these interactions cannot be considered significant explanatory variables and require further study.

In a third set of regressions, I examined interactions between types of advising delivery models and control variables in predicting overall graduation rates. Once more, although some significant interactions emerged, the inclusion of interaction terms did not produce significant improvements over the main models. Therefore the interactions serve only to draw our attention to the potential of a pattern, but this requires verification through future research.

The results for the two significant interactions are shown in Table 14. Again, Model 1 represents the main model, including only the control variables along with shared and decentralized advising (centralized advising is the omitted comparison category).

In Model 2, overall graduation rate is regressed on the interaction of the proportion of full-time students and decentralized advising, along with the control variables. The resulting coefficient for the interaction term (b = -.13, p <.05) signifies that for every percentage increase in full-time students at institutions with decentralized advising, the average overall graduation rate is .13% lower than it is for full-time students at universities that have centralized or shared advising delivery models.

In Model 3, the interaction of the proportion of non-traditional students and decentralized advising is included in the regression along with the control variables. The results indicate that for each percentage increase in non-traditional students at schools with decentralized advising, overall graduation rates increase by .16% (b = .16, p <.01) compared with institutions using the other advising models. Also, controlling for this interaction, the coefficient for decentralized advising become significant (b = -4.33, p <.05), suggesting that aside from the positive relationship decentralized advising has with overall graduation rates for non-traditional students, decentralized advising is associated with lower graduation rates than centralized advising.

Table 14

Regressions of Overall Graduation on Control Variables, Advising Delivery Model and Interactions (n = 381)

Variable	Model 1 *b*	Model 1 *SE b*	Model 1 *B*	Model 2 *b*	Model 2 *SE b*	Model 2 *B*
Control Variables						
Institution Size[a]						
Very Small	-5.76**	2.00	-.10	-6.08**	2.00	-.11
Small	-3.76**	1.41	-.09	-3.68**	1.40	-.09
Large	.98	1.59	.02	1.13	1.58	.02
Publicly Funded	-8.83***	1.35	-.22	-8.99***	1.34	-.22
% Women	-.03	.07	-.01	-.01	.07	-.01
% Non-White	-.10***	.02	-.12	-.10***	.02	-.12
% Full-Time	.19***	.05	.17	.23***	.05	.20
% Non-Traditional	-.22***	.05	-.22	-.23***	.05	-.23
Standardized Test Scores	9.73***	.81	.44	9.77***	.80	.44
No Test Scores Required	-7.88**	1.73	-.16	-7.83***	1.73	-.15
Advising Model[b]						
Decentralized (within academic department)	-.42	1.28	-.01	9.84	5.26	.24
Shared (department & central administration)	1.96	1.39	.04	1.72	1.39	.04
Interactions						
% Full-Time X Decentralized Advising				-.13*	.06	-.26
% Non-Traditional X Decentralized Advising						
Intercept	51.48***	6.25		47.86***	6.48	
R^2	.73			.73		
F	83.55***			78.08***		

Table 14 (continued)

Regressions of Overall Graduation on Control Variables, Advising Delivery Model and Interactions (n = 381)

Variable	Model 3 *b*	*SE b*	
Control Variables			
Institution Size[a]			
Very Small	-6.29**	1.20	-.11
Small	-3.54**	1.40	-.08
Large	1.34	1.58	.03
Publicly Funded	-9.00***	1.34	-.22
% Women	-.02	.07	-.01
% Non-White	-.10***	.02	-.12
% Full-Time	.20***	.04	.17
% Non-Traditional	-.28***	.05	-.27
Standardized Test Scores	9.81***	.80	.44
No Test Scores Required	-7.98***	1.72	-.16
Advising Model[b]			
Decentralized (within academic department)	-4.33*	1.91	-.10
Shared (department & central administration)	1.46	1.39	.03
Interactions			
% Full-Time X Decentralized Advising			
% Non-Traditional X Decentralized Advising	.16**	.06	.13
Intercept	52.14***	6.20	
R^2	.74		
F	79.06***		

Note. *p <.05. **p <.01. ***p <.001. [a]Medium sized institutions are the omitted reference category. [b]Centralized advising is the omitted reference category.

In sum, controlling for institutional characteristics, compared with centralized and shared advising (which is not significantly different from centralized advising in these models), decentralized advising seems to be negatively related to overall graduation rates among full-time students and positively related to overall graduation rates for non-traditional students. However, taking these interactions into account does not provide any additional explanation in the amount of variation in overall graduation rates as the R^2 value either does not change or changes only from .73 to .74 in models that include the interaction terms. Since including interaction terms do not produce an improvement over the main model, as indicated by a lack of significance in the changes in *R*-square and *F* scores, the significant interactions must be interpreted with caution and cannot be considered significant explanatory variables.

In the last set of analyses I examined the relative influence of the control and independent variables on the dependent variables by regressing the dependent variables on full models, containing all of the institutional characteristic control variables, as well as the levels of structure in admission policies governing the declaration of a major and the advising delivery models.

Table 15 reports the results of regressing the first to second year retention variables, one for full-time students and another for part-time students, on full models. In the first model in which retention for full-time students is regressed on the study variables, once institutional characteristics are controlled, neither level of structure in admission policies nor advising models are significant. The full model accounts for 60% of the variation in first to second year retention among full-time students ($R^2 = .60$, $F = 39.64$, $p < .001$).

Table 15

Regression of First-to Second Year Retention Rates for Full-Time and Part-Time Students on Control and Independent Variables (n = 381)

Variable	Full-Time Students			Part-Time Students		
	b	*SE b*	*B*	*b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-8.44***	1.78	-.21	2.86	5.18	.04
Small	-2.95*	1.21	-.10	3.09	3.42	.06
Large	1.98	1.36	.06	-6.89	3.79	-.12
Publicly Funded	-1.60	1.16	.06	-9.51**	3.19	-.19
% Women	.06	.06	.04	-.22	.18	.07
% Non-White	-.01	.02	-.02	.07	.06	.08
% Full-Time	.03	.04	.03	-.04	.12	-.03
Non-Traditional	-.17***	.04	-.24	-.17	.13	-.13
Standardized Test Scores	6.09***	.69	.39	9.44***	2.30	.29
No Test Scores Required	-9.70***	1.50	-.27	15.73***	4.17	-.26
Independent Variables						
Admission Structure[b]						
Low	-.76	1.21	-.03	4.64	3.42	.09
High	.54	1.67	.01	10.71*	5.08	.14
Advising Delivery Model[c]						
Decentralized	1.34	1.23	.05	6.82*	3.49	.13
Shared	.37	1.21	.01	3.27	3.38	.06
Intercept	74.96***	5.47		75.96***	15.84	
R^2	.60			.23		
F	39.64***			6.00***		

Note. **p* <.05. ***p* <.01. ****p* <.001. [a]Medium sized institutions are the omitted reference category. [b]Medium level of structure in admission policies governing selection of major is the omitted reference category.

In the second model, in which retention for part-time students is regressed on study variables, the results are different. A high level of structure in admission policies regarding designating a major, compared with medium structure, is associated with higher overall graduation rates for part-time students (b = 10.71, p <.05). Also, decentralized advising, compared with centralized advising, is related to higher overall graduation rates for part-time students (b = 6.82, p <.05). Among part-time students, retention is not related to institution size as there are no differences between medium size institutions (the omitted comparison category) and institutions of other sizes in part-time student retention. However, rates of retention of part-time students are significantly lower (b = -9.51, p <.05) at publicly funded institutions than at privately funded institutions. The variables in this model account for far less of the variation in retention for part-time students, just 23% R^2 = .23, F = 6.0, p <.001), than they do for full-time students.

These results from the regressions of full-time student retention and part-time student retention highlight the differences between these two student populations. The findings suggest that different variables are at work in retaining part-time students than those that apply to full-time students. Also, the result indicate that other variables than those included in this study account for a much greater amount of variation in first to second year retention among part-time students, whereas the variables studied here explain a majority of the variance in retention among full-time students.

Table 16 shows the results of regressing each of the five variables pertaining to graduation rates (overall, four year, six year, men's and women's graduation rates) on the control and independent variables. The results were largely consistent across all of the graduation rates, with a few exceptions.

In regard to the independent variables, across the different graduation rates, controlling for institutional characteristics, low level of structure admission policies governing the declaration of a major is not different from medium structure, and decentralized and shared advising are not significantly different from centralized advising. High structure in admission policies is unrelated to all graduation rates except overall graduation; here it is associated with higher ($b = 4.77$, $p < .05$) overall graduation rates than medium structure.

In regard to institutional characteristics, across the five graduation rates, very small institutions have significantly lower ($p < .001$) graduation rates compared with medium size universities (the omitted comparison category), as do small institutions, with the exception of four year graduation rates. For each of the five graduation rates, publicly funded institutions have significantly lower ($p < .001$) graduation rates than do privately funded universities. For none of the graduation rates is the proportion of women significant, controlling for other institutional characteristics and the independent variables. However, with the exception of the four year graduation rate, the proportion of non-whites in the student population is associated ($p < .01$) with lower graduation rates. Again, with the exception of the four year graduation rate, the proportion of full-time students in the population is positively related ($p < .01$) to graduation rates. The percentage of non-traditional students is negatively associated

Table 16

Regression of Graduation Rates on Control and Independent Variables (n = 381)

Variable	Overall *b*	Overall *SE b*	Overall *B*	Four Year *b*	Four Year *SE b*	Four Year *B*
Control Variables						
Institution Size[a]						
Very Small	-7.07***	2.06	-.12	-6.17**	2.4	-.09
Small	-4.03**	1.41	-.10	-1.79	1.59	-.04
Large	.77	1.58	.02	-4.86**	1.80	-.09
Publicly Funded	-8.65***	1.35	-.22	-15.22**	1.52	-.35
% Women	-.03	.07	-.01	.16	.08	.06
% Non-White	-.10***	.02	-.12	-.05	.03	-.05
% Full-Time	.18***	.05	.15	.06	.06	.04
Non-Traditional	-.23***	.05	-.23	-.33***	.06	-.27
Standardized Test Scores	9.65***	.80	.44	11.22***	.91	.47
No Test Scores Required	-8.52***	1.74	-.17	-9.71***	2.01	-.16
Independent Variables						
Admission Structure[b]						
Low	.45	1.40	.01	.03	1.58	.00
High	4.77*	1.94	.08	-.11	2.27	-.00
Advising Delivery Model[c]						
Decentralized	.06	1.42	.00	1.23	1.62	-.03
Shared	2.54	1.40	.06	.60	1.59	.01
Intercept	52.17***	6.35		39.45***	7.42	
R^2	.74			.73		
F	73.03***			67.36***		

Table 16 (continued)

Regression of Graduation Rates on Control and Independent Variables (n = 381)

Variable	Year Six			Men		
	b	*SE b*	*B*	*b*	*SE b*	*B*
Control Variables						
Institution Size[a]						
Very Small	-8.04***	2.04	-.14	-9.76***	2.26	-.16
Small	-3.23*	1.36	-.08	-4.42**	1.52	-.10
Large	1.88	1.54	.02	1.27	1.70	.02
Publicly Funded	-7.93***	1.30	-.20	-9.09***	1.46	-.21
% Women	.05	.07	.02	.01	.09	.00
% Non-White	-.08***	.02	-.10	-.09***	.03	-.10
% Full-Time	.18***	.05	-.31	.15**	.05	.12
Non-Traditional	.13***	.05	-.31	-.24***	.05	-.22
Standardized Test Scores	9.46***	.78	.44	-10.98***	.87	.47
No Test Scores Required	-9.69***	1.72	-.18	-9.31***	1.92	-.17
Independent Variables						
Admission Structure[b]						
Low	.03	1.35	.00	-1.14	1.53	-.03
High	1.42	1.93	.02	3.18	2.14	.05
Advising Delivery Model[c]						
Decentralized	-.45	1.39	-.01	-1.91	1.56	.04
Shared	1.67	1.36	.04	1.08	1.52	.02
Intercept	53.86***	6.36		50.78***	7.32	
R^2	.76			.73		
F	79.62***			69.40***		

Table 16 (continued)

Regression of Graduation Rates on Control and Independent Variables (n = 381)

Variable	Women *b*	*SE b*	*B*
Control Variables			
Institution Size[a]			
Very Small	-8.52***	2.10	-.15
Small	-4.66***	1.42	-.11
Large	2.38	1.59	.05
Publicly Funded	-9.27***	1.36	-.23
% Women	.03	.07	.01
% Non-White	-.07**	.03	-.08
% Full-Time	.20***	.05	.17
% Non-Traditional	-.29***	.05	-.28
Standardized Test Scores	8.25***	.82	.37
No Test Scores Required	-8.84***	1.78	-.17
Independent Variables			
Admission Structure[b]			
Low	-.27	1.42	-.01
High	2.93	2.00	.05
Advising Delivery Model[c]			
Decentralized	-1.70	1.44	-.04
Shared	2.64	1.42	.06
Intercept	51.06***	6.50	
R^2	.73		
F	70.75***		

Note. *p <.05. **p <.01. ***p <.001. [a]Medium sized institutions are the omitted reference category. [b]Medium level of structure in admission policies governing selection of major is the omitted reference category. [c]Centralized advising delivery model is the omitted reference category.

(p <.001) with lower graduation rates. And, across all five graduation rates, the composite standardized test score variable is positively related (p <.001) to graduation rates, and institutions that do not require applicants to submit test scores have lower average graduation rates (p <.001) than universities that do require them.

In sum, smaller institutions and publicly funded institutions have lower graduation rates, as do schools with higher proportions of non-white and non-traditional students, and those that do not require test scores from applicants. The proportion of non-white and full-time students appears unrelated to four year graduation rates, but related to the other graduation rates. And, the independent variables are not significantly related to any of the graduation rates, with the exception of high structure admission policies and overall graduation. The variables

in this study account for between 73% and 76% of the variation in the graduation rates examined here, as the R^2 = values range from .73 to .76 in these models.

Regressions by Institutional Size and Funding Source

In an effort to explore whether the admissions policies governing the declaration of a major or the advising models might operate differently for institutions of different sizes, or of differing funding sources (public versus private), or for schools that do not require test scores of applicants. Since there were few significant results, analyses are not shown, but they are discussed later. First, I regressed first-to-second year retention and overall graduation rates on each set of these variables. The main model included student population characteristics: proportion of women; non-whites; full-time students; and, non-traditional students, as well as the composite standardized test score variable. A second model included the main model variables and added the dummy variables for low structure and high structure admission

policies governing the declaration of a major, leaving medium structure as the omitted reference category. A third model included variables from the main model and added the shared and decentralized advising dummy variables, leaving out centralized advising as the comparison category.

In regression analyses by school size, I aggregated very small and small schools for a larger *n*, and separately ran regressions for: (a) very small and small universities; (b) medium size universities; and, (c) large universities. There were only two significant results. First, among very small and small schools (analyzed together), first to second year retention of full-time students was lower (b = -4.41, p < .03) in institutions with a low structure (no major or college declaration) admission policy compared to those with a medium structure (must declare a college but not a major) admission policy. Second, among large universities, first to second year retention of part-time students was significantly higher (b = 10.58, p < .02) in institutions with low (compared with medium) structure admission policies.

In regression analyses in which I separated publicly funded institutions from privately funded institutions, only one significant result emerged: among public universities decentralized advising is associated (b = 2.99, p < .04) with higher first to second year retention among full-time students. This finding was not evident among privately funded universities.

Finally, I separated institutions that do not require standardized test scores from applicants from those that do and conducted the regression analyses described above. There were two significant findings, both relating to schools that do not require applicants to submit standardized test scores: First, first to second year retention among part-time students was significantly higher (b = 10.6, p < .02) in institutions with high structure admission policies

(must declare a major) compared with those with medium structure (must choose college but not major). Second, overall graduation rates are significantly higher ($b = 13.8$, $p < .01$) in institutions with high structure admission policies. These results were not found among institutions that do require students to submit standardized test scores as part of their application for admission.

Summary

Overall, the patterns revealed in the regression analyses of first to second year retention and graduation rates reflect patterns identified in earlier analyses. On the whole, with the exception of some key interactions, the independent variables in this study are not significant predictors of the student outcomes studied here once institutional characteristics are controlled. Instead, institutional characteristics such as size, funding, the composition of the student population, and the qualifications of students as reflected by standardized test scores account for a substantial proportion of the variation in retention and graduation among universities in the U.S. Still, this study identified some potential patterns and interactions in the relationships between student outcomes and the policies concerning students having to designate a college or major and the ways in which advising is delivered that may contribute to our understanding of these phenomena and provide useful insights for policy and practice, and point to directions for future research. These are considered in the Discussion and Conclusion portions of Chapter V.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The purpose of this research study was to explore potential relationships and patterns by admissions policies governing the declaration of a major and advising delivery models in student outcomes of retention and graduation rates. The overall question was whether student retention or graduation rates varied by institutional policies regarding academic major declaration at the time of admission or by the way academic advising is delivered.

The initial data analyses uncovered some relationships and patterns in student outcomes by level of structure of admission policies and by academic advising delivery models. Once the institutional factors were controlled through the regressions, the different levels of structure in admissions policies, and academic advising models did not explain much in regard to retention and graduation rates at the institutional level. The patterns that were uncovered, however, point to the possibility that different levels of structure in admissions policies concerning selection of an academic major and some models of academic advising may be more beneficial for certain populations of students and types of institutions than others. That is, the results of this study highlight the benefit of institutions recognizing that the same policies and services may not work equally well for all kinds of students. Rather, institutional awareness of student population characteristics and explicit efforts to address varying needs of different segments of that population may produce improved student outcomes in regard to retention and graduation rates.

Retention Rates and Admission Structure

Full-time students. Overall, first to second year retention rates for full-time students at institutions with a high level of structure in admissions policies governing the declaration of a major were significantly lower than at universities with medium and low structure policies. Requiring students to declare an academic major when they are not developmentally prepared to make such a concrete decision may result in incongruence between their aptitudes and academic major choice (Gordon, 2007). Declaring a major before ever taking any courses related to the subject area can create certain expectations and perceptions about the major. Students do not always declare their academic majors based on facts and research, but popular culture, family influences, or process of elimination (Galotti, 1999; Simpson; 2003). Once students begin to take coursework in a declared major, they may realize that their choice was not well informed and find that their expectations are not met. After students determine the major they have selected is not a match, they may struggle academically, and this may contribute to their questioning their enrollment in the university. If students commitment to their education waivers on an academic level, they are at greater risk for leaving (Astin, 1997; Tinto, 1993). Another risk for students who are struggling academically is being administratively dropped from the university for poor performance. If premature selections occur and academic struggles result, this practice could contribute to lower retention rates at institutions that require students to declare their academic major at the onset of their education. One consideration for institutions that require students to declare their major at the time of enrollment are their policies for changing majors at a later time. Given the high percentage of students who will change their academic major during their academic career is high (Gordon,

2007), restrictive admission policies and equally rigid academic major change policy institutions may set up students for departure (Tinto, 1993).

In this study, very small (those with fewer than 1,000 students) and small institutions (those with 1,000 to 2,999 students) with either high or low structure admission policies in regard to declaring a major have significantly lower first to second year retention rates than the same size schools with medium structure policies. Based on the literature, I had hypothesized that schools with low structure admissions policies concerning declaring a major would have higher retention rates over schools with high and medium structure policies. It is possible that low levels of structure in the major selection process provide too much flexibility and high levels of structure are not flexible enough. At some of the very small and small institutions, there may be limited support services and other ways for students to become engaged with the university. Thus, having students choose an academic home may promote a connection in an academic avenue because other opportunities for involvement may not be as apparent.

In these data, schools with higher proportions of underrepresented and non-traditional students, higher structure admission policies concerning the declaration of a major are associated with higher retention and graduation rates. The results of the study point to an interaction between the percentages of non-white, full-time enrollment, and schools with low structure admission policies governing the declaration of academic major. The possible interaction shows that as full-time, non-white student enrollment increases, first to second year retention rates decrease. Providing a low level of admission structure in the declaration of academic major to underrepresented populations may not be providing enough of a framework to an already identified at-risk population that could need a higher level of organization (Muraskin & Lee, 2004). Minority students may be first generation college students, have

financial aid concerns, and need academic support services to promote success (Kelpe Kern, 2000). In this study an interaction between non-traditional (over age of 25) students and low admission policy structure in the declaration of academic major schools also suggests that retention is lower at universities that do not require students to declare a major or a college as the proportion of non-traditional students increases. This may be because non-traditional students often have many external forces competing for their time and energy, including families, jobs, and financial burdens, which can create challenges in their learning environment and pull students away from institutional commitment (Tinto, 1993).

Low structure admission policy for the declaration of academic major institutions displayed lower retention rates than medium admission policy structure schools, however the rates increased at institutions with higher full-time student enrollment. Full-time enrolled students have higher retention rates compared with part-time enrolled students (College Board, 2011). We know much more about how to retain full-time students than we do about how to retain part-time students (Laird & Cruce, 2009). Full-time students often have more opportunities to utilize campus resources and become involved in social activities, factors that strengthen retention (Astin, 1984, 1997).

In this study, higher first to second year retention rates for full-time students seem to be related to medium admission policy structure for the declaration of academic major institutions perhaps because this allows students to begin to identify with an academic home on campus, which is different than the hypothesized low structure having the higher retention rates. One possible explanation is that declaring an academic college, but not specific major, allows students to establish an academic identity at the onset of their education (Astin, 1993; Gordon, 2007; Tinto, 1993). Their academic identity does not have to be fine-tuned to fit a specific

major, but with medium level of academic declaration admissions structure, a student can select an interest area to explore. Students can enroll in major-specific courses while still having the flexibility to solidify their choice gradually. By belonging to an academic home, a student may feel connected not just to the university, but have a deeper tie to the academic department. A sense of academic belonging can lead to greater student retention and degree completion (Astin, 1997; Tinto, 1993).

Another factor that may help to account for the positive relationship between medium structure admission policies governing the selection of a major and retention rates is students' commitment to getting a college education, even if they are not certain about a major. Retention rates may be higher at institutions that have medium admission policy structure for academic major selection even for students who are not sure if the declared academic department is a match for them, but because the students have a commitment to finish the degree (Tinto, 1993). Students may struggle academically if they realize that their initial choice of major is not the correct one for them (Gordon, 2007). The pressure and stress around the decision to change majors or remain in a major that is not congruent to their interests/abilities may create substantial anxiety for students (Pike, 2006). This distress might be reduced in medium admission policy structure institutions through the creation of straightforward change of major policies. Medium admission policy structure institutions position students in an academic college, but not in a specific major. This moderate organizational level may allow the student to maintain the freedom to explore and change their mind easily, but provide enough of a framework to be supportive of a student's need to be academically integrated into the institution (Astin, 1997). Ease of transferring from one major to another in a medium admission policy structure institution may not negatively impact

academic performance if a student is committed to degree completion during their time of relative uncertainty (Tinto, 1993).

Part-time students. First to second year retention for part-time students is lower in general for part-time students compared to full-time students at institutions of higher education (Tinto, 1993). Students enrolled part-time had higher first to second year retention rates when coupled with higher level of admission policy structure as compared to full-time students with higher rates at low admission policy structure schools. Part-time student retention rates were higher at large institutions with high structure admission policies that required students to declare an academic major at the time of enrollment. A possible explanation for the difference between full-time and part-time students may be that part-time students are more concentrated on their academic major and achievement oriented when they make the decision to enroll (Benshoff, 1991). Part-time students are often non-traditional students who may have multiple responsibilities including jobs and families (Laird & Cruce, 2009). Students attending college part-time have been reported to spend more time in external activities, such as jobs and caring for families, that can pull them away from their educational path, more so than full-time students (National Survey of Student Engagement, 2004, 2006). Part-time students are often non-traditional students (Laird & Cruce, 2009) and may have more of a clear plan for fulfillment of graduation requirements in a concise and linear manner that fits with high admission policy structure as compared with full-time students who may have time to devote to exploring their interests. Full-time, traditional aged students are younger and generally have fewer external responsibilities, allowing them to devote more time to campus activities and co-curricular experiences (National Survey of Student Engagement, 2004, 2006). The size of the institution may be a factor for part-time students because of availability and vastness of

campus support resources at large schools over some of their smaller counterparts (College Board, 2009).

Retention Rates and Academic Advising Models

Full-time students. In the study, first to second year retention rates for full-time students are higher in institutions that have a shared or decentralized advising structure over centralized academic advising models. Both shared and decentralized advising models assign students to an academic advisor in an academic department. Similarly, in the declaration of an academic college with medium admission policy structure institutions, having an academic advisor in their academic home could encourage a student to develop a relationship with the faculty/staff advisor potentially proving positive for retention (Tinto, 1993). Decentralized academic advising models assign students to an academic advisor within an academic department. Ideally, the academic advisor is in student's major. However, if a student is undeclared, they are assigned an advisor in an academic department with no connection to the academic major. Shared advising models distribute academic advisors in both a centralized advising program and within the academic department. Faculty and staff connections can contribute to overall retention of students (Astin, 1997; Tinto, 1993). Making connections with faculty/staff within the departments of study can help develop a student's academic identity and encourage the sense of belonging on an academic and social level.

First to second year retention rates for full-time students drop significantly for women at institutions that provide a shared model of academic advising over centralized models. At institutions with a shared academic advising model, retention rates were higher for men over women. One possible explanation for a difference in retention between men and women is their developmental ability to view knowledge and form relationships (Baxter Magolda, 1992).

Women are most comfortable with receiving knowledge in a more private manner than their male counterparts and will turn to their peers for guidance and support. According to Baxter Magolda (1992) women are not as apt to engage in relationships with instructors or advisors, where men are searching for any opportunity to demonstrate their knowledge to others and learn from those whom they view as authorities. Men at this developmental stage are dualistic and seek answers from those that they view as authorities, which include faculty and advisors (Perry, 1999). Thus, by exposing men to a shared model, they are thriving at the increased exposure to faculty or staff advisors to show what they know and gain the better answers from the individuals whom they view as the authorities for their academic planning.

Institutions that have decentralized advising programs display higher retention rates for non-traditional and non-white students. These specialized populations of students may benefit from the concise organizational structure of the decentralized model that rests in the student's academic home. Individualized attention from one specific advisor in a specialized academic area may provide the best balance of services. Both the non-traditional and non-white student populations are underrepresented on most college campuses and can be populations difficult to retain (Tinto, 1993). The highly specialized and focused nature of the decentralized advising structures may be beneficial in fostering success.

Institutions that do not require standardized test scores and have a decentralized academic advising program displayed higher levels of first to second year retention rates for full-time students over part time students. Some schools are not requiring standardized test scores are attracting more first generation students, females, and ethnic minorities (Syverson, 2007). Some of the universities beginning to move away from requiring standardized test in the admissions process are doing so in part because the test scores do not always equal merit

(Syverson, 2007). The National Center for Fair and Open Testing (FairTest, 2011) reports upwards of 700 four-year degree granting institutions in the United States that do not require standardized test scores for admission. High school QPA and standardized test scores have been shown as the highest predictors in college success (Geiser & Santelices, 2007; Hoffman & Lowitzki, 2005; Zwick & Sklar, 2005). Standardized test scores have been shown to not be as an accurate predictor for underrepresented minority students (Geiser & Santelices, 2007). A decentralized model can provide students with focused advising support to make the academic connection, which is essential to retain all populations of students (Tinto, 1993). Assigning students to academic advisors in a decentralized advising model opens the opportunity for the students to embed themselves in their academic home. The end result of these advising relationships is ideally the development of a connection for the students and creating the environment for positive student outcomes for this specialized population.

Part-time students. In this study, students enrolled part-time in an institution appear to benefit from high admission structure and decentralized advising. The characteristics of the part-time student may explain the need for a highly structured major selection process and focused advising model. Part-time students often are at risk populations, inclusive of ethnic minorities, women, and non-traditional students (Laird & Cruce, 2009). By providing a clear academic path to follow, part-time students may have a better opportunity to remain enrolled.

In this study, retention is lower among part-time students at institutions that do not require standardized test scores. Some reasons not to require standardized test scores are to appeal to a more diverse student body, reduce the importance of standardized tests that may be biased against certain populations of students, and also often to fit a specialized mission of the schools (Syverson, 2007). The majority of the schools that are not requiring test scores

identify themselves as “non-competitive” or “minimally competitive” (Syverson, 2007). The de-emphasis of standardized test scores is allowing traditionally underrepresented groups of first generation students, females, and ethnic minorities greater access to college admission, but additional or different kinds of support may be needed to foster success among these groups of students (Syverson, 2007).

Graduation Rates and Admission Structure

Once the dependent variables have been controlled, not any one type of admission structure is not really better for the graduation rate categories of overall, four year, six year, men or women. One significant finding that was uncovered is overall graduation rates at institutions that did not require standardized test scores were found to be significantly higher at institutions with higher structure admission policies. However, the remainder of data reflects the pattern for graduation rates across all of the categories were the lowest at high admission structure institutions. High admission structure institutions that require students to declare their major could be setting students up for taking additional time to complete their degrees. If a student did not make an informed choice at the onset and needed to change their major, additional time could be added (Gordon, 2007). The addition of more time could make students choose to leave the university to pursue a degree at another institution or to depart their education all together. Graduation rates may be higher at institutions not requiring standardized test scores because the populations at some of these types of schools may require the higher organizational framework and additional support (Syverson, 2007).

Full-time enrollment in combination with a low admission structure for the declaration of academic major resulted in increased overall graduation rates. Full-time students may be in a better position to leave their academic choices open and have the time to devote to the

exploration (Snyder, Tan, & Hoffman, 2006). There is also more known about the full-time student and how to foster their success and ultimate graduation (Laird & Cruce, 2009). Non-traditional students are the opposite of the traditional aged full-time student in respect to overall graduation rates in relationship to academic advising structure. Non-traditional students seem to thrive more in a highly structured admissions process where they are required to declare their academic major. One possible explanation could be that they are more focused on the completion of the degree and dive into the academic major with little room for exploration.

Institutions that do not require test scores have lower graduation rates across the board for both women and men in overall, four year, and six year rates. Most schools that do not require test scores considered themselves as "non-competitive" (Syverson, 2007). Open admission schools have historically displayed lower retention and graduation rates over highly selective schools (College Board, 2011). Institutions that are not requiring test scores and do have open enrollment may consider the development of an additional layer of resources to support their growing population of specialized learners to promote positive student outcomes.

Graduation Rates and Academic Advising Models

The patterns in the data show graduation rates across all categories were higher in institutions having decentralized or shared advising models. Students exposed to a shared or decentralized advising structure have the opportunity to develop relationships at the academic departmental level. Institutions with solely centralized advising models do not create the opportunity for students to make the connections with the academic homes as readily as the other types of advising models. Making academic connections contribute to retention and can end in an ultimate increase in graduation rates (Astin, 1994; Tinto, 1993). In the shared model,

having interactions with two types of advisors could increase the opportunity for meaningful relationships, instead of just at the departmental level or only at a centralized unit.

Full-time students participating in decentralized advising structures have lower levels of overall graduation rates compared to the shared advising model, where non-traditional students have higher overall graduation rates when in a decentralized structure. The full-time student may be more involved overall with other campus resources and services and may be more comfortable with the shared advising model utilizing a centralized unit in conjunction with a departmental advisor. Characteristically non-traditional students are not residential, may not spend as much time engaging in campus resources, and have external responsibilities that pull them from the university (Astin, 1994; Tinto, 1993). Having these additional responsibilities coupled with academic requirements, non-traditional students may be better suited in a decentralized model due to the direct and focused nature of the organizational structure.

Limitations

One of the major limitations of the study is that individual student outcomes are being studied at the institutional level. Interpretations are made at the institutional level, where individualized student success may shed more light onto overall retention and graduation rates. Many factors influence student retention and graduation rates, thus studying individual students over time may provide more insight into factors that help students to stay at a school and persist to graduation.

A second limitation of the study is admission policy structure for the declaration of academic major choice and academic advising models are the only variables that are considered in relation to retention and graduation rates. There are many other factors,

including personal and institutional characteristics that influence retention and degree completion for students are not presented as areas of focus for the study. Individual student characteristics such as ethnicity, socioeconomic status, college preparation, and family educational background were not directly studied (Pascarella & Terenzini, 2005). Institutional resources, involvement in campus life, and academic support services also contribute to a student's decision to remain at their university (Astin, 1997; Bean, 1985; Tinto, 1993). The delivery of social and academic support services can be crucial in the efforts to retain students (Astin, 1984, 1997).

A third limitation of the study could be threats to reliability and validity from the data collected in the primary and secondary data sources. Individual coders were trained in primary data collection for admission policies and advising models. Construct validity could be threatened as a result of the training the coders underwent for the data collection process (Mertens, 1998). The coders collected data based on the information they were given at the time of training. The training itself may have inadvertently and unintentionally led to skewed or biased labeling of data. Reliability of the individual websites could also be questionable for accuracy, currency, and clarity. Future research may want to look closely at admissions policies and advising structures using data from other sources that could support the reliability of this type of data. The secondary data taken from the National Center of Education Statistics is one of the most widely used sources of secondary data in higher education research (Thomas & Heck, 2001). However, caution should still be used in the interpretation of the results, especially when considering small case numbers (Association for Institutional Research, 2004).

A limitation in the scope of this study was consideration for the type of university included. The study did not control for the types of institutions in regard to whether they are

brick and mortar versus online and for profit versus not for profit. Campus structure was not factored into the selection criteria in drawing the sample, but perhaps should have been considered based on recent evidence that online and for-profit universities tend to have lower retention and graduation rates (U.S. Department of Education, 2010).

Another limitation is that this study does not take into account issues of quality in how academic advising is delivered. Prescriptive and developmental advising delivery methods are related to different patterns of student retention (Hale, Graham, & Johnson, 2009), but this is not considered for the scope of the current study. Only organizational models of academic advising were considered, not the quality of advising at institutions. While the delivery model can lay the framework for providing academic advising, the actual communication and interaction between advisors and students is likely more influential in student retention and graduation rates (Gordon, 2007).

Directions for Future Research

Some of the findings and unexpected results of this study warrant further investigation and research. One area that seems to need additional explanation is the relationships between underrepresented populations, admission structure, and academic advising models. A pattern that developed was the need for non-white, non-traditional, and part-time students to have high structure admission and decentralized advising models for more successful outcomes. Are these populations of students in need of specialized admission policies and advising structures to foster their success? It seems that all of these students could be considered "at risk" for not being retained and not completing their degrees, which means additional research is warranted to find the best match of services to benefit these students.

Another area that calls for further study is of student outcomes in institutions that do not require standardized test scores and are open enrollment or minimally competitive based on the findings of this study that these types of institutions have lower retention and graduation rates across all of the categories. Some schools that are not requiring test scores are attracting more diverse populations, requiring more individualized support services. A longitudinal study of student outcomes at these types of schools could be conducted to measure success and also draw on other predictors of student outcomes since standardized test scores were not included.

A further area of additional investigation is the quality of academic advising and academic advisors in relation to retention and graduation rates. An exploration of how academic advising is delivered, in a developmental or prescriptive manner, in relationship to the organizational structural model it originates may show how delivery of information impacts student outcomes. A study of this kind would require a more in-depth analysis, looking closely at the details of how academic advising is actually occurs with students.

Implications for Policy and Practice

This study did uncover some relationships and patterns in admission policy structures in the declaration of academic major, advising models, and student outcomes that may have an impact on policy and practice for higher education administrators. Many influencing factors for student retention and graduation rates cannot be solely controlled at an institutional level. Students are individuals and bring their unique attributes and needs with them, requiring differing services and supports to aid in their individual success. Admissions policies and academic advising models may be more or less supportive for particular student populations, it is important that the institutional mission stresses that all students have access to campus

resources that help promote their success. One of the overarching patterns that emerged in this study was the positive relationship between student outcomes and a high level of structure in declaration of major and decentralized, academic department-based advising for underrepresented populations, including non-whites, non-traditional, and part-time students. The other main theme from the findings of this study is that a lower level of structure in major declaration and decentralized advising are positively related to student outcomes for historically typical student populations.

Students bring to college many varied experiences and characteristics. Attempts to match the most supportive environment with students' interests and needs help cultivate their success (Astin, 1994). From a logistical view, it may be a challenge for the same institution to offer students different levels of structures in admission policies governing the declaration of academic major and different models of advising. However, it may be worthwhile to consider in light of the different needs of different student populations. Examining students' developmental needs could shape how an advising program is organized. Perry's (1999) College Student Intellectual Development Model maps how students process knowledge and make decisions through their time in college. Following Perry's (1999) developmental positions, the creation of a staggered advising system that is initially high in structure and then moves to lower structure as the students progresses through college may better match with the changing needs of students rather than a single system applied to all students from first year to graduation.

Evaluating the institutional type in relation to size, student population, and campus environment could aid in retention and degree completion rates. Institutions of different sizes may want to consider the impact of the various types admission structure on retention and

graduation rates. Most very small and small institutions have either low or high levels of structure in their admission policies governing the declaration of a major, however, their overall retention rates were lower than the medium admission policy structure institutions. An analysis of current admission structures and the sizes of the school may be helpful in increasing at least first to second year retention rates. Low admission policy structure in the declaration of academic major seemed to point to lower retention rates for most sized schools.

There are some institutions that do not require standardized test scores for admission. The majority of these types of schools classify themselves as "non-competitive" or "minimally competitive" (Syverson, 2007). However there are some highly competitive schools that do not require standardized test scores with admissions material but, instead, use alternative forms of evaluations in line with their institutional mission (Syverson, 2007). The results of this study indicate that retention and graduation rates are lower at schools that do not require test scores. It seems that an analysis of student outcomes, including retention and graduation rates, at the institutions not requiring test scores for admission might be considered. High school QPA and standardized test scores have been identified as strong predictors of student success in college (Geiser & Santelices, 2007). In the absence of standardized test scores, additional predictive factors may need to be evaluated when admitting students to promote student success at these types of institutions. Individual characteristics, pre-college experiences, and high school performance have been linked to be predictors of student success and persistence in college and could be considered in the absence of standardized test scores (Astin, 1994; Pascarella & Terenzini, 2005; Tinto, 1993).

Conclusions

This study contributes to our understanding of university student outcomes by exploring how admissions policies concerning selection of a major and delivery of academic advising relate to retention and graduation rates. The answers are not straightforward and patterns vary based on institutional characteristics, such as the composition of the student population. Institutions of higher education vary in their policies in regard to how students declare an academic major. Many students may be undecided on their major, but are required to decide on an academic path at the time of admission due to an institutional policy. Approximately 75% of students are undecided on their major at the time they begin their college career (Gordon, 1995, 2007). Students entering college undecided on their exact academic major path may struggle to become integrated into the campus community without the aid of institutional resources.

Students entering college may be undecided and not prepared developmentally to make a decision about their specific academic major (Perry, 1999). A key to student success is commitment to the campus community and integration as a student holistically (Tinto, 1993). Finding the match between student academic major declaration and academic advising delivery could promote overall student success. Academic major declaration at the time of admission could be high, medium, or low structure. Academic advising models explored were centralized, decentralized, and shared.

Depending on the size of the institution different admission policy structures for the declaration of academic major vary in promoting student success. Very small and small institutions displayed higher levels of retention rates for medium levels of structure admission policy in the declaration of academic major, which may indicate a policy evaluation for those

sized schools. Medium admission policy structure institutions had the highest levels of student retention; perhaps alluding to students feeling connected through having an academic home, but not feeling the pressure of having to decide upon an academic major at matriculation. Institutions with centralized advising models had the lowest levels of retention and graduation rates, which may encourage administrators considering a policy analysis if they are providing academic advising only in one central location. Students in shared or decentralized advising models have interaction and exposure to their academic department that may afford them opportunities to become both academically and socially integrated to the campus community. By establishing an academic home and identity, a student may develop relationships needed to succeed and produce positive student outcomes.

The patterns identified in this study also highlight that different admission structure policies to declare academic majors and the organization of advising models may be needed to effectively serve different student populations. These findings may alert policy makers in higher education to be attuned to different characteristics, backgrounds, and needs in students, and to establish a variety of approaches to support these special populations. For example, in this study, institutions with higher proportions of what have been considered "at-risk" students, non-white, non-traditionally aged, and part-time students, seem to see better retention and graduation rates with a high level of structure in their declaration of academic major policies and by having students receive academic advising in an academic "home" department. Matching all students at an institution with a need-specific option for selecting an academic major or academic advising model may not be feasible from a logistical standpoint, but focusing on the typically "at-risk" student populations may be a starting point. Personal interactions and the quality of academic advising may be as important, or more so, than the

delivery model itself. Providing developmental support holistically to the students may aid in overall student success.

Institutions that attempt to match individual student needs in relation to academic major declaration policies and academic advising organizational models may see an increase in their student outcome measures of retention and graduation rates. Lower levels of academic major declaration structure and shared or decentralized academic advising seemed to mesh with the needs of the full-time, more traditional college student. The non-traditional and historically "at-risk" student populations appeared to benefit from high structure admission policies by declaring their academic major at the time of admission and also seemed to have better retention and graduation outcomes when exposed to decentralized academic advising. The overarching theme to this study points to the differences in needs for individual types of students and the importance of trying to match the types of academic major declaration policies and advising organizational structures that produce the most desirable results of increased retention and persistence to degree completion.

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APPENDICES

APPENDIX A

Results of the Factor Analysis

Description of Study Variables

Variable	Coding	Mean	Median	Mode	Std. Dev.	Range	n
Full Time Student First-to-Second Year Retention Rate	percentage Score	72.25	73.00	72.00	14.05	19-100%	381
Part Time Student First-to-Second Year Retention Rate	percentage Score	55.90	50.00	100	25.09	7-100%	302
Overall Graduation Rate	percentage Score	50.33	50.00	40.00	19.99	4-98%	381
4 Year Graduation Rate	percentage Score	34.02	29.50	21.00	21.91	0-90%	362
6 Year Graduation Rate	percentage Score	50.83	50.50	39.00	19.94	5-98%	364
Overall Men Graduation Rate	percentage Score	46.75	46.00	55.00	21.26	0-97%	372
Overall Women Graduation Rate	percentage Score	52.97	53.00	36.00	20.00	0-99%	376
Low Admission Structure	Permitting students to remain undeclared on an academic major when they enter the university (1=yes, 0=no)	54%				0 or 1	207
Medium Admission Structure	Requiring students to declare an academic college but not a major (1=yes, 0=no)	32%				0 or 1	122
High Admission Structure	Requiring incoming students to declare an academic major (1=yes, 0=no)	14%				0 or 1	52
Centralized Academic Advising Model	Professional advisors and faculty advisors in one administrative unit (1=yes, 0=no)	37%				0 or 1	142

Description of Study Variables

Variable	Coding	Mean	Median	Mode	Std. Dev.	Range	n
Decentralized Academic Advising Model	Students are advised in academic departments (1=yes, 0=no)	36%				0 or 1	135
Shared Academic Advising Model	Combination of central and decentralized (1=yes, 0=no)	27%				0 or 1	104
Very Small Institution	fewer than 1,000 students (1=yes, 0=no)	15%				0 or 1	55
Small Institution	1,000 to 2,999 students (1=yes, 0=no)	33%				0 or 1	126
Medium Institution	3,000 to 9,999 students (1=yes, 0=no)	32%				0 or 1	123
Large Institution	More than 10,000 students (1=yes, 0=no)	20%				0 or 1	77
PubliclyFunded	Institutions rely on regional, state, and federal funding streams (1=public)	44%				1	166
Privately Funded	Institutions are primarily funded through tuition dollars and donated endowments (0=private)	56%				0	215
Women Enrollment	percentage Score	57.62	57.00	57.00	8.29	21-100%	381
Non-White Enrollment	percentage Score	28.48	21.00	10.00	24.39	1-100%	381
Full Time Enrollment	percentage Score	80.26	87.00	91.00	17.58	9-100%	381
Non-Traditional (age 25+) Enrollment	percentage Score	23.74	20.00	1.00	19.61	0-92%	381
Composite Standardized Test Score							

APPENDIX B

Study Variables, Measures, Codings, Ranges, and Distributions

Factor Analysis of Standardized Test Score Variables (SAT and ACT 25th and 75th percentiles) and Extraction of Regression Factor Score

Communalities

	Initial	Extraction
% Reading SATs in 25th percentile	1.000	.854
% Reading SATs in 75th percentile	1.000	.848
% Math SATs in 25th percentile	1.000	.857
% Math SATs in 75th percentile	1.000	.878
% ACT Composit 25th percentile	1.000	.890
% ACT Composite 75th percentile	1.000	.885
% ACT English 25th percentile	1.000	.838
% ACT English 75th percentile	1.000	.777
% ACT Math 25th percentile	1.000	.793
% ACT Math 75th percentile	1.000	.795

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.416	84.161	84.161	8.416	84.161	84.161
2	.773	7.727	91.888			
3	.284	2.841	94.729			
4	.165	1.648	96.377			
5	.127	1.267	97.644			
6	.074	.742	98.387			
7	.068	.682	99.069			
8	.047	.466	99.535			
9	.023	.234	99.768			
10	.023	.232	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
% Reading SATs in 25th percentile	.924
% Reading SATs in 75th percentile	.921
% Math SATs in 25th percentile	.926
% Math SATs in 75th percentile	.937
% ACT Composit 25th percentile	.944
% ACT Composite 75th percentile	.941
% ACT English 25th percentile	.915
% ACT English 75th percentile	.881
% ACT Math 25th percentile	.890
% ACT Math 75th percentile	.892

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

APPENDIX C

Bivariate Correlation Among Study Variables (n = 381)

	1	2	3	4	5	6	7	8
First-to-Second Year Retention Rates								
1. Full Time Students	1							
2. Part Time Students	.32***	1						
Graduation Rates								
3. Overall Rate	.76***	.42***	1					
4. 4 Year Rate	.67***	.45***	.90***	1				
5. 6 Year Rate	.78***	.43***	.98***	.91***	1			
6. Men	.78***	.40***	.95***	.88***	.95***	1		
7. Women	.73***	.42***	.94***	.88***	.95***	.93***	1	
Admission Structure								
8. Low	-.01	-.03	-.02	-.06	-.02	-.05	-.01	1
9. Medium	.13*	.00	.04	.07	.06	.07	.04	-.75***
10. High	-.16**	.05	-.04	-.02	-.06	-.03	-.04	-.43***
Academic Advising Model								
11. Centralized	-.13*	-.08	-.11*	-.07	-.01*	-.09	-.10	.15**
12. Decentralized	.08	.08	.02	.03	.02	.02	-.02	-.46***
13. Shared	.06	-.00	.10	.44	.10	.07	.12	.33***
Institution Size								
14. Very small	-.37***	.03	-.23***	-.16**	-.26***	-.25***	-.24***	--.10
15. Small	-.13*	-.02	-.14**	-.07	-.14**	-.15**	-.15**	.04
16. Medium	.23***	.04	.22***	.21***	.21***	.22***	.22***	.02
17. Large	.21**	-.04	.11*	-.03	.13*	-.13*	.12	.02
Institutional Funding								
18. Public (versus Private)	-.07	-.25***	-.30***	-.47***	-.28***	-.31***	-.29***	.20***
Composition of Undergraduate Population								
19. Women	-.19***	-.14	-.25***	-.13*	-.22***	-.26***	-.25***	-.05
20. Non-White	-.26***	-.10	-.37***	-.29***	-.35***	-.35***	-.33***	-.09
21. Full-time	.42***	.23***	.54***	.47***	.53***	.50***	.57***	.03
22. Non-traditional (age 25+)	-.56***	-.25***	-.60***	-.54***	-.65***	-.56***	-.63***	-.13*
Admissions Test Scores								
23. Composite Standardized Test Score	.57***	.27***	.68**	.69***	.70***	.71***	.65***	-.09

	9	10	11	12	13	14	15	16
First-to-Second Year Retention Rates								
1. Full Time Students								
2. Part Time Students								
Graduation Rates								
3. Overall Rate								
4. 4 Year Rate								
5. 6 Year Rate								
6. Men								
7. Women								
Admission Structure								
8. Low								
9. Medium	1							
10. High	-.27***	1						
Academic Advising Model								
11. Centralized	-.27***	.15**	1					
12. Decentralized	.47***	.03	-.57***	1				
13. Shared	-.21***	-.19***	-.47***	-.45	1			
Institution Size								
14. Very small	-.12*	.32***	.01	.09	-.10*	1		
15. Small	-.03	-.02	.04	-.02	-.02	-.29***	1	
16. Medium	.09	-.16**	-.01	-.07	.08	-.28***	-.49***	1
17. Large	.03	-.07	-.04	.02	.01	-.21***	-.35***	-.35***
Institutional Funding								
18. Public (versus Private)	-.06	-.21***	-.01	-.12*	.13*	-.32***	.02	.02
Composition of Undergraduate Population								
19. Women	.02	.05	.00	-.02	.02	-.06	.18***	-.03
20. Non-White	.04	.08	.04	.02	-.07	.16**	-.09	-.03
21. Full-time	-.01	-.03	-.05	-.03	.08	-.10*	.02	.12*
22. Non-traditional (age 25+)	-.01	.20	.13	.00	-.14**	.22***	-.02	-.14**
Admissions Test Scores								
23. Composite Standardized Test Score	.11*	-.02	-.10*	.10	.01	-.23***	-.17**	.17**

	17	18	19	20	21	22	23
First-to-Second Year Retention Rates							
1. Full Time Students							
2. Part Time Students							
Graduation Rates							
3. Overall Rate							
4. 4 Year Rate							
5. 6 Year Rate							
6. Men							
7. Women							
Admission Structure							
8. Low							
9. Medium							
10. High							
Academic Advising Model							
11. Centralized							
12. Decentralized							
13. Shared							
Institution Size							
14. Very small							
15. Small							
16. Medium							
17. Large	1						
Institutional Funding							
18. Public (versus Private)	.23***	1					
Composition of Undergraduate Population							
19. Women	-.12*	-.05	1				
20. Non-White	.00	.06	.17**	1			
21. Full-time	-.07	-.12*	-.23***	-.16**	1		
22. Non-traditional (age 25+)	-.01	-.06	.31***	.22***	-.70***	1	
Admissions Test Scores							
23. Composite Standardized Test Score	.20***	-.27***	-.19***	-.26***	.25***	-.32***	1

APPENDIX D

Analyses of Variance of Dependent Variables by Combinations of Major Declaration Admissions Policies and Types of Academic Advising Delivery Models

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Full Time Yr 1 to 2 Retention Rate (%)	Between Groups	3498.186	8	437.273	2.276	.022
	Within Groups	71482.118	372	192.156		
	Total	74980.304	380			
Part Time Yr 1 to 2 Retention rate (%)	Between Groups	3175.260	8	396.908	.624	.758
	Within Groups	186370.955	293	636.078		
	Total	189546.215	301			
Overall Grad rate (%)	Between Groups	2560.616	8	320.077	.797	.606
	Within Groups	149414.050	372	401.651		
	Total	151974.667	380			
4 yr grad rate (%)	Between Groups	2567.885	8	320.986	.664	.723
	Within Groups	170728.979	353	483.651		
	Total	173296.865	361			
6 year grad rate (%)	Between Groups	2599.923	8	324.990	.814	.590
	Within Groups	141676.855	355	399.090		
	Total	144276.777	363			
Grad Rate MEN	Between Groups	2427.955	8	303.494	.667	.721
	Within Groups	165238.293	363	455.202		
	Total	167666.247	371			
Grad Rate WOMEN	Between Groups	2785.438	8	348.180	.868	.544
	Within Groups	147235.240	367	401.186		
	Total	150020.678	375			