

ACADEMIC ADVISING INFLUENCE ON UNDERGRADUATE STUDENT ODDS  
OF RETENTION AND GRADUATION: A MULTILEVEL ANALYSIS

A Dissertation Presented to the  
Faculty of the College of Education  
University of Houston

In Partial Fulfillment  
of the Requirements for the Degree

Doctorate in Higher Education Leadership and Policy

By

Kathryn Wheatley

May 2018

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May 2018

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## Abstract

**Background:** Academic advising can be an effective intervention for students needing guidance through their academic programs. At this point, we are unsure how academic advising affects the success of students who bring different pre-enrollment academic experiences. **Purpose:** The purpose of this study is to better understand the factors associated with success of transfer and dual-credit students in order to help inform efforts to improve university-wide advising practices. Therefore, these analyses attempted to identify individual- and college-level factors influencing the likelihood that FTIC, transfer, and dual-credit students will persist from their first to second year and the likelihood that they will graduate. **Methods:** The outcomes of interest in this study are dichotomous indicators of student success (retention and graduation). Therefore, a Hierarchical Generalized Linear Model was used to estimate the probability ( $\phi$ ) that a student from the 2012 cohort graduated conditioned on a set of fixed effects at the individual ( $\beta$ ) and college ( $\gamma$ ) levels. Logistic regression was used to determine whether student retention from the first to second year was influenced by student demographics, college designation, academic advising attendance, and other background characteristics. Finally, multiple regression was used to determine whether cohort 2015 students' cumulative first year GPA was influenced by student characteristics and behaviors. **Results:** HLM results indicated that college-level factors percentage of transfer students and percentage of students at high academic risk, as well as multiple student-level variables including academic advising contact were strong predictors of student graduation. Logistic regression revealed that increased academic advising contact, transfer designation and full-time enrollment status, among other variables, were likely to

predict persistence to second year. Finally, multiple regression results indicated that academic advising contact and other variables were associated with first-year GPA.

**Conclusion:** This study demonstrates the importance of academic advising contact within colleges and the researcher suggests changes to advising practice and ideas for future research.

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## **Chapter I: Introduction**

### **Background**

Images of the typical American college student have evolved over the course of the last fifty years. The history of higher education is filled with examples of homogenous student bodies and admissions policies which limited access to students from diverse racial and socioeconomic backgrounds. With the passage of the Higher Education Act of 1965, access to higher education became more realistic for more families, and the number of low-income students attending college increased dramatically (Geiger, 2011; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012). Student populations across different college campuses and online universities are more representative of the demographics of this country than was the case in the previous century.

Along with greater access to four-year colleges and universities, more varied pathways to earning a college degree have emerged in the marketplace. Community colleges offer higher education at a more affordable price point (American Association of Community Colleges, 2017). Students take advantage of the lower costs by starting at community colleges and transferring credits to four-year institutions if they intend to earn a four-year degree (National Student Clearinghouse, 2015). If students are able to transfer a large number of credits to a four-year institution, their probability of graduating increases (Kopko & Crosta, 2016; Monaghan & Attewell, 2015). Community colleges are also partners with high schools in dual-enrollment programs. Whereas students of previous generations could earn credits from a two-year or four-year institution after high school graduation, students can now start working towards college credentials while still

enrolled in high school. According to a report from the National Center for Education Statistics (NCES), these non-traditional pathways to higher education are growing more popular across the nation (2013). Texas students rely on Advanced Placement courses and tests to opt out of lower level college courses (AIR, 2011). The state has made an investment in dual enrollment programs, which have grown significantly over the last decade (Giani, Alexander, & Reyes, 2014; Miller, Kosiewicz, Wang, Marwah, Delhommer, & Daugherty, 2017). These options are attractive to students as time and cost saving mechanisms in regards to their higher education careers. If students are able to begin college with several credits, their time to earn a degree is potentially decreased as are tuition fees.

As options such as these make higher education more affordable, more students are striving to earn a college degree, with 40 percent of young adults enrolling at institutions of higher education (NCES, 2017). While access to higher education for lower-income families remains a vital issue in educational policy (The Institute for College Access & Success, 2016), the issue of student persistence has also gained national attention (Ishitani, 2016; McKinney & Burrige, 2015; NCES, 2017). An increasingly diverse population is enrolling in college, but graduation levels remain higher for students from higher socioeconomic backgrounds (Bjorklund-Young, 2016; NCES, 2015). Higher education as a system continues to be most beneficial to those populations which it has always served. As greater numbers of diverse students enroll, are colleges changing their delivery of services, or their structures, to meet the needs of a continuously changing student demographic? If we can understand how certain college

resources are related to student retention, colleges and universities may be able to better serve diverse student populations and increase graduation rates.

### **Importance of Retention in Higher Education**

Postsecondary institutions place a high value on retaining students from year to year. Yet, the United States has fallen in the world rankings for percentage of citizens who hold postsecondary degrees. Students who persist to graduation are more likely to gain benefits including higher earning potential and the potential for upward social mobility, as well as the health benefits included in having a more educated society (Baum, Ma, & Payea, 2013). The United States economy is dependent on specialist positions which require training and education. According to the Bureau of Labor Statistics (BLS), 70% of the projected fastest growing jobs for 2016-2026 require a degree or non-degree certificate (2017). Of these jobs, those that require at least a four-year degree project an average median income \$33,000 higher than the highest median income of a job that does not require a four-year degree (BLS, 2017). The National Center for Education Statistics (NCES) also reported in 2016 that for 20- to- 24- year-olds, the employment rate was 88% for those with a bachelor degree or higher when compared with 77% for people with some college and 48% who did not complete high school (NCES, 2017). The job market values higher education, but this American ideal requires time and money to achieve.

Educational researchers have identified that underrepresented and low-income student populations are disproportionately represented in the categories of underprepared students and they are struggling to persist to graduation. A report from the NCES, for example, contains data drawn from the 2004/09 Beginning Postsecondary Students

Longitudinal Study and the 2009 Postsecondary Education Transcript Study and indicates that 78% of Black students and 75% of Hispanic students starting at 2-year colleges, and 76% of students from the lowest income groups took remedial courses as a result of being underprepared for college (2016). At four-year institutions, results are similar with 66% of Black students, 53% of Hispanic students, and 52% of students from the lowest income group taking remedial coursework. Students who complete all remedial coursework at a four-year institution have higher graduation rates compared with non-completers, with 55% graduating after six years (NCES, 2016). The NCES report indicates that some institutions have support services that assist these students with their academic transition into college (2016). If institutions do not have services designed to support these students, academic advisors must help these students navigate their way.

Retention in higher education is necessary to attain a degree that could provide opportunities to break the cycle of poverty. These underrepresented students would benefit from additional support from the postsecondary institutions which they are able to attend. Colleges and universities must take action to help these populations persist and graduate at higher levels.

### **The Role of Academic Advising in Retention**

Pascarella and Terenzini's (2005) review of empirical literature found that, among many components, academic advising has a positive impact on student retention no matter the student demographics or institutional size. The bulk of studies reviewed noted that if a student has a strong relationship with an academic advisor, they are more likely to have academic success. Academic advising is a consistent institutional touchpoint for the majority of college students. Academic advisors are a uniquely positioned population

among university faculty and staff as students have more immediate access to them and can create an institutional connection. Tinto's (2006) research indicates that college students thrive when given clear expectations. Academic advising is designed to set clear expectations for the student to follow in pursuit of a degree. Advising appointments provide a roadmap of courses to take and credits needed to graduate.

Crookston (1994; 2009) has referred to academic advising as a strategy for retaining students. Other previous studies have found that academic advising is a mechanism through which administrators can identify students at a higher risk for attrition and intervene (Bahr, 2008; Kot, 2014; Strayhorn, 2015; White, 2015; Young-Jones, et. al, 2013). While academic advising has been found to be a helpful resource, many institutions do not utilize advising to its fullest potential as an intervention tool (Lotkowski, Robbins, & Noeth, 2004). Perhaps if more institutions utilized academic advising as an intervention tool, retention and graduation rates for underrepresented populations would rise.

### **Statement of Research Problem**

This study sought to understand how students enrolling in a four-year university with no previously earned credits (FTIC), those enrolling with transfer credits, and those enrolling with dual enrollment credits differ with respect to how successful they are as defined by retention to their second year and graduation status. More specifically, this study sought to understand how students' interaction with available academic advising offices in each college influence their predicted odds of retention and graduation. The researcher attempted to gauge whether Metropolitan University's Population Health Management approach to academic advising is serving their student population in the

manner that it intended. The student population at Metropolitan University is ethnically, culturally, and socioeconomically diverse. Students entering the university for the first time also have diverse educational backgrounds which determine their differing levels of advising necessity (Allen, Smith, & Muehleck, 2013; Easterly, 2008). There is a need to expand the literature in understanding how academic advising influences student success outcomes for FTIC students, and those bringing in academic credits via transfer and dual credit.

Metropolitan University uses a Population Health Management framework as a guiding approach to academic advising. The framework is used to identify students' risk levels for departure in an effort to give more assistance to these students and decrease attrition rates. The study would seek to understand the impact of this specific advising framework on students with various risk factors.

### **Research Questions**

The following questions were addressed in the study in an effort to determine what predictors, if any, influence the odds of student success:

RQ1a. Are the odds of students' persistence from first year to second year in college influenced by individual-level characteristics including the student's gender or ethnicity, major or college, or type of credits earned prior to enrollment?

RQ1b. Are the odds of students' graduation influenced by individual-level characteristics?

RQ2a. Are the odds of students' persistence from first year to second year influenced by college-level characteristics including number of students in college,

number of academic advisors working within the college, or other advising features within the college?

RQ2b. Are the odds of students' graduation influenced by college-level characteristics?

RQ3. Are there differences in the odds of persistence across colleges attributed to advising characteristics at the college level?

RQ4. Is there an interaction between the student- and college- level predictors of odds of persistence and graduation?

RQ5. Is first-year GPA influenced by academic advising for students in the 2015 cohort?

### **Significance of the problem**

Retention and graduation rates are utilized as measures of accountability for institutions of higher education. The U.S. Department of Education's Digest of Education Statistics (2016) notes that Asian and White students are twice as likely as their Hispanic and Black counterparts to earn a bachelor's degree or above. These statistics highlight the struggle many institutions face in increasing persistence and graduation rates. As educators and researchers, we must determine best practices for assisting students who are at risk for departure in an effort to turn more college students into graduates.

More low-income students are in the college pipeline and are at higher risk for dropout behavior. A report from the Southern Education Foundation indicated that low-income students are a majority of the youth in the college pipeline (Nellum & Hartle, 2016). In order to increase college graduation rates in this country, research needs to

devote more resources to looking at how to help higher risk students persist to graduation as they are coming through the pipeline in higher numbers.

### **Key Terms**

Pre-enrollment credit-earning opportunities are growing in popularity, but questions remain about their impact on the success of the students once they are enrolled at a four-year college or university. As we pursue the understanding of college student success as measured by degrees earned, it is important to clarify nuances within the student population entering a four-year institution for the first time. For the purposes of this study, the student populations for comparison are first time in college (FTIC), transfer students, and dual-credit earners.

In this study, *FTIC students* are defined as those that transition directly from high school graduation to a four-year college or university without earning any college credits. Many researchers have been focused on understanding a majority of the college student population, thus studies focusing on FTIC students have been more prevalent in creating models and theories attempting to understand college student success and retention.

*Transfer students* are generally divided into two categories; *lateral* and *vertical* transfer. Students who initially enroll at a two-year institution, such as a community college or trade school, and transfer to a four-year institution are referred to as vertical transfer students (Hossler, Shapiro, Dundar, Ziskin, Chen, Zerquera, & Torres, 2012). Students transferring credits from one four-year college or university to another are considered lateral transfers (Dougherty, 1992; Gerhardt & Ackerman, 2014; Goldrick-Rab, 2006). For the purposes of this study, vertical transfer students served as the focus

of the transfer student population in this study, as there is a larger student population transferring credits from two-year institutions.

Finally, *dual credit* or *dual enrollment* programs are designed for high school students to earn academic credit for college (Bailey & Karp, 2003). These college credit courses are typically taught by faculty at participating community colleges and are thought to prepare high school students for the rigor of college course expectations (Marken, Gray, & Lewis, 2013).

### **Organization of the Study**

This dissertation is organized into five chapters. The first chapter gives a general overview of the background and research problem. This chapter briefly introduces the study, its research questions, and the basic methodology.

The second chapter is a review of the relevant literature on academic advising styles, transfer student research, dual enrollment research, and student success research. In this chapter, the author outlines prior research studies on the influence of academic advising on college student outcomes. The author also examines the impact of college students transferring from two-year colleges on post-transfer success, as well as the literature investigating the benefits and critiques of dual enrollment programs on the national and state level.

In chapter three of this study, the author proposes the research methodology. The researcher shares a conceptual model for the study. This chapter also explains why a multilevel approach is appropriate for the analysis.

Chapter four contains the research findings and data analyses. This chapter describes the application of the Hierarchical Linear Modeling and regression approaches.

The key findings offer insight into how students' advising interactions are influencing their odds of persistence and graduation.

The researcher further discusses the findings and provides insight into the significance of these findings for the university in the fifth chapter. This chapter makes inferences into possible outcomes as a result of the research findings. Furthermore, the strengths and limitations of this dissertation are considered as well as opportunities to build upon this study in future research.

## **Chapter II: Literature Review**

### **Overview**

Chapter two reviews the relevant literature as it pertains to persistence and involvement, transfer student research, dual credit research, and academic advising. The chapter begins with an introduction to the theoretical and conceptual models which frame this study. Tinto's (1975, 1993) models of student departure are the basis for this study as the models suggest that academic and social integration are necessary to student success. Building from Tinto's work, Bean's (1980, 1983) model of student attrition brings together organizational and educational contexts for a greater understanding of institutional impact on student outcomes. Bridging the departure and attrition theories is Astin's (1993) seminal theory of student involvement. His work emphasizes the role students' behavior plays in their collegiate experience. Finally, in this section there is an introduction to the population health management approach ascribed to by the institution used in the study.

The remainder of chapter two will dive deeply into the literature of the three areas of interest for this study. First, comprehending how students who bring credits from different academic experiences perform in college requires understanding of these different student populations. The review of transfer student literature delves into transfer student characteristics, barriers to success, pre-transfer academic preparation, departure after transfer, and measuring success. Next, the literature surrounding the intricacies of dual credit programs are explored. A brief history of dual enrollment programs is followed by a review of successes and criticisms of the programs, an overview of national policies, and specific Texas state policies. Finally, the chapter reviews the

academic advising literature, including background on academic advising, its importance in higher education, an overview of advising styles, and a review of advising research.

### **Conceptual Framework**

Tinto's (1975) student integration model is perhaps the most widely cited theory about college student persistence. Tinto's model suggests that students need to integrate into the culture of the university academically and socially in order to be successful. The original model was created from research on the traditional college student as defined by the student population at the time. Tinto updated his model in 1993 as the Interactionalist Model of Student Departure. This revision of the original 1975 departure model underscores the importance of student involvement in positive student outcomes while reinforcing the need for students to integrate into the institutional culture. Similar to Astin's (1993) work, Tinto points to student behavior as an important variable in their success.

Critics of Tinto's models have noted that context is lacking from his (1993) theory (Braxton, et. al., 1997; Milem & Berger, 1997; Pascarella & Terenzini, 1980). Braxton, Sullivan, and Johnson (1997) indicate that research needs to identify specific examples of social and academic integration. While behavior is discussed, there is space to test what behaviors and activities lead to the integration that improves academic outcomes. In alignment with that approach and for the purposes of this study, the researcher tests the efficacy of engaging in academic advising points of contact as a behavior which can lead to academic and social integration

Bean's (1980, 1983) Industrial Model of Student Attrition is derived from a departure model for employees within work organizations and adapted for students

within an educational organization. The conclusion of Bean's (1983) study testing a workplace turnover model at a major land-grant university was that there are significant parallels between employee turnover in work organizations and student departure in institutions of higher education. Satisfaction and departure in both types of organizations can be similarly predicted. One can draw the conclusion that parallels can also be drawn between work organizations and educational organizations when it comes to managing personnel and student needs. Metropolitan University aspires to model their advising strategy after a hospital industry model used for evaluating severity of patients in an effort to give more attention to students who are in need of the most support. This study draws from Bean's frame by evaluating whether a workplace model, the population health management model, could be helpful to the university in improving college student persistence.

Both grades and practical value of the education were variables that were significantly related to dropout in Bean's (1983) model. The practical value variable is described as the perceived value of the degree in terms of earning potential. Through academic advising, these topics should be part of the educational plan and the discussions between advisor and student. As these variables were both stated to have significant direct effects on dropout, academic advising, which was not part of this study, could be the intervention that might ameliorate these effects. These variables were also linked to satisfaction which was negatively associated with dropout. Bean's 1982 study on student attrition indicated that students' institutional loyalty and clear educational goals could potentially influence their persistence. Institutional loyalty is gained through interactions with faculty and staff as well as cocurricular programs (Bean, 1982). Interactions with an

academic advisor could increase loyalty as well as clarify academic goals for the student, potentially increasing the likelihood of persistence.

Alexander Astin's (1984) theory of student involvement is based on students' behavior and effort they exert during college. According to Astin's research (1984, 1993), students who spend a significant amount of time studying, spend time talking with faculty outside the classroom, and devote time to engaging in activities outside the classroom are more likely to be successful than students who are not as involved in similar activities. His work is often the basis upon which persistence research is built (Kuh et. al, 2008; Milem & Berger, 1997; Pascarella & Terenzini, 2005). In the context of this study, Astin's work is important in assessing the student behavior of scheduling and academic advising contact. This level of student engagement underlies the student characteristics examined in this study. Not all students choose to attend advising sessions. Those who do may or may not be more likely to persist and graduate. This study sought to determine if this act of integration influences the odds of student success.

Finally, a central concept for this study is the population health management approach as applied to student interventions in higher education. According to an Education Advisory Board Student Success Collaborative whitepaper, population health management is an approach used by health systems in which they use a variety of approaches and resources to keep people healthy as opposed to only treating those who are ill, in effect, limiting the number of severe cases (Venit, 2016). The approach uses in-person interventions, remote monitoring, and preventative care and administers these interventions in differing combinations to patients at varying levels of risk. Patients are sorted into three categories: low-risk, rising-risk, and high-risk.

In practice, the population health management approach can work similarly in higher education and can be especially useful for academic advising. This approach would require students' risk to be identified by the institution and stratified for appropriate interventions (Venit, 2016). Students at higher risk for attrition would receive the most attention and in-person support. Moderate risk students would be monitored to catch any potential problems. Low risk students would be left to self-direct so that staff could use their energy elsewhere. This is the approach that the study institution is implementing. Whether the current system is effectively meeting their stated goals for student success are addressed in this study.

In an attempt to test the efficacy of this approach, students are categorized into the three risk categories based on their first semester and second semester, post-enrollment GPA. The numbers in these categories were then used to determine the percentage of students at high- and moderate- risk in each college. These labels were also used to determine if students at high- and moderate-risk were more likely to have positive success outcomes as a result of attending academic advising sessions.

### **Role of the Organization**

This study relies not only on student data, but also on college data to determine the odds of student success. Metropolitan University is a largely decentralized institution in which academic colleges house their own advising departments. Each advising department has its own director and they operate independently of the other college advising departments. Within this framework, there are organizational theories which may shape the way in which we understand how the study institution approaches the allocation of resources and how these decisions can impact student success outcomes.

## **Organizational Theory Applied to Metropolitan University**

Metropolitan University is a complex, modern institution. The organizational structure influences the way in which students interact with and experience the institution, which can influence student retention at the institution. Bolman and Deal's (2013) research on understanding organizations through multiple frames reminds readers that the failures of an organization cannot be blamed on the people or the bureaucracy. Their research states that organizations can be confusing and ambiguous. Organizations can choose to change or to conserve what they have built. Universities operate in political, human resources, structural, and symbolic frames. In short, there is no simple way to understand an organization as complex as Metropolitan University. This study examined the complexities of academic advising through the structural and human resources frames. Through the structural frame, the study considered the goals, technology, and environment of academic advising at the institution. The alignment of the student and organizational needs can be pondered through the human resources frame.

An organizational theory with more pragmatic application is Pfeffer and Salancik's (2003) foundational work in organizational resource dependency. Their theory suggests that organizations are driven by resource necessity. In the context of higher education, the financial and administrative resources available impact the service to students. A deficiency in state and federal financing can constrain the number of academic advisors retained by each college, in effect diminishing the resources for students in need of advising, thus restricting the optimal impact of an advising model such as the population health management model of advising. Or, in the case of the study

institution, the volume of students enrolled at the university has needs which may not be met by the limited staff resources in each college academic advising office. For example, in the College of Natural Sciences and Mathematics, there is an average of 1,330 students for every one academic advisor. The administrative resources in that college could impact the success of students dependent upon the service offered to them by the university. See appendix 1 for a detailed look at the organizational structure of college advising for one cohort of students in the study.

### **Transfer Student Research**

The National Student Clearinghouse (NSC) reported that nearly half of students graduating from public or private four-year institutions in 2014 transferred from a two-year institution (2015). The report stated that of the students who transferred, 47% enrolled in at least five semesters at a two-year institution before transfer (NSC, 2015). These data highlight the importance of understanding how transferring with multiple credits can influence students' success post-transfer.

**Characteristics of transfer students.** Transfer students are disproportionately low-income (Bastedo & Jaquette, 2011; Hills, 1965; Ishitani & McKittrick, 2010; Laanan, 2007; Tinto, 2006), minority (Laanan, 2001, 2007; Townsend & Wilson, 2006), and first-generation students (Ishitani, 2006; Smith & Miller, 2009) who are at higher risk for dropout behavior once they transfer to a four-year institution (Tinto, 2006). Many community college students are older than FTIC students enrolling at four-year colleges and universities, often beginning postsecondary education at ages 20-24, and almost 20% starting after age 25 (NCES, 2012). Students attending two-year colleges are more likely to work full-time than their FTIC peers, and a large proportion, approximately 30%, are

from the lowest socioeconomic income bracket (NCES, NSPAS, 2012). There is a vast literature on the challenges faced by transfer students (Cejda, Rewey, and Kaylor, 1998; Laanan, 2001; Miller, 2013) identifying that this student population is in greater need of additional administrative support and intervention than most FTIC students. Students transfer from community colleges or other four-year institutions with varying levels of academic preparedness with different needs which makes it difficult for colleges and universities to adequately prepare a cohort of incoming transfer students for transition and success at their institutions (Caison, 2005).

**Academic preparation pre-transfer.** There are several studies focused specifically on the effect of academic factors on transfer student persistence (Cejda, Rewey, & Kaylor, 1998; Townsend, McNerny, & Arnold, 1993). Cejda, et. al (1998) and Townsend, et. al (2003) focus on academic factors achieved by the student prior to transferring to a liberal arts college or a moderately selective private institution. Their findings suggest that if a student earns an associate degree before transfer, he or she is more likely to persist to graduation. These results are supported by more recent studies showing that earning more credits towards an associate degree prior to transferring increase the likelihood of success for transfer students (Kopko & Crosta, 2016; Monaghan & Attewell, 2015).

Other recent studies have investigated the other measures of academic preparation prior to vertical transfer. Studies by Crisp and Delgado (2014) as well as Melguizo, Hagedorn, and Cypers (2008) found there were negative effects of developmental education on likelihood of transfer. However, Bahr's (2008) findings

indicate that students who successfully complete developmental coursework are equally as likely to transfer as students who did not need to complete developmental coursework. There are more studies which use community college GPA as a predictor of persistence post-transfer (D'Amico, Dika, Elling, Algozzine, & Ginn, 2014; Eagan & Jaeger, 2009; Hagedorn, Cypers, & Lester, 2008). While this dataset does not provide information on whether transfer students were enrolled in any developmental courses, the total number of hours transferred was included as a variable in determining post-transfer success.

**Barriers to success post-transfer.** The literature regarding transfer student success once enrolled at a four-year institution covers a range of focus areas. Literature regarding transfer shock is foundational in understanding barriers to transfer success. Transfer shock is a term that has been used to describe the transitory decline in transfer students' GPA in the first, and sometimes second, semester post-transfer (Hills, 1965; Ishitani & McKittrick, 2010; Laanan, 2001, 2006; Miller, 2013). Each of these studies determined that a temporary drop in GPA is common for transfer students, but their grades rebound back to the levels before transfer. With appropriate academic and social support, transfer students transition successfully into the new four-year institution.

Student finances (Perna, 2010), lack of institutional support (Laanan, 2001), and students' lack of academic and career goals (Gerhardt & Ackerman, 2014) can negatively affect transfer student success and persistence. Student need for balance between employment and school work is also a roadblock to success (Duggan & Pickering, 2008). Transfer students are more likely to be employed outside the university while enrolled than their FTIC counterparts (Holland, 2010). Credit loss between the two- and four-year

institutions is also a contributing factor in post-transfer attrition (Monaghan & Attewell, 2015).

The academic challenges facing transfer students have been well documented. Goldrick-Rab (2006, 2009) and Townsend, et al. (1993) have written that many students who transfer from two-year institutions to four-year institutions may struggle while adjusting to the higher academic standards at the receiving institution and frequently come across different challenges than those they faced at their sending institutions. Some of these challenges have been accounted for by differences in institutional size, geography, level of academic difficulty, and more competition with native students (Laanan, 2001, 2007).

Social factors also influence transfer persistence. Transfer students sometimes seek out their own support systems on campus by getting involved with established social organizations and academic projects. These students struggle with finding a sense of belonging (Hausmann, Ye, Schofield, & Woods, 2009). Involvement outside of the classroom is an intimidating prospect for some students, whereas others are too busy working to afford school to get involved (Holland, 2010). Transfer students are more likely to persist to graduation if they become involved in co-curricular activities (Astin, 1993). However, transfer students tend to commute to campus and maintain residence with family, making them less likely to get involved in co-curricular experiences on campus than their more traditional peers (Ishitani & McKittrick, 2010).

**Departure and success post-transfer.** Transfer student departure at the four-year level does not always follow the same patterns as departure of more traditional, FTIC students. Research emphasizes that transfer students have higher rates of attrition post-

transfer to a four-year institution and initially earn lower GPAs when compared with FTIC students (Bound, Lovenheim, & Turner, 2010; Bowen, Chingos, & McPherson, 2009; Gerhardt & Ackerman, 2014). Variables including transfer grade point average (Cejda, Rewey, & Kaylor, 1998), standardized test scores (Cejda, Rewey, & Kaylor, 1998; Gerhardt & Ackerman, 2014), and whether developmental courses were taken by the students (Crisp & Delgado, 2014) have been used by researchers when identifying transfer student risk for attrition. Demographic predictors of transfer student academic success have included gender, age, and ethnicity (Bean & Metzner, 1985; Cejda, Rewey, & Kaylor, 1998; Tinto, 1975), and socioeconomic status (Gerhardt & Ackerman, 2014; Townsend, McNerny, & Arnold, 1993).

There are also studies that suggest what factors make students succeed and persist to graduation post-transfer. Many of these studies focus on academic ability (Bowen, Chingos, & McPherson, 2009; Townsend & Wilson, 2006) and background characteristics (Bowen, Chingos, & McPherson, 2009). Many researchers have attempted to assess transfer student transition by measuring academic performance at the four-year institution (Cejda, 1997; Cejda, Kaylor, & Rewey, 1998). Other studies measure outcomes including persistence, time to graduation, and overall graduation numbers while comparing native and transfer students in order to better understand transfer student success (Laanan, 2001). There are still other researchers including Astin (1993), Cabrera and Casteneda (1993), and Tinto (2006) who have found that student involvement, intent to stay, institutional loyalty, and goal commitment are factors related to student success and persistence for transfer students.

A common theme among several studies which explore success for students after transfer is integration into the new institution (Milem & Berger, 1997; Tinto, 2006; Townsend & Wilson, 2006). There is a social integration component for transfer student success that is related to the engagement (Kuh, et al., 2008) and involvement (Astin, 1993) theories based on studies of more traditional student populations. Interacting with faculty and staff and having meaningful experiences are integral to persistence of students no matter what their academic background.

This study used variables previous studies used in understanding both the success and departure of students post-transfer in combination with institutional level characteristics with the additional element of student engagement through academic advising. The literature on transfer student challenges is vast, but there is little known about how academic advising impacts the success outcomes for this population. Based on the findings from the aforementioned success studies, academic advising could be a significant point of integration for transfer students. Within the framework of academic advising, students are offered a chance to have a significant interaction with a staff member who could also introduce the student to other important engagement opportunities. Goal commitment is also addressed in this context.

**Intersection of student and institutional variables affecting persistence.** There is limited literature on the use of institutional characteristics as variables utilized in retention research. However, in a 2012 study, Chen utilized longitudinal and hierarchical data in a multilevel event history model combining student and institutional attributes associated with student attrition. Chen worked with a nationally representative data set including data from the Beginning Postsecondary Students (BPS 96/01) and IPEDS

(1995-2000) to determine how both student and institutional factors associate with student attrition. As many previous persistence studies were conducted from a student-centered research approach focused on student behavior and characteristics, Chen chose to integrate institutional characteristics to understand their contributions to student attrition. He discovered that students with higher levels of social and academic integration in their first year of college tended to have a lower risk of attrition, and the largest student level predictor was college GPA. Students from lower-income families were at a higher risk for dropout than students from other levels of socioeconomic status. From an institutional characteristics perspective, the author also explained that colleges and universities with larger student services expenditures had lower odds of student dropout after controlling for student level variables. Studies on institutional effect have narrowed the scope of institutional characteristics such as financial factors and structure, excluding factors such as student engagement with university resources including faculty, staff, academic assistance, and advising (Chen, 2012). Following Chen's (2012) study, this study utilized college enrollment numbers, advising staff to student ratio, number of recorded yearly advising sessions per college, and at-risk student demographics per college.

Nutting (2011) found that transfers in academic departments with a large amount of transfer students had significantly lower graduation rates. His work, in addition to studies by Ehrenberg and Smith (2004) and Duggan and Pickering (2008), echoes Chen's (2012) criticism of the lack of research that is being conducted about institutional level characteristics and their impact on persistence of transfer students. Nutting (2011) found that a larger concentration of transfer students within academic departments lowered the

quality of the department and the performance and persistence of the transfer students in the department, potentially indicating that some departments do not have the support infrastructure needed to meet the needs of the transfer student population. This study is supported by the work of Duggan and Pickering (2008), who found that transfer students often transfer with several barriers to persistence and academic achievement, frequently finding themselves in challenging academic courses for which they do not possess the skills to successfully perform. Again here, these studies are indicative of the lack of resources many colleges devote to supporting students who enroll with previously earned academic credits whose academic experiences differ from the FTIC students the systems are designed to support.

Within the context of this study, the work of Chen (2012) and Nutting (2011), gives relevance to exploring the role the institution plays in student success. While the catalog of research on student persistence and attrition is immense, the majority focus on student characteristics to guide an understanding of student success. This study aims to close the gap by considering both student-level and institutional-level characteristics which predict the odds of student retention and graduation.

## **Dual Credit Programs**

### **Introduction to Dual Credit**

A growing area of research is dedicated to understanding students entering credits earned in dual credit programs. Through dual credit programs, students can earn college credits while attending high school. Dual credit programs are endorsed by policy makers and educators as it is a mechanism that research suggests helps students become academically better prepared for college (An, 2015). Dual credit programs have seen

rapid growth since the 1990s and research assessing the direct effects of these programs on student success is growing more rigorous (Allen, 2010; Allen & Dadgar, 2012; Bailey & Karp, 2003; Hoffman, 2007; Lerner & Brand, 2006; Swanson, 2008). Extant literature findings suggest that dual credit participants have increased postsecondary enrollment numbers, higher first semester grade point averages, higher retention rates, and tend to enroll in more college credit hours than non-participants (Allen & Dadgar, 2012; An, 2015; Swanson, 2008). While there are positive early college outcomes associated with dual enrollment participants, there are no studies which seek to understand the academic advising needs of these students or how these students seek to engage with advisors once enrolled at a four-year institution.

**Success of dual credit programs.** Advocates for dual credit programs suggest that high school students benefit from participating as they are better prepared for postsecondary curriculum (An, 2015). Several studies have found that students who have participated in dual credit programs prior to enrolling in college are less likely to need developmental courses at the collegiate level (An, 2013; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Kim & Bragg, 2008). Critics of the programs note that there is a lack of clarity surrounding dual enrollment programs. There are issues pertaining to how programs define college-level work, what type of students these programs serve, varying goals of programs, and who is responsible for delivering the program services (Hoffman & Voloch, 2012).

Research on the success of dual credit programs has increased in rigor in the last decade (Allen, 2010; An, 2015; Karp et al., 2007; Speroni, 2010; Swanson, 2008). These studies used larger sample sizes and more rigorous methodologies than earlier studies on

the impact of dual credit on student success. However, in an effort to comprehend the impact of policies and individual programs on students, many researchers are still using small sample sizes and case studies (Bailey & Karp, 2003; Karp, 2012; Hoffman & Voloch, 2012; Lerner & Brand, 2006; Pretlow & Patteson, 2015).

Allen and Dadgar's (2012) case study on dual enrollment at the City University of New York identified the following outcomes as measures of success for dual credit students after they matriculated at the four-year institution: the number of credits earned during students' first semester of college (not including credits earned through the dual enrollment program), the first semester grade point average, and retention to the third semester. The authors used regression analysis and difference in differences to control for preexisting student characteristics and academic achievement indicators to understand the effect of a dual enrollment program on participants. The results from this quasi-experiment indicate that participants had increased first semester credit attainment and higher first semester GPA when compared with non-participants.

An (2015) found that for students who participated in dual credit programs, there is a direct, positive effect on first year college GPA when controlling for pre-college variables. Participants also exhibited higher levels of engagement and motivation than non-participants once enrolled at a four-year institution. She discovered that while academic motivation and engagement about for some the dual enrollment participation effect, dual enrollment has a directly positive effect on college performance.

**Criticisms of dual credit programs.** Taylor (2015) conducted a state-wide study using propensity score matching to determine the differential effects for low-income and minority students that dual credit policy has on college access and completion. He

determined that while all students benefited from participating in dual credit programs, the effect sizes were smaller for both low-income and minority students. Taylor suggests that the state dual credit policies are inequitable and the benefits of the programs will not significantly reduce the gap in educational outcomes.

Critics of dual credit programs note that there are some positive academic outcomes for student participants who are lower achieving, but the majority of programs are intended for higher achieving students who have the academic skills to succeed in college (Hughes, Karp, Fermin, & Bailey, 2005; Karp, 2012; Kleiner & Lewis, 2005). While advocates argue that dual credit participants exhibit positive outcomes associated with their program involvement, these critics point out that the students who are eligible to participate are those that already have a higher probability of success in postsecondary education. Recent studies, however, show that academic preparation is one among many factors which contributes to student persistence (Conley, 2007; Conley, 2010; NCES, 2013). An additional concern is that dual credit students may endure credit loss when they enroll at a four-year institution college, similar to transfer credit loss, as institutional policy may prevent schools from accepting credits earned through dual credit courses (Miller, Kosiewicz, Wang, Marwah, Delhommer, & Daugherty, 2017).

In an effort to comprehend the additional benefits of dual credit participation to higher achieving students, Karp (2012) conducted a qualitative study in which she examined 26 students' perceptions of the role of a college student prior to, during, and after participating in a dual credit program in New York. She discovered that students who engaged in a course that more closely reflected the structure of a college-level course made gains in their understanding of the differences between high school and

college expectations, responsibility, and course work. She noted that students enrolled in courses which had lower academic expectations saw less differentiation between college and high school. The study illustrates the inconsistencies that exist within a single dual credit program. The students who had a more authentic college experience felt more prepared for college than the students whose experiences more closely resembled their high school experience.

Karp's (2012) study highlights the arguments both in favor of and critical of dual enrollment programs. The mission and purpose of the programs varies from state to state and from program to program, as does the quality of courses being offered and how participation eligibility is decided. There is not one agreed upon mission for these programs. Some programs seek to provide opportunities for high achieving students to take challenging courses not offered at their high school, while other programs seek to reach out to underserved students in an effort to help them to become college ready. The rigor of curriculum is generally decided upon by the instructor and rigor itself is ill defined. Many educators and policymakers believe that dual credit programs have the capability to advance college access and student success outcomes (Adelman, 1999; Conley, 2010; Hoffman & Voloch, 2012). If, however, there is not a critical understanding of how dual credit programs should be offered, these programs may not service these goals.

**State trends in dual credit policies.** Policies regarding the implementation of dual credit programs vary from state to state. Depending on the state, dual credit programs may be subsidized by the state, or the burden of payment may fall on the families of those students who choose to participate (Hoffman, Vargas, & Santos, 2008).

Pre-requisites for dual enrollment programs also vary by state. Some require that students must have reached a certain grade level, while other states have a minimum GPA requirement for eligibility (Karp, et al., 2005; Western Interstate Commission for Higher Education, 2006). While eligibility requirements are common across state policies regarding dual credit programs, quality control and accountability are not emphasized in the majority of state policies (WICHE, 2006). A 2010 report from the NAECP acknowledged that some states were making efforts to implement standards for quality in policy and practice.

These early studies cite a lack of oversight in dual credit programs which illuminates gaps in knowledge supporting claims of the success of dual credit programs in college student persistence. Taylor, Borden, and Park (2015) sought to bridge this knowledge gap with their study using an input, process, output model in an effort to understand how state policies address the quality standards of these programs. Using document analysis, questionnaires, and structured interviews, the research team found that 34 states had some policy regulating the types of courses that can be offered in dual credit programs. These policies still varied, with some states requiring that no courses offered could be remedial or that offered courses needed to be part of a transfer system or articulation agreements. State policies differed on their enforcement of dual credit policy. Some states required high schools and colleges to participate in the programs while other state policies encouraged participation. In the majority of states, dual credit participation is voluntary. This study also found that 80% of state policies had regulations on instructors. The majority of state policies indicated that instructors must meet the same qualifications as faculty at the institution granting credit to the students. Of the states

regulating teaching qualifications, one-third of the states had policies relating to ongoing professional development or training for dual credit faculty.

Pretlow and Patteson (2015) similarly highlight the differences in how dual credit programs operate in different policy environments. Their study investigates the implementation of policy through the lens of a dual enrollment coordinator who has worked in two states that have different policy foci. The writers present the policy implications on universities, secondary education, and the students involved in the programs, sharing the benefits and challenges of each approach. The dual enrollment policies of Ohio and Virginia were examined in this case study. Ohio engages a market approach to dual enrollment and encourages competition for student participants among the institutions. The schools are free to set their own tuition prices and they allow the students to research all available options via a centralized website which includes all information on courses and prices. Virginia has a more centralized approach incorporating high schools and community colleges into state funding formulas for the number of student participants creating a more equitable structure. When it comes to transfer credit, Ohio is more centralized, allowing certain courses to be accepted at all public colleges and universities. Virginia allows all courses to be accepted at community colleges but leaves the decision to the four-year institutions whether to accept the courses or not. The system in Ohio has potential to leave first generation and low-income students at a disadvantage if they do not know where or how to find the information about the programs that most closely match their needs. The system in Virginia limits the choices for student participants and lacks clarity for discerning where the credits will be accepted. There are benefits and drawbacks to both states' policies. Students, parents, and

administrators must know the policies in their states to derive the greatest benefit from the programs.

The studies on dual credit policy reflect a wide variation in requirements for course offerings, student eligibility, quality control, transferability of credit, and faculty requirements. While there are studies suggesting that dual credit students enter the university with advantages related to their participation in the various programs across the country, it is necessary to further evaluate and understand the students who engage in these programs. As participation in dual credit programs increases, there is an imperative to investigate how participation in these programs influences student outcomes and needs at the collegiate level.

### **Dual Credit Programs in Texas**

Dual credit participation has increased in response to Texas legislative action which seeks to increase the college graduation rates in the state by supporting college transition programs. The Texas Higher Education Coordinating Board (THECB) reported that 10 percent of all students enrolling in postsecondary education in the fall of 2015 had previously participated in dual credit programs (2016). Higher education institutional participation has also increased in the last 15 years, with 96 out of 105 institutions in the state offering at least one dual credit course (Miller et al., 2017).

### **Dual Credit Legislation in Texas**

In 2005, Texas House Bill 1 introduced legislation requiring all school districts to support opportunities for students to earn at least 12 college credits through Advanced Placement, International Baccalaureate, or dual credit courses in addition to developing guidelines for determining eligibility of dual credit courses. Texas recently broadened

accessibility to dual credit programs with HB 505, by prohibiting programs from excluding students who are not in eleventh- and twelfth-grade. Texas lawmakers also expanded the reach of higher education institutions participating in dual credit programs by allowing them to partner with any school district instead of limiting the institutions to partnering with local districts. Supporters of the recent legislative changes argue that broader accessibility of these programs will allow students to earn postsecondary degrees in less time in a more cost-effective manner (Texas Community College Teachers Association, 2015).

While Texas law does not require uniformity across partnerships between higher education institutions and school districts, the state does require that the partnership agreements outline how dual credit instruction and support services are going to be delivered (Miller et al., 2017). A THECB report notes that the greatest variation in the implementation of dual credit programs across the state is found in where instruction of programs takes place, how students and institutions finance programs, and how instructors are chosen to deliver the programs (2011). The majority of dual credit coursework is offered through community colleges. The interim report states that the increase in institutional participation is likely connected to legislative incentives offered to school districts and higher educational institutions to support dual credit programs (2017). Early college high schools offering dual credit courses face greater scrutiny for quality of courses than school districts partnering with institutions of higher education as they enroll students at highest risk of attrition (Miller et al., 2017).

**Eligibility of courses and students in Texas.** Although the state does not limit the number of courses students can take in dual credit programs, there are restrictions on

the types of courses that can be offered through dual credit programs for which higher education institutions can receive funding. Public two-year institutions can only receive dual credit state funding for teaching curriculum approved in the *Lower Division Academic Course Guide Manual* and for technical and skill building college courses approved by the *Workforce Education Course Manual* (Miller et al., 2017). The only restrictions placed on public four-year institutions are that the dual credit courses must be offered from the institutions' undergraduate catalog and that they do not qualify as developmental courses.

Texas law allows eligible students to enroll in dual credit courses. Eligibility to enroll in dual credit course is based on Texas's standards for college readiness. Students may demonstrate college readiness through scores on various standardized tests in reading, math, and writing, (e.g. ACT, SAT, or State of Texas Assessments of Academic Readiness) or through satisfactory scores on qualifying exams in advanced subjects. Younger students may enroll in some dual credit courses by demonstrating academic proficiency through lower level standardized tests and end-of-course exams. They can take dual credit courses without demonstrating college readiness only if the courses do not have eligibility requirements (Miller et al., 2017). Institutions of higher education may place additional academic requirements on courses such as a minimum GPA or limiting the course to students at a certain grade level.

**Who can teach dual credit in Texas.** Texas requires that all academic dual credit instructors hold a master's degree and have taken at least 18 hours of graduate courses in their subject area (Miller et al., 2017). The Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) does not mandate that the instructor of the dual

credit course must be a faculty member at an institution of higher education, so the instructors are often high school teachers who meet the criteria. Higher education partners are able to set their own policies regarding who can teach dual credit courses. The higher education partners are required by SACSCOC to evaluate the instructors of dual credit courses. The institutions also have the authority to decide how the course is delivered to the students (face-to-face, online, hybrid).

**Effectiveness of dual credit programs in Texas.** Although there has been an expansion of dual credit programs in the state, the research devoted to understanding the impact of these programs in Texas is limited. The THECB recently released an interim report detailing the challenges and successes of dual credit programs in the state of Texas. The number of programs has dramatically increased in the state recently, resulting in questions about quality control among the various programs. The interim report, based on an initial study of dual credit education programs in the state, assessed the accessibility, quality, efficiency, and diversity of the current programs (Miller, et al., 2017).

Other studies have been mostly descriptive in nature and have focused on the demographic and socioeconomic breakdown of students participating in dual credit programs (Appleby, Ashton, Ferrell, Gesing, Jackson, Lindner, Mata, Shelnett, & Wu, 2011; THECB, 2011). These studies have illuminated that low-income and students of color are inequitably underrepresented within dual credit programs, having limited access to the programs (Appleby et al., 2011). Some studies also showed that dual credit programs were more available to rural students than to students in an urban environment (Appleby et al., 2011; Eklund, 2009). The limited nature of the current research on dual

credit programs in Texas demands more methodologically rigorous studies be conducted to understand how students are benefitting from these programs and if they are effective in helping Texas to reach its goal of increasing college graduation rates.

## **Academic Advising**

### **Background**

American higher education was modeled after the English universities and the curriculum originally emulated the European liberal arts programs. Students attending early American colleges followed a prescribed course of study which was decided upon by the faculty. Harvard president Charles W. Eliot was the first to champion the idea of an elective system wherein students had more flexibility to choose which classes and courses of study aligned with their interests and abilities (Lucas, 2006). As higher education expanded and more options were presented to students, selecting classes to fulfill degree requirements became more complicated and students required guidance. In his retrospective of developmental academic advising, Grites (2013) notes that academic advising began primarily as a faculty-based service and has shifted into a professional role on most college campuses. For the purposes of this study, academic advising is used as a general term for meetings between professional academic advisors and students where degree progress is discussed. There are different styles and techniques academic advisors use which will be explained in more detail. An exploration of academic advising research follows.

### **Importance of Academic Advising in Higher Education**

Academic advising is a touchpoint for the majority of college students. While research notes that the role of academic advising is critical to student success (Campbell

& Nutt, 2008; Drake, 2011; Smith & Allen, 2006), it is unclear how academic advising impacts students entering college with a variety of credits. Students entering the university for the first time have diverse educational backgrounds which determine their differing levels of advising necessity (Allen, Smith, & Muehleck, 2013; Easterly, 2008). Transfer students could enroll with as many as 60 credit hours, while it is more likely that dual enrollment students will enter with 12 credit hours or fewer. This wide variation in pre-enrollment credits demonstrates the complexities facing students and academic advisors as they navigate course selection and degree plans at the four-year institution. There is a need to expand the literature in understanding how academic advising influences student success outcomes for students bringing in academic credits via transfer and dual credit.

**Academic advising styles.** Early academic advising literature suggested best practices for advisor-advisee interactions. Hardee (1970) described the foundation of *developmental academic advising*, one of the most widely utilized styles of advising throughout the profession's history. She articulated the relationship between the advisor and advisee as that of "teacher-learner" and advocated for advising sessions to cover a variety of topics including students' educational efforts, career goals, and personal development (Hardee, 1970). Hardee's vision was derived from the student personnel holistic approach to college student development (Grites, 2013).

Two researchers created more comprehensive approaches for academic advising building on Hardee's work. Burns Crookston (1974) suggested that there was a continuum between what he described as *prescriptive academic advising* and *developmental academic advising*. On one end of the continuum, a prescriptive approach

to academic advising is essentially limited to course scheduling. On the other end of the continuum, developmental academic advising should encompass developing a life and career plan which the college courses will assist students in accomplishing. Terry O'Banion's (1974) work detailed a five-step process for community college student academic advising which also included goal setting and planning for vocation beyond the students' time in college. Both of these early advising models had an emphasis on educating the whole student and acknowledged the growing diversity of the student population at the time (Grites, 2013).

The term *developmental academic advising* was widely adopted in 1984 and was conceptualized through the understanding of holistic treatment of the college student (Grites, 2013). This advising strategy stressed a close student-advisor relationship which concentrated on the students' goals, skills, and attitudes as well as on intellectual and personal growth (Winston, Miller, Ender, & Grites, 1984). Academic advising was recognized at this time as a collaboration between student affairs and academic affairs. It was also recognized as a critical element for improving retention in colleges and universities (Habley, 1981). Habley (1981) viewed academic advising as an opportunity for students to connect their academic experiences in the classroom to the goals which were set in advising sessions.

Various approaches to academic advising have been introduced to the profession over the last several decades, including *advising as coaching* (McClellan & Moser, 2011), *strengths-based advising* (Schreiner, 2005), *appreciative advising* (Bloom, Hutson, & He, 2013), and *proactive* (formerly *intrusive*) *advising* (Glennen, 1975, 1983; Glennen & Baxley, 1985; Varney, 2007). Grites (2013) posited that each of these

approaches is grounded in the developmental advising approach. The National Association of Academic Advising (NACADA) included allusions to the developmental advising approach in its *Concept of Academic Advising* (2006), acknowledging that academic advising consists of teacher and learner relationship and a process which focuses on the students' goals during college and beyond. White (2015) suggests that:

The ultimate goal of a fully functioning advising program is to engage students as scholars, thus transforming the student experience. Academic advisers work with students to enable them to be confident and assertive in their own abilities to learn, generate, and apply new knowledge and to empower them to embrace their own knowing, learning, thinking, and decision making. (p. 271)

**Academic advising research and critiques.** While different approaches to academic advising are implemented at colleges and universities across the country, the importance of the profession and its impact on students is generally agreed upon by researchers. Academic advising is commonly referred to as one of the best strategies for increasing college student retention (Bean & Eaton, 2001; Habley, 1981; Habley & McClanahan, 2004; Kuh et al., 2005; Tinto, 1993; Thayer, 2000). Literature highlights that although there is no single formula for increasing retention (Caison, 2007; Davidson, Beck, & Milligan, 2009; Tinto, 2006), academic advising provides an opportunity for the university to increase student satisfaction with and connection to the institution (Hemwall & Trachte, 2005; Propp & Rhodes, 2006) while simultaneously delivering academic strategies, resources, and support to students in need (Crookston, 1994, 2009; Nutt, 2003).

Research has identified that the quality of the relationship between a student and an interested institutional representative is a positive influence on student retention (Habley, 2004). Academic advisors are uniquely situated amongst university faculty and staff as they are an institutional connection whom students can easily access (Swecker, Fifolt, & Searby, 2013). Tinto (1993) surmised that students thrive in institutional environments which provide clear expectations and support. Academic advisors have the ability to act as the translators of these expectations, such as institutional policies regarding academic guidelines or clearly defining the path to graduation. Academic advising is an opportunity for student engagement as defined by Kuh (2006) as an intersection between student behavior and institutional contributions that may influence student outcomes.

Although research has indicated the potential for academic advising to increase student retention, survey results from the American College Testing (ACT) program and NACADA presented evidence that many institutions do not utilize academic advising as an intervention to improve students' academic performance (Lotkowski, Robbins, & Noeth, 2004). The profession has been critiqued for largely limiting the research of the advising field focusing on student satisfaction surveys (Campbell & Nutt, 2008; Hemwall & Trachte, 2005; Kelley, 2008; Winston, 1994). Notwithstanding some trailblazers in academic advising assessment (Abelman & Molina, 2000, 2001; Glennen, 1975; Glennen & Baxley, 1981; Kirk-Kuwaye & Nishida, 2001), the majority of methodologically rigorous assessment linking advising to student success outcomes has been conducted in the last decade (Schwebel, Walburn, Jacobsen, Jerrolds, & Klyce, 2008; Swecker, et al., 2013; Vander Schee, 2007; Young-Jones, Burt, Dixon, & Hawthorne, 2013).

Research evaluating the efficacy of academic advising has encompassed several outcome variables related to student retention. Young-Jones et al. (2013) conducted a study about how students' expectations of academic advising, compared with students' experiences with academic advising predicted grade point average. Utilizing principal axis factor analysis, multiple regression and analysis of variance, the authors tested advisor accountability, advisor empowerment, student responsibility, student self-efficacy, student study skills, and student perception. Multiple regression demonstrated that two of the six factors, students' study skills and self-efficacy, were significant predictors of GPA. The analysis of variance established that attending at least one meeting with an academic advisor during the semester contributed positively to student success, however, the authors do not clarify if a specific advising approach was used. Though there is no evaluation of advising style, the authors did conclude that levels of perceived support were higher for students who met with an advisor. Young-Jones et al. stated that while the results indicated that student meetings with advisors did not have a direct impact on GPA, there were other benefits which other researchers have associated with student retention and persistence (2013).

Based upon the definition of retention outlined by Braxton, Brier, and Steele (2007) as continuous enrollment from one fall semester to the next, Swecker et al. (2013) used the number of meetings students had with an academic advisor as a predictor for student retention of first-generation students at a large, urban institution. The researchers conducted multiple linear regression using retention status as the binary predictor variable. Independent variables including gender, ethnicity, and major were not significant predictors of retention. However, the number of academic advising

appointments was a significant predictor of student persistence. The authors reported results indicating that increased advising increased the odds percentage of a first-generation student persisting to their second year. The results of this study did not specify an advising technique was used. Their information was based on student reporting of attendance at academic advising appointments. The authors hypothesized that a higher number of advisor meetings could be a potential retention strategy for students who are at the highest risk for attrition, such as low-income and transfer students. Swecker et al. suggested that future research could add to the literature by utilizing a longitudinal dataset for multiple cohorts which included graduation statistics to further test the impact of meetings with academic advisors on student retention.

Researchers have also examined the effectiveness of tactics used by academic advisors to increase student retention. This is well-documented in the case of proactive (intrusive) advising. Glennen (1975) used the University of Nevada at Las Vegas as a case study for understanding the impact of intrusive advising. After introducing this type of advising, in which academic advisors take on the responsibility of initiating contact with students, attrition for freshmen at UNLV was reduced from 45% to 6% during their first year. Glennen also implemented intrusive advising strategies at Western New Mexico University and Emporia State University with similarly encouraging results (Schwebel et al., 2013).

Kirk-Kuwaye and Nishida (2001) investigated the impact of the difference in low-intrusion and high-intrusion advising in an experiment with 427 students on academic probation. Students who received higher-intrusion advising were required to attend academic advising appointments and were retained at a slightly higher rate than their

low-intrusion counterparts. Their work was supported by a series of studies conducted by Ableman and Molina (2000, 2001, 2002) in which they chronicled the impact of three different levels of intrusive academic advising on at-risk students. Their studies established that students who received the most intrusive form of advising showed higher academic performance and persistence than those students who received a less intrusive form of advising support. Their critique of the advising approach was that the quality of the interaction was less important than the quantity of interactions, their findings at odds with the foundational approach of developmental academic advising favored by many practitioners.

Perhaps the most methodologically rigorous study was the study conducted by Schwebel et al. (2012) considering the efficacy of advising outreach on retention. The authors conducted a four-year randomized trial at an urban state university with 501 students in three majors. With the support of professional academic advisors, half of the cohort received a version of intrusive advising while the other half received regular university announcements via email informing them of academic advising resources and options. The outcomes of interest in this experiment were retention (measured by graduation, enrollment status, on-time graduation, number of terms enrolled, and number of credit hours earned), academic progress (measured by cumulative GPA and the number of times the student changed their major), and advising contact (measured by the total number of face-to-face meetings with the advisor and the number of semesters the student met face-to-face with the advisor).

Schwebel, Walburn, Jacobsen, Jerrolds, and Klyce (2008) looked at the success of the advising practice one year into the trial and discovered that increasing advisor

outreach resulted in an increase in percentage of students scheduling academic advising appointments and attending meetings with their advisors. The results from the end of the trial (Schwebel et al., 2012) indicated that the intrusive advising style increased the number of contacts that students had with advisors. However, the advising did not significantly contribute to student persistence or academic success, though the retention rates was slightly higher for those in the outreach group than for the group that only received university announcements. The authors posited that intrusive advising may be most beneficial to at-risk students which supports the findings from Ableman and Molina (2000, 2001, 2002) and Swecker et al. (2013).

### **Summary**

A review of literature in this chapter covered the conceptual framework for the study, relevant organizational theories, a review of the paucity of literature using institutional characteristics as variables, transfer student literature, dual credit research, and work evaluating academic advising. The researcher sought to fill the gaps in the literature by employing a methodologically rigorous study which explored a relatively new topic. Evaluating students entering into the university at the same time with different pre-enrollment academic experiences and credits through the lens of their engagement with academic advising will add to several successful models. This study provides more context to Tinto's (1993) departure model by providing an example of academic and social integration. This study adds to the work of Astin (1993) and Bean (1980, 1982) by looking into how student behavior can impact their ultimate outcomes. In chapter three, the researcher outlines how the study was executed.

## **Chapter III: Methodology**

### **Overview**

This chapter introduces the methodology of the study. An introduction to the university used for the study details the student population as well as retention and graduation rates during the years the study covered. The research questions are reintroduced, followed by the conceptual model for the study. Next, the researcher discusses the data and sample available for the study. The chapter concludes with a description of the methodologies used in the study. The Hierarchical Generalized Model, logistic, and linear regression models are explained including the formulas used in the study.

### **Setting**

This study examined students from Metropolitan University, an urban, public research university which houses over 40,000 ethnically diverse students each year. The majority of the student population commutes to campus from the surrounding areas. Undergraduates have the opportunity to choose from more than 120 majors and minors within 10 colleges. Perhaps unique to this institution, the academic advising departments are decentralized and located within the structure of the colleges.

The city which houses the study's four-year institution is also home to three large community college systems from which many students transfer to the university. More than 4,000 new students transfer to the university each year, outnumbering the number of FTIC students entering at the same time. First year transfer student retention at the university from 2012 to 2017 was, on average, about four percentage points higher than national first year retention average of 76% for four-year public universities reported by

the National Student Clearinghouse Research Center (Shapiro, Dundar, Huie, Wakhungu, Yuan, Nathan & Hwang, 2017). This timeframe (2012-2017) was used as a basis of comparison for this longitudinal study. This retention statistic is fairly impressive for a large, urban research university. The six-year graduation rate for FTIC females is 55.5% compared with FTIC males at 46.3%. The six-year graduation rates for full-time, degree seeking transfer females is 68.7%, while the male transfer graduation rate is 64.2%. The six-year graduation rate for full-time FTIC students attending public universities nationally is 59%, while the transfer and part-time student data are excluded from this dataset (Shapiro, et al., 2017). The overall six-year graduation rate for Metropolitan University is 52%. Table 1 displays the year to year persistence of all transfer students at this institution. Table 2 shows the persistence and graduation rates for all FTIC students at the university.

While these numbers from Metropolitan University appear to indicate that transfer students are graduating at higher rates than FTIC students, the data provided by the institution only include students who are enrolled full-time. No data are provided on transfer or FTIC students enrolled part-time. Transfer students enrolled part-time are more likely to work full-time and more likely to dropout (McKinney & Burrige, 2015; NCES, NPSAS, 2012; Tinto, 2006). In this study, part-time and full-time enrollment were variables utilized to determine how enrollment status affects persistence and graduation for students entering the university with differing levels of academic credit. Including this variable could potentially offer a more holistic picture of what issues need to be addressed at the institutional level to help more students persist to graduation.

Table 1

*University Four Year Trends in Full-Time Transfer Student Retention and Graduation*

Cohort	Annual Rates	Initial Year	One Year Later	Two Years Later	Three Years Later	Four Years Later	Five Years Later
2012	Enrolled	1,089	880	599	224	67	30
	Retention		.81	.55	.21	.06	.03
	Graduation		.004	.14	.51	.64	.68
2013	Enrolled	862	710	491	155	53	
	Retention		.82	.57	.18	.06	
	Graduation		.001	.20	.57	.67	
2014	Enrolled	1,205	991	632	234		
	Retention		.82	.52	.19		
	Graduation		.002	.24	.53		
2015	Enrolled	1,276	1,059	712			
	Retention		.83	.56			
	Graduation		.004	.22			

Table 2

*University Four Year Trends in Full-Time FTIC Student Retention and Graduation*

Cohort	Annual Rates	Initial Year	One Year Later	Two Years Later	Three Years Later	Four Years Later	Five Years Later
2012	Enrolled	3,350	2,835	2,435	2,157	1,158	361
	Retention		.85	.73	.64	.35	.11
	Graduation			.002	.03	.30	.52
2013	Enrolled	3,321	2,863	2,480	2,185	1,121	
	Retention		.86	.75	.66	.34	
	Graduation			.002	.03	.33	
2014	Enrolled	3,908	3,372	2,938	2,576		
	Retention		.82	.75	.66		
	Graduation			.002	.03		
2015	Enrolled	4,010	3,393	2,913			
	Retention		.85	.73			
	Graduation			.003			

## Research Questions

The purpose of this study was to better understand the factors associated with success of transfer and dual-credit students in order to help inform efforts to improve university-wide advising practices. Therefore, this multilevel analysis attempted to identify individual- and college-level factors influencing the likelihood that FTIC, transfer, and dual-credit students persisted from their first to second year and the likelihood that they graduated. The broad research questions addressed by the study include: (RQ1a) whether the odds students persisted from first year to second year in college are influenced by individual characteristics including the student's gender or ethnicity, major or college, grade point average, type of credits earned prior to enrollment, or whether the student is enrolled full-time or part-time; (RQ1b) whether the odds students graduated are influenced by individual-level characteristics; (RQ2a) whether the odds of persistence and (RQ2b) graduation were influenced by college-level characteristics (e.g. number of students in college, number of academic advisors working within the college, other advising features within the college); (RQ3) whether differences in likelihood of persistence attributed to advising features were consistent across colleges; (RQ4) whether there is an interaction between the student- and college- level predictors of odds of persistence and graduation; and (RQ5) if first year cumulative GPA of 2015 cohort students was influenced by student characteristics. Figure 1 provides a conceptual model of the study.

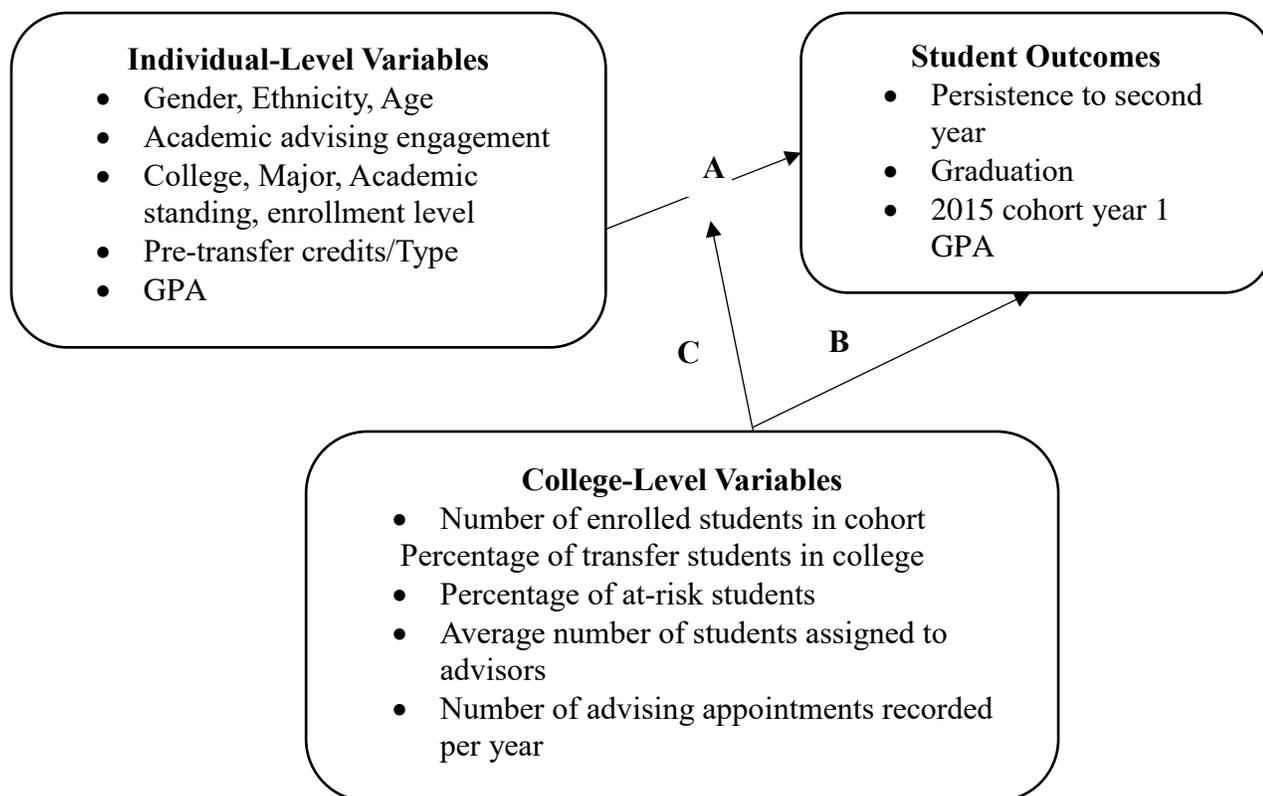


Figure 1. Conceptual model of study

### Data

The study examined data from student records for four cohorts of undergraduate students at an urban university in Texas (Level-1  $N = 29,022$ )<sup>1</sup> who enrolled during the fall semesters of school years 2012-2015 and enrolled as FTIC or brought in earned academic credit through a dual-enrollment program, or transferred from a two-year institution prior to enrollment. These records were collected by the provost's office at the university and are longitudinal. The dataset contains student data from the time of first enrollment through spring 2017. These students are clustered into academic colleges at the university (Level-2  $n=8$ ) based on their major course of study. Organizing these data into a hierarchical structure allowed the simultaneous examination of individual characteristics and college

<sup>1</sup> The original total number of 32,503 students was reduced when students enrolled in the College of Engineering were removed from the analysis because of a lack of data.

characteristics as they relate to student success outcomes. Table 3 describes all variables used in the study.

### **Variables**

**Student persistence (Outcome).** The first outcome of interest for this study is the students' persistence from the first year to the second year of study at the university (if they returned the following fall semester or not). This outcome is operationalized by a binary variable (did not return second year = 0, returned second year = 1).

**Student graduation (Outcome).** The second outcome of interest for this study is students' graduation status. This outcome is operationalized by a binary variable (did not graduate = 0, graduated = 1). This outcome variable is only used for the cohort of students who enrolled in the fall of 2012 who were most likely to have earned enough credits to graduate by the fall of 2017 where the dataset ends.

**Student demographics (Level-1).** At the individual level, this study examined the connection between student success outcomes (persistence and graduation) and four sets of student characteristics including their demographics (e.g. sex, race and ethnicity), their broader academic characteristics at time of enrollment (e.g. total number of previously earned credits, dual credit or transfer designation), academic characteristics post-enrollment (major, GPA by year, enrolled part- or full-time), and academic advising engagement by year (how frequently the student attended advising sessions each year). The researcher treated GPA by year and attended advising sessions by semester as it related to the graduation outcome.

**College characteristics (Level-2).** The level-2 variables will focus on individual college characteristics. Because this study is primarily interested with understanding the

influence of academic advising with respect to promoting student success, this study will focus on differences between colleges among advising resources and practices.

Table 3

*List of Variables in the Study*

VARIABLE	DESCRIPTION	OPERATIONALIZATION
<b>Level 1 Factors</b>		
Sex	Female/Male	0=Female; 1=Male
Race/Ethnicity*	Self-reported race/ethnicity - Reference group = white	<i>African-American, Asian, Hispanic, International, Other</i>
GPA	Cumulative GPA by year after enrollment	Continuous (0.00-4.00)
Total Transfer Hours	Hours completed prior to enrolling at university	Continuous
Enrollment Designation	Type of credit earned prior to enrollment, dummy coded, FTIC=reference group	transfer; dual-credit, FTIC
Hours Enrolled	Enrolled part-time or full-time	0=part-time; 1=full-time
College*	College of Major - Reference group= CLASS	Business, Education, Engineering, HRM, NSM, Technology, Exploratory Studies
Advising Engagement	Number of academic advising contacts each semester	Continuous
<b>Level 2 Factors</b>		
<i>College</i>	College ID	15=Architecture; 30=Education... 90=Exploratory Studies
<i>CollegeEnrolled</i>	Number of enrolled students in college	Continuous
<i>AVGAdvisee</i>	Average number of advisees per advisor	Continuous

<i>AdvYear</i>	Number of advising appointments per year	Continuous
<i>AtRisk1</i>	% of enrolled students considered at moderate risk each semester	Ratio
<i>AtRisk2</i>	% of enrolled students considered at high risk each semester	Ratio
<i>TransferPercent</i>	% of transfer students in the cohort in each college	Ratio
<b>Outcome Variables</b>		
<i>Persist</i>	Student returned fall semester after first year of enrollment	0=did not return; 1=returned
<i>Graduate</i>	Student graduated from the university	0=did not graduate; 1=graduated

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\*Variables dummy coded to comparison group listed in the description

## Analysis

### Hierarchical Generalized Linear Model

Because two of the outcomes of interest in this study are dichotomous indicators of student success, a Hierarchical Generalized Linear Model was initially used to estimate the probability ( $\varphi$ ) that a student enrolled in the second year after their first enrollment and the probability ( $\varphi$ ) that a student from the 2012 cohort graduated conditioned on a set of fixed effects at the individual ( $\beta$ ) and college ( $\gamma$ ) levels. After conducting running the unconditional models for the outcome variables of retention and graduation for the 2012 cohort, only the graduation outcome model was determined to have variance explained at both level 1 and level 2. Because the conditional probability (equation 1) follows a binary distribution (1=earned degree; 0=did not earn degree), a logit link function (equation 2) was utilized to enable multilevel linear regression analysis

(Raudenbush & Bryk, 2002). As a result, these analyses yielded parameter estimates in the form of log-odds and odds ratios.

$$\text{Prob}(\text{Degree}_i = 1|\beta) = \varphi \quad (1)$$

$$\log\left(\frac{\varphi}{1-\varphi}\right) = \eta_i \quad (2)$$

$$\eta_{ij} = \gamma_{00} + u_{0j}$$

The analysis followed a four-step process beginning with a fully unconditional structural model (equation 3) where baseline log-odds were modeled without level-1 or level-2 predictors and with a random error term at level-2 ( $u_0$ ) in order to estimate between-college variance in odds of student persistence from year one to year two.

$$\text{Level 1- } \eta_{ij} = \beta_0 \quad (3)$$

$$\text{Level 2- } \beta_0 = \gamma_{00} + u_0$$

Next, the researcher estimated fixed effects for all level-1 predictors ( $\beta_1 \dots \beta_{24}$ ) while allowing baseline odds of persistence to vary across colleges ( $u_0$ ) and constraining the between-college variance of the level-1 effects to zero (equation 4). This ANCOVA model identified significant level-1 predictors of within-college variation in odds of retention.

$$\text{Level 1- } \eta_{ij} = \beta_0 + \beta_1(\text{DC}) + \beta_2(\text{Transf}) + \dots + \beta_{24}(\text{Cohort}_{2012})$$

$$\text{Level 2- } \beta_0 = \gamma_{00} + u_0 \quad (4)$$

$$\beta_1 = \gamma_{10}; \dots \beta_{24} = \gamma_{240}$$

A third random-coefficients model included random effects ( $u_{10} \dots u_{170}$ ) estimating the degree to which the effects of level-1 predictors varied across level-2 units

(equation 5). The random-coefficients model was intended to identify level-1 factors with enough variation at level-2 to warrant modeling with level-2 predictors (Question 3).

$$\begin{aligned} \text{Level 1- } \eta_{ij} &= \beta_0 + \beta_1(\text{DC}) + \beta_2(\text{Transf}) + \dots + \beta_{24}(\text{Cohort}_{2012}) \\ \text{Level 2- } \beta_0 &= \gamma_{00} + u_0 \\ \beta_1 &= \gamma_{10} + u_1; \beta_{24} = \gamma_{240} + u_{24} \end{aligned} \quad (5)$$

The final intercepts- and slopes-as-outcomes model (equation 6) simultaneously estimated fixed effects of student characteristics ( $\beta_1 \dots \beta_{24}$ ) on odds of persistence (Question 1a); estimated fixed effects of student characteristics ( $\beta_1 \dots \beta_{24}$ ) on odds of graduation (Question 1b); estimated fixed effects of college characteristics ( $\gamma_{01} \dots \gamma_{05}$ ) on baseline odds of student retention and graduation (Questions 2a and 2b); and estimated fixed effects of college characteristics (e.g.  $\gamma_{01} \dots \gamma_{05}$ ) on slopes estimating the relationship between level-1 predictors and odds of persistence and graduation (Question 4).

$$\begin{aligned} \text{Level 1- } \eta_{ij} &= \beta_0 + \beta_1(\text{DC}) + \beta_2(\text{Transf}) + \dots + \beta_{15}(\text{Cohort}_{2012}) \\ \text{Level 2- } \beta_0 &= y_{00} + y_{01}(\text{TransPer}) + \dots + y_{05}(1880\text{AtRisk2}) + u_0 \\ \beta_1 &= y_{100}; \dots \beta_5 = y_{150} \\ \beta_{17} &= y_{00} + y_{10}(\text{TransPer}) + \dots + y_{150}(1880\text{AtRisk2}) + u_{15} \end{aligned} \quad (6)$$

### **Logistic & Multiple Linear Regressions**

Logistic regression was utilized to determine how student characteristics and behavior associated with their retention from the first year to the first semester of their second year. The following model was used to calculate the odds ratio:

$$\ln(\text{ODDS}) = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_i X_i,$$

where “ $p$ ” is the predicted probability of students persisting to the first semester of their second year post-enrollment.

Linear regression has been widely used in higher education research as it is suited for studies with dichotomous dependent variables such as retention and graduation. (Peng, So, Stage, & St. John, 2002). Multiple linear regression (MLR) was conducted in an attempt to discover the associations between student characteristics and behavior, and first-year cumulative GPA for the 2015 cohort. MLR is a fitting tool to understand the relationships between any outcome variables and independent variables that contain a mixture of continuous and categorical covariates (Peng, et. al, 2002). The multiple linear regression equation is as follows:

$$\hat{Y} = b_0 + b_1 X_1 + b_2 X_2 + \dots + b_p X_p,$$

where  $\hat{Y}$  is the predicted value of the first year cumulative GPA as dependent variable,  $X_1$  through  $X_{18}$  are the predictor variables,  $b_0$  is the value of  $Y$  when all of the independent variables ( $X_1$  through  $X_{18}$ ) are equal to zero, and  $b_1$  through  $b_{18}$  are the estimated regression coefficients.

### Summary

This chapter introduced the setting for the study, the data set, and the analysis approach. The study sought to understand which student-level and college-level factors are influential in predicting the odds of a student persisting from their first year of enrollment to their second year of enrollment as well as which factors are influential in

predicting the odds of a student graduating. The study gives insight into how the advising model at the institution impacts the success outcomes of the student population in each college. This study also provided an overall picture of the different approaches to advising in each college and if those differences have influenced student outcomes.

## **Chapter Four: Research Findings**

### **Introduction**

Hierarchical linear modeling was used to statistically analyze a data structure where students (level-1) were nested within colleges (level-2). Model testing proceeded in five phases: intercept-only model, means-as-outcomes model, ANCOVA model, random regression coefficients model, and the intercepts and slopes as outcomes model. The intercept-only model tested the outcomes of interest with no other variables in the model to determine appropriateness of multilevel modeling. The means-as-outcomes model tested whether the level-2 college characteristics, including average number of students per advisor, percentage of transfer students, percentage of at-risk students, and number of advising contacts made each year influenced the probability of student graduation. The ANCOVA model tested the relationship between the student's level-1 individual background characteristics (sex, ethnicity, age), academic characteristics (what type of credits they earned before enrolling at the university, total number of transfer hours, cumulative GPA post-enrollment, college of major), and academic advising contact, and their probability of graduation. The random coefficients model tested the level-1 fixed effects variables to account for between-college variance. Finally, the intercepts-and-slopes model assessed the interaction of level-1 and level-2 variables on the outcome of interest.

Next, logistic regression was employed to understand which factors would be likely to predict whether students from each cohort were retained from the first to the second semester post-enrollment. Finally, multiple linear regression was used in an

attempt to discover the associations between student characteristics and college enrollment on first-year cumulative GPA for the 2015 cohort only.

## Findings

### Results by Research Question

Data were subjected to a series of multilevel analyses designed to identify individual- and college-level characteristics connected to the likelihood that new students in cohorts 2012 to 2015 would be retained to their second year post-enrollment and would graduate from Metropolitan University. The results for these analyses are explained in relation to the research question they were utilized to answer.

**RQ1a results.** This research question asked whether the odds of student persistence from the first to second year were influenced by individual-level characteristics. While HLM was an inappropriate method to answer this question<sup>2</sup>, logistic regression was used to discover which factors would be more likely to predict the dichotomous outcome of retention to second year for each cohort. The dependent variable was second year retention (0=no; 1=yes). The independent predictor variables for each cohort were both metric and non-metric. The predictor variables were a combination of individual student characteristics and which college they were enrolled in during their first year.

**2012 cohort logistic regression results.** Logistic regression was conducted in an effort to understand which factors are likely to predict the odds of students in the 2012 cohort (n=6,392) persisting to their second year of college. 23 predictor variables were

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<sup>2</sup> Testing of the intraclass correlation coefficient for the persistence outcome indicated that less than 6% of the variance of persistence could be explained at the college-level, negating the appropriateness of a two-level model.

included in the model covering academic variables, demographic variables, and college of enrollment<sup>3</sup>. Full results for this analysis are presented in Table 4<sup>4</sup>.

With all variables entered into the model, the omnibus model of coefficients shows that the model was significant ( $\chi^2 = 1258.91$ ,  $df = 23$ ,  $\rho < .001$ ). The rate of prediction between the null model and the active model increased from 83.2% to 86.9%. The results from the 2012 cohort binary logistic regression indicate that the variables Full-time degree seeking ( $\beta = .623$ ,  $\rho < .001$ ), first semester GPA ( $\beta = .335$ ,  $\rho < .001$ ), first year cumulative GPA ( $\beta = .275$ ,  $\rho = .004$ ), first semester at-risk status 1 ( $\beta = .280$ ,  $\rho = .039$ ), and second semester at-risk status 2 ( $\beta = -1.375$ ,  $\rho < .001$ ) were all significant predictors of student persistence to year two.

The odds ratio for the full-time degree-seeking coefficient is 1.864, suggesting that students who enroll full-time their first year are almost twice as likely to persist to their second year when compared with students who enroll part-time or less. For every one-unit increase in GPA the first semester, an increase of 1.398 in the log-odds of student persistence can be expected. Similarly, for every one-unit increase in first-year cumulative GPA, we can expect a 1.316 increase in the log-odds of student retention, holding all other independent variables constant. The odds ratio for first semester at risk-status 1 suggests that students who earn a GPA between 2.0 and 2.99 in their first semester are 1.324 times more likely to persist to their second year than students who were at differing levels of risk. However, students who were in the at-risk category 2,

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<sup>3</sup> Advising variables were not included in this model as complete advising reporting was not available until the Spring 2014 semester.

<sup>4</sup> In subsequent tables the College of Hotel and Restaurant Management is labeled HRM, the College of Natural Sciences and Mathematics is labeled NSM, and the Exploratory Studies program which is for undeclared students is labeled by the program name UScholars.

earning a GPA of 1.99 or less, were less likely to persist to year two than students at no risk by a multiplicative factor of .257.

Table 4

*Logistic Regression Predicting Persistence to Second Year for 2012 Cohort Results*

<b>Variable</b>	<b>B</b>	<b>SE<sub>B</sub></b>	<b>e<sup>B</sup></b>
Intercept	1.597***	.034	4.936
Dual Credit	.191	.148	1.211
Transfer	.136	.108	1.145
Full Time Degree Seeking	.623***	.100	1.864
First semester GPA	.335***	.093	1.398
Frist Year Cumulative GPA	.275**	.094	1.316
Sex	.033	.080	1.033
Age	.004	.011	1.004
Hispanic	.052	.103	1.053
African American	.061	.141	1.063
Asian	-.044	.118	.957
International	.215	.225	1.240
Other	-.135	.194	.874
Architecture	-.288	.259	.750
Business	-.245	.143	.782
Education	-.109	.163	.897
HRM	.572	.340	1.773
NSM	.228	.132	1.256
Technology	-.056	.140	.945
UScholars	.061	.160	1.063
Risk level 1 First semester	.280*	.136	1.324
Risk level 2 First semester	-.431	.236	.650
Risk level 1 Second semester	.111	.122	1.117
Risk level 2 Second semester	-1.357***	.157	.257

Note. \*  $p < 0.05$ ; \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

**2013 cohort logistic regression results.** Logistic regression was conducted in an effort to understand which factors are likely to predict the odds of students in the 2013 cohort (n=6,389) persisting to their second year of college. 25 predictor variables were included in the model covering academic variables, demographic variables, and college of enrollment<sup>5</sup>. Full results for this analysis are presented in Table 5.

With all variables entered into the model, the omnibus model of coefficients shows that the model was significant ( $\chi^2 = 1632.01, df = 25, \rho < .001$ ). The rate of prediction between the null model and the active model increased from 81.0% to 86.3%. The results from the 2013 cohort binary logistic regression indicate that the academic variables Full-time degree seeking ( $\beta = .603, \rho < .001$ ), first semester GPA ( $\beta = .226, \rho = .016$ ), first year cumulative GPA ( $\beta = .385, \rho = .004$ ), first semester at-risk status 1 ( $\beta = .316, \rho = .018$ ), first semester at-risk status 2 ( $\beta = -.699, \rho = .003$ ), and second semester at-risk status 2 ( $\beta = -1.397, \rho < .001$ ) were all significant predictors of student persistence to year two. Demographic variables Sex ( $\beta = -.200, \rho = .012$ ), and African American ( $\beta = -.302, \rho = .027$ ) were also significant predictors of retention. Finally, college variables including Spring 2014 advising contact ( $\beta = .419, \rho < .001$ ), Summer 2014 advising contact ( $\beta = .410, \rho < .001$ ), and enrollment in the Colleges of Education ( $\beta = -.538, \rho = .002$ ) and Natural Sciences and Mathematics ( $\beta = .389, \rho = .003$ ) were also significant predictors in the model.

The odds ratio for the full-time degree-seeking coefficient is 1.828, suggesting that students who enroll full-time their first year are almost twice as likely to persist to

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<sup>5</sup> Advising variables were included in this model starting with the Spring 2014 semester as complete advising reporting was not available until that time. Therefore, Fall 2013 advising data is not included in this model.

their second year when compared with students who enroll part-time or less. For every one-unit increase in GPA the first semester, an increase of 1.253 in the log-odds of student persistence can be expected. Similarly, for every one-unit increase in first-year cumulative GPA, we can expect a 1.469 increase in the log-odds of student retention, holding all other independent variables constant. The odds ratio for first semester at risk-status 1 suggests that students who earn a GPA between 2.0 and 2.99 in their first semester are 1.371 times more likely to persist to their second year than students who were at differing levels of risk. However, students who were in the at-risk category 2 their first semester, earning a GPA of 1.99 or less, were less likely to persist to year two than students at lesser risk by a multiplicative factor of .497. Students who are in the at-risk category 2 at the end of their first year can expect a .249 decrease in log-odds of persistence.

The coefficient for the Sex variable, .818, indicated that male students have slightly lower log-odds of persistence when compared to their female counterparts. The coefficient for African American students is .739, suggesting that these students are less likely to persist to their second year than White students.

Finally, for every one-unit increase in Spring 2014 advising contact, an increase of 1.521 in the log-odds of student persistence can be expected. Similarly, for every one-unit increase in Summer 2014 advising contact, we can expect a 1.507 increase in the log-odds of student retention, holding all other independent variables constant. When compared with students enrolled in the College of Liberal Arts and Social Sciences, students enrolled in the College of Education have lower log-odds of persisting to year

two by a factor of .584 while students in the College of Natural Sciences and Mathematics have higher log-odds of persisting by a factor of 1.476.

Table 5

*Logistic Regression Predicting Persistence to Second Year for 2013 Cohort Results*

<b>Variable</b>	<b>B</b>	<b>SE<sub>B</sub></b>	<b>e<sup>β</sup></b>
Intercept	1.448***	.033	4.255
Dual Credit	.051	.132	1.052
Transfer	-.058	.113	.944
Full Time Degree Seeking	.603***	.105	1.828
First semester GPA	.226*	.094	1.253
First year cumulative GPA	.385***	.096	1.469
Spring2014 Advising	.419***	.049	1.514
Summer2014 Advising	.410***	.081	1.507
Sex	-.200*	.079	.818
Age	.002	.159	1.002
Hispanic	-.003	.104	.997
African American	-.302*	.136	.739
Asian	-.003	.118	.997
International	-.217	.198	.805
Other	-.117	.202	.890
Architecture	.042	.299	1.043
Business	.164	.158	1.178
Education	-.538**	.178	.584
HRM	.339	.297	1.404
NSM	.389**	.130	1.476
Technology	.070	.134	1.073
UScholars	.028	.127	1.028
Risk level 1 First semester	.316*	.134	1.371
Risk level 2 First semester _1	-.699**	.238	.497
Risk level 1 second semester	.098	.118	1.103
Risk level 2 Second semester	-1.397***	.154	.247

Note. \*  $p < 0.05$ ; \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$

**2014 cohort logistic regression results.** Logistic regression was conducted in an effort to understand which factors are likely to predict the odds of students in the 2014 cohort (n=8,035) persisting to their second year of college. 26 predictor variables were included in the model covering academic variables, demographic variables, and college of enrollment<sup>6</sup>. Full results for this analysis are presented in Table 6.

With all variables entered into the model, the omnibus model of coefficients shows that the model was significant ( $\chi^2 = 1741.37$ ,  $df = 26$ ,  $\rho < .001$ ). The rate of prediction between the null model and the active model increased from 85.8% to 89.2%. The results from the 2014 cohort binary logistic regression indicate that the academic variables Full-time degree seeking ( $\beta = .520$ ,  $\rho < .001$ ), transfer designation ( $\beta = -.282$ ,  $\rho = .011$ ), first year cumulative GPA ( $\beta = .364$ ,  $\rho < .001$ ), first semester at-risk status 2 ( $\beta = -.734$ ,  $\rho = .001$ ), and second semester at-risk status 2 ( $\beta = -1.536$ ,  $\rho < .001$ ) were all significant predictors of student persistence to year two. Demographic variable Age ( $\beta = -.036$ ,  $\rho = .001$ ) was also a significant predictor of retention. Finally, college variables including Fall 2014 advising contact ( $\beta = -.108$ ,  $\rho = .010$ ), Spring 2015 advising contact ( $\beta = .563$ ,  $\rho < .001$ ), Summer 2015 advising contact ( $\beta = .571$ ,  $\rho < .001$ ), and enrollment in the College of Natural Sciences and Mathematics ( $\beta = .336$ ,  $\rho = .014$ ) were also significant predictors in the model.

The odds ratio for the full-time degree-seeking coefficient is 1.682, suggesting that students who enroll full-time their first year are more than one and a half times as likely to persist to their second year when compared with students who enroll part-time or less. For every one-unit increase in first-year cumulative GPA, we can expect a 1.468

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<sup>6</sup> This is the first model including Fall, Spring, and Summer advising contact counts.

increase in the log-odds of student retention, holding all other independent variables constant. The odds ratio for first semester at risk-status 2 suggests that students who earn a GPA less than 2.0 in their first semester are .480 times less likely to persist to their second year than students who earned at least a 3.0. Similarly, students who are in the at-risk category 2 at the end of their first year can expect a .215 decrease in log-odds of persistence compared with students considered not at-risk.

The coefficient for the transfer designation is .754, indicating that transfer students have slightly lower log-odds of persistence when compared to their FTIC counterparts. The coefficient for Age students is .965, suggesting that a unit increase in age can decrease the log-odds of persistence.

Advising contact was significant for this cohort as well as for the 2013 cohort. However, for every one-unit increase in Fall 2014 advising contact, a decrease of .898 in the log-odds of student persistence can be expected. Conversely, holding all other independent variables constant, for every one-unit increase in Spring 2015 and Summer 2015 advising contact, we can expect a 1.755 and 1.769 increase in the log-odds of student retention respectively. When compared with students enrolled in the College of Liberal Arts and Social Sciences, students enrolled in the College of Natural Sciences and Mathematics have higher log-odds of persisting by a factor of 1.399. The College of Education was not significant in this model.

Table 6

*Logistic Regression Predicting Persistence to Second Year for 2014 Cohort Results*

<b>Variable</b>	<b>B</b>	<b>SE<sub>B</sub></b>	<b>e<sup>β</sup></b>
Intercept	1.798***	.033	6.039
Dual Credit	-.153	.144	.858
Transfer	-.282*	.110	.754
Full Time Degree Seeking	.520***	.098	1.682
First Semester GPA	.120	.094	1.127
First Year Cumulative GPA	.364***	.096	1.468
Fall2014 Advising	-.108*	.042	.898
Spring2015 Advising	.563***	.053	1.755
Summer2015 Advising	.571***	.086	1.769
Sex	-.132	.079	.877
Age	-.036**	.010	.965
Hispanic	-.083	.106	.920
African American	-.214	.139	.807
Asian	-.152	.116	.859
International	-.167	.185	.846
Other	-.088	.194	.915
Architecture	.305	.318	1.357
Business	-.094	.148	.910
Education	-.215	.192	.807
HRM	-.077	.251	.926
NSM	.336*	.137	1.399
Technology	.180	.114	1.197
UScholars	.099	.141	1.104
Risk level 1 First semester	.236	.132	1.266
Risk level 2 First semester	-.734**	.231	.480
Risk level 1 Second semester	-.008	.121	.992
Risk level 2 Second semester	-1.536***	.150	.215

*Note.* \*  $p < 0.05$ ; \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

**2015 cohort logistic regression results.** Logistic regression was conducted in an effort to understand which factors are likely to predict the odds of students in the 2015 cohort (n=8,206) persisting to their second year of college. 26 predictor variables were included in the model covering academic variables, demographic variables, and college of enrollment. Full results for this analysis are presented in Table 7.

With all variables entered into the model, the omnibus model of coefficients shows that the model was significant ( $\chi^2 = 1789.54$ ,  $df = 26$ ,  $\rho < .001$ ). The rate of prediction between the null model and the active model increased from 84.8% to 88.6%. The results from the 2015 cohort binary logistic regression indicate that the academic variables Full-time degree seeking ( $\beta = .542$ ,  $\rho < .001$ ), transfer designation ( $\beta = -.262$ ,  $\rho = .010$ ), first year cumulative GPA ( $\beta = .364$ ,  $\rho = .023$ ), first semester at-risk status 2 ( $\beta = -.920$ ,  $\rho = .001$ ), and second semester at-risk status 2 ( $\beta = -1.586$ ,  $\rho < .001$ ) were all significant predictors of student persistence to year two. No demographic variables were significant predictors of persistence for this cohort. Spring 2016 advising contact ( $\beta = .526$ ,  $\rho < .001$ ), Summer 2016 advising contact ( $\beta = .746$ ,  $\rho < .001$ ), and enrollment in the Colleges of Technology ( $\beta = .320$ ,  $\rho = .002$ ) and Hotel and Restaurant Management ( $\beta = .815$ ,  $\rho = .016$ ) were significant predictors of persistence to the second year in the model.

The coefficient for the transfer designation is .770, indicating that transfer students have slightly lower log-odds of persistence when compared to their FTIC counterparts. The odds ratio for the full-time degree-seeking coefficient is 1.720, suggesting that students who enroll full-time their first year are more than one and a half times as likely to persist to their second year when compared with students who enroll

part-time or less. For every one-unit increase in first-year cumulative GPA, we can expect a 1.194 increase in the log-odds of student retention, holding all other independent variables constant. The odds ratio for first semester at risk-status 2 suggests that students who earn a GPA less than 2.0 in their first semester are .403 times less likely to persist to their second year than students who earned at least a 3.0. Similarly, students who are in the at-risk category 2 at the end of their first year can expect a .205 decrease in log-odds of persistence compared with students considered not at-risk.

Advising contact during the first semester was not significant for this cohort. However, academic advising contact remained important predictors for probability of persistence. Holding all other independent variables constant, for every one-unit increase in Spring 2016 advising contact, a 1.692 increase in the log-odds of student retention can be expected. Similarly, a 2.108 increase in the log-odds of student retention can be expected for an increase in units of Summer 2016 advising contacts. When compared with students enrolled in the College of Liberal Arts and Social Sciences, students enrolled in the College of Technology have higher log-odds of persisting by a factor of 1.377, while students enrolled in the College of Hotel and Restaurant Management have higher log-odds of persistence than their CLASS peers by a factor of 2.260.

Table 7

*Logistic Regression Predicting Persistence to Second Year for 2015 Cohort Results*

<b>Variable</b>	<b>B</b>	<b>SE<sub>B</sub></b>	<b>e<sup>β</sup></b>
Intercept	1.722***	.032	5.598
Dual Credit	.257	.159	1.293
Transfer	-.262*	.102	.770
Full Time Degree Seeking	.542***	.094	1.720
First Semester GPA	.166	.088	1.180
First Year Cumulative GPA	.177*	.078	1.194
Fall2015 Advising	-.071	.040	.931
Spring2016 Advising	.526***	.054	1.692
Summer2016 Advising	.746***	.104	2.108
Sex	.027	.077	1.027
Age	-.012	.009	.988
Hispanic	.020	.097	1.021
African American	.138	.135	1.148
Asian	-.049	.110	.953
International	.146	.188	1.157
Other	-.297	.311	.743
Architecture	.001	.294	1.001
Business	-.167	.140	.846
Education	-.036	.198	.965
HRM	.815*	.340	2.26
NSM	.245	.130	1.278
Technology	.320**	.103	1.377
UScholars	-.183	.151	.833
Risk level 1 First semester	.225	.130	1.252
Risk level 2 First semester	-.910***	.225	.403
Risk level 1 Second semester	.143	.114	1.154
Risk level 2 Second semester	-1.586***	.133	.205

Note. \*  $p < 0.05$ ; \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

**RQ1b results.** This research question asked whether the graduation outcome was influenced by student-level predictors. To test the appropriateness of applying multilevel analyses to these data, the researcher performed a preliminary analysis using a fully unconditional model (Equation 3). Results from Model 1 indicated significant variation in odds of graduation across colleges, ( $\chi^2(7) = 1064.84, p < .001$ ). Following the approach for calculating the intraclass correlation coefficient (ICC) for a dichotomous outcome recommended by Snijders and Bosker (2011), the ICC was calculated to be .13, indicating 13% of the variance in odds of student graduation can be attributed to differences between colleges. This result indicated it was appropriate to proceed with a multilevel analysis of these data. Full results for the 2012 Cohort HLM are located in Table 7.

In an effort to answer the question of level-1 predictors' influence on the graduation outcome for the 2012 cohort, the ANCOVA model was tested using all level-1 predictor variables. The regression coefficients for dual credit designation ( $b = 0.20, \rho = 0.019$ ), transfer designation ( $b = 1.84, \rho < 0.001$ ), full-time students ( $b = 0.52, \rho < 0.001$ ), and students retained to the second year post-enrollment ( $b = 1.45, \rho < 0.001$ ) as they relate to student graduation were all positive and statistically significant. These results indicated dual credit and transfer students were more likely than FTIC students, and students who persisted to the second year were more likely than students who were not retained, to graduate from Metropolitan University.

Additionally, students' cumulative GPA at the end of their second semester ( $b = -0.37, \rho < 0.001$ ) was negative and statistically significant, while students' cumulative GPA at the end of their fourth semester ( $b = 2.88, \rho < 0.001$ ) was positive and

statistically significant. At the end of the first-year post-enrollment, higher GPA slightly decreases the odds a student will graduate, but the magnitude is negligible. However, at the end of a student's second year post-enrollment, higher GPA has a multiplicative factor increasing odds of graduation by nearly three.

The individual advising contacts were tested by semester<sup>7</sup>. Student advising contact for semesters Spring 2014 ( $b = .62, \rho < 0.001$ ), Summer 2014 ( $b = .34, \rho < 0.001$ ), and Fall 2015 ( $b = .16, \rho < 0.001$ ) were all positive and statistically significant. The semesters including Summer 2016 ( $b = -0.23, \rho < 0.001$ ), Fall 2016 ( $b = -0.73, \rho < 0.001$ ), and Spring 2017 ( $b = -2.94, \rho < 0.001$ ) were all negative and statistically significant. These results indicate that students who had academic advising contact with their college advisors prior to Spring 2016 were more likely to graduate than students who did not participate in advising. However, from Summer 2016 forward, students who participated in advising were less likely to graduate than students who did not.

Student demographic variables including sex, gender, and ethnicity were not statistically significant in estimating the probability of student graduation. The only college that was statistically significant was Architecture ( $b = -1.47, \rho = 0.002$ ), indicating that students enrolled in the College of Architecture had lower probability of graduating from Metropolitan University.

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<sup>7</sup> The model used advising contact as a variable starting with the Spring semester of 2014. Prior to this semester, several colleges, including the College of Liberal Arts and Sciences and the College of Hotel and Restaurant Management were not entering their advising contacts into the advising tracking system where this data was gathered.

Table 8

*Multilevel Analysis Results for 2012 Cohort Graduation Outcome*

	Model 1: Fully Unconditional Model		Model 2: Means-as- Outcomes		Model 3: ANCOVA		Model 4: Random Coefficient		Model 5: Slopes and Intercepts Model	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
<i>Independent Variables</i>										
Intercept ( $\gamma_{00}$ )	-1.36***	.21	-3.101	2.32	-9.73***	.30	-5.00***	.56	-3.61*	.74
Transfer% ( $\gamma_{01}$ )			3.32	1.58					1.23*	.77
AvgAdvisee ( $\gamma_{02}$ )			.005	.005					<-.001	<.001
Advising Appointments Per Year ( $\gamma_{03}$ )			<.001	<.001					<.001	<.001
First Semester Level 1 Risk ( $\gamma_{04}$ )			1.94	6.29					.89	1.32
First Semester Level 2 Risk ( $\gamma_{05}$ )			-10.17	4.96					-4.52*	1.12
<i>Fixed Effects</i>										
Dual Credit ( $\gamma_{10}$ )					.20*	.09	.19	.12	.02	.11
Transfer ( $\gamma_{20}$ )					1.84***	.07	.92**	.19	1.16***	.20
Full-time ( $\gamma_{30}$ )					.52***	.06	.27*	.09	.35**	.09

Retention ( $\gamma_{40}$ )	1.45***	.16	.23	.43	-2.50*	.76
First Semester GPA ( $\gamma_{50}$ )	.01	.04	.01	.04	-0.01	.03
First Year Cumulative GPA ( $\gamma_{60}$ )	-0.35***	.11	-0.27	.12	-0.42*	.14
First Semester year 2 GPA ( $\gamma_{70}$ )	-.98***	.18	-.99***	.18	-0.53***	.13
Second Year Cumulative GPA ( $\gamma_{80}$ )	2.88***	.15	1.02***	.18	1.20***	.18
SP2014Advisin g ( $\gamma_{90}$ )	.62***	.03	.34**	.08	.36**	.08
SU2014Advisin g ( $\gamma_{100}$ )	.34***	.05	.31**	.07	.16*	.06
F2014Advising ( $\gamma_{110}$ )	.34***	.03	.15*	.06	.17*	.07
SP2015Advisin g ( $\gamma_{120}$ )	.43***	.03	.21***	.03	.24***	.04
SU2015Advisin g ( $\gamma_{130}$ )	.25***	.04	.03	.17	.07	.18
F2015Advising ( $\gamma_{140}$ )	.16***	.03	.05	.06	.05**	.02
SP2016Advisin g ( $\gamma_{150}$ )	.06	.03	.07	.09	.01	.08
SU2016Advisin g ( $\gamma_{160}$ )	-0.23***	.06	.01	.15	-0.05**	.02
F2016Advising ( $\gamma_{170}$ )	-.73***	.04	-0.19	.13	-0.19	.10
SP2017Advisin g ( $\gamma_{180}$ )	-2.94***	.11	-0.36	.25	-0.41	.35
AGE ( $\gamma_{190}$ )	-.01	<.001	-0.007	.008	<.001	<.001

Hours transferred (Y <sub>200</sub> )	<.001	<.001	.002	.001	<.001	<.001
HISP (Y <sub>210</sub> )	.05	.05	.02	.06	.02	.04
AFRAM (Y <sub>220</sub> )	.03	.02	-0.03	.08	.02	.05
ASIAN (Y <sub>230</sub> )	.01	<.001	-0.02	.07	-0.01	.04
INTERNAT (Y <sub>240</sub> )	<.001	<.001	-0.11	.12	-0.02	.08
OTHER (Y <sub>250</sub> )	<.001	<.001	-0.03	.12	-0.03	.08
ARCHITEC (Y <sub>260</sub> )	-1.47***	.48	-0.34	.23	.23	.27
Cohort2012 (Y <sub>270</sub> )	2.48***	.06	1.67***	.04	1.88***	.06
<i>Interactions</i>						
Retention to second year * % ofTransferStude nts in college					3.84**	.74
Spring2014Adv *RiskLevel 2					2.87*	.75
Summer2015 Advising*Risk level 1					-3.99*	1.16
Summer2015 Advising * Risk level 2					5.37**	1.15

*Chi-square table for HLM Graduation Outcome*

	SD	Variance	Df	$\chi^2$
Model 1	0.69	0.47	7	1064.84***
Model 2	0.43	0.18	2	103.19
Model 3	0.40	0.16	7	170.29**
Model 4	1.53	2.34	7	20.09**
Model 5	1.08	1.18	2	12.22**

*Note.* \*  $p < 0.05$ ; \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

**RQ2a results.** After running initial intercept-only models for each of the outcome variables on each cohort, HLM analysis proved appropriate only for the 2012 cohort graduation outcome. Therefore, binary logistic regression was deemed appropriate for testing the binary outcome of persistence from first year to second year (1=persisted; 0=did not persist). While college-level characteristics could not specifically be tested for in the logistic regression model, the difference in persistence across colleges was tested and the results are explained under the results section for RQ3.

**RQ2b results.** Research question 2b asked about college-level characteristic influence on graduation. The HLM means-as-outcomes model tested only college-level variables on the graduation outcome. The results, found in Table 8, indicated that the level-2 variables (percentage of transfer students in the college, average number of students per advisor, total advising contacts for the year, and percentages of students with at-risk statuses) alone could not account for the variance in the outcome variable.

However, the random-regression coefficient model tested between-college variance, indicating which level-1 factors demonstrated variance at the college level. Baseline odds of retention demonstrated significant variance ( $\chi^2 (7) = 20.09, p = .006$ ) across colleges. The random-regression coefficients model was tested using predictor variables that were statistically significant in the ANCOVA model (Dual Credit, Transfer, Full-Time, Retention, Cumulative GPA 1 and 2, Advising Contact, and Architecture). Results from the random-effects model indicated nine of the 16 level-1 fixed-effects included in the model demonstrated significant between-college variance. Transfer designation ( $\chi^2 (7) = 45.12, p < .001$ ), Retention ( $\chi^2 (7) = 26.84, p < .001$ ), Cumulative GPA 2 ( $\chi^2 (7) = 15.24, p = .033$ ), Spring 2014 advising contact ( $\chi^2 (7)$

=31.41,  $\rho < .001$ ), Fall 2014 advising contact ( $\chi^2 (7) = 31.41$ ,  $\rho < .001$ ), Summer 2015 advising contact ( $\chi^2 (7) = 44.49$ ,  $\rho < .001$ ), Fall 2015 advising contact ( $\chi^2 (7) = 37.27$ ,  $\rho < .001$ ), Summer 2016 advising contact ( $\chi^2 (7) = 27.36$ ,  $\rho < .001$ ), Fall 2016 advising contact ( $\chi^2 (7) = 51.55$ ,  $\rho < .001$ ), and Spring 2017 advising contact ( $\chi^2 (7) = 61.37$ ,  $\rho < .001$ ) all demonstrated significant between-college variance.

In addition, fixed effects for the variables Transfer ( $b = 0.92$ ,  $\rho < .001$ ), Full-time ( $b = 0.27$ ,  $\rho = .023$ ), Cumulative GPA 2 ( $b = 1.02$ ,  $\rho < .001$ ), Spring 2014 advising ( $b = 0.34$ ,  $\rho = .005$ ), Summer 2014 advising ( $b = 0.16$ ,  $\rho = .035$ ), Fall 2014 ( $b = 0.15$ ,  $\rho = .046$ ), and Spring 2015 advising ( $b = 0.21$ ,  $\rho < .001$ ), continued to be positive and significant, while the remaining advising semesters and the College of Architecture were no longer statistically associated with odds of graduating.

**RQ3 results.** Research question three asked whether differences in likelihood of persistence could be attributed to college advising features. As the HLM approach was inappropriate to the application of this question<sup>8</sup>, it cannot be answered directly. Indirectly, through the use of logistic regression, we can see how students interacting with advising in each college influenced their persistence from first to second year. As explained in the results section for RQ1a, some of the colleges had either a positive or negative influence on the probability of student persistence<sup>9</sup>.

College of enrollment was dummy coded with the College of Liberal Arts and Social Sciences as a reference group as this college had the highest number of students

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<sup>8</sup> Testing of the intraclass correlation coefficient for the persistence outcome indicated that less than 6% of the variance of persistence could be explained at the college-level, negating the appropriateness of a two-level model

<sup>9</sup> The 2012 cohort cannot be included in the analysis for this question as advising details were not available from the colleges until the Spring of 2014.

enrolled each year. Therefore, the 2013 Cohort students enrolled in the College of Education had lower log-odds of persisting to year two by a factor of .584 while students in the College of Natural Sciences and Mathematics had higher log-odds of persisting by a factor of 1.476 compared to CLASS students. Students in the 2014 Cohort who were enrolled in the College of Natural Sciences and Mathematics had higher log-odds of persisting by a factor of 1.476. Finally, the Cohort of 2015 had two colleges that had positive log-odds related to student retention. Students enrolled in the College of Technology had higher log-odds of persisting by a factor of 1.377, and students enrolled in the College of Hotel and Restaurant Management had higher log-odds of persistence than their CLASS peers by a factor of 2.260.

**RQ4 results.** The fourth research question asked whether there was an interaction between student- and college- level predictors on the odds of persistence and graduation. While the HLM model was not useful for the persistence outcome<sup>10</sup>, this question can be answered for the graduation outcome using the 2012 cohort. Refer back to Table 8 to reference the intercepts-and-slopes model results discussed in this section.

The intercepts-and-slopes as outcomes model was initially tested with all variables simultaneously and subsequently trimmed to remove all non-significant level-2 factors<sup>11</sup>. The final model was significant ( $\chi^2 (2) = 12.22, p < .01$ ) and indicated that there were two college-level variables that were significant in predicting the odds of whether or not students graduated. The percentage of transfer students enrolled in a college was

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<sup>10</sup> Testing of the intraclass correlation coefficient for the persistence outcome indicated that less than 6% of the variance of persistence could be explained at the college-level, negating the appropriateness of a two-level model.

<sup>11</sup> While running the level-2 variables, multicollinearity was discovered among total advising contact for each year. It was therefore decided that the model would run with the total number of advising appointments held during the 2015 school year as that was the first year with complete advising data reported from all colleges.

positively and statistically significantly ( $b= 1.23, \rho =.77$ ) associated with the odds student graduation. Conversely, the percentage of students in a college who had high-risk GPAs were negatively and statistically significantly ( $b= -4.52, \rho =.033$ ) associated with odds of student graduation. In both cases, the magnitude of these of effects was quite large, suggesting practical significance for these findings.

As was the case in previous models, a number of level-1 predictors, including Transfer designation ( $b= 1.16, \rho <.001$ ), retention to the second year ( $b= - 2.5 \rho =.032$ ), Cumulative GPA for the first year ( $b= - 0.42 \rho =.005$ ), GPA for the first semester of the second year ( $b= - 0.53, \rho =.003$ ), Cumulative GPA for the second year ( $b= 1.20, \rho <.001$ ), Spring 2014 advising ( $b= 0.36, \rho =.004$ ), Summer 2014 advising ( $b= 0.16, \rho =.026$ ), Fall 2014 advising ( $b= 0.17, \rho =.046$ ), Spring 2015 advising ( $b= 0.23, \rho <.001$ ), Fall 2015 advising ( $b= 0.05, \rho =.003$ ), and Summer 2016 ( $b= -0.05, \rho =.003$ ), were found to be statistically significantly associated with odds of graduation.

Interactions between advising and at-risk students were tested to determine if students at greatest academic risk would benefit from academic advising. There were significant interactions for Spring 2014 advising and students at risk level 1 ( $b= - 1.99, \rho =.049$ ), Spring 2014 advising and students at risk level 2 ( $b= 2.87, \rho =.012$ ). Significant interactions were also found for Summer 2015 advising with students at risk level 1 ( $b= - 3.99, \rho =.018$ ) and students at risk level 2 ( $b= 5.37, \rho =.006$ ). There was also a positive significant interaction between student retention to the second year and percentage of transfer students in the college ( $b= 3.84, \rho =.004$ ).

**RQ5 results.** The outcome of interest for this question was the cumulative GPA for the 2015 cohort. This outcome was of particular interest for this cohort as they were

the first cohort to experience academic advising contact after a change in institutional policy calling for increased efforts among academic advising units in the colleges at Metropolitan University to more accurately report their advising contact methods. As HLM was an inappropriate method to predict the academic outcome, multiple regression analysis was conducted to predict the first year cumulative GPA.

Thirteen predictor variables were entered simultaneously into the analysis: dual credit designation, transfer designation, Fall 2015 advising contact, Spring 2016 advising contact, sex, age, and college with CLASS as the reference group. The model was statistically significant  $F(19, 7587) = 31.13, p < .001$  Adjusted  $R^2$  indicates the overall variance explained by the predictors was 7.2%.

Six predictors positively associated with the outcome variable. Fall 2015 advising contact ( $\beta = .075, p < .001$ ) and Spring 2016 advising contact ( $\beta = .086, p < .001$ ) had significant positive regression weights, indicating that students who had more advising contact in these semesters were expected to have a higher first year GPA, after controlling for the other variables in the model. Enrollment in the Colleges of Business ( $\beta = .277, p < .001$ ), HRM ( $\beta = .444, p < .001$ ) and NSM ( $\beta = .130, p < .001$ ) were also associated with having a higher first year GPA than students enrolled in the College of Liberal Arts and Social Sciences, after controlling for the other variables in the model. Students enrolled full-time ( $\beta = .097, p < .001$ ) were expected to have a higher first-year GPA when compared with students enrolled part-time.

Three predictor variables were negatively associated with first year cumulative GPA. Students with a transfer designation ( $\beta = -.178, p = .000$ ), were expected to have a lower first year cumulative GPA when compared with FTIC students. Students

enrolled in the College of Technology ( $\beta = -.182, \rho = .000$ ) and Exploratory Studies ( $\beta = -.243, \rho = .000$ ) were also expected to have lower first-year GPA than students enrolled in the College of Liberal Arts and Social Sciences after controlling for the other variables in the model.

Demographic variables including sex and age were not statistically significant in the model. The dual credit designation and enrollment in the Colleges of Architecture and Education were also insignificant in determining first-year cumulative GPA. Ethnicity was removed from the model as it did not add any significance to the model. Full regression results can be found in Table 9.

Table 9

*Multiple Regression Predicting 1<sup>st</sup> Year Cumulative GPA for 2015 Cohort*

<b>Variable</b>	<b><i>B</i></b>	<b><i>SE<sub>B</sub></i></b>
Intercept	2.801***	.053
Dual Credit	.015	.036
Transfer	-.099***	.024
F2015 Advising	.092***	.010
Sp2016 Advising	.096***	.011
FullTime Degree Seeking	.097***	.028
Sex	-.005	.020
Age	-.011	.002
Architecture	.003	.075

Business	.104***	.033
Education	.014	.049
HRM	.075***	.067
NSM	.050***	.034
Technology	-.079***	.028
UScholars	-.083***	.038

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### Conclusion

The results from the multilevel analyses were explained in this chapter. The HLM analysis was only appropriate for use with the 2012 cohort with the graduation dichotomous outcome. In an effort to answer the subsequent research questions related to persistence and GPA, the researcher used additional statistical methods. Binary logistic regression was employed with data from each cohort to determine which factors influenced the probability of second year retention. Multiple linear regression was utilized to examine which factors associated with the first-year cumulative GPA outcome for the 2015 cohort.

Results indicated that variance can be explained by both student- and college-level predictors. Results from HLM, logistic regression, and linear regression also indicated that academic advising contact is an important and significant predictor of both student persistence and graduation. The next chapter will further discuss the results for each research question and the researcher will suggest implications for practice and for research.

## Chapter 5: Discussion and Implications

### Overview

In this final chapter, the study results will be discussed in greater detail for each research question as they relate to previous research. Implications for practice and research will follow the results discussion. The limitations of the study are considered and the chapter will conclude with consideration of how this study contributes to the broader existing research on academic advising and student success.

### Discussion by Research Question

**RQ1a.** This research question asked whether the odds of retention to the second year were influenced by student-level characteristics. Each cohort was tested separately due to significant differences in data availability affecting each year of data. Despite differences between cohorts, the data collectively give a fairly cohesive overall picture of what factors contribute to student persistence. The results below are discussed by cohort and as a whole.

**2012 cohort results.** First, students enrolled at full-time degree seeking status had a higher probability of persisting to the first semester of their second year compared with students enrolled part-time or non-degree seeking students. This finding is consistent with previous research on student persistence linked with intent to stay and goal commitment (Astin, 1993; Bean, 1982; Cabrera & Casteneda, 1993; Tinto, 2006). Students enrolling full-time are more likely following a degree plan and are working towards a goal of graduation. Students committed to their goal are likely to continue into their second year of school, barring academic or personal barriers preventing their return. This model also suggests that first semester and cumulative first year GPA are important predictors of

persistence. Chen's (2012) study similarly indicated that GPA was one of the most significant predictors of student persistence or attrition.

One of the more surprising findings indicated that students who were at-risk level one, meaning their GPA fell between 2.0 and 2.99, had a higher probability of persisting to their second year than students with other risk levels. The comparison group for this dummy coded variable was students at low-risk, with GPA of 3.0 or higher. This was also the case for the 2013 cohort. There are several possible interpretations of this result. First, it could indicate academic advising intervention. Second, this could be a natural student reaction to adjusting to college. Once the first semester grades are posted, students strive to maintain their grades so that they may persist to the next year. Third, given the large transfer student population at Metropolitan University, this could be an indication of transfer shock (Hills, 1965; Ishitani & McKittrick, 2010). Finally, Metropolitan University has a history of students transferring to other institutions when they earn a high GPA during their first year, indicating that students with lower GPAs may have higher retention levels because they are returning to MU in their second year. Previous research on transfer shock notes that with proper support, transfer students recover and can persist (Hill, 1965). These results support previous transfer student research. Less surprising is the result indicating that students earning below a 2.0 GPA at the end of their first year are less likely to persist to the following year. Students are placed on academic probation and may become discouraged, declining to enroll in the next year. Institutional policies related to financial aid require students to maintain good academic standing to receive various forms of financial assistance. Therefore, attrition for students earning below a 2.0 GPA could be due to financial constraints.

**2013 cohort results.** The model for the 2013 cohort was the first to include any academic advising data but was still incomplete without the fall semester advising data. The results for this cohort were similar to those of the 2012 cohort in regards to the higher probability of retention for students enrolled full-time, with similar results for the first semester and cumulative GPA, and at-risk results.

Two demographic variables showed significant results, both with decreased log-odds of persistence. First, males were slightly less likely to persist than females. This is consistent with first-year retention rates for males (82%) and females (87%) at MU. This cohort also showed that African American students are less likely to persist than White students as a comparison group. This finding is consistent with the most recent national report on student persistence which indicated that African American students have the lowest first-year persistence rates (NSC, 2017). What is most surprising about these results is that demographic characteristics generally were not statistically significant predictors across statistical models.

Academic advising contact was introduced into this model and was found to be a positive predictor of persistence. The results suggest that the more times a student had contact with academic advisors during the spring and summer semesters, the probability of persistence increased. Swecker et al. (2013) had similar findings in their study of first-generation students. This model also introduced enrollment in different colleges as significant predictors of student persistence. While Swecker et al.'s study found major was not a significant predictor of persistence, this study found that college of enrollment has a potential impact on student probability of retention. The College of Liberal Arts and Social Sciences (CLASS) was used as a comparison group. Students enrolled in the

College of Education (COE) had a slightly lower likelihood of persistence, while students enrolled in Natural Sciences and Mathematics (NSM) had a larger coefficient positively linked to odds of persistence. Looking at the advising structure of both colleges in Appendix 1, NSM has fewer advisors and a higher student population than the COE. Each college has similar total academic advising appointments as well. This case puts Pfeffer and Salancik's (2003) organizational resource dependency theory into question. A more detailed qualitative analysis into advising practice of the various colleges would be necessary to understand why students in a college with more staff resources are less likely to persist to their second year.

**2014 cohort results.** This cohort model was the first to include full advising data. The results from this logistic analysis and that of the 2015 cohort are more similar to one another. As was found in the previous two cohorts, full-time enrollment is a positive predictor of retention log-odds, as is first-year cumulative GPA. Similar to the previous cohort results, at-risk level 2 for both semesters is negatively associated with the probability of persistence. Once again, NSM students were more likely to persist to year two than their CLASS peers.

This cohort had two significant demographic variable predictors. Transfer students and older students had a decrease in odds of persistence compared with FTIC and more traditionally aged college students. These two variables are likely related. As stated earlier, transfer students are typically older than students entering as FTIC (NCES, 2012). Transfer students are also less likely to persist to graduation, and are less likely to enroll full-time (NSPAS, 2012). Therefore, it is consistent with previous research that these students have slightly lower odds of persistence than their comparison group.

The advising contact variables are divided in their success. First semester advising is associated with a lower probability of persisting, but the significance of this finding is smaller compared to those for the spring and summer semesters which support the previous findings that increased contact with academic advisors is positively related to the probabilities of retention. As is true with the other analyses conducted in this study, first semester academic advising is less significant than advising contact after the first semester.

**2015 cohort results.** In this final logistic regression analysis, the results are consistent with the majority of the findings. As with each of the models, full-time students, cumulative GPA, and spring and summer advising are all predictors which increase the probability a student will persist. Once again, transfer students, and those with at-risk status 2 are at decreased probability of persisting. The different results in this model are related to college enrollment. NSM is no longer significant, but the Colleges of Hotel and Restaurant Management (HRM) and Technology both have large positive coefficients related to the probability of persistence. What makes this interesting is that the 2015 cohort was the first to experience college academic advising after an institutional policy change which encouraged colleges to more closely monitor their advising practices. A future longitudinal study may be able to capture trends as a result of this policy change.

**Summary.** Consistent across all four models and cohorts were the significant results for full-time student enrollment, first-year cumulative GPA, and at-risk status 2 in the second semester. Academic advising contact, particularly in the spring and summer semesters, was a predictor of probable persistence, while transfer students were less

likely to persist. These student-level characteristics successfully predicted the persistence outcome in each model at a high rate. Demographics factors were less consistent across models. This is unsurprising considering that Swecker et al. (2013) did not find demographic characteristics to be significant predictors in their retention study. This is also reflective of the HLM results where demographic variables were also insignificant in predicting graduation.

**RQ1b.** This research question asked whether the graduation outcome was influenced by student-level predictors. The HLM ANCOVA model tested the level-1 predictors. The results for academic predictors indicate that both dual credit and transfer students are more likely to graduate than FTIC students when all other variables are held constant. While this result is in contrast to the first-year persistence logistic regression results for the 2014 and 2015 cohorts, it could be explained by the transfer shock literature (Hills, 1965; Ishitani & McKittrick, 2010) which suggests that with guidance and support, transfer students can rebound after their first year. The dual credit student results are not as statistically strong as the transfer results. However, this positive result is tangentially supported by dual credit literature which states that students who participate in these programs are likely to have higher a first-year GPA (An, 2015; Karp, 2012), though these studies have not linked dual credit program enrollment to graduation outcomes.

Consistent with work pointing to goal commitment as an important success factor (Astin, 1993; Bean, 1982; Cabrera & Casteneda, 1993; Tinto, 2006), students who were enrolled full-time and those who persisted to the first semester of their second-year post-enrollment had higher log-odds of graduating. First year cumulative GPA had a small

negative coefficient indicating that there was a small decrease in probability of graduation for a higher GPA. More important in predicting graduation was the second year cumulative GPA. This result indicated that students had a nearly three times higher log-odds of graduating for every unit increase in GPA. This result is consistent with Chen's (2012) multilevel study.

Academic advising contact for this cohort had significant results related to the probability of graduation. Advising data for all colleges left in the model was counted starting with Spring 2014, over one year after the 2012 cohort first enrolled. Higher levels of academic advising contact, meaning the more times a student interacted with an academic advisor, for the Spring 2014, Summer, 2015, and Fall 2015 semesters were associated with an increase in the probability of graduation. However, academic advising contact from Summer 2016 forward was associated with decreased odds of graduating. If students were still seeking academic advising after the Spring semester, they were unlikely to graduate within five years of their initial enrollment<sup>12</sup>.

Finally, students enrolled in the College of Architecture, when compared with CLASS students, had approximately 1.5 times lower log-odds of graduating. While previous studies did not find any significant relationship between students' major and their success outcomes (Swecker et al., 2013), this study has found that the college can have an influence on student outcomes. However, as more variables are added into this model, college influence becomes insignificant.

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<sup>12</sup> Data for this cohort end before the end of the Spring 2017 semester. Graduation data for that semester is unavailable.

**RQ2b.**<sup>13</sup> This research question asked whether college-level characteristics had an influence on the probability of college student graduation. The HLM model testing only the college-level variables indicated that the variables (percentage of transfer students per college, average number of students per advisor, total advising contacts made by college per year, percentage of students with at-risk status 1, and at-risk status 2) alone could not explain any changes within the graduation probabilities of the students. However, the combination of these factors with level-1 factors were significant in predicting odds of graduation, as discussed in the RQ4 discussion section.

The random-coefficients model did show that the random effects on transfer students, persistence to second year, first-year cumulative GPA, academic advising contact for Spring 2014, Fall 2014, Summer 2015, Fall 2015, Summer 2016, Fall 2016, and Spring 2017 were all significant predictors across colleges. While there is no evidence of college features influencing student graduation, there is evidence that several variables have significant influence on students' probability of graduating within these colleges. Previous research has similarly found that persistence to second year (Nora, Barlow, & Crisp, 2005) and GPA (Wintre & Bowers, 2007) are predictors of graduation. The majority of academic advising studies have primarily focused on how advising influences persistence (Ableman & Molina, 200, 2001, 2002; Glennen, 1975; Swecker et al., 2013).

**RQ3.** This question asked whether differences in likelihood of persistence could be attributed to college advising features. For the answer to this question it is necessary to

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<sup>13</sup> RQ2a was unanswerable via the statistical models used and is therefore not included in the discussion.

look at how students engaged with advising within their colleges, which was answered within the logistic regression models run for each cohort, as discussed in RQ1a.

The number of times a student engaged with academic advisors each semester was used as a factor to predict persistence. The majority of colleges as predictor variables for each cohort of students were not significant predictors of persistence, meaning that the college of enrollment has less influence on students' success than individual student characteristics. This is supported by the Swecker et al. (2013) study which found that major was not a significant predictor of retention. However, Chen's (2012) study found institutional level characteristics such as student services expenditures and student engagement with university resources had an impact on student attrition. Chen's study was longitudinal and used a national dataset. The colleges that were found to be significant predictors of persistence in this study varied by year. Perhaps a more consistent longitudinal dataset could provide more consistent results to analyze. Significant results for the advising engagement by college should not be ignored, however. There are future research questions and practical implications for these results which will be addressed in the next sections.

**RQ4.** This question asked whether there was an interaction between student- and college-level predictors on the odds of persistence and graduation. This question could only be answered for the 2012 cohort and the graduation outcome. While the college-level variables alone could not predict the probability of graduation, when tested with the individual-level predictors, both percentage of transfer students in the college and the percentage of students at high academic risk were significant in predicting graduation outcomes.

In contrast to the findings of Nutting's (2011) study which found that high percentages of transfer students in a program decreased the likelihood of graduation, these results indicate that for each increase in transfer student percentages in the college, students enrolled in that college have log-odds 1.41 times higher of graduating. This is consistent with the individual-level variable of transfer students also having positive influence on a students' odds of graduating. The interaction between percentage of transfer students and student retention to year two strongly supports the graduation outcome, indicating that students enrolled in colleges with a higher percentage of transfer students have an increase of log odds of 3.84 of persisting to their second year. Persistence to the second year is a strong predictor of likelihood of graduation (Cabrera, et al., 1993).

Colleges with larger percentages of students with a first-year cumulative GPA of less than 2.0 were associated with a large decrease in the odds that students will graduate. This study found that academic advising contact during Spring 2014 and Summer 2015 was most impactful for students with the highest academic risk. Students with a GPA below 2.0 who had contact with advising had substantially higher probabilities of graduating than students who did not attend advising. Whether the institutional adoption of a more proactive form of advising contributed to these positive outcomes is difficult to assess. The results from all other semesters were non-significant. Students who were at a lower risk actually decreased their odds of graduating by participating in advising. This could be a result of those students transferring to another institution. Further research and longitudinal data observed after the institutional advising change will shed more light on

whether or not there is a positive trend in advising helping students at higher risk for attrition, but these results indicate that high-risk students certainly benefit from advising.

The Young-Jones et al. (2013) study indicated that academic advising did not have a direct impact on GPA but had positive impacts on retention. Ableman and Molina (2000, 2001, 2002) found that intrusive advising had a positive effect on academic achievement. The student-level predictor results indicated that academic advising contacts were positive predictors of graduation. Continuing to utilize intrusive advising tactics with students at highest academic risk could potentially improve persistence and graduation rates. More practical implications will be discussed in the following sections.

**RQ5.** This question asked whether first-year cumulative GPA for the 2015 cohort was influenced by academic advising contact. Academic advising contact for both Fall 2015 and Spring 2016 were positively associated with the GPA outcome variable. In contrast with the Young-Jones et al. (2013) study, GPA is influenced by having more academic advising contact. This study and the Young-Jones et al. study used different predictor variables, however. The variables in the model only accounted for a small percentage of the total variance in GPA. Therefore, it would be prudent to conduct more tests with a longitudinal dataset to see if there is a positive trend for multiple cohorts over time.

Students enrolled in the Colleges of Business, HRM, and NSM were also expected to have a higher first year GPA compared with CLASS students, while Technology students and those enrolled in Exploratory Studies were expected to have lower GPAs than CLASS students. Transfer students also had lower GPAs in this model than FTIC students, consistent with transfer literature (Hills, 1965; Ishitani & McKittrick,

2010). These results are similar to the logistic regression results on persistence for transfer students.

### **Implications for Practice**

This study was designed to predict success outcomes for students enrolling with different types of credits from different academic experiences (transfer and dual credit), through the lens of academic advising engagement. The work of Tinto (1975, 1993), Astin (1993), and Bean (1980, 1983) states that student behavior is often the key to academically and socially integrating into the institution, which is vital to persistence. The results from the various analyses demonstrated that the more often a student made the effort to engage with academic advisors, there were positive academic outcomes and positive outcomes related to persistence and graduation. While these results supported the prior research, there was no indication of the type or intensity of advising contact between students and advisors. The advising check-in system allows for notes to be added to the student advising file. This feature was used inconsistently by college advisors. If more drop-down options were added to the form, Metropolitan University could analyze what types of conversations are happening during advising sessions and could use this information to inform practice and to identify at-risk students for earlier intervention.

While dual credit students did not have many significant results across analyses in this study, there is still a need to include them in future studies. In order to better understand this population of students and how they are performing at Metropolitan University and across the state, it may be helpful to add an option on the common Texas public university application which allows students to self-select a dual credit status to

differentiate these credits from transfer credits. At the Metropolitan University level, dual credit designation should be added into the student tracking system. This status will make evaluation of this population easier in the future.

There are several studies indicating that intrusive or proactive advising practices can help students at highest risk for attrition (Glennen, 1975) and can have positive impact on academic outcomes (Ableman & Molina, 2000, 2001, 2002). While type and intensity of academic advising were not indicated by the data, the researcher posits that the institution would benefit from taking a more proactive advising approach with students. The aspirational population health management model would be especially helpful for students who are in the at-risk status 2 category in their first semester. Those students at highest academic risk would be more likely to persist if an academic advisor intervened and helped them to make clear educational goals (Cabrera & Casteneda, 1993; Laanan, 2001).

Transfer students are a large proportion of each cohort of new students enrolling at Metropolitan University. As previous research states, this is a student population that has a greater need for administrative support and intervention than FTIC students (Cejda, Rewey, & Kaylor; 1998; Miller 2013). This study had conflicting information about transfer student success. While transfer students in the 2012 cohort were reported as more likely to graduate, transfer students in the 2014 and 2015 cohorts were less likely to persist to their second year, and more likely to have a lower first-year GPA. Research has indicated that if transfer students have the proper administrative support, they will recover from transfer shock (Hills, 1965; Ishitani & McKittrick, 2010) and can be just as successful as their FTIC peers. The results from this study indicate that transfer students

need more support in their first-year post-enrollment as they adjust to a new institution. Metropolitan University may want to consider adding responsibilities to some academic advisor roles that include supporting first year transfer students. Another possible tactic would be to implement the aforementioned proactive advising model, paying special attention to first-year transfer students.

### **Implications for Further Research**

There are several opportunities for continuing this research. The practical implications from this study also inform potential directions for future research with Metropolitan University. As stated in the previous section, the type and intensity of academic advising happening in each college is largely unknown. A qualitative research project could be devoted to understanding the advising approach taken by advisors in each college before deciding what advising approach the university should adopt. Academic advising philosophies could be documented and notes from the advising check-in system could be evaluated to determine what is happening within advising sessions. Colleges with higher retention numbers and better academic outcomes could serve as comparison groups. This would be especially interesting considering the disparities in average students per advisors in different colleges.

In order to get a better understanding of trends in student success outcomes as they relate to academic advising contacts, another longitudinal study could be conducted for the cohorts enrolled after the shift in institutional policy went into effect. As Chen's (2012) study demonstrates, more years of data can create a clear understanding of what is working and what needs improvement. More college-level data availability would make for more robust models, especially if Metropolitan University wants to understand how

college-level variables influence persistence, academics, and graduation for multiple cohorts.

Metropolitan University may also consider piloting a study to evaluate the efficacy of proactive academic advising. Schwebel et al. (2008) provide a model to follow for conducting a randomized trial comparing the results from a more intrusive style of advising and that of a more passive advising style. If the institution wanted to consider instituting a specific advising approach, they may want to test it first.

Finally, as Metropolitan University has a large transfer student population, it would be interesting to understand which colleges have articulation agreements with area community colleges and high schools. A future study could uncover how these agreements influence transfer student success in comparison with students transferring credits from institution which do not hold articulation agreements with the university. Loss of credits could hinder transfer student progress. Currently, there is not a centralized location to procure that information.

### **Limitations**

The data set and study have limitations which must be considered if this work is to be improved upon in future studies. This study is limited because data was collected from a single institution. As this institution is large and urban with a very diverse student population, the results of this study may not be generalizable to other institutions which are smaller, private, or have a more homogenous population. There are also some assumptions made by the researcher about the data set. For example, students entering college with credits from different sources are more difficult to track as their educational backgrounds place them at various starting points. Dual enrollment credits present as

transfer credits on student records. The author made the assumption that those students considered FTIC who enrolled at the university with pre-enrollment credits earned those credits through a dual credit program.

There is also no flag within this dataset that indicates whether or not a transfer student earned an associate degree before transferring to Metropolitan University. Cjeda et al. (1998) suggests that students earning an associate degree prior to transfer are more likely to persist to graduation post-transfer. Total hours transferred was a variable used in this study but was not significant in predicting persistence or graduation. A variable indicating an earned associate degree may have been more significant in the models.

There is also a limitation in the information provided by the individual college academic advising departments. The university does not require departments to follow one operating procedure when entering advising appointment information into the university-wide system. Therefore, the data set provides inconsistent information from one college to the next. The advising contacts reported may not accurately reflect the number or frequency of advising contacts taking place in each college. In addition, the advising appointment information does not reflect whether the student attended the appointment, only that the appointment was scheduled, or that contact was made between the advisor and the student. The College of Engineering data had to be removed due to a lack of reporting advising contacts reducing the size of the dataset. In addition, examining the effect colleges have on student outcomes could be approached in different ways that may be more effective than comparing them by student population size in future research. More appropriate means of comparison could include comparing each college with the other or using a different within college variable as a point of

comparison such as pre-enrollment standardized test score averages or GPAs to assess a student baseline.

Multicollinearity was discovered among the college-level data reporting the number of advising contacts made each year. The total number of advising appointments conducted each year created a near singularity. Therefore, the HLM model was restricted to testing total academic advising data from only one year as it predicted the graduation outcome for the 2012 cohort.

Finally, while we know that financial aid and financial hardships can be a contributing factor to student attrition (Bastedo & Jaquette, 2011; NCES, NSPAS, 2012), the dataset provided for this study does not include students' financial information. Therefore, student finances were not included as a variable for consideration in determining the impact on student success and persistence. Nor were student finances be considered when determining which students are at higher risk for attrition.

### **Conclusion**

This study is valuable to body of research on academic advising as it adds new variables and outcomes to existing work, challenges previous work on transfer student success, and offers evidence-based suggestions for improving academic advising practice. Swecker et al.'s (2013) study also found that number of academic advising meetings was a significant predictor of student retention, but they found no evidence to support that a student's major could influence retention. Their study also suggested using longitudinal dataset with multiple cohorts and adding graduation as an outcome to further test the efficacy of academic advising meetings. This study improved upon the Swecker et al. study with the addition of those elements. This study also adds to the increasingly

methodologically rigorous studies on academic advising (Schwebel, et al., 2008; Swecker, et al., 2013; Vander Schee, 2007; Young-Jones, et al., 2013).

Practitioners may find this study interesting as they consider their work advising students. As this and other studies indicate, interactions with academic advisors is an important factor in student academic outcomes, first-year persistence, and graduation. Academic advisors are a rare population within a university context as they have more one-on-one student contact than the majority of faculty and staff. They have the power to influence students' academic progress, attitude towards the university, and opinion of university personnel. Academic advisors hold a unique position in the university organizational structure that allows them to form a more personal connection with students. These staff members should use their influence to guide students to make healthy decisions about their academic careers.

NACADA has called for more institutions to use academic advising as an intervention tool, noting that the majority of institutions are not proactively attempting to improve their student retention numbers (2004). Universities with decentralized academic advising units, such as Metropolitan University, have a duty to examine how these units are approaching their advising practice. A study such as this highlights that academic advising offices are not necessarily equipped to meet with every student enrolled in their college, and students who may be at higher risk for attrition are not receiving the attention that they need to be successful. If institutions want to improve graduation rates, they should start by taking a look at their advising structure.

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## **Appendix A**

### **College Level Data for 2012 Cohort HLM Analysis**

Table A1

*College Level Data for 2012 Cohort HLM Analysis*

College ID		Transfer	FTIC	DC	Transf %	Advisors	AvgADV	Total Adv 2012	Total Adv 2013	Total Adv 2014	Total Adv 2015	1880 AR_1	1880 AR_2
15	Architecture	69	42	24	0.51	2	357	249	228	206	169	0.35	0.18
25	Business	476	107	52	0.75	18	335.5	1869	2780	2002	1049	0.19	0.11
30	Education	327	62	23	0.79	7	375.57	1369	1438	1066	579	0.3	0.2
40	HRM	112	52	21	0.61	4	295.5	0	162	80	63	0.27	0.04
46	CLASS	1630	430	189	0.73	41	290.81	0	1620	2388	1673	0.3	0.19
47	NSM	431	429	204	0.41	4	1420.25	1410	1087	823	529	0.25	0.19
65	Tech	453	83	30	0.8	7	530.29	668	867	877	590	0.28	0.24
90	Exploratory	120	500	209	0.15	5	406.4	3004	676	273	149	0.3	0.14

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APPROVAL OF SUBMISSION

June 30, 2017

Kathryn Wheatley

kpwheatley@uh.edu

Dear Kathryn Wheatley:

On June 30, 2017, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	DUAL-CREDIT AND TRANSFER STUDENT ACADEMIC ADVISING ENGAGEMENT: A MULTI-LEVEL STUDY
Investigator:	Kathryn Wheatley
IRB ID:	STUDY00000403
Funding/ Proposed Funding:	Name: Unfunded
Award ID:	
Award Title:	
IND, IDE, or HDE:	None
Documents Reviewed:	<ul style="list-style-type: none"><li>• IRB Data Approval Memo Wheatley.pdf, Category: Letters of Cooperation / Permission;</li><li>• Wheatley IRB Protocol, Category: IRB Protocol;</li></ul>
Review Category:	Exempt
Committee Name:	Not Applicable
IRB Coordinator:	<a href="#">Sandra Arntz</a>

The IRB approved the study from June 30, 2017 to June 29, 2022, inclusive.

To ensure continuous approval for studies with a review category of “Committee Review” in the above table, you must submit a continuing review with required explanations by the deadline for the May 2018 meeting. These deadlines may be found on the compliance website (<http://www.uh.edu/research/compliance/>). You can submit a continuing review by navigating to the active study and clicking “Create Modification/CR.”

For expedited and exempt studies, a continuing review should be submitted no later than 30 days prior to study closure.

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If continuing review approval is not granted on or before June 29, 2022, approval of this study expires and all research (including but not limited to recruitment, consent, study procedures, and analysis of identifiable data) must stop. If the study expires and you believe the welfare of the subjects to be at risk if research procedures are discontinued, please contact the IRB office immediately.

Unless a waiver has been granted by the IRB, use the stamped consent form approved by the IRB to document consent. The approved version may be downloaded from the documents tab.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system.

Sincerely,

Office of Research Policies, Compliance and Committees (ORPCC)  
University of Houston, Division of Research  
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