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First-Year Retention at Virginia Commonwealth University: Understanding Student Departure and the Potential Impact of Academic Advising

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

by

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FIRST-YEAR RETENTION AT VIRGINIA COMMONWEALTH UNIVERSITY: UNDERSTANDING STUDENT DEPARTURE AND THE POTENTIAL IMPACT OF ACADEMIC ADVISING

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This dissertation examines first-year enrollment at Virginia Commonwealth University to determine what factors are associated with an increased likelihood of a student not being retained, and for which of these factors there is evidence that academic advising is an effective intervention. A survey of common retention models identified six factors associated with retention likelihood: student background prior to enrollment ("pre-enrollment factors"), financial support, institutional support, institutional performance, institutional engagement, and student intention. Prior research has shown that academic advising is an effective intervention for two of these factors: institutional performance and institutional support.

The significance of these factors was tested through a correlational, quantitative, non-experimental design using secondary data captured by the university. The sample population for the study was the entire full-time first-year 2017-2018 student population - a total of 4,215

students. A total of sixteen independent variables were tested, twelve of which served as proxies for retention factors (GPA, earned credit hours, GPA credit hours, credits brought to institution, high school GPA, SAT score, ACT score, in-state status, number of completed advising appointments, advising account holds, financial account holds, and administrative account holds) and four of which served as control variables (first generation status, race, ethnicity, and gender). The dependent variable was retention status. A binomial regression was performed to test for significance, and four of the independent variables were found to be significant at $p<0.05$: number of completed advising appointments ($p<.001$, odds-ratio 1.305), high school GPA ($p<.001$, odds-ratio 1.305), in-state status ($p = .005$, odds-ratio 1.499), and Hispanic ethnicity ($p = .008$, odds-ratio .371). These findings suggest that VCU should prioritize support and sources to out-of-state students, students with lower high school GPAs, and Hispanic students, as these students are less likely to be retained during the first year. Further, these findings reaffirm the value of academic advising.

Chapter 1:
Introduction

On February 13, 2013, the Department of Education, following a recent State of the Union Speech by President Barack Obama, launched the College Scorecard website (Department of Education, 2013). Part of an effort by the Department of Education to show the real cost of attending higher education institutions, the Scorecard highlights information about colleges and universities, including for the first time publicly, their graduation and retention rates. Defined as the percentage of first-time, full-time enrolled undergraduate students who complete their enrolled degree program within six years, graduation rates are a simple statistic designed to demonstrate how effective an institution is, as well as the perceived risk borne by enrolled students seeking their degrees (National Center for Education Statistics, 2016). A metric related to graduation rates, retention rates are similarly defined as the number of first-time, full-time enrolled first-year students who return for their second-year of academic studies (National Center for Education Statistics, 2016). Along with requiring institutions to publicly list their graduation rates for the first time, the Department of Education has signaled a growing emphasis on this statistic, implying that future availability of federal student financial aid and loans may hinge on reaching specific graduation rate benchmarks.

These changes have ushered in a new focus on retention and graduation at public institutions of higher education. Through examining student demographic and academic data, this study seeks to identify the reasons why first-year students at Virginia Commonwealth University, a large, public urban institution in Richmond, Virginia, choose not to return for their second year, and what role academic advising can play in retaining these students.

To accomplish this goal, Chapter One examines the background and context of college student retention, as well as the setting for this study, Virginia Commonwealth University. Chapter Two explores contemporary research on student retention and academic advising, and uses six widely used retention models to construct a unified model. By better understanding these specific factors, institutions can understand why students leave, and when academic advising is an appropriate intervention to improve retention rates.

Chapter Three outlines the research methodology of the study, as well as the sample population, examined variables, and research hypotheses. Chapter Four examines the collected secondary data, and finally Chapter Five discusses the results of the study, offers suggestions for how this research can be used at VCU, and recommends areas for further study.

The Completion Agenda: Retention and Graduation-Rates in Practice

A focus on retention and graduation rates has also occurred at the state level, where most public university funding originates. Legislatures have focused on graduation rates as an important metric which might be used to determine funding, mirroring similar performance-based funding schemes in K-12 education (National Center for Education Statistics, 2016). Termed the “completion agenda”, this strategy has been adopted by funding bodies in Ohio, Tennessee and Texas.

As of the 2020-2021 budget year Virginia has not yet implemented the completion agenda or strict performance-based funding, the State Council of Higher Education for Virginia (SCHEV), a state advisory body tasked with providing guidance to the legislature and the Governor on higher education, has shown an increasing interest in using standardized metrics to award funding and balance costs and growth (State Council of Higher Education, 2019). SCHEV proposes investigating other state models as an alternative to Virginia’s current flat appropriation

model to balance institutional needs with the needs of the system as a whole, and the state in general.

While retention and graduation have long been priorities of American universities, the completion agenda has reframed these issues in a new context wherein the continued existence of an institution is predicated on ensuring that students both stay in school and graduate in a timely matter. Thus, universities are financially incentivized to encourage retention and graduation in a way that has not existed previously. Nationally, when this new focus began in 2012, the six-year graduation rate for students at four-year institutions who began their program in 2006 was 59% (National Center for Education Statistics, 2016). By 2018, this rate rose to 62% (National Center for Education Statistics, 2020).

Key to the spread of the completion agenda is the rising cost of tuition. Over the past twenty-five years, increases in tuition costs have far outpaced inflation. In 1981, the average cost of attendance, adjusted for inflation (and represented in 2011 dollars), for an in-state student at a four-year public institution was $6,439 per year. In 2007, prior to the Great Recession, the average tuition cost was $12,317, and in 2011 tuition stood at $14,292, a nearly $2,000 increase over four years (National Center for Education Statistics, 2014). During this period enrollment, in degree-granting higher education institutions has dramatically increased, reflecting an increase in the population attending college across the United States, as well as the progression of degree expectation within the job market. During the ten-year period from 1991 to 2001, overall enrollment increased by 11% to 21 million. From 2001 to 2011, enrollment increased a further 11% to 31.1 million (National Center for Education Statistics, 2014). State support has decreased substantially over the last twenty years as well. Even in the two years since the generally accepted end of the Great Recession, states have made few strides returning to pre-2008 funding

levels (Mitchell, et al., 2014). On average, for the 2014 budget cycle, states are spending 23% less than before 2008, amounting to a $2,026 funding decrease per student (Mitchell, et al., 2014). A total of 48 states (all except Alaska and North Dakota) have not returned funding to pre-Recession levels, with the most dramatic cuts coming in Arizona—a 48.3% decrease as compared to 2007 funding levels—and Louisiana—a 43.2% decrease (Mitchell, et al., 2014). Proponents of the completion agenda believe that utilizing performance-based funding will alleviate tuition costs in two ways: first, higher performing institutions will receive more state funds, thereby obviating the need to raise tuition to replace shrinking state appropriations, and second, students will spend less time in school and thus pay less overall to attend college and graduate.

Retention and Advising

With a growing focus on retention and graduation-rates, universities have turned to academic advising as a vehicle for keeping students enrolled and helping them graduate on time. Academic advising has long been seen as a tool to improve retention. Research into retention first began in the early 1970s as the first wave of Baby Boomers began matriculating into higher education, dramatically increasing the number of college students. At that time, academic advising was seen as a way to increase retention rates (Tinto & Cullen, 1973). Tinto, one of the early researchers into this space, is generally seen as both the father of modern, professional academic advising, as well as the scholar who has shaped academic conversation surrounding student persistence over the last fifty years.

This study will reframe this foundational understanding—that academic advising is a vehicle for retaining students and improving retention outcomes—by synthesizing general theories of retention within the specific context of academic advising. Through this synthesis, a

new advising-focused retention model will be developed, seeking to answer a fundamental question: what factors influence retention likelihood, and is there evidence that academic advising helps mitigate these factors? To attempt to answer these research questions, this study will examine retention at Virginia Commonwealth University (VCU), a large, urban public research university in Richmond, Virginia.

Virginia Commonwealth University (VCU)

Before reviewing the specific context of retention, graduation, and advising at VCU, it is worthwhile to examine how the university came to be, and how this history has shaped where the university is today.

Virginia Commonwealth University was founded in 1967 when two separate Richmond based colleges, the Medical College of Virginia (MCV) and the Richmond Professional Institute (RPI), were merged together in order to create an "urban-orientated state university" to serve the growing population of Richmond and wider Virginia (Wayne, 1967). This decision was based on the findings of the Wayne Commission, a state-appointed commission established in 1965, led by Edward A. Wayne, the then-head of Richmond's Federal Reserve Bank, to examine the creation, organization, and implementation of a new institution of higher education within the state (Wayne, 1967). This new university was split between two campuses in the City of Richmond: RPI became the Monroe Park campus, built around the historic Monroe Park, and the Medical College became the MCV Campus, built around the medical school and hospital.

From the start, VCU has been led by a sixteen-member Board of Visitors that holds final authority over the operation of the university (23 V.A. § 50.6). The Board is responsible for setting tuition rates, approving institutional promotions, awarding degrees, managing university income, defining institutional goals, and appointing (as well as reviewing) the university's

President, who oversees day-to-day operations. Members of the Board of Visitors are appointed by the Governor of Virginia and approved by the General Assembly. Terms last for two years, and members of the Board are allowed to serve two consecutive terms (Office of the President, 2019).

From the start, VCU was tasked with servicing the growing number of Virginians seeking higher education, with an emphasis on attracting urban commuter students in search of affordable vocational education. Over the next decade, the new institution focused on integrating MCV and RPI, including merging administrative apparatus, curriculum standards, and integrating two student bodies with differing goals and backgrounds (Bonis, et al., 2006, p. 8). Starting in the 1980s, focus shifted towards expanding VCU, including building new residence halls and athletic facilities and paving the way for an establishment of an extensive undergraduate and graduate research program on the Monroe Park campus. This trend continued through the 1990s and during the tenure of President Eugene P. Trani. Trani established VCU's School of Engineering, constructed a large biotechnology campus to attract biomedical businesses to the Richmond area, and began a new collaborative relationship between VCU and the City of Richmond to help promote local job growth (Bonis, et al., 2006, p. 8).

Beginning in 2004, Trani helped establish a new institutional agenda for VCU, termed "VCU 2020", which laid out VCU's plan for aggressive physical expansion throughout the City of Richmond in an attempt to become the premier urban research institution in the United States ("VCU 2020", 2004). No longer would VCU function as a small university focused on educating Virginia citizens and commuters; instead, it would compete at the highest levels of academia. In adopting this plan, Trani helped VCU pass the requirements for regional reaccreditation with the Southern Association of Colleges and Schools (SACSCOC). To meet SACS's standards, VCU

produced a Quality Enhancement Plan (QEP), which, along with VCU 2020, helped outline the specific institutional agenda for the school over the next decade.

VCU's QEP focused on the creation of a system for new student advising and support. It also made significant improvements to VCU's undergraduate curriculum with an emphasis on the first year, which SACSCOC deemed "not challeng[ing] enough" and leading to student detachment ("Enhancing Student Engagement in Learning", 2004). Essential to this improvement was the construction of new classroom facilities, as well as the hiring of new, nationally recognized faculty. To further improve VCU student outcomes, and increase retention, in 2006 Trani also created the University College, a new academic unit which combined elements of centralized first-year advising (including hiring professional advisors), student tutoring and academic support services, and first year writing courses.

Meeting these goals came at a significant financial cost, and led to the growth of VCU's budget. In 2004 VCU spent $615 million dollars, in 2006 $780 million, and in 2007 $829 million (Virginia Department of Budget and Planning, 2014). Enrollment during this period also grew significantly: VCU enrolled 28,462 students in 2004, 30,381 in 2006, and 31,907 in 2007. Trani retired in 2009 and was replaced by Michael Rao, who reaffirmed Trani's goals and has overseen VCU during reductions in state funds from 2009 until today.

VCU and Retention

Like any large, public university primarily funded through student tuition, and in consideration of national developments in performance-based funding, VCU hopes to retain as many of these students as possible after their first undergraduate year, and graduate them within the six-year window. Over the past five years, the period during which national interest in retention rates has grown, first-year retention rates have fluctuated between 83% and 86.5%.

This is higher than the national average, discussed further below (Institutional Research and Decision Support, 2018). In detail, the rates between 2013 and 2017 are:

Table 1.

VCU First-Year Retention, 2013-2014 to 2017-2018

Academic Year	First-Year Retention
2013-2014	86.5%
2014-2015	85.5%
2015-2016	86.4%
2016-2017	83%
2017-2018	84.7%

(Institutional Research and Decision Support, 2018)

This statistic includes only first-time, full-time first-year students, whereby a student enrollment the following semester—for example, from 2013-2014 to 2014-2015—is considered retained. Retention rates are compiled by VCU's Institutional Research and Decision Support office annually and are provided publicly in compliance with state, regional, and federal standards, as well as used internally to help guide policy decisions.

VCU also provides retention data for in-state and out-of-state student populations:

Table 2.

VCU First-Year Retention by Student Type, 2013-2014 to 2017-2018

Academic Year	Total Retention	In-State Retention	Out-of-State Retention
2013-2014	86.5%	87.2%	81.9%
2014-2015	85.5%	86.4%	81.3%
2015-2016	86.4%	87.3%	80.2%
2016-2017	83%	83.1%	81.7%
2017-2018	84.7%	85.1%	80.6%

(Institutional Research and Decision Support, 2018)

Over this five-year period, first-year, full-time, first-time enrollment has increased:

Table 3.

VCU First-Year Enrollment, 2013-2014 to 2017-2018

Academic Year	Enrollment
2013-2014	3,594
2014-2015	3,586
2015-2016	4,090
2016-2017	4,234
2017-2018	4,214

State Council of Higher Education for Virginia, 2018.

The largest jump in enrollment came during the 2015-2016 academic year. For the time period examined by this study, the total first-year, full-time, first-time enrollment was 4,214 students, with 84.7% returning for the following year (the 2018-2019 academic year). The total number of students who were not retained—who dropped out—was 815.

Despite enrolling more students, admissions standards have remained consistent. The median SAT score increased from 1115 to 1160 during this period (although notably VCU became SAT and ACT optional in 2015) (“Admissions (Test Score) Trends”, 2020).

VCU’s retention rate is higher than the national average. Total national retention rates for students enrolled at four-year public universities during the period from 2013 to 2017 (dates during the examined range for which data was available):

Table 4.

National Retention, 2013-2014 to 2016-2017

Academic Year	First-Year Retention
2013-2014	70.1%
2014-2015	69.4%

2015-2016	69.7%
2016-2017	71.2%

(National Student Clearinghouse Research Center, 2018)

Academic Advising

Academic advising serves an important role in retaining students, particularly first-year students who are new to higher education. The National Academic Advising Association (NACADA), the largest professional organization for higher education academic advising, defines academic advising at the most basic level as the process of teaching students how to make the most of their college experience (NACADA, 2014). Beyond this basic interaction, the Council for the Advancement of Standards in Higher Education has set standards of what an academic advisor should do and how academic advising should function. Specific standards for academic advising include having accurate information about requirements and programs, monitoring assigned students for academic distress, helping students prepare to make meaningful contributions to society, and helping students develop emotionally and intellectually (CAS, 2018).

In practice, the role of the academic advisor is to help keep a student on track towards graduation, while also working with them to grow as an individual and find a place on campus. While specific goals may vary according to unit or academic program, the key goal of academic advising is to ensure students are retained and graduate on time.

Academic Advising at VCU

VCU currently employs approximately 140 full-time, professional academic advisors. VCU utilizes a blended academic advising model which includes both centralized advising and discipline-specific advising. Building (and expanding) on the University College created under

Trani, first-year students are advised through a centralized unit, with the exception of some students in the Honors College and the College of Engineering. This unit is called University Academic Advising, which is now housed in a distinct administrative unit called Student Success, within the larger unit Division of Strategic Enrollment Management. Within University Academic Advising, advisors specialize in either a specific discipline—Biology for example—or subject areas. They may also specialize in working with specific types of students, such as students without a chosen major.

After completing their first year, most students matriculate to a discipline-specific advisor located within an academic unit or department. Specific advising format and expectations vary by unit, but all students are assigned to a dedicated professional advisor. Caseloads vary across the university depending on the size of the unit and the staffing available. Regardless of model, academic advisors are specifically tasked with monitoring retention and graduation rates and increasing student retention. To assist in this task, advisors are provided with a number of tools, including dedicated student advising software, called the Student Success Collaborative (SSC).

SSC is the main academic advising technology resource in use at VCU, and features both a student and an advisor platform. The student platform allows a student to see who their academic advisor is, and in most cases, schedule an appointment with them. The advisor platform allows an advisor to organize their assigned student caseload, as well record information about completed advising appointments and other student information deemed important. Beyond simply organizing information, SSC also functions to alert advisors and the institution of students who may fail to graduate. Each student is assigned a predictive risk score, based on the historical likelihood of a student with a similar academic profile (including grades,

hometown, and major) graduating. Risk is codified as either "low," "medium," or "high". The formula to calculate risk is proprietary to SSC and not entirely shared with the institution.

VCU and Retention: Looking Forward

Beginning in 2018, VCU set ambitious retention goals as part of a university-wide strategic planning process, "Quest 2025: Together We Transform." ("Quest 2025", 2018). Quest 2025 was approved by VCU's Board of Visitors in 2018 as a follow-up to a previous seven-year master plan, "Quest for Distinction." Quest 2025 serves a number of overarching purposes: guiding university policy, maintaining state and regional accreditation standards, and refocusing university priorities, including financial expenditures. Among other areas, Quest 2025 focuses in particular on the undergraduate student experience, specifically through planning to "redesign the undergraduate curriculum and [and] driving innovation, access and excellence for students at every level" ("Quest 2025", 2018). From this general goal, VCU has defined specific strategic and operational priorities, with a category focusing on student support, including increasing financial, academic, and social support.

To accomplish these goals, VCU also developed an implementation plan that outlines specific goals, how these goals will be assessed, and which areas of the university are responsible for meeting these goals ("High-Level Implementation Plan", 2018). Published in May 2018, this draft plan sets a specific goal to "enhance the university culture supporting student success, including improved student retention and graduation rates" ("High-Level Implementation Plan", 2018). For this overall goal, VCU has defined five high-level strategies: "advance a university-wide culture focused on success of our students", "expand student success campaigns for targeted populations", "decrease student debt through targeted initiatives", "mobilize faculty, UAP [University Academic Professionals], and staff in implementing best

practices in support of student success", and "empower students to define and support student success" ("High-Level Implementation Plan", 2018). Responsibility for these high-level strategies rests with a number of university programs and departments, including the Office of Student Success, the Provost's Office, and Academic Affairs.

From these general strategies and goals, VCU has created several specific retention and retention-related targeted metrics. Developed through the Office of Student Success, a new department tasked with overseeing academic advising, student tutoring, student support services, and student athlete academic support, VCU established the following targets relevant to this study: a 90% first-year retention rate and 78% 6-year graduation rate by 2025, as well as the conclusion of Quest 2025 ("Student Success at @ VCU", 2018). To reach this goal, the university is employing a number of early strategies, including establishing university-wide committees to examine student retention, hiring more academic advisors, and increasing student support in general. These efforts are currently in early stages.

This study supports this goal by examining in detail in the following chapters the reasons why students are leaving VCU, and determining for which of these reasons advising is an effective intervention, as well as identifying populations at higher risk of dropping out. Chapter Two explores the literature surrounding student retention and academic advising, constructing a unified model combining common retention factors, before narrowing this model to factors for which advising is a significant intervention. Chapter Three outlines the research hypotheses, methodology and analysis, and study variables. Chapter Four examines the selected data, and finally Chapter Five discusses the results of the study, offering specific suggestions for VCU and state policy.

Chapter 2:
Literature Review

This chapter reviews the relevant literature surrounding student retention, exploring why students choose not to finish their studies, as well as the origin and development of academic advising and the relationship between academic advising and student retention. This review starts by examining the work of Vincent Tinto, a foundational scholar whose early work began modern research into student retention and graduation as well as the development of academic advising as a discipline. From Tinto, this chapter next explores a number of subsequent retention models, including work by Anderson, Bean, and Seidman among others. These models are then used to construct a unified model for the purpose of this study, based on common, shared retention factors.

After examining retention theory broadly, the literature surrounding the relationship between academic advising and retention, including studies which explore the value of advising as an intervention, are reviewed. Based on this research, the unified model is narrowed, creating a model which specifically identifies retention factors for which advising is proven to be a successful intervention. Finally, this chapter examines existing research on the structure and function of academic advising units.

Understanding Why Students Leave: Tinto's Foundational Work

Modern research on student retention and persistence largely began with the work of Tinto (1973). Tinto first examined student persistence behavior in a 1973 report for the federal government's Office of Planning, Budgeting and Evaluation, during a time in which the Baby

Boomer generation was beginning to matriculate to higher education institutions, and enrollment was expected to dramatically increase (Tinto & Cullen, 1973). Tinto and Cullen defined dropout as "those persons who permanently leave the institution in which they are registered," a general definition which, while refined since then, is accepted within the larger discourse (Tinto & Cullen, 1973). As part of this report, Tinto first defined his theoretical model of student persistence, upon which he later elaborated throughout his career (Tinto, 1993), highlighting an institution's role in helping students persist. Building on the work of sociologist Emile Durkheim, Tinto argued that "breaking one's ties with a [higher education institution] stems largely from a lack of integration into the common life of that society" (Tinto & Cullen, 1973). This integration can come in two forms: normative integration, which is integration into the social environment of higher education, and structural integration, integration into the academic demands of the institution. Both are necessary to succeed, as students can either voluntarily leave or be dismissed for academic performance (Tinto & Cullen, 1973). Through his research, Tinto determined that this factor—integration—is most directly related to persistence, beyond individual circumstance and personal characteristics. Importantly though, and foundational to academic advising as a field, Tinto argued that "institutional commitment"—both an individual's commitment to their institution, as well as the steps an institution may take to encourage that student to integrate, through environment and services—is part of the act of integration, and functions to determine if students will persist (Tinto & Cullen, 1973).

In the report, Tinto also outlines one of the first models to identify high-risk students, students who are statistically more likely to leave an institution. Common characteristics of this group include being the first generation in a household to attend college, a lower socioeconomic

background, poor prior academic performance, and no family support structure (Tinto & Cullen, 1973).

Tinto elaborated on his model of student persistence (and explanation for why students drop out) throughout the following decades (Tinto, 1993). Expanding his model generally into categories of academic and social integration, Tinto found that students must engage both socially and academically, although the engagement within the two areas does not have to be equal (Tinto, 1993). Institutions can take steps to increase this engagement through their efforts, namely having students live on campus (Astin, 1977), promoting interaction between faculty and student, creating social contexts in which a student can engage with faculty members outside of a strictly formal classroom setting, and creating resources to address external pressures individual to a student, such as parental or societal expectation (Tinto, 1993).

Social integration can take many forms, but normatively involves a student joining a culture or a subculture with which they begin forging social connections (Tinto, 1993). These connections are important, as they provide students a framework to navigate the disorientating and unfamiliar experience of higher education, and most often take the form of participating with campus clubs and organizations (Tinto, 1993). In contrast to the social experience, wherein connections are made through student effort, academic integration comes as a part of a student attending class and positively interacting with faculty and staff (Tinto, 1993). Because academic integration often occurs as a consequence of a student simply enrolling within an institution, students who lack social integration, yet still succeed (and are well-integrated) academically, are still at significant risk to drop out, as their development is stunted and underdeveloped (Tinto, 1993).

Drawing from this understanding, Tinto defined five "steps" along the retention pathway that led to a particular student outcome. Students are influenced by their pre-entry attributes (academic, financial and family background), their goals and commitments prior to enrollment, their institutional experience (academic performance and involvement), their social integration, and finally their goals and commitments once enrolled (Tinto, 1993). These five steps lead to a decision to either stay enrolled or drop out.

Despite its importance and widespread citation, Tinto's work is not without criticism. According to Swail, Redd, Perna (2003), Tinto ignores the influence that external, non-campus related factors—such as family pressure, financial cost, and non-college friends—can have on student success and decision to remain. This is in large part because the population Tinto focused on was relatively homogenous: middle-class and upper-middle-class students attending college directly post-high school and able to attend full-time (Swail, et al., 2003). Further, Tinto's model also fails to account for the unique characteristics of minority students, who may straddle two cultural worlds instead of fully committing to a specific academic acculturation (Swail, et al., 2003).

Subsequent Student Retention and Persistence Models

One way to understand the complexity of student retention is using a broad theoretical model defining the factors that contribute to a student's decision to leave, as well as the path this decision takes.

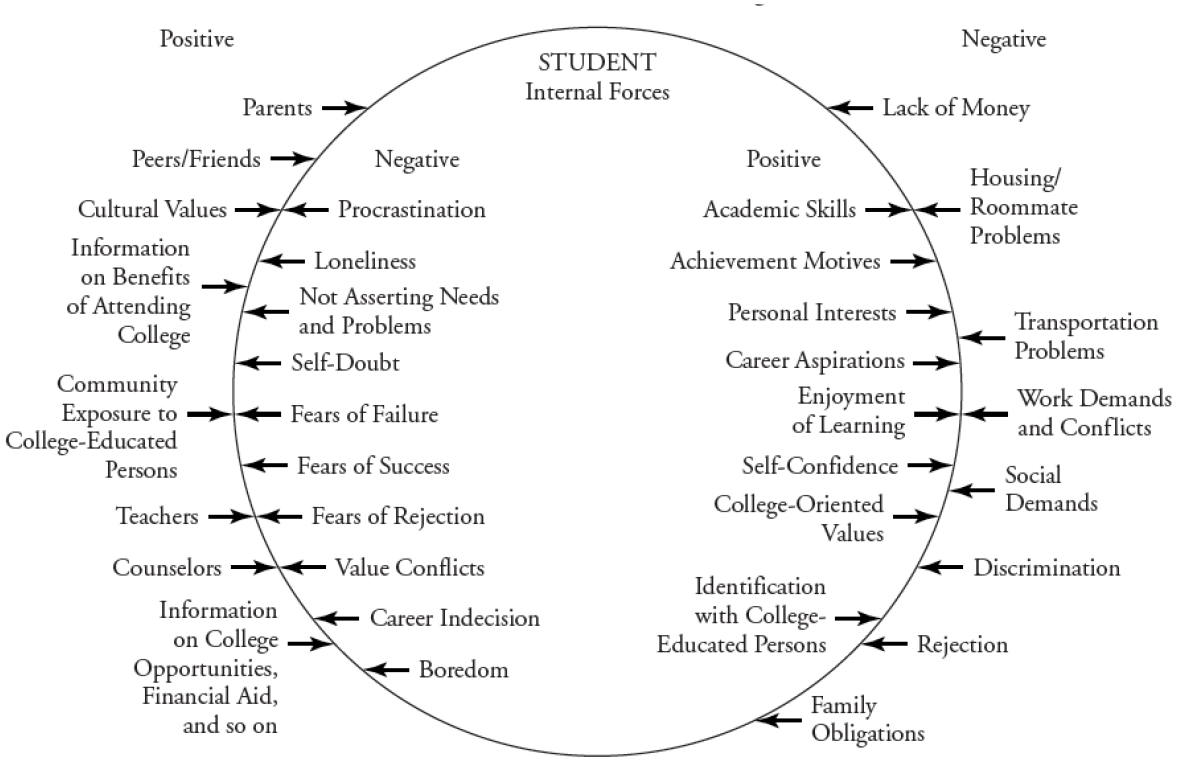
Anderson: Force Field Analysis of College Persistence

Building on Tinto's earlier work, Anderson's "Force Field Analysis of College Persistence" provides a general understanding of why students choose to leave before

graduating. Anderson found that a student's decision to leave a college program was the consequence of three related and interactive "forces" which can have either a negative or a positive influence: internal forces, external forces, and institutional forces (1983). His work largely drew on his previous exploration surrounding an individual's decision to attend college in the first place. Anderson found that these original influence factors persisted through college attendance, and that, in a sense, retention is the original college attendance decision replayed numerous times over a college career. Importantly, Anderson's model represents an expansion of Tinto's original work (1973), in that it integrates both non-college and college influences, as well as financial pressures (Swail, et al., 2003). Further, Anderson presents a relatively complete model of retention decision-making: acknowledging the complexity of student decision making and how decisions may change over time. Anderson's model is not based on experimental research, but is rather a theoretical integration of existing work within a larger explanatory model.

Table 5.

Anderson's "Force Field Analysis of College Persistence"



Anderson (1983)

Within Anderson's model, each force—internal, external, and institutional—can be present to different degrees, and these degrees can change over time, influenced by the shifting of positive and negative factors. Anderson identified several common examples for each defined force. Among external forces, factors include socioeconomic situation (ability to pay for higher education and employment), transportation, support structure, social engagement, and influence of peers, parents, teachers, and other involved parties (Anderson, 1983).

Internal forces are personal to the student, and include, among others, academic skills (prior to matriculation and within an institution), personal values, social integration, the interaction between personal value system with the values of higher education, motivation, and self-worth. Finally, institutional factors are the ways in which an institution creates a system

which either encourages or discourages retention. Examples of institutional factors include offering courses necessary to meet graduation requirements, effectively communicating with students (informing them of what they need to do to graduate), and providing institutional support (Anderson, 1983). Notably, this model lacks a linear progression through explanatory factors. Instead, Anderson represent the enrollment decision as continuous, with a constant interplay of factors instead of a single path process where factors are either present or not present in a binary fashion.

There is obvious overlap between many of the factors Anderson identifies. For example, it is possible to cluster "housing/roommate problems" and "social demands" within a general category of social engagement, which Tinto identified early in his work (Tinto, 1973). In the same vein, "work demands and conflicts," "transportation problems," and "lack of money" are part of a larger category of financial status. There is also overlap between the specific forces, which reflects the complex interplay between a student and their environment. For example, college-oriented values (internal factor) can be a result of counselors (external factor) who are provided by the institution itself (institutional factor).

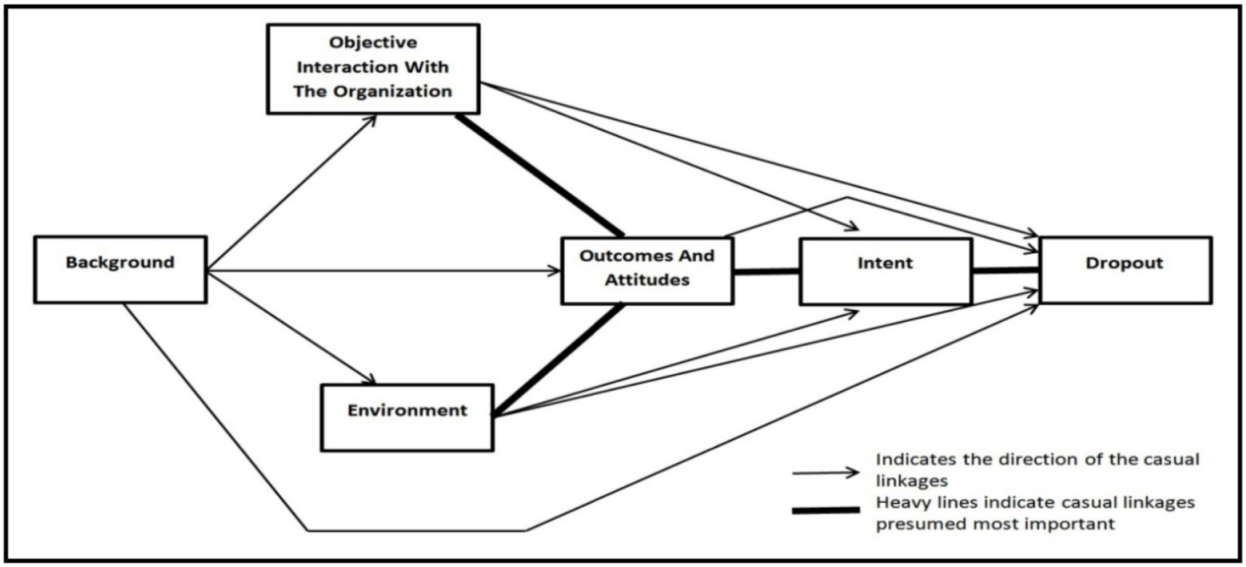
Bean: The Student Attrition Model

Building on Tinto and Cullen's 1973 work, Bean created his own retention model, the Student Attrition Model, originally published in 1980 and further revised and republished in 1982. Drawing from earlier work on job satisfaction (in contrast to Tinto's sociological underpinnings), Bean argued that the decision to leave prior to graduation was similar to an employee's decision to quit, and his model was a better representation of this process (1980). Within this framework, overall satisfaction with the education experience—not social engagement with college culture—is the most significant factor in retention (Bean, 1980). In

subsequent work, Bean expanded his model to further define what satisfaction means for a student:

Table 6.

Bean's "Student Attrition Model"



(Bean, 1982)

Bean defined four categories of variables that are part of satisfaction: 1. background: a student's background prior to enrollment; 2. objective: how a student interacts with their college; 3. environment: the overall environment experienced by the student, including social interaction; and 4. outcomes and attitudes: how a student performs and how they view their experiences (1982). These four variables, combined with intent to graduate, lead to a decision to stay

Bean's model is significantly more general than Tinto's work. For Bean, student background is less significant than a student's experience once enrolled, and that experience can be seen as a proxy for their satisfaction.

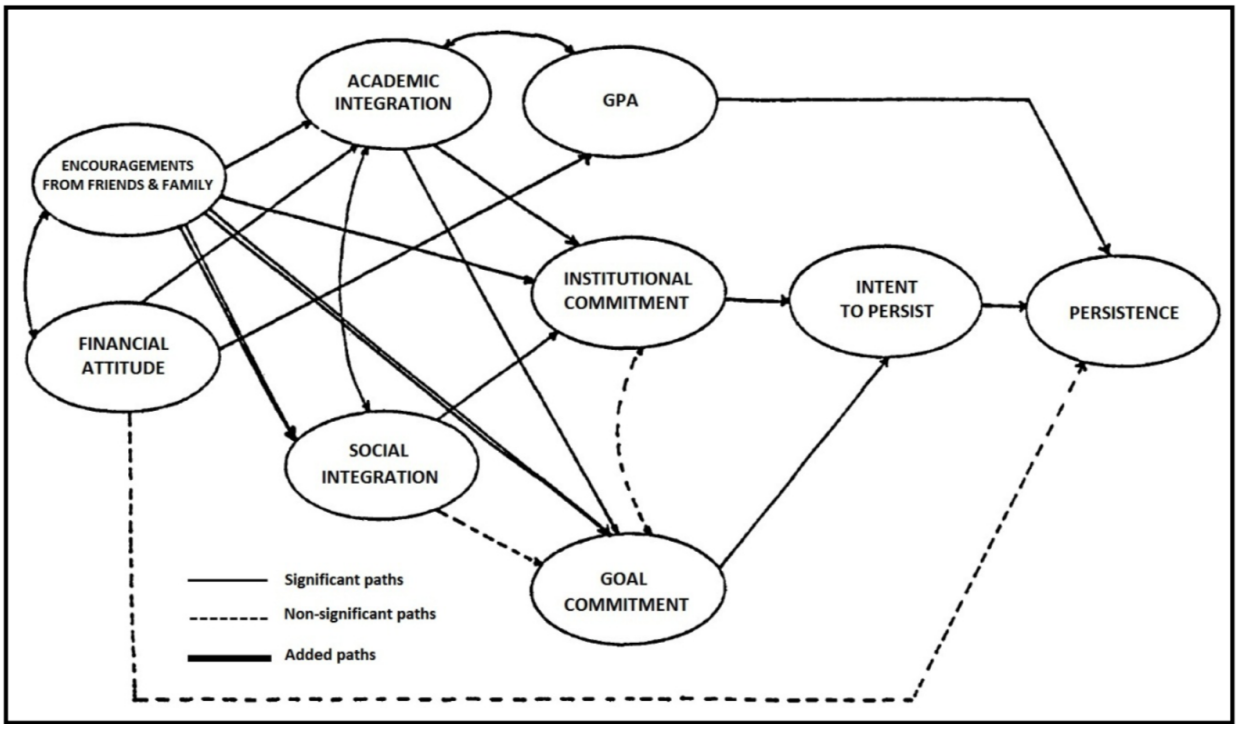
Cabrera, Nora and Castaneda: Integrated Model of Student Retention

Cabrera, Nora, and Castenada (1993) created their "Integrated Model of Student Retention," to unify Tinto's work and other retention models (Bean and Astin among others) in a single, explanatory model. Key to Cabrera, Nora, and Castenada's model is an attempt to test each underlying proposition through structural equation modeling (1993). In particular, the "Integrated Model of Student Retention" was created to respond to one perceived shortcoming of Tinto's model: that it ignored the influence of outside factors (Cabrera et al., 1993).

Researchers utilized a longitudinal design, following 2,459 incoming first year students at a large southern public institution over the 1988-1989 academic year. Participants were surveyed at two points, yielding a total of 466 usable surveys. Cabrera, Nora, and Castaneda identified nine retention factors from previous retention models: financial attitudes, encouragement from friends and family, academic integration (academic preparation), academic performance, social integration, institutional commitment, goal commitment, and intent to persist (1993). Survey results measured against actual student performance supported the validity of the hypothesized model, yielding a new, revised model:

Table 7.

Cabrera, Nora, and Castenada's "Integrated Model of Student Retention"



(Cabrera, Nora, and Castaneda, 1993)

Students progress through the factors of the "Integrated Model of Student Persistence" linearly, although the authors recognize that factors can reemergence to influence persistence likelihood and decision.

The researchers also ranked their variables in order of importance based on calculated effect coefficient, which were in order of most impactful to least: intent to persist, GPA, institutional commitment, encouragement, goal commitment, academic integration, financial attitudes, and social integration. Notable in this ranking is the low position of financial attitude—likely a consequence of the significantly lower tuition fees associated with the time when the study was performed (1993).

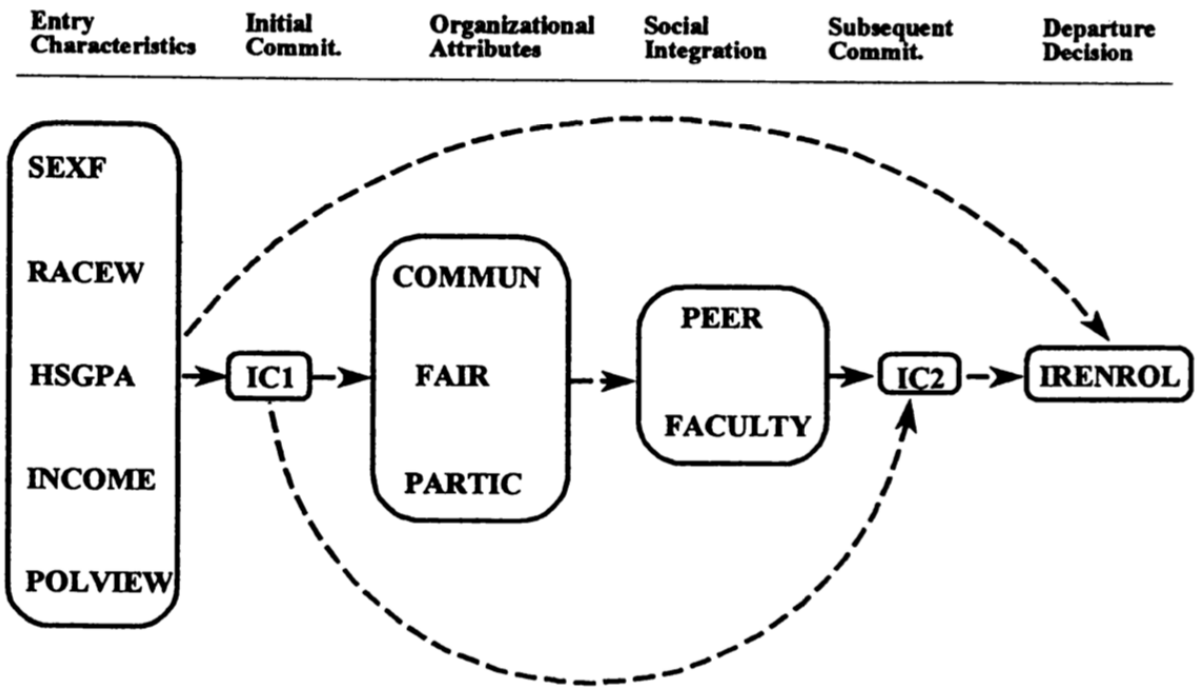
Unlike many theoretical models, the "Integrated Model of Student Retention" is based on experimental research; however, it still has significant shortcomings. The limited sample size—less than 500 students drawn from a single institution—makes generalizing the information to other institutions challenging. Despite these shortcomings, the model was an important development in establishing the interconnectedness of factors that lead to the decision to withdraw, and in particular, was part of a growing body of evidence that intervention prior to withdrawal decision can help retain more students.

Berger and Braxton: Revised Interactionalist Model

Responding to earlier models, Berger and Braxton created their model after recognizing that the rates of student departure had remained steady despite growing understanding of why students leave, including at highly competitive programs with low admission rates (1998). Berger and Braxton also took issue with two specific problems in Tinto's previous work: Tinto ignored the influence of the institution itself on student social integration—what they term "organizational characteristics"—and secondly, he had failed to integrate new developments in the field into his work (1998). Specifically, they argue that "participation in organization decision-making, fairness in the administration of policies and rules, and communication" strongly influence social integration, which in turn influences retention decision (Berger & Braxton, 1998). They hypothesized the below model, with five categories of variables leading to a departure decision: entry characteristics, initial commitment, organizational attributes (organizational contribution), social integration, and subsequent commitment:

Table 8.

Berger and Braxton's "Revised Interactionalist Model"



(Berger & Braxton, 1998)

To test the validity of their model, Berger and Braxton surveyed 1,500 entering freshmen at a highly competitive private research university with low historical attrition at three points during the 1995-1996 academic year: entry, first semester mid-point, and during the Spring semester (1993). Their instrument contained questions designed to measure student perception of organizational culture and attributes. The surveys yielded a sample size of 718 students. Data analysis found that organizational attributes directly affect social integration, which in turn correlates with stated likelihood to return (1993). This study did not take into account student performance once enrolled, or if students returned the following year. Rather, Berger and Braxton measured student intention (1993). Berger and Braxton's model has significant limitations. They specifically tested their model at an institution with low attrition rates and a homogeneous population with little racial diversity or financial need (Berger & Braxton, 1993).

What their model does suggest is that student social integration can be affected by university action and student perception—in particular how a university treats their student body.

Seidman: Student Success Model

Responding directly to Tinto's earlier work (1993), Seidman (2005; 2012) hypothesized that an intervention-based approach to retention can function to retain more students. Finding contemporary measures of retention insufficient, as they focused solely on the number of students enrolled at a given time, Seidmen argued that a better approach is to incorporate personal student goals in this measure, since retention can be defined in a number of ways (2005; 2012). Taking a different approach than previous scholars, Seidman created a specific, process-driven formula along with this theoretical model that colleges can use to identify students at risk of dropping out, as well as explaining how to intervene to retain these students. Seidman's "Student Success Model" formula is shown below:

Table 9.

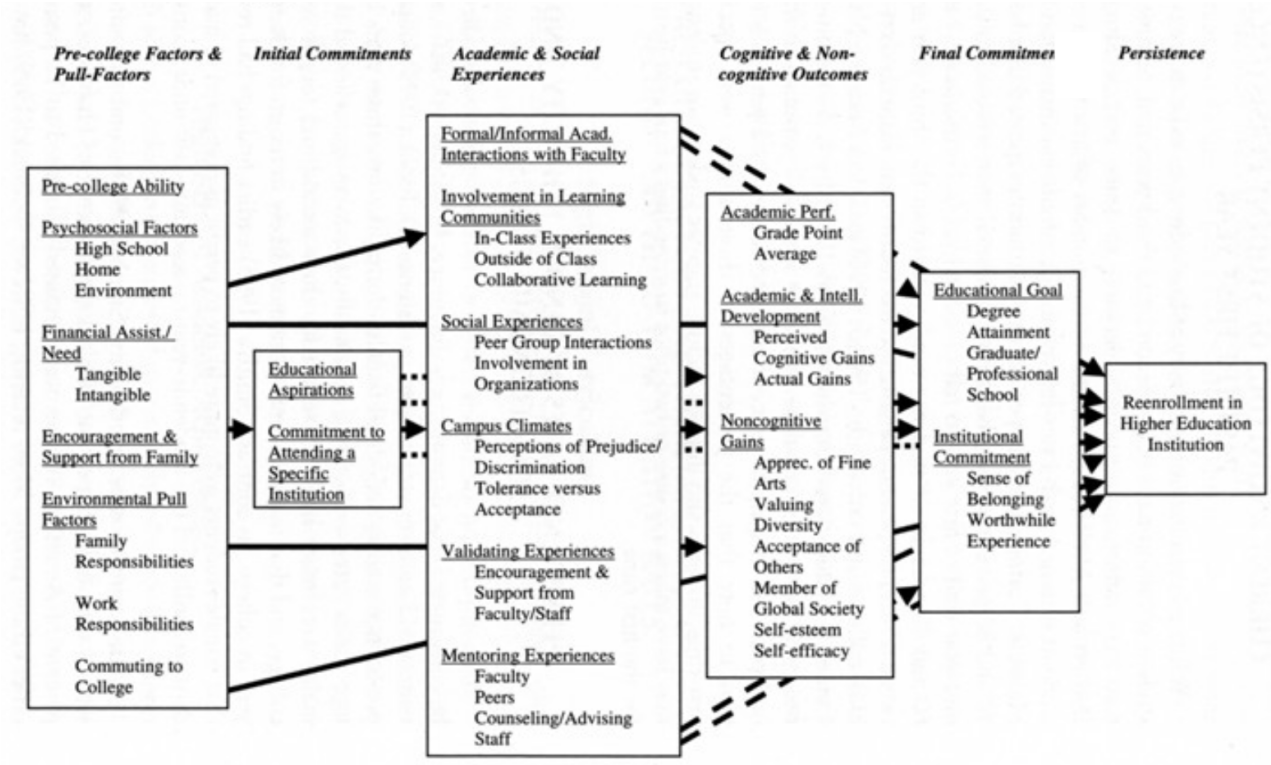
Seidman's "Student Success Model" Formula

Retention = Early Identification + (Early + Intensive + Continuous) Intervention

(Seidman, 2012)

Table 10.

Seidman's "Student Success Model"



(Seidman, 2012)

Expanded into a full model, Seidman identified five categories of factors which influence the retention decision: pre-college factors, initial commitments, academic and social experiences once enrolled, cognitive and non-cognitive outcomes (actual growth and perceived growth once enrolled), and financial commitments (2012). Like earlier models, Seidman perceived these factors as progressing linearly, ending in the decision to continue to re-enroll (presumably at the end of a semester).

It is key to note that this model focuses less on the reasons for which a student may leave, instead emphasizing what a program can do about it and when this intervention can take place. Seidman argued that a university should use in-class assessment to identify engagement with his

five categories of retention factors, and then proactively work with students who show a likelihood to depart.

Seidman's work is of particular importance to the development of professional academic advising as a discipline. While Tinto's research identified retention as a problem and what factors contribute to the decision to leave, Seidman made the important step of linking university intervention to student outcome, cementing an expectation that proactive interventions can function to retain more students. Seidman helped lay the groundwork for a modern academic advising retention initiative.

A Synthesis Model

While these various models share many characteristics and are often made in response to a previous model, there is no single, unified, or accepted model for student retention and persistence within the literature. Despite the development of many models since Tinto's early work, even today many scholars still use Tinto's framework when examining student retention in a specific area. For example, Seidman specifically responded to Tinto's work from the 1970s when creating his model in 2005). Further, these retention models, despite appearing comprehensive, are based on either theoretical assumptions of student behavior or data drawn from a limited sample from a single institution, limiting their applicability outside their original theoretical framework.

Bearing these shortcomings in mind, then, there is value in constructing a model drawn from the most common factors identified in the six models. After conducting a review of each model, six common categories of factors emerge:

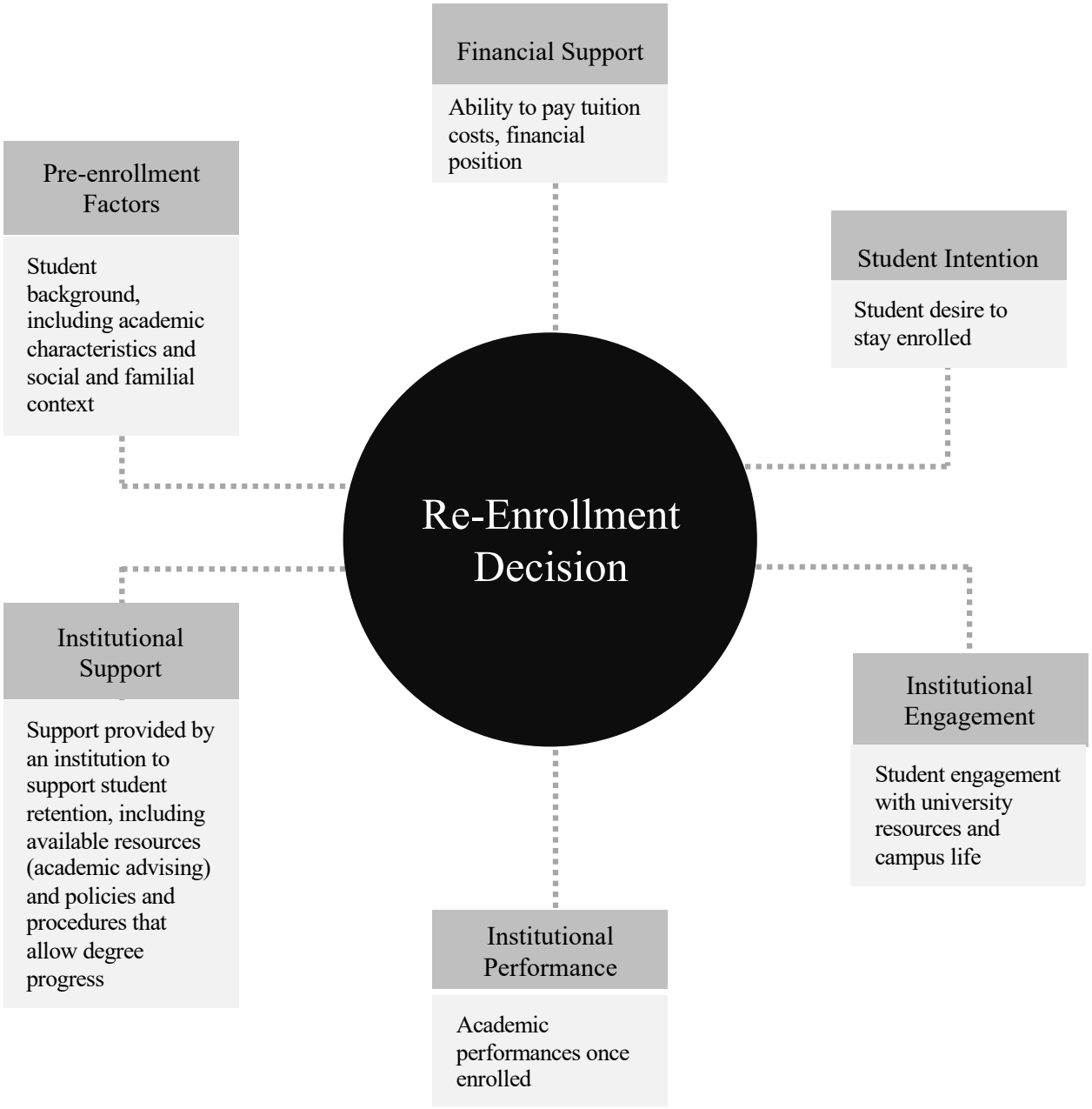
Table 11.

Synthesis Model Factors

Pre-Enrollment Factors	Student background, including academic characteristics and social and familial context
Financial Support	Ability to pay tuition costs, financial position
Institutional Support	Support provided by an institution to support student retention, including available resources (academic advising) and policies and procedures that allow degree progress
Institutional Performance	Academic performance once enrolled
Institutional Engagement	Student engagement with university resources and campus life
Student Intention	Student desire to stay enrolled

Table 12.

Synthesis Model



These six categories are present in the majority of the models:

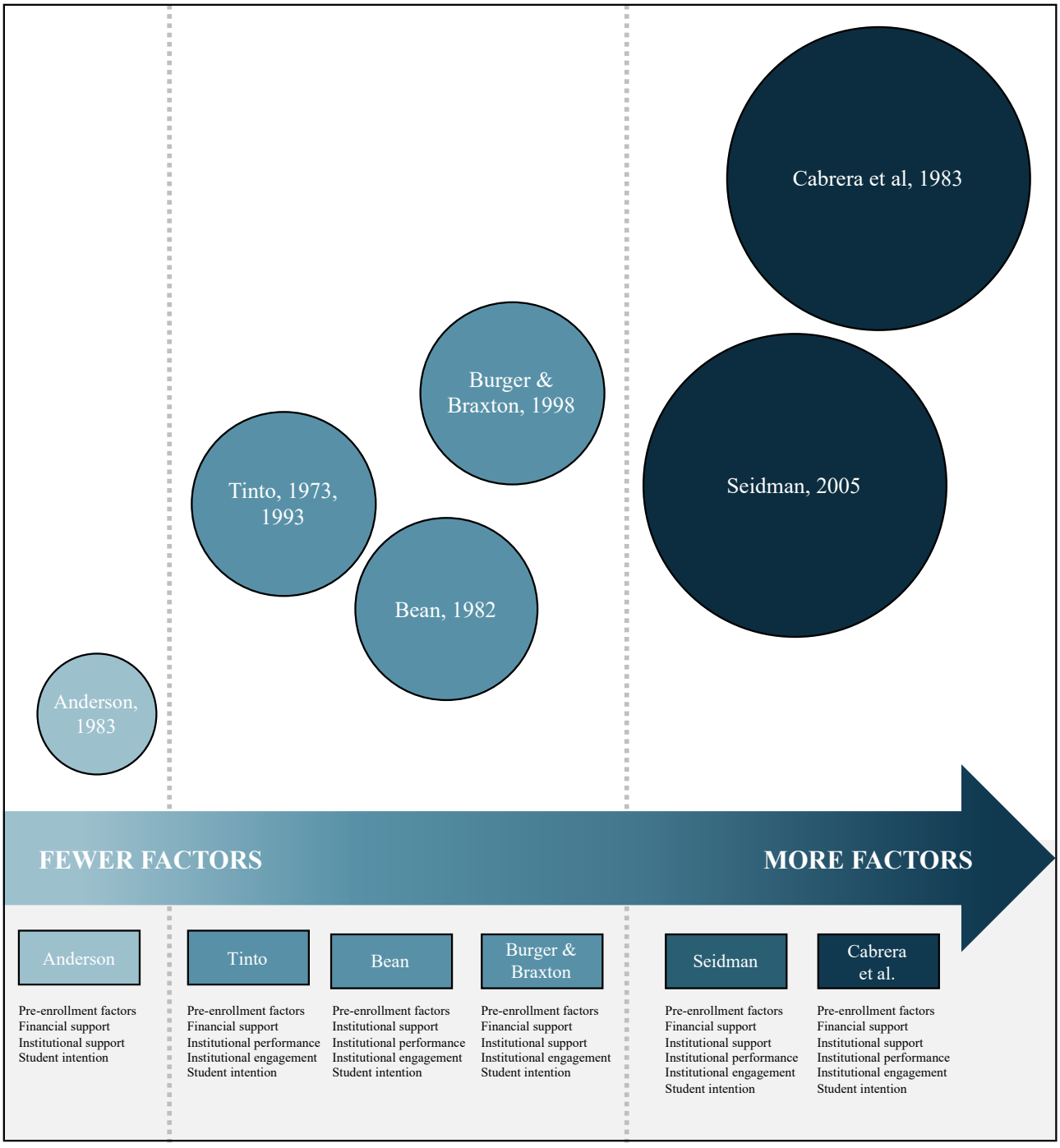
Table 13.

Synthesis Model Antecedents

Synthesis Model	**Pre-Enrollment Factors**	**Financial Support**	**Institutional Support**	**Institutional Performance**	**Institutional Engagement**	**Student Intention**
Tinto (Tinto, 1973) (Tinto, 1993)	Yes: "Pre-Entry Attributes"	Yes: "Pre-Entry Attributes" Note: Only prior to enrollment	No	Yes: "Institutional Experience"	Yes: "Social Integration"	Yes: "Goals and Commitments"
Anderson (Anderson, 1983)	Yes: "External Force"	Yes: "External Force"	Yes: "Institutional Force"	No	No	Yes: "Internal Force"
Bean (Bean, 1982)	Yes: "Background"	No	Yes: "Objective"	Yes: "Outcomes and Attitudes"	Yes: "Objective"	Yes: "Intent"
Cabrera, Nora & Castaneda (Cabrera, et al., 1993)	Yes: "Academic Integration" & "Encouragement From Friends and Family)	Yes: "Financial Attitude"	Yes: "Institutional Commitment"	Yes: "GPA"	Yes: "Social Integration"	Yes: "Intent to Persist" & "Goal Commitment"
Burger & Braxton (Burger & Braxton, 1998)	Yes: "Entry Characteristics"	Yes: "Entry Characteristics"	Yes: "Organizational Attributes" Note: Student perception	No	Yes: "Social Integration"	Yes: "Initial Commitment" & "Subsequent Commitment"
Seidman (Seidman, 2005)	Yes: "Pre-College Factors"	Yes: "Pre-College Factors"	Yes: "Academic & Social Experiences"	Yes: "Cognitive & Non-Cognitive Outcomes"	Yes: "Academic & Social Experiences"	Yes: "Initial Commitment" & "Final Commitment"

Table 14.

Synthesis Model Antecedents Expanded



Race, Ethnicity and Retention

None of the six included models specifically identifies a relationship between student race or ethnicity and retention outcome. Several do include student characteristics as part of student background (Pre-Enrollment Factors), but don't examine these characteristics as a variable that has an outcome on retention, or that requires different intervention or administrative treatment. Despite this shortcoming, other scholars have examined the specific relationship between race or ethnicity and retention and degree attainment. This section will focus in particular on the retention and graduation of Hispanic and Black students, as these are the two largest groups of underrepresented minority students at VCU.

Total undergraduate enrollment of underrepresented minority students has significantly increased over the last four decades. Between 1980 and 2011, enrollment of Hispanic students increased by 500%, and Black students by 165%, particularly at minority-serving institutions (MSIs), which serve at least one-third of minority students (Gasman & Conrad, 2021; Meristotis & McCarthy, 2005). Graduation rates of Black and Hispanic students lag significantly behind those of white and Asian students. For the 2010 entry cohort, the 6-year graduation rate of white students was 67%, and Asian students 71.5%, but only 39% for Black students and 54% for Hispanic students (National Center for Education Statistics, 2020).

One common explanation for lower retention and degree attainment rates amongst minority students is that they have less "cultural and social capital"—a general term which represents level of privilege, including social support network, and place within the larger socioeconomic hierarchy—when enrolling, which makes them less equipped to handle the social and cultural challenges of persisting through their first year (Wells, 2008). Other factors that influence retention likelihood include persistent inequities in college preparation in high school, family instability, more off-campus responsibilities including work, and less of a sense of

campus belonging (Robnett & Baker, 2012). These explanations speak to two of the identified retention factors, Student Intention and Pre-Enrollment Factors, but have a level of complexity missing from the included retention models, likely due to the differences in population and unique challenges facing minority students.

Several studies have identified Hispanic students as a population at particular risk for dropout compared to other minority students, although in general retention of Hispanic students in higher education is a relatively unexamined area within the literature (Zapata, 2008; Otero, et al., 2007). Compared to students from other underrepresented minority groups, Hispanic students saw significantly fewer gains in degree attainment from the 1970s to 2000 (de los Santos, et al., 2005). Specific strategies proposed to increase Hispanic student retention and degree attainment include hiring Hispanic faculty and staff to model success, targeted need-based aid, high school-to-college bridge programs to help students acclimate to the college environment, and creating whole family programming that includes both the college student and their family to create cultural and social capital (Oseguera, et al., 2009).

In terms of overall retention strategies to improve underrepresented minority student outcomes, a survey of MSIs with significant year-over-year increases in retention rate found that the most successful programs adopted targeted financial aid support, created structured support programs to model successful behavior, and paired incoming students with successful student peer mentors (Meristotis & McCarthy, 2005). There is also evidence that implementing high-impact practices (HIP), such as a dedicated first year experience, undergraduate research, and learning communities, can increase first-year retention rates amongst first-year students. Testing these strategies at four public colleges and universities in Tennessee, the Lumina Foundation

found that the retention rate of students participating in HIP was 8% higher than for those who did not participate (Valentine & Price, 2021).

Academic Advising: Where it Helps

Using this broad, general model as a starting point, it is possible to construct a narrower model limited to only the specific retention factors for which previous research has shown that advising can be an effective and statistically significant intervention for keeping students enrolled. As part of developing this narrower model, it is important to review the previous research literature examining the relationship between academic advising specifically (instead of retention or enrollment in general) and each retention factor in the Synthesis Model.

Academic Advising and Pre-Enrollment Factors

There is no evidence that college-level academic advising can improve or change Pre-Enrollment Factors, including high school academic performance, student demographics or background, or familial support. Theoretically academic advising prior to enrollment could help students understand how their profile may influence their future performance, and thereby their likelihood to return for a second year and graduate. However, no study has examined whether such a program would improve retention outcomes. Based on the existing research, academic advising is not an effective intervention for students whose departure is based on Pre-Enrollment Factors and should not be a factor in a narrow, advising-specific retention model.

Academic Advising and Financial Support

Financial Support is an important factor in student retention and preventing premature dropout. Beyond the models above that specifically identify financial resources as key to the retention decision-making process, there are numerous significant studies that examine the role

of finances in retention and how to retain students with financial struggles (St. John, E. P., 2000). Herzog found that students with unmet financial need (or financial struggles) drop out at twice the rate of students with financial resources (2005). Additionally, a meta-analysis of subject area research found that within retention research, a consensus has been reached that unmet financial need is associated with decreased retention and graduation rates (Hossler, et al., 2009). Even Tinto, who earlier (1973) had dismissed student finances as a significant factor in persistence (although he does include it in his model), now acknowledges the important role financial support plays in persistence among low-income students as the college population has evolved (2010).

None of these studies point to academic advising as an appropriate intervention to retain a student that lacks financial support. Academic advising is not an effective intervention for students whose departure is based on financial support and financial resources, and should not be a factor in a narrow, advising-specific retention model.

Academic Advising and Institutional Support

Several studies have shown a connection between availability of academic advising and perception of institutional support via student satisfaction and the relationship between persistence and satisfaction (Bean, 1980). Academic advising is effective in improving student retention and graduation rates in part due the relationship between student persistence and student satisfaction (Bean, 1980). Key to understanding this relationship is Herzberg's early sociological work on employee satisfaction and retention. A sociologist by training, in the late 1950s Herzberg began studying job motivation and satisfaction, surveying 200 accountants and engineers, and using his results to construct his Two-Factor Theory, also known as the Motivator-Hygiene Theory (Ramlall, 2004; Herzberg, Mausner, & Snyderman, 1959). In large

part, this theory was developed out of an application of Maslow's Hierarchy of Needs, which argued that fundamentally, humans desire self-actualization and reach this state by progressing through four previous levels of need—physiological, safety, belonging, and esteem—before reaching self-actualization (Maslow, 1943; Ramlall, 2004). According to Herzberg, "employees tended to describe satisfying experiences in terms of factors that were intrinsic to the content of the job itself" factors known as "motivators" (Ramlall, 2004). Motivators include achievement, recognition, the type of work found in the job, and position within an organization, factors that comprise the overall job experience (Ramall, 2004). Dissatisfying experiences, on the other hand, called "hygiene" factors, "largely resulted from extrinsic, non-job-related factors, such as company policies, salary, coworker relations, and supervisory styles" (Ramall, 2004).

Importantly, Herzberg observed that job satisfaction and dissatisfaction are not necessarily linked, and "therefore, managers who seek to eliminate factors that create job dissatisfaction can bring about peace, but not necessarily motivation" (Ramall, 2004). Herzberg described seven principles to be used when altering a job to motivate an employee, including removing some controls, sharing reported information with a worker, and allowing employees to become expert at a task or in an area (Herzberg, 1968; Ramall, 2004).

While researchers have long used theoretical models originating in customer service and business research to measure student satisfaction in higher education (Kotler and Fox, 1995 for example), Herzberg's Two-Factor Theory was first utilized in a 2005 study examining business student satisfaction at Pennsylvania State University (DeShields, Jr., Kara, & Kaynak, 2005). In this study, the scholars examined satisfaction in three key areas: classes, faculty, and advising services. They theorized that, within Herzberg's model, classes and faculty were motivating factors (satisfiers) while advising services as a hygiene factor (dissatisfiers) (DeShields, Jr., et

al., 2005). Researchers surveyed approximately 160 business students with a standard student satisfaction instrument and awarded participants extra course credit. Study results verified the researchers' hypothesis, demonstrating the validating of applying Herzberg's theory to an education and student satisfaction context (DeShields, Jr., et al., 2005). The researchers also concluded that satisfaction with advising services (along with other elements) contributes to overall student satisfaction, confirming previously-held assumptions (DeShields, Jr., et al., 2005). In turn, this increase in satisfaction functions to improve retention.

Based on these studies, it is reasonable to conclude that academic advising is an effective intervention to retain students whose departure is based on institutional support and should be a factor in a narrow, advising-specific retention model.

Academic Advising and Institutional Performance

Institutional academic performance measured through GPA is strongly correlated with retention rate, particularly amongst first year students (Kern, et al., 1998; Miller, 1991). While GPA and retention can be considered distinct outcomes—students with a high GPA can choose to drop out for non-academic reasons or transfer to another institution—students with higher GPAs stay enrolled at higher rates (Kern, et al., 1998; Jamelske, 2008). GPA or academic performance is an element of four of the six models included in the Synthesis Model.

There is some evidence that academic advising as an intervention functions to specifically increase student GPA, although isolating academic performance as a variable amongst overall retention is challenging and rare within the literature. In an early study, Metzner found no statistically significant link between advising, advising quality, and academic performance (1989). A randomized, longitudinal study following 501 students over four years at a large, urban state university also found no statistically significant correlation between

utilization of advising services and student achievement, measured by GPA and number of major changes (Schwebel, et al., 2012).

A more recent study examining the effect of academic advising on GPA amongst 2,745 first-year students who had access to advising resources, but were not required to use them, did find a positive correlation between advising and student performance (Kot, 2014). This study found that students who sought out and used academic advising had a first semester GPA one grade step higher (a C vs. a C-) than those who did not, and overall were 4% more likely to return for their sophomore year (Kot, 2014). Kot argued that student motivation, the idea that more motivated students will proactively seek out advising and perform better in their courses, did not explain the positive relationship between GPA and advising usage, as the statistical variance between the two groups was too large to be explained by an unobserved variable, even though there was no proxy variable for motivation within the study (Kot, 2014). What this study did not examine, though, was frequency of academic advising, as it simply compared a cohort who used advising against one that did not. Nor did it examine the specific way in which academic advising improved student academic performance (Kot, 2014). Instead, this study simply concluded that centralized advising was beneficial for student retention and performance.

Based on these studies, academic advising may be an effective intervention to retain students whose departure is based on academic performance, although further research into this subject (including measuring quality and frequency of academic advising) is needed.

Academic Advising and Institutional Engagement

Five of the six models in the Synthesis Model include some form of student institutional engagement as a factor of student retention. In one of the largest longitudinal studies to date, Allen et al. (2008) examined social and institutional engagement as predictors of retention

amongst 14,464 students from 48 institutions, and found that engagement with campus life had a significant positive effect on student retention, supporting previous theoretical research (including several of the models included in the Synthesis Model).

Again, there is no research suggesting that academic advising increases or promotes student institutional engagement beyond the fact that seeing an advisor is, in and of itself, an example of engagement. Academic advising is not an effective intervention for students whose departure is based on institutional engagement and should not be a factor in a narrow, advising-specific retention model.

Academic Advising and Student Intention

All six of the models included in the Synthesis Model cite Student Intention—student desire and motivation to stay enrolled and graduate—as a factor of retention and graduation likelihood. Tinto (1993, 1975) particularly highlighted the importance of student intention (which he called "commitment") in the decision to stay and graduate, arguing that an uninterested student would choose to leave even when significant resources were devoted to retaining them (Swail, 1995).

A meta-analysis of 109 studies found that while GPA is the best predictor of retention likelihood, there is a statistically significant relationship between achievement motivation and return likelihood (Robbins, et al., 2004). This conclusion was further confirmed in a longitudinal study examining academic performance and motivation as predictors of retention among 14,464 first-year students from 48 institutions (Allen, et al., 2008). The researchers found that college commitment (Student Intention in the Synthesis Model) had a positive, direct effect on dropout odds.

None of these studies points to academic advising as an appropriate intervention to retain a student that lacks desire or motivation to stay enrolled. Academic advising is not an effective intervention for students whose departure is based on student intention and should not be a factor in a narrow, advising-specific retention model.

Narrow Model

Based on this review, there are two possible retention factors for which advising has been shown to be an effective intervention. The resulting narrowed model is:

Table 15.

Advising Specific Synthesis Model

Category	Description
Institutional Support	Support provided by an institution to support student retention, including available resources (academic advising) and policies and procedures that allow degree progress
Institutional Performance	Academic performance once enrolled

This model can be used in conjunction with the Synthesis Model and statistical analysis to identify students for which advising may theoretically be an effective intervention to increase retention likelihood.

Related Research into Academic Advising: Advisor Load

Beyond the effect of academic advising on student retention in specific cases, little work has been done on practical concerns of academic advising as a profession; i.e., the particulars of working as an academic advisor in a higher education setting. Related to this study is the topic of

advisor load, which is the number of students assigned to an academic advisor. Academic advisors generally work forty hours per week, and in this time are able to complete a finite number of academic advising appointments. The number of students each advisor is expected to advise can influence the frequency of appointments with these students. A larger caseload requires less frequent appointments (contingent on advising expectations and models), while a smaller caseload allows an advisor to meet their students more frequently. Currently, no research has been completed that examines advisor-student ratios or advisor caseloads.

Instead, The National Academic Advising Association (NACADA) conducts an annual survey on "advisor load," publishing their results without recommendations, statistical analysis, or conclusions (Robbins, 2013). NACADA divides member institutions (and survey respondents) into categories based on two characteristics: type of institution (community college vs. 4-year, etc.) and size of institution (either small, medium, or large). In 2011, the latest year from which survey data has been made available, the median advisor caseload for small institutions was 233:1, medium institutions 333:1, and large institutions 600:1. For two-year institutions, the median caseload was 441:1, public bachelor institutions 285:1, private bachelor institutions 100:1, public master 300:1, private master 179:1, public doctorate 285:1, and private doctorate 200:1 (Robbins, 2013). According to NACADA, "meaningful case load comparisons remain elusive because too many factors affect advising delivery. In other words, there is no objective recommended case load for advisors…" (Robbins, 2013). Confounding factors include institution advising models, advisor responsibility, how advising is delivered, advising time line, and goal of an advising unit (Robbins, 2013).

Beyond information published by NACADA, almost no research has been done examining advisor load or student to advisor ratio, especially in the context of retention.

NACADA offers advice for advisors on how to manage a large caseload, pointing to technology, strong organization, a clear definition of types of students an advisor is expected to see, and membership to national organizations (such as NACADA) as best practices for advisors (Applegate & Hartleroad, 2011).

Summary

This chapter first reviewed popular models explaining why students drop out before graduating, and then constructed a unified, synthesis model based on common, shared retention factors amongst these models. This unified model was then narrowed, creating a second model which specifically identifies retention factors for which advising is proven to be a successful intervention. Finally, this chapter examined existing research on the structure and function of academic advising units.

Chapter 3:
Research Design and Methodology

Research Question and Study Design

This study seeks to answer two research questions: what factors influence retention likelihood, and is there evidence that academic advising helps mitigate these factors? These questions are tested through a correlational, quantitative, non-experimental design involving the analysis of secondary data for one complete academic year. All data used in this research was secondary, and was acquired through VCU's Office of Student Success, which warehouses data and provides institutional analysis and benchmarking, as well as oversees first-year advising. Student Success has access to data from both SSC as well as student academic and demographic data. Data was anonymized to protect student identities, and did not contain any identifying characteristics, such as unique student identification numbers (VNumber) or students' email addresses. No additional interventions or points-of-contact were utilized in the study.

Sample

The sample for the study is the entire first-year, first-time, full-time student population at Virginia Commonwealth University for the 2017-2018 academic year—4,215 students. This sample was chosen because it is the specific group that is measured to determine first-year student retention, an evaluative metric used nationally (Institutional Research and Decision Support, 2018). Further, each member of this population has an assigned professional advisor.

This sample does not include students whose enrollment is not used to measure first-year retention, such as part-time students or students with previous college enrollment. These students

are not considered first-year students for purposes of calculating retention rates. Further examination of these groups is worthwhile, although outside the scope of this study.

Methodology and Study Analysis

Because of the exploratory nature of this study, the methodology used cannot be modeled on previous work. Variables used in this study were identified based on the Synthesis Model, with selected independent variables serving as proxies for retention factors. These variables, and their equivalent factors in the Synthesis Model, are defined below.

Data examination began by first screening the sample for students with incomplete data, and excluding these participants from further analysis. After screening for these students, the sample was analyzed for descriptive statistics. After analyzing for descriptive statistics, a collinearity analysis was performed on the selected variables, before proceeding to a binary logistic regression analysis. The resulting model tests the hypotheses by identifying which of the independent variables are statistically significant predictors of retention likelihood. This study did not require IRB approval as the sample population did not meet the institutional definition of human subjects.

Study Variables

The selected variables were determined by which information VCU stores in its databases, including SSC and Banner. Along with SSC, the centralized advising software purchased by VCU from the Education Advisory Board, VCU also utilizes Ellucian Banner, a centralized student information system that controls all aspects of data management for the university, including admissions, course registration, faculty and student management (“Ellucian Solutions”, 2019). Because of the exploratory nature of this research, and to increase viability

and applicability of results, a wide number of variables was collected, and then controlled for through collinearity analysis.

Two specific limitations to variables are noteworthy. For the "gender" variable, VCU currently only allows students to choose either "male" and "female", with no option for either not selecting a gender, or additional non-binary options. VCU also only provides six options for race and two for ethnicity, and does not require students to disclose this information. This is in contrast to other research studies involving student retention and race as factors relevant to retention, which typically offer more options (see, for example, Lee, 2018).

Further, there are no independent variables that serve as a proxy to measure Institutional Engagement. VCU does not track student participation in student organizations or activities in a centralized, accessible database, and does not correlate this data with student outcomes. This is an area worthy of further study.

Dependent Variable

Table 16:

Dependent Variable

Dependent Variables		
Variable Name	**Description**	**Value**
Retained	Source: Banner If a student enrolled for the Fall 2018 semester. This variable is the final determination of student retention (National Center of Education Statistics, 2017). Type: Categorical	0 = no, 1 = yes

Table 17:

Independent Variables

Independent Variables			
Variable Name	**Description**	**Value**	**Combined Model Variable and Study Purpose**
First Generation Status	Source: Banner A student's self-reported first generation college status, defined as not having parents who have graduated from college. Type: Categorical	0 = Not first generation; 1 = First generation	Demographic and Control
Race	Source: Banner, Admissions Data A student's race, optionally self-reported during admission application. Type: Categorical	0 = No Data, 1 = Two or more, 2 = Asian, 3 = American Indian, 4 = Black and African-American, 5 = Hawaiian and Pacific Islander, 6 = White	Demographic and Control
Ethnicity	Source: Banner, Admissions Data A student's ethnicity, optionally self-reported during admission application. Type: Categorical	0 = No Data, 1 = Hispanic, 2 = Non-Hispanic	Demographic and Control
Gender	Source: Banner A student's gender, reported during admission application. VCU currently provides only two options for gender, either male or female.	0 = Male, 1 = Female	Demographic and Control

	Type: Categorical		
Grade Point Average	Source: Banner Students' overall grade point average, on a 0.00 to 4.00 scale. VCU currently only awards letter grades, and does not award plus or minus variations (i.e. no A+ or A-, simply an A). Only grades earned at VCU are reflected in a student's grade point average. Type: Numerical	Measured on a numeric scale from 0.00 to 4.00	Institutional Performance
Earned Credit Hours	Source: Banner The total number of credits completed by a student, including any credits completed outside of the institution or prior to enrollment, and transferred in. Only courses successfully completed (with a grade a D or higher at VCU) are counted in a student's earned credit hours. Type: Numerical	Measured numerically	Institutional Performance
GPA Credit Hours	Source: Banner The number of earned credits completed at VCU which are used for GPA calculation. Distinct from earned credit hours, which includes credits earned outside the institution, which are not used for GPA calculation. Type: Numerical	Measured numerically	Institutional Performance
Credits Brought to VCU	Source: Banner	Measured numerically	Pre-Enrollment Factors

	The number of earned credits brought to VCU by an incoming student. Type: Numerical		
High School GPA	Source: Banner High school GPA when applying to VCU for admission. Type: Numerical	Measured numerically	Pre-Enrollment Factors
SAT Score	Source: Banner Score on the Standard Aptitude Test, a common pre-admissions aptitude test for matriculating high school students. Total score is out of 2400, with sub scores of 0-800 for verbal, mathematics, and writing. Currently, the SAT is not required for matriculation at VCU if an applicant has a high school GPA over 3.3. Scores will not be broken down by subtest for this variable. Type: Numerical	Measured numerically	Pre-Enrollment Factors
ACT Score	Source: Banner Score on the ACT college standardized test, a common pre-admissions aptitude test for matriculating high school students. Total score is out of 36, and is a composite of four subtest scores, English, reading, mathematics, and science. Currently, the ACT is not required for matriculation at VCU if an applicant has a high school GPA over 3.3. Scores will not be broken down by subtest for this variable.	Measured numerically	Pre-Enrollment Factors

	Type: Numerical		
In-State Status	Source: Banner, Admissions data Whether or not a student is a Virginia resident or not. When divided by residency, in-state students are more likely to be retained at VCU (Institutional Research and Decision Support, 2018). Type: Categorical	0 = out-of-state, 1 = in-state student	Financial Support
Number of Completed Advising Appointments	Source: SSC Number of advising appointments completed during the 2017-2018 academic year. Note: 2 appointments is the baseline minimum for students. Type: Numerical	Measured numerically	Institutional Support
Advising Account Hold	Source: Banner Hold placed on a student account for not meeting with an assigned academic advising for a required academic advising appointment. Type: Categorical	0 = no advising account hold, 1 = advising account holds	Institutional Support
Financial Account Hold	Source: Banner Hold placed on a student account for not paying a bill. Includes both outstanding account balance and account balances sent to collections. Type: Categorical	0 = no financial account hold, 1 = financial account hold	Financial Support

Administrative Account Hold	Source: Banner Hold placed on a student account for failing to complete a required administrative task. Specific holds include not providing the university with required immunization documentation, not sending in a final high school transcript or proof of high school graduation, and not completing required training following a student conduct sanction. Type: Categorical	0 = no administrative account hold, value of 1 = administrative account hold	Institutional Support

Hypotheses

The hypotheses for this research focus on the influence of the selected independent variables (associated with retention from the Synthesis Model) on return likelihood. Hypotheses were tested for statistical significance and positive or negative effect on retention through a binominal regression model. The hypotheses for this study are:

H_1: Grade Point Average (Institutional Performance factor) - As Grade Point Average increases, retention likelihood increases.

H_2: GPA Credit Hours (Institutional Performance factor) - As GPA Credit Hours increase, retention likelihood increases.

H_3: Credit Hours Brought to VCU (Pre-Enrollment factor) - As Credit Hours Brought to VCU increases, retention likelihood increases.

H_4: High School GPA (Pre-Enrollment factor) - As High School GPA increases, retention likelihood increases.

H_5: In-State Status (Financial Support factor) - Students with In-State Status have a higher retention likelihood than students without In-State Status.

H_6: Number of Completed Advising Appointments (Institutional Support factor) - As Number of Completed Advising Appointments increases, retention likelihood increases.

No relationship was hypothesized for the presence of account holds (advising, financial, and administrative) because the presence of these holds ensures a student is not able to re-enroll at VCU, and is therefore not retained by definition. No relationship was also hypothesized for ACT and SAT Score as they are not required for admission to VCU and not provided by most students.

Chapter 4
Data Analysis and Results

Introduction

This chapter details the data analysis performed during this study, and the results of this analysis. The analysis first began by checking the sample for entries with incomplete data, then performing descriptive statistics on the sample, followed by selecting variables for inclusion in regression analysis, then testing for multicollinearity, and finally by performing a binomial logistic regression. All statistical analysis in this chapter was completed using IBM's SPSS Statistics software program.

Missing Data

The sample included complete data for 3,873 students out of 4,214. 341 students were missing data for either their High School GPA (81 students) or their VCU GPA (260), and were excluded from further analysis. The retention rate for the 3,873 students with complete data was 81.8%, with 3,167 students retained and 706 not retained.

Descriptive Statistics

This section explores descriptive statics for the variables included in the study. The most relevant data will be discussed, and analysis provided where appropriate.

Descriptive Statistics: Dependent Variable

The retention rate for the 3,873 students with complete data was 81.8%, with 3,167 students retained and 706 not retained.

Descriptive Statistics: Numerical Independent Variables

The below sections include descriptive statistics for the selected numerical variables: SAT Score, ACT Score, GPA, Earned Credit Hours, GPA Credit Hours, Credits Brought to VCU (CreditsBrought), High School GPA (HSGPA), and Number of Completed Advising Appointments (AdvAppt).

Table 18:

Descriptive Statistics – Numerical Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
SAT Score	358	440	1670	1129.52	203.596
ACT Score	975	10	35	24.28	4.549
GPA	3873	0	4	2.903	0.82514
Earned Credit Hours	3873	0	122	35.21	17.69
GPA Credit Hours	3873	0	63	26.57	8.294
Credits Brought	3873	0	89	9.49	13.014
HS GPA	3873	1.98	4.99	3.632	0.46273
Adv Appt	3873	0	50	7.23	4.857

Only 358 students applied to VCU with an SAT Score, and only 975 an ACT Score, with significant deviation in scores. VCU does not require test scores for admission, which explains why the majority of students did not provide a test score, and makes judging the value of submitting a test score difficult as the data does not show if test score was used to as an admissions criteria case-by-case.

VCU GPA ranged from 0.0 (having passed no courses) to 4.0, with a standard deviation of 0.825 and a mean of 2.9. Earned Credit Hours, GPA Credit Hours, and Credits Brought to VCU also showed significant variance, with a mean of 35, 26 and 9 respectively. High School

GPA ranged from 1.98 to 4.99, with a mean of 3.6 and a standard deviation of 0.462. Finally, Number of Completed Advising Appointments ranged from 0 to 50, with a mean of 7.

Descriptive Statistics: Categorical Independent Variables

This section includes descriptive statics for the categorical variables included in the study: Gender, First Generation Status, Race, Ethnicity, Financial Account Hold, Administrative Account Hold, and Advising Account Hold.

Gender

Table 19.

Gender Variable Descriptive Statistics

Gender	Frequency	Percent
Male (0)	1752	45.2%
Female (1)	2121	54.8%

As previously noted, VCU offers only two choices for gender identification and students are required to provide an answer.

In-State Status

Table 20.

In-State Status Variable Descriptive Statistics

Status	Frequency	Percent
Out-of-State (0)	347	9%
In-State (1)	3526	91%

First Generation Status

Table 21.

First Generation Status Variable Descriptive Statistics

First Gen Status	Frequency	Percent
Not First Generation (0)	2606	67.3%
First Generation (1)	1267	32.7%

Race

Table 22.

Race Variable Descriptive Statistics

Race	Frequency	Percent
No Data (0)	185	4.8%
Two or more (1)	358	9.2%
Asian (2)	667	17.2%
American Indian (3)	16	0.4%
Black and African-American (4)	795	20.5%
Hawaiian and Pacific Islander (5)	5	0.1%
White (6)	1847	47.7%

As previously noted, VCU offers limited choices when selecting race and does not require students to provide an answer.

Ethnicity

Table 23.

Ethnicity Variable Descriptive Statistics

Ethnicity	Frequency	Percent
No Data (0)	51	1.3%
Hispanic (1)	416	10.7%
Non-Hispanic (2)	3406	87.9%

Account Holds

Table 24.

Account Holds Variables Descriptive Statistics

Advising Hold	Frequency	Percent
No hold (0)	3846	99.3%
Hold (1)	27	0.07%
Finance Hold	**Frequency**	**Percent**
No hold (0)	3841	99.2%
Hold (1)	32	0.08%
Administrative Hold	**Frequency**	**Percent**
No hold (0)	3805	98.2%
Hold (1)	68	1.80%

A total of 127 students had either an administrative, financial or advising account hold. No student has more than one type of hold. The numerical descriptive statistics of this group were a mean GPA of 2.8, a mean Earned Credit Hours of 35, a mean GPA Credit Hours of 26, a mean Credits Brough to VCU of 9, a mean High School GPA of 3.4, and a mean of Completed Academic Advising Appointments of 6. This group was 52% male and 48% female, 17% out-of-state and 83% in-state, and 67% not first generation and 33% first generation. The ethnicities of students with holds were 7% Hispanic and 93% Non-Hispanic. The group was 6% Asian, 1% American Indian, 31% Black and African-American, 46% White, 1% Hawaiian and Pacific Islander, 18% Two or more races, and 2% provided no data. Compared to the sample overall, this population was more male, more out-of-state, had a slightly lower GPA and high school GPA, and completed one fewer academic advising appointment.

The value of this data is that it suggests a likely reason for why each of these selected students left VCU: out of the 706 students within the sample who were not retained, 32 of them

were likely not retained due to the influence of Financial Support factors and 95 were likely not retained due to the influence of Institutional Support factors.

Average Student in Sample

Based on the descriptive statistics, the average student included in the sample was retained, was White, Non-Hispanic, Female, In-State, not First Generation, did not provide a test score when applying to VCU, had a VCU GPA of 2.9, a High School GPA of 3.63, brought 9 credits to VCU, earned 26 credits over their first year, and completed 7 academic advising appointments.

Variable Selection

Financial Account Hold, Administrative Account Hold, and Advising Account Hold were excluded from further analysis due to their correlation with retention status. Students with holds on their account are unable to register for courses, and therefore cannot be retained by definition. While these variables may be useful to determine why an individual student may have not been retained after the hold was placed, these variables are not predictive. ACT Score and SAT Score were also not included due to the limited number of students within the sample who submitted test scores, and the inability to determine if these test scores were determinative in an admission decision. Further, High School GPA serves a proxy variable for the same retention factor, Pre-Enrollment Factors.

Multicollinearity

The next step during statistical analysis was to test for multicollinearity between independent variables. Multicollinearity is found when two or more variables measure the same

underlying attribute, and can reduce the precision of a model, calling into question the stated significance of variables (Knock & Lynn, 2012).

Table 25 below shows the result of a multicollinearity test run for the selected independent variables.

Table 25:

Collinearity Analysis 1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.307	.060		5.107	<.001		
	Gender	.001	.012	.001	.096	.924	.994	1.006
	InStateStat	.086	.021	.064	4.149	<.001	.984	1.016
	GPA	-.001	.007	-.003	-.201	.841	.973	1.028
	FirstGenStat	-.009	.013	-.011	-.706	.480	.955	1.047
	EarnedCreditHours	.000	.002	-.017	-.175	.861	.024	40.977
	GPACreditHours	.000	.002	-.009	-.187	.851	.101	9.901
	CreditsBrought	.001	.002	.033	.432	.665	.039	25.488
	HSGPA	.081	.013	.097	6.255	<.001	.955	1.047
	AdvAppt	.023	.001	.288	18.643	<.001	.967	1.034
	Race=No Data	-.010	.034	-.005	-.288	.774	.665	1.503
	Race=Two or more	.011	.021	.008	.530	.596	.915	1.093
	Race=Asian	.019	.017	.018	1.129	.259	.869	1.151
	Race=American Indian	.093	.093	.015	1.005	.315	.979	1.022
	Race=Black and African-American	.015	.016	.016	.951	.342	.840	1.190
	Race=Hawaiian and Pacific Islander	.092	.165	.009	.557	.577	.985	1.015
	Ethnicity=No Data	-.187	.055	-.055	-3.382	<.001	.868	1.152
	Ethnicity=Non-Hispanic	-.014	.022	-.011	-.610	.542	.651	1.536

a. Dependent Variable: RetentionStatus

Using a variance inflation factor threshold (VIF) of 3.3 as proposed by Knock and Lynn (2012), three independent variables showed multicollinearity: Earned Credit Hours, GPA Credit Hours, and Credits Brought to VCU (CreditsBrought). Race=White and Ethnicity=Hispanic are excluded from the analysis with a tolerance of .000. Excluding Earned Credit Hours, which is the

sum of GPA Credit Hours and Credits Brought to VCU, eliminates the presence of multicollinearity, as seen in the follow up test shown in Table 26:

Table 26:

Collinearity Analysis 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.308	.060		5.123	<.001		
	Gender	.001	.012	.001	.097	.923	.994	1.006
	InStateStat	.086	.021	.064	4.158	<.001	.986	1.015
	GPA	-.002	.007	-.003	-.209	.835	.975	1.026
	FirstGenStat	-.009	.013	-.011	-.711	.477	.956	1.046
	GPACreditHours	-.001	.001	-.017	-1.074	.283	.936	1.068
	CreditsBrought	.001	.000	.020	1.270	.204	.928	1.078
	HSGPA	.081	.013	.097	6.254	<.001	.955	1.047
	AdvAppt	.023	.001	.288	18.644	<.001	.967	1.034
	Race=No Data	-.010	.034	-.005	-.290	.771	.665	1.503
	Race=Two or more	.011	.021	.008	.526	.599	.915	1.092
	Race=Asian	.019	.017	.018	1.129	.259	.869	1.151
	Race=American Indian	.093	.092	.015	1.003	.316	.979	1.022
	Race=Black and African-American	.015	.016	.016	.948	.343	.840	1.190
	Race=Hawaiian and Pacific Islander	.092	.165	.009	.558	.577	.985	1.015
	Ethnicity=No Data	-.187	.055	-.055	-3.383	<.001	.868	1.152
	Ethnicity=Non-Hispanic	-.014	.022	-.011	-.607	.544	.651	1.536

a. Dependent Variable: RetentionStatus

By excluding Earned Credit Hours, no independent variables have a VIF greater than 1.6, a figure well below the 3.3 threshold, and no tolerance value below .665 (Knock & Lynn, 2012). Therefore, there was no evidence that changing one independent variable would influence another.

Binomial Regression

A binominal logistic regression was then performed to determine which independent variables were statistically significant and to create a formula to predict retention likelihood. This

specific type of regression analysis was chosen because the goal of this research was to predict the incidence of a single dichotomous dependent variable (in this case retention status) with multiple independent variables of different types (Garson, 2016).

After correcting for multicollinearity, the independent variables included in the regression analysis were Gender, In State Status (InState), GPA, First Generation Status (FirstGenStat), GPA Credit Hours, Credits Hours Brought to VCU (CreditsBrought), Race, Ethnicity, High School GPA (HSGPA), and Number of Completed Advising Appointments (AdvApp). Two of the variables—Race and Ethnicity—were categorical variables with multiple values. The result of the binomial logistic regression is shown below:

Table 27:

Binomial Logistic Regression Equation

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Gender	-.008	.091	.007	1	.932	.992
	GPA	.000	.055	.000	1	.999	1.000
	FirstGenStat	-.129	.098	1.719	1	.190	.879
	GPACreditHours	-.007	.006	1.521	1	.218	.993
	CreditsBrought	.004	.004	.993	1	.319	1.004
	Race			2.814	6	.832	
	Race(1)	-.116	.255	.209	1	.648	.890
	Race(2)	.086	.159	.292	1	.589	1.090
	Race(3)	.114	.133	.739	1	.390	1.121
	Race(4)	.625	.794	.621	1	.431	1.869
	Race(5)	.135	.124	1.174	1	.279	1.144
	Race(6)	.673	1.231	.299	1	.585	1.961
	Ethnicity			8.813	2	.012	
	Ethnicity(1)	-.992	.373	7.063	1	.008	.371
	Ethnicity(2)	.105	.169	.382	1	.536	1.110
	HSGPA	.512	.102	25.121	1	<.001	1.669
	AdvAppt	.266	.015	330.627	1	<.001	1.305
	InStateStat	.405	.144	7.958	1	.005	1.499
	Constant	-2.081	.441	22.242	1	<.001	.125

a. Variable(s) entered on step 1: Gender, GPA, FirstGenStat, GPACreditHours, CreditsBrought, Race, Ethnicity, HSGPA, AdvAppt, InStateStat.

Four independent variables showed statistical significance at $p<0.05$: Number of Completed Advising Appointments ($p<.001$), High School GPA ($p<.001$), In-State Status ($p = .005$). Ethnicity(1) ($p = .008$). Gender, First Generation Status, GPA Credit Hours, Credits Brought to VCU, and Race showed no evidence of statistical significance.

Number of Completed Advising Appointments was positively correlated with retention likelihood, with an odds ratio (Exp(B)) of 1.305. High School GPA was also positively correlated, with an odds ratio of 1.670. In-State Status was positively correlated with an odds ratio of 1.499, meaning that in-state students are more likely to be retained than out-of-state students. Finally, students who self-identified as Hispanic were less likely to be retained, with an odds ratio of .371.

Model and Model Accuracy

The resulting model was:

$$\textit{Retention Odds} = -.008\textit{(Gender)} + .405\textit{(InStateStat)} + 0\textit{(GPA)} + -.129(\textit{FirstGenStat}) + -.007(\textit{GPACreditHours}) + .004(\textit{CreditsBrought}) + -.116(\textit{Race(1)}) + .086(\textit{Race(2)}) + .114(\textit{Race(3)}) + .625(\textit{Race(4)}) + .135(\textit{Race(5)}) + .673(\textit{Race(6)}) + -.992(\textit{Ethnicity(1)}) + .105(\textit{Ethnicity(2)}) + .512(\textit{HSGPA}) + .266(\textit{AdvAppt}) - 2.081$$

The classification table (Table 28) shows that the model successfully predicted 84.7% of cases, including 99.1% of students who were retained, and 20.4% of students who were not. The Cox & Snell R^2 for the model was .134, and the Nagelkerke R^2 was .218.

Table 28:

Classification Table

Classification Table[a]

			Predicted		
			RetentionStatus		Percentage Correct
	Observed		0	1	
Step 1	RetentionStatus	0	144	562	20.4
		1	29	3138	99.1
	Overall Percentage				84.7

a. The cut value is .500

The implications and usefulness of the model will be discussed in the following chapter.

Chapter 5
Discussion

Introduction

This chapter discusses the results and implications of the study, offers specific policy suggestions based on these results, and describes study limitations, offering suggestions for future research.

Hypotheses Discussion

Of the six hypotheses tested as part of this study, support was found for three (p-value less than 0.05): H4: As High School GPA increases, retention likelihood increases, H5: Students with In-State Status have a higher retention likelihood than students without In-State Status, and H6: As Number of Completed Advising Appointments increases, retention likelihood increases. For the remaining three hypotheses, H1, H2, and H3, the null hypothesis was not rejected, and no support was found. The three hypotheses where support was found—and their associated retention factors—are discussed in detail below.

Significant Retention Factors: Pre-Enrollment Factors

One proxy variable for Pre-Enrollment Factors—High School GPA—showed statistical significance. High School GPA was positively correlated with retention likelihood, with an odds-ratio (1.669) greater than 1, indicating that as high school GPA increased by 1, the odds of a student being retained increased by 67%.

Another way to measure the impact of High School GPA is by calculating probability, which is the likelihood of a specific student being retained. For the average student in the sample, the change in retention probability[1] at different high school GPAs is modeled below.

Table 29:

Retention Probability vs. High School GPA Chart

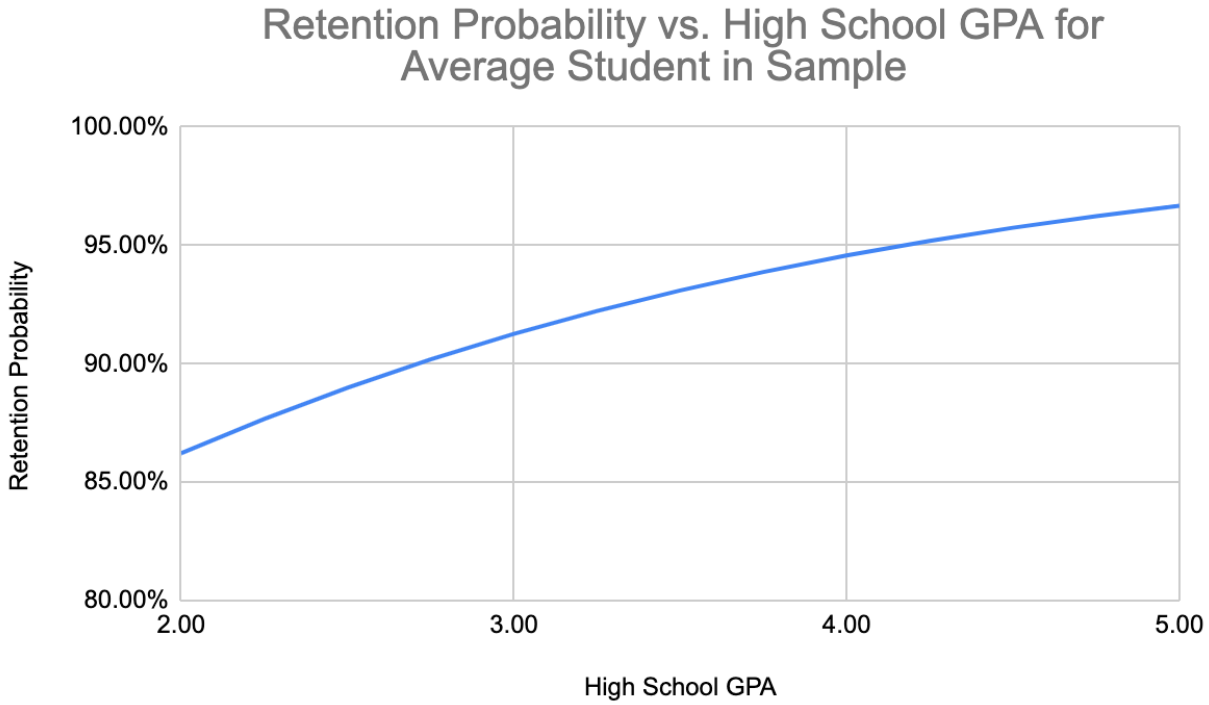
High School GPA	Retention Probability	Increase
2.00	86.22%	
2.25	87.67%	1.45%
2.50	88.99%	1.32%
2.75	90.19%	1.19%
3.00	91.26%	1.08%
3.25	92.23%	0.97%
3.50	93.10%	0.87%
3.75	93.88%	0.78%
4.00	94.57%	0.70%
4.25	95.19%	0.62%
4.50	95.75%	0.55%
4.75	96.24%	0.49%
5.00	96.68%	0.44%

Graphed, the relationship appears as below:

[1] The formula used to calculate probability (p) is $p = \exp(log\text{-}odds)/(1 + \exp(log\text{-}odds))$ where the *log-odds* is the output of the retention likelihood formula.

Table 30:

Retention Probability vs. High School GPA Graph



The greatest change in retention probability occurred between a 2.0 and 3.0 high school GPA (6.01%). After that, the rate of change diminishes. The 90% threshold of retention probability is reached at a 2.75 GPA.

Significant Retention Factors: Institutional Support

The proxy variable for Institutional Support—Number of Completed Advising Appointments—also showed statistical significance. Number of Completed Advising Appointments was positively correlated with retention likelihood with an odds-ratio (1.305) greater than 1, indicating that for each completed advising appointment, the odds of being retained increased by 31%.

Another way to measure the impact of change in number of completed advising appointments is by calculating probability, which is the likelihood of a specific student of being

retained. For the average student in the sample, the change in retention probability at different numbers of completed academic advising appointments is modeled below:

Table 31:

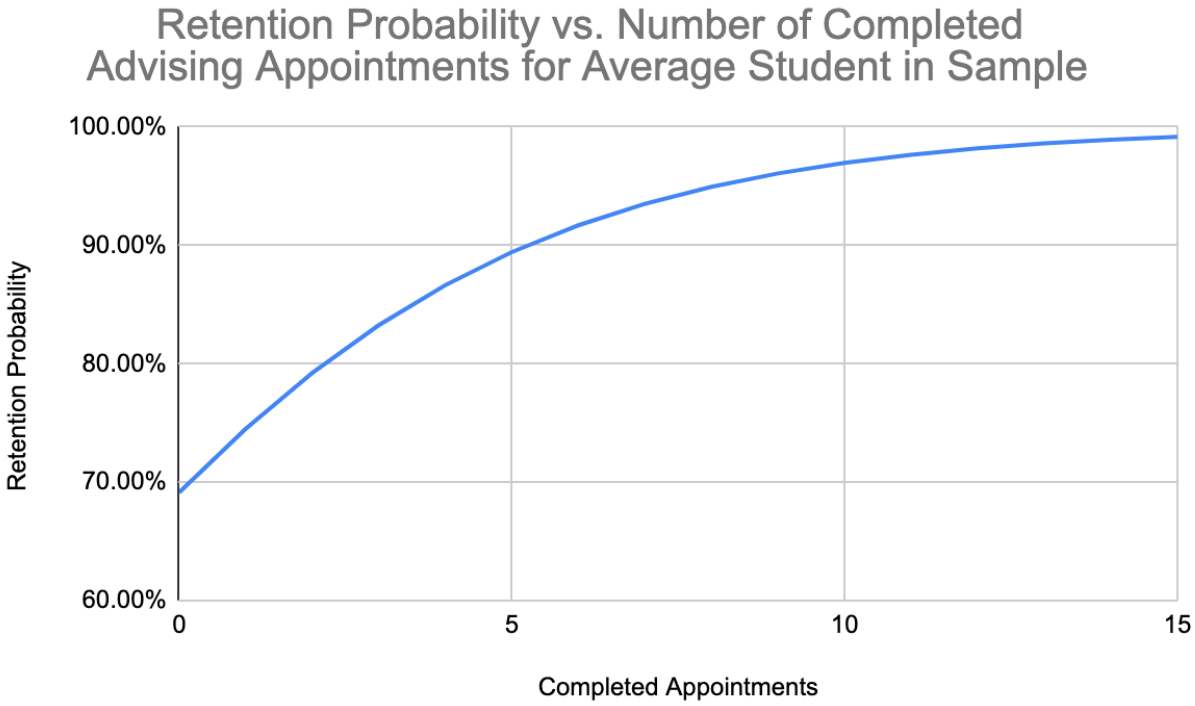
Retention Probability vs. Number of Completed Advising Appointments Chart

Number of Completed Advising Appointments	Retention Probability	Increase
0	69.14%	
1	74.51%	5.37%
2	79.23%	4.72%
3	83.27%	4.04%
4	86.65%	3.39%
5	89.44%	2.79%
6	91.70%	2.26%
7	93.51%	1.81%
8	94.95%	1.44%
9	96.09%	1.13%
10	96.97%	0.89%
11	97.66%	0.69%
12	98.20%	0.54%
13	98.61%	0.41%
14	98.93%	0.32%
15	99.18%	0.25%

Displayed as a graph:

Table 32:

Retention Likelihood vs. Number of Completed Advising Appointments Graph



The greatest change in retention probability occurred between 0 to 3 appointments (14.13%), with diminishing returns after 9 completed appointments. The probability of 90% retention (VCU's 2025 goal) was reached after 6 appointments.

Significant Retention Factors: Financial Factors

Similarly, the proxy variable for Financial Factors—In-State Status—showed statistical significance. In-State Status was positively correlated with retention likelihood with an odds-ratio (1.499) greater than 1, indicating that in-state students were 1.5 times more likely to be retained than out-of-state students. Another way to measure the effect of In-state Status is by calculating probability, which is the retention likelihood of a specific student, instead of measuring the overall association between in-state status and retention. Using the profile of the

average student of the sample and changing only in-state status, an in-state student had a 2.93% higher probability (93.5% vs 90.5%) of being retained as compared to an out-of-state student.

Notably, though, for the purpose of this study in-state status is treated as a proxy for Financial Factors – but there are other differences between the in-state vs. out-of-state experience which may contribute to retention decision and are worth further study that were outside the scope of this study. These include further distance from social networks, change in environment and structure, as well as unexpected academic rigor. Based on the information available as part of this study, though, there is no evidence of a difference in academic preparation (Pre-Enrollment Factors) prior to admission to VCU: the average high school GPA of an admitted out-of-state student vs. an in-state student shows only a .1 difference – 3.53 (out-of-state) vs. 3.63 (in-state).

Other Significant Independent Variables

Only one demographic factor, ethnicity—specifically students who self-identified as Hispanic—showed statistical significance. This factor was negatively correlated with retention likelihood. Hispanic students had an odds-ratio (.371) less than 1, indicating that Hispanic students were significantly less likely to be retained during their first-year. Specifically, the odds of a Hispanic student being retained were 62% lower. Using the profile of the average student in the sample and changing only ethnicity, a Hispanic student had a 10.7% lower probability of being retained than a non-Hispanic student (82.8% vs. 93.5%), and a 10% lower probability than a student who did not provide ethnicity data (82.8% vs. 92.8%).

Specific to completed advising appointments—an example of institutional support with a statistically significant positive correlation—there is a large difference in predicted retention probability between a Hispanic and a non-Hispanic student at different numbers of completed

advising appointments, controlling for independent variables other than ethnicity by using the profile of the average student in the sample.

Table 31:

Retention Probability vs. Number of Completed Advising Appointments by Ethnicity

Number of Completed Advising Appointments	Hispanic Student Retention Probability	Non-Hispanic Student Retention Probability	Difference
0	42.79%	69.14%	26.35%
1	49.39%	74.51%	25.12%
2	56.01%	79.23%	23.22%
3	62.42%	83.27%	20.84%
4	68.43%	86.65%	18.22%
5	73.88%	89.44%	15.56%
6	78.68%	91.70%	13.03%
7	82.80%	93.51%	10.71%
8	86.27%	94.95%	8.69%
9	89.12%	96.09%	6.96%
10	91.45%	96.97%	5.52%
11	93.31%	97.66%	4.35%
12	94.79%	98.20%	3.41%
13	95.96%	98.61%	2.65%
14	96.87%	98.93%	2.06%
15	97.59%	99.18%	1.59%

Compared to a non-Hispanic student, diminishing returns were seen after 11 appointments, with the 90% retention goal reached after 10 appointments, an increase of 4.

Non-Significant Retention Factors

One notable result was the lack of statistical significance found for any variables which served as a proxy for Institutional Performance. Even though Institutional Performance was

included in four of the six models used to develop the Synthesis Model, neither VCU GPA nor GPA Credit Hours (credits completed at VCU) showed a statistically significant effect on retention likelihood. Further, neither gender, or any variables associated with race were significant, which speaks to VCU's efforts in closing equity gaps between male and female students and students of different racial backgrounds.

Why Students Leave

The main purpose of this study was to better understand why students leave VCU. Based on the findings, three factors were associated with students having lower odds of being retained: Financial Factors, Institutional Support, and Pre-Enrollment Factors. In practice, this means that students are leaving VCU because of either a lack of institutional support (or not using the institutional support provided), financial insecurity or inability to pay tuition costs, or their academic background and preparation prior to enrollment.

The second purpose of this study was to examine if, for any of these reasons, academic advising is an effective intervention, and the answer is yes. Considerable research has shown that advising is an effective intervention for students whose departure is based on lack of institutional support, validating the applicability of the Advising Specific Synthesis Model to VCU, as well as the use of advising at VCU in general.

Study Results and Synthesis Model

One of the goals of this study was to test several popular retention models and the viability of the Synthesis Model constructed from them. As noted in the literature review, of the six models included in the Synthesis Model, four were based on applying theory drawn from other fields to the problem of student retention without validating this theory through

experimental study. The two models which tested their hypotheses through experimental research—Cabrera, Nora, and Castaneda (1993) and Burger and Braxton (1998)—used small samples drawn from institutions substantially different from VCU both in size and the type of student enrolled.

With three of the four tested Synthesis Model retention factors showing statistical significance, this dissertation helps validate the previous research into student retention, and shows that this research can be generalized to VCU despite differences amongst student populations. These studies should continue to be used to help develop strategies to increase retention and graduation rates, and can offer insight into student behavior. Further, these findings validate the Synthesis Model, arguing for its continued use in further studies instead of individual models which may not contain all relevant retention factors.

Study Implications and Recommendations

This section outlines the implications of the study findings, as well as makes specific recommendations policy changes at VCU based on these implications.

Ethnicity and Retention at VCU: Implications and Recommendations

Student ethnicity had by far the largest impact of any single independent variable in this study and immediate action is needed to support this population. The decreased retention likelihood of Hispanic students has significant implications for VCU, and aligns with previous research that has found that Hispanic students as a population at particularly high-risk for dropout, even amongst other minority students (Zapata, 2008). Hispanic students often face a particularly challenging college experience. Factors which specifically influence these students include challenges acclimating to college culture, the lack of a support network which

emphasizes college completion, and language challenges for those from whom English is not their first language (Zapata, 2008).

VCU should immediately work to address this retention gap by proactively connecting with Hispanic students and creating new programs that align with best practices to support Hispanic students during their first year. Example of practices that have been shown to increase Hispanic student retention and degree attainment increased need-based student aid, creating high school-to-college bridge programs to help students acclimate to the college environment, and creating whole-family programming that includes both the college student and their family to help create a supportive environment (Oseguera, et al., 2009). In particular VCU should also seek to recruit and admit more Hispanic students to help create a welcoming culture (less than 10% of the students in the study sample identified as Hispanic, significantly below other URM groups), and specifically work to recruit and hire Hispanic faculty and staff to help model success.

Further, VCU should encourage Hispanic students to participate in high-impact practices (HIP) that already exist at VCU, as there is evidence that minority students who participate in HIP are retained at a higher rate (Valentine & Price, 2021). Finally, VCU may consider modeling programming for Hispanic students after successful programs at minority-serving institutions, including cultural sensitivity training, targeted faculty training, and creating Hispanic-serving student support groups. Finally, VCU should also increase academic advising expectations for the first-year Hispanic students. While non-Hispanic students reach the 90% retention likelihood threshold at 6 completed advising appointments—less than the average number completed within the study population—Hispanic students only reach this threshold at 10 appointments. VCU should work to adjust caseloads and hire additional advisors to accommodate this increased

advising expectation, and move away from a one-size-fits-all advising recommendation that fails to account for significant differences amongst student profiles and the impact of these differences on retention likelihood.

Admissions Policy Implications and Recommendations

The results of this study also have implications for VCU's admissions policy. If VCU wishes to increase its first-year retention rate, the statistically significant positive correlation between High School GPA and retention likelihood suggests a clear strategy: raise academic admissions standards and prioritize high school GPA as an evaluative metric for admission over other criteria. One strategy for VCU to raise retention rates (and eventually graduation rates) would be to admit fewer out-of-state students, although this has financial implications for the school as these students pay higher tuition costs to attend. VCU should also ensure that they apply the same academic standards to both in-state and out-of-state applicants to help ensure that students regardless of their hometown enter at the same academic baseline.

Student Outreach, Resources and Advising Policy Implications and Recommendations

The study results suggest several policy approaches for student outreach in general and advising in particular. The significance of High School GPA has implications for identifying students at risk for dropping out early, and how to structure interventions and resource allocation. Unlike some of the variables included the study, High School GPA is fixed at point of admission, and can be used to identify at-risk students as soon as they begin at VCU. One prospective strategy to increase first-year retention rate is to target students with a high school GPA below the mean of their admitted class, and proactively connect them to institutional resources, providing these students with additional institutional support. VCU also might consider creating

bridge programs which specifically target admitted students with lower high school GPAs for additional support and community programming over the summer prior to the start of their first semester.

Similarly, VCU should prioritize support for out-of-state students, and make sure advisors are aware of which students on their caseload of out-of-state. Out-of-state students pay a significantly higher tuition rate—which is a financial benefit to the university—but are retained at a lower rate. Beyond tuition costs, out-of-state students can face significant challenges, as their distance from home makes socially integrating into university life more difficult, and they may face academic challenges due to differing levels of rigors between state high school systems (Delen, 2010). By prioritizing these students through proactive research VCU can ensure that they are offered necessary support.

Beyond showing the statistical significance of Institutional Support in general, the finding that the number of completed academic advising appointments is positively correlated with retention likelihood validates academic advising as an effective intervention to retain students. VCU should continue to expand academic advising resources and require students to meet with an academic advisor. VCU should also proactively focus on students who fail to meet with their advisor, as this action shows that student is at risk for not persisting.

The lack of statistical significance of any Institutional Performance factors, including VCU GPA, may be due to VCU's academic requirements to re-enroll each semester. VCU students are required to maintain a GPA of 2.0 or higher, but only risk academic suspension (which would prevent a student from re-enrolling) after three consecutive semesters below a 2.0—after their first semester below a 2.0 they are placed on warning, after the second semester on probation, and only finally after the third semester are suspended for one academic year. As

first year students, the students included in this study had only been enrolled at VCU for two semesters, and were allowed to re-enroll regardless of their academic performance.

This finding has two important implications. First, students are not self-selecting out of VCU during their first year, and instead are choosing to reenroll regardless of their GPA. Second, it may be worthwhile for VCU to reevaluate resources allocated to helping students raise their GPAs during their first year, including tutoring support services, or reallocate these resources to provide more support to second-year or later students. As an example, currently VCU provides supplementary instruction (peer led group study tutoring) primarily for introductory courses taught to first-year students. Instead, these resources could be reallocated, and these tutors assigned to upper-level courses where there is conceivably unmet demand. Similarly, academic advisors should deemphasize VCU performance as a metric for identifying which students are at risk for not being retained, and instead focus on other factors, such as high school GPA, and how often a student is meeting with their academic advisor.

Study Results and State Policy

Beyond providing guidance for meeting internal retention benchmarks, these strategies may also be useful to help VCU secure funding if Virginia transitions to a performance-based funding model instead of set appropriations independent of institutional performance. Recognizing students at risk of not being retained as early as point of admission helps to identify a population which could potentially be reached through proactive, targeted intervention. VCU could also use the results of this study as evidence of the need for funding increases from the state due to their enrollment choices. Virginia benefits from having a university willing to admit students with lower high school GPAs (which also speaks to VCU's original mission when founded), but supporting that choice may require a change in retention expectations or additional

funding to provide support for these students.

The lower retention rate of out-of-state students also is an area in which state policy should be changed to assist VCU. Right now, VCU is incentivized to admit out-of-state students to make up funding shortfalls from the state, even though these students are less likely to be retained (and thereby lower VCU's retention rate), and do not meet VCU's mission to educate Virginia residents (Groen & White, 2004). If Virginia switched to a flexible tuition funding model which took in account the number of enrolled in-state students—and increased funding to VCU, whose first-year class 91% in-state even before these changes—VCU could admit even more in-state students.

Finally, Virginia needs to support VCU's efforts to improve the retention rates of Hispanic students. The specific programs described earlier—programs that have proven to be successful in increasing Hispanic student retention elsewhere—require financial resources. The creation and implementation of these programs would be made much easier if, instead of having to pull funding from elsewhere, Virginia increased VCU's overall appropriation, or even established state-wide support programs. Creating a state-wide culture of recruiting and supporting Hispanic students would be transformative.

Study Recommendations Summary

Table 32:

Study Recommendations Summary

Finding	Recommendations
Number of completed advising appointments statistically significant and positively correlated with retention likelihood	Prioritize students who are not meeting with their academic advisor for further outreach as these students have higher odds of not being retained Academic advising validated as a significant intervention; continue to provide resources to

	support academic advising
High school GPA statistically significant and positively correlated with retention likelihood	Emphasize high school GPA as an evaluative metric for admissions Create bridge programs targeted at admitted students with high school GPAs below mean prior to start of first semester Use high school GPA as an early identifier of students who may be at higher risk for dropping out and specifically target these students with institutional support, including academic advising Make all academic advisors aware of the high school GPA of students on their caseload so they can appropriately gauge student risk level
In-state status statistically significant and out-of-state students less likely to be retained	Prioritize in-state admissions if financially feasible Target out-of-state students with institutional support, including academic advising Make academic advisors aware of students in-state/out-of-state status Advocate to SCHEV and the Commonwealth of Virginia for additional resources to support out-of-state students or to change funding models to make admitting out-of-state students less necessary
Student ethnicity statistically significant and Hispanic students less likely to be retained	Most important finding: largest impact on retention likelihood. Create new programs to support Hispanic students that align with best practices to address retention gap between Hispanic and non-Hispanic students Specific programs include: encouraging Hispanic students to participate in high-impact practices, hire Hispanic

	faculty and staff, create targeted financial aid for Hispanic students, and creating bridge programs between high school graduation and first semester Increase required advising appointments from 2 to 10, hire more advisors to accommodate this increase in expectation
Variables associated with VCU academic performance not statistically significant	Consider deemphasizing student academic support services during the first year, reallocating these resources elsewhere Use criteria other than VCU GPA when gauging student risk level and providing supplemental and targeted resources

Study Limitations and Future Research Opportunities

While this study showed a statistically significant relationship between several retention factors in the Synthesis Model and retention likelihood, there are several limitations that have implications for the generalizability of the findings, as well as many opportunities for further research. This study only examined full-time, first-time first-year students, and no other student population at VCU. The results reflect VCU's population, and should not be generalized to schools with significantly different populations or demographics. Further research is necessary to determine what retention factors may be significant with other student populations, and how that should shape university policy and resource allocation.

Further, this study did not attempt to measure quality or content of academic advising appointments, simply frequency. All completed advising appointments, which serve as a measure of Institutional Support, are treated as equal in effect. It would be worthwhile to specifically investigate both what happens during specific appointments—and the effect of any observed differences—as well as the quality of academic advising appointments. As part of this research, it would also be worthwhile to investigate how frequently advisors are referring students to other

campus services, both academic and non-academic, and if there is a relationship between number of referrals and retention likelihood.

Similarly, this study did not go in-depth to investigate the differing experiences of in-state vs. out-of-state students and how this may impact their retention likelihood. For the purposes of this study (and largely based on what information VCU currently collects), in-state status was treated as a proxy for financial cost, but there are other differences between the experiences of out-of-state and in-state students, irrespective of cost. A worthwhile future study would be to follow a cohort of out-of-state students throughout their first-year and compare their experiences to a similar cohort of in-state students.

This study also did not attempt to measure other factors that may influence retention beyond what occurs at the university and can be reflected through available data. Further research is necessary to investigate other, non-VCU related factors and events which may influence the decision to leave. Additionally, although race was not a statistically significant variable in this study, more research in this space is necessary.

At the time of this study, limitations in VCU's data collection prevented two factors identified in the Synthesis Model from being tested at all. In particular VCU's lack of data measuring student involvement with clubs and organizations—an important measure of Institutional Engagement—merits further investigation. Finally, this study did not measure Student Intention, which is a factor in the Synthesis Model and may have an impact on retention likelihood and the decision to stay enrolled. A future study focusing on the relationship between Student Intention, how intention changes throughout the course of a student's first year, and retention outcome at VCU for first year students would be worthwhile.

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