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From Intended Enrollment to Actual Enrollment: A Statistical Analysis of Summer Melt

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From Intended Enrollment to Actual Enrollment: A Statistical Analysis of Summer Melt

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Education

by

Belen Sanchez

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ABSTRACT OF THE DISSERTATION

From Intended Enrollment to Actual Enrollment: A Statistical Analysis of Summer Melt

by

Belen Sanchez

Doctor of Education

University of California, Los Angeles, 2020

Professor Mark Hansen, Chair

Summer melt is defined as the attrition of students who complete high school with the intent to enroll in college but do not begin in the fall. The existing literature related to summer melt primarily focuses on interventions in an effort to minimize summer melt. These studies point to the benefit of summer assistance, either through advising or nudge text messaging, as strategies to decrease the rate of melt. Research to date primarily focuses on the macro-level of whether a student went to college or not.

This study uses a different approach in that it investigates the type and frequency of change between intended enrollment and actual enrollment. I conducted a quantitative study using records from four graduating high school classes (2016 – 2019) of a national charter public network. Type is analyzed by categorizing intended and actual enrollment as four-year college, two-year college, or no college. This allowed for a more nuanced view of shifts between plans. In addition, I conducted a multiple logistic regression analysis of four-year intending students to test candidate predictors of melt. The final regression model included student demographic characteristics, academic record and intended institution characteristics. I fit the same model with two-year intending students to identify similarities and differences in the variables associated with melt based on the type of institution a student plans to attend.

Of the 17,343 records used in this dataset, 22.8% of students had actual plans that did not match their intended plan. For four-year intending students, three variables were found to have

statistically significant associations with melt: Expected Family Contribution (EFC), grade point average (GPA), and the six-year minority graduation rate of the intended institution. An implication from this study is that the lower the EFC, the higher expected probability of melt. This affirms the systemic challenges that exist for low-income students to gain access to higher education, perpetuating a system of social reproduction where those who are more affluent have higher odds of beginning college and greater chances to reap the benefits afforded by a college degree.

The dissertation of Belen Sanchez is approved.

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2020

DEDICATION

I dedicate this to all of those who give of themselves to help others navigate a system that was not built for us. Whether as a role model, mentor, or in a formal role – continue to challenge the status quo.

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I begin by acknowledging my parents, Jose Luis and Margarita. Mom y Papi – gracias por todo su amor y esfuerzos. Ustedes siempre me han apoyado y me dieron la confianza que yo puedo lograr a lo que le pongo ganas.

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VITA

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CHAPTER ONE

Problem Overview

The immediate college enrollment rate, defined as high school graduates who enroll in college by October immediately after high school, increased seven percentage points, from 63% to 70%, over the 16-year period from 2000 to 2016 (NCES, 2018). Despite this progress, the immediate enrollment is not equal across all student groups. For example, there are notable differences based on family income: 67% of students from low-income families enroll in college immediately after high school, compared to 83% of their more affluent counterparts (NCES, 2018). Research on delayed college enrollment indicates a negative association between a late start and college completion (Bozick & DeLuca, 2005; Goldrick-Hab and Han, 2011). There are many reasons for this gap in immediate college enrollment, including differences in interest in attending, insight to the application process, and success in the application process. Even among students standing at the precipice of starting college, there are some who intended to enroll and did not enroll at that time. This is a phenomenon referred to as "summer melt".

Summer melt is defined as the attrition of students who graduate high school with the intent to enroll in college but are not enrolled when fall term begins (Castleman, Arnold, & Wartman, 2012). Intent to enroll in college typically means a student secured their seat by submitting paperwork, and at times financial payments, to confirm their plan to enroll at the institution. Castleman & Page (2014) estimate that students from low-income households are more susceptible to summer melt.

While there is a plethora of research related to college access, the summer after high school graduation remains relatively unexamined (Castleman et al., 2012). Research points to financial and information barriers as reasons that students do not begin college. Examples of

information barriers students face include the need to access, interpret and respond to requests from the institution such as registering for orientation and selecting classes. In addition, students and families have to finalize decisions to finance the cost of attending college and may face unanticipated expenses such as travel to the intended institution or fees associated with taking out loans (Arnold, Chewning, Castleman, & Page, 2015).

Furthermore, students who come from low-income families are likely to live amongst other family members and neighbors who do not have experience with higher education; this spatial isolation limits their access to others who enrolled in and completed college (Farmer-Hinton, 2008; McKillip, Godfrey, & Rawls, 2012). Limited access to others with college experience can impact whether or not students enroll at their intended college immediately after high school. During the summer, students are no longer in high school and are not yet fully matriculated to their intended college, leaving their support system in a state of uncertainty (Castleman et al., 2012). This gap presents itself at the same time that there are pulls from their intended institution and financial aid regulators. These pressures surface new, important decisions that students need to make, such as whether or not to take out loans to attend college. This happens at a time when students may no longer have access to those who supported them with the college application process. Students from wealthier families or whose parents attended college may not feel the strain of losing access to their high school. There are systemic barriers that impact whether or not a student will begin college, even if they complete all the steps to be eligible, gain entry, and commit to a college.

Project Overview

The national rate of summer melt is unknown, as intended matriculation and actual enrollment are not tracked in a systematic way. Most high schools do not monitor if their

graduates begin college and focus only on their attainment of a high school diploma, and colleges only publicly track and report on completion rates for students who officially begin at the institution. Students who secure their spot but do not enroll are not counted in the college's completion rate denominator.

In this study, I examined the phenomenon of summer melt. I investigated patterns of change between intended postsecondary plans and actual enrollment. I also tested candidate predictors of melt to understand what characteristics, if any, predicted whether actual enrollment aligned with students' intended enrollment. This study is important as it investigated a student population that is difficult to identify and thus, easily forgotten.

The study utilized a sample of 17,343 students from four graduating high school classes (2016 through 2019) across 30 districts that are part of the Power Charter Network (PCN, a pseudonym that will be used throughout this report). I drew from this group because the PCN collects the requisite data to determine if there are changes from intended enrollment to actual enrollment. PCN monitors both student intention through the college application process and college enrollment status for all of their alumni. Enrollment status is verified through individual student check-ins and the National Student Clearinghouse; this information is updated a minimum of once per year. This level of monitoring student educational trajectory made it possible to identify students' original postsecondary plans and compare against what they did the fall immediately after high school. Although PCN has been around for over two decades, I limited the sample group to the four most recent graduating high school classes for which fall college enrollment data were available.

Significance of Research

Power Charter Network serves primarily low-income students of color. Ninety-five percent are Black or Latino, and 89% qualify for free and reduced lunch. The majority of PCN schools are in under-resourced communities with college attainment rates that are historically low. The increased benefit of having a bachelor's degree – and its connection to a multitude of longer-term benefits – has prompted an increase in research on students' transition to college and the path toward a college degree (Andrews, 2018). This study merges these topics, as it investigated students – the majority of whom are students of color – who are on the cusp of beginning college. I examined the paths they take and tested hypothesized predictors of students' actual enrollment.

Investigating the changes that occurred between intent to enroll and actual enrollment with this population of students is important given the historically lower college enrollment and completion rates of low-income students and students of color. As noted earlier, there is a 16-percentage point difference in immediate college enrollment between students from lower-income households and their more affluent peers (NCES, 2018). While there are a multitude of reasons for this gap, the focus of this study is the population of students who are at the point of college entry. For some, this is the closest they come to enrolling in college. For various reasons, they do not enroll, and this may contribute to the overall gap in college participation between students from low- and high-income households. A focus on this particular group is important to understand why those who submit their intent to enroll and provide a financial deposit, do not immediately enroll in college.

Summer melt is frustrating for college access professionals and disappointing for students. These students applied to college, were admitted, weighed their options, submitted a

deposit and, yet, did not begin college. The complexity of the college application and enrollment process can be particularly challenging for students who are the first in their family to attend college and may not have support to navigate a new system or understand the various steps they must complete, even after selecting a college. The findings from this research provide insight for other organizations that seek to guide students in the transition from high school to college, offers recommendations for institutions of higher education, and draws further attention to the systemic barriers that prevent students from moving forward with their intended college plans.

Findings Summary

An analysis of 17,343 high school senior graduates found that 22.8% experienced a change between intended enrollment and actual enrollment. These changes varied from intending to enroll at a four-year institution and either enrolling at a two-year or not at all (5.9%), to not planning to enroll in college and enrolling in college, either a two- or four-year institution (11%). Multiple logistic regression analyses demonstrated that Expected Family Contribution (EFC) was a significant predictor of melt for four-year intending students. High school grade point average (GPA) was also a significant predictor of melt for both four-year and two-year intending students.

CHAPTER TWO

Literature Review

Across the United States, by the age of 25, only 29% of individuals from the lowest-income quartile have *attempted* postsecondary education, compared to 80% of those in the highest-income quartile (Bailey & Dynarski, 2011). There are various reasons that contribute to this large gap between income groups, including college readiness, interest, and awareness of the application process. An additional reason, and the focus of this study, is summer melt. Summer melt is when students commit to a college while in high school, which generally includes making a financial deposit, but do not begin college in the fall (Castleman et al., 2012).

There is minimal research on summer melt, and the exact frequency of nationwide melt is unknown, as higher education institutions do not typically report on students unless they officially enroll at their institution. The inability to determine an exact number of students who are affected by this phenomenon makes it difficult to quantify the extent of the issue or learn from students who experience summer melt. Research related to summer melt has pointed to proactive support over the summer, either via a counselor or text message reminders, as a potential intervention to mitigate this phenomenon. Identifying students who "melted" is difficult, and the ability to learn from four cohorts of college-intending students adds insight to the existing research that to-date has primarily focused on efforts to decrease summer melt.

I begin with an overview of two lenses through which to view this phenomenon: capital and the ecological shift a student undergoes during the transition from high school to college. This is followed by an overview of existing research related to summer melt including efforts to estimate the rate of melt, attempted interventions, and factors that influence melt. I

then discuss the importance of immediate college enrollment, and end with an overview of factors that influence the college application process.

Theoretical Framework

Bourdieu's (1986) theory on capital and Arnold et al.'s (2015) ecological model of college readiness in the transition from high school to college are useful in the analysis of why students who intend to go to college do not actually enroll. This study focuses on the "traditional" pathway to college, that is, enrolling immediately after high school. I begin with an explanation of capital, as elements of this theory are embedded in the ecological model of college readiness. In the strictest sense of the word, capital refers to money and property; this literal definition of capital is at times referred to as economic capital. Bourdieu (1986) introduced two theoretical forms of capital: social and cultural. Collectively, social and cultural capital help to explain the differences in academic outcomes that exist between individuals, regardless of their natural abilities. There are documented cases of students with the same ability who do not apply to, attend or graduate from college. The ability to access higher education favors those whose capital aligns with the dominant culture. McDonough (1994) shares that students from wealthier families, even with moderate ability, want to maintain their "presumed birthright, an education at a 'good' college" (p. 440). This is an example of the habitus that is built by their capital. Bourdieu (1986) defines habitus as an internal system of values, attitudes, and beliefs that are enduring and drive the actions one takes. The habitus one builds originates from their immediate family, community and school environment; it is influenced by members who comprise their social network. Habitus is grounded in social and cultural capital as these close individuals and everyday practices create deeply ingrained habits, skills and tendencies. It alludes to what comes naturally but in reality, is a manifestation of one's lived experiences.

Social capital is the collection of relationships and group membership that gives each member access to resources. This access might include an introduction to someone in a position of power that can lead to a good job. Similarly, if one is a member of a tribe, that tribe contributes to their social capital (Bourdieu, 1986). One's social capital depends on the size of their network, the amount of power held by those in their network, and the ability to leverage the relationships. Social capital refers to the *connections* to sources of information, resources, and expectations (Robinson & Roksa, 2016).

Cultural capital is a *symbolic* reflection of one's social class that is primarily seen through skills, tastes, material belongings, and expectations (Bourdieu, 1986). These are preferences that are developed primarily through one's environment and interactions with others. Cultural capital is difficult to measure; most instances are subtle cues that are part of one's everyday life passed through familial relationships and circumstances (Bourdieu, 1986). Cultural capital can range from one's linguistic structures and learned table manners, to a built-in expectation to attend college because others in the family attended. Robinson and Roksa (2016) explain cultural capital as the impact that class-based preferences, knowledge, and dispositions have on an individual.

Examples of cultural capital include built-in knowledge about what it takes to be eligible and gain entry to college, educational credentials that increases one's credibility such as participating in extracurricular activities for students or parents who have a certain degree (Paulsen & St. John, 2002). The expectation held by upper-middle class families to attend a "good" college led them to seek professional assistance with the college application process as the landscape of admissions changed and they sought to maintain their "birthright" (McDonough, 1994). This is an example of these families activating their different forms of

capital. Cultural capital created the expectation of going to college, social capital helped in finding professional assistance, and economic capital provided the means to pay for this service.

Distribution & Conversion

In his explanation of cultural and social capital, Bourdieu (1986) also discusses how capital is distributed and converted, how it is passed from one person to another. If the ability to officially transmit capital is prevented or hindered, this results in a cycle of reproducing the existing social structure; this is seen in families that have generations of either living in poverty or affluence. Bourdieu (1986) posits that the educational system can serve as a vehicle to reproduce social structures if it fails to realize its role and enact change to provide cultural and social capital to create a different habitus to further enhance academic achievement. This reproduction is visible with those from higher socio-economic standing who continue to seek out, apply to, and enroll in college and in students with lower socioeconomic standing applying to and enrolling in college at lower rates. Bourdieu (1986) suggests that this cycle will continue unless there is a distribution which can come from the high school or other sources.

Students who come from low-income families or whose parents did not attend college are likely to live in a community amongst others who similarly do not have experience with higher education (Farmer-Hinton, 2008; McKillip et al., 2012). The potential isolation from others who have experienced college can result in a continued cycle of not going to college (Farmer-Hinton, 2008; Kim & Nuñez, 2013; McKillip et al., 2012). The differences between income classes in college entrance (and ultimately completion rates) perpetuate existing social inequalities (Perna & Jones, 2013). It is necessary to disrupt these cycles by transferring capital that is favored by systems of higher education to those who do not have this insight. Capital is a necessary part of the college access process as beyond the belief that college is attainable, there is a specific

'know-how' that is needed to enroll in college. High schools with strong college-going cultures and college access programs play a role in transmitting capital by providing insight on the specific steps needed to be eligible for, apply, enroll, and graduate from college. Access to additional support is particularly important the summer between high school and college as students prepare for multiple changes including their environment, peers, expectations, and support systems.

Beyond Capital

The Bordieuan approach to capital has been challenged, as it can lead to deficit-thinking. It insinuates that there are those who have capital and those who do not (Rios-Aguilar & Deil-Amen, 2012). Funds of knowledge was first introduced by Moll, Amanti, Neff, and Gonzalez (1992) as a result of their qualitative study that explored practices both in the classroom and households in working class, Mexican communities. Their findings brought forth an innovative approach to bridge essential household activities that are specific to a community, in the classroom. This strategic knowledge and approach leverage the "funds" that align with the activities that are specific to a region. Funds of knowledge has been presented as an alternative framework to capital; this approach highlights the different assets that individuals and families have that may not always be captured in the traditional capital framework. Rios-Aguilar, Kiyama, Gravitt, and Moll (2011) suggest the intertwining of these frameworks, specifically to study funds of knowledge within a capital lens to glean more insight about education outcomes for historically under-represented students.

While this study uses the Bordieuan capital approach, I present this alternative framework as a reminder that students who melt do have capital; they have various funds they bring with them. If this study was investigating students who did begin college and sought to

understand what contributed to their ability to enroll, funds of knowledge would be used as the primary framework. This study investigates summer melt from a systemic standpoint and considers the role of institutions, thus using a capital approach. The steps to gain entry and enroll at institutions of higher education favor specific types of capital, including access to others who have been through the process and a habitus about one's expectation to attend college. A capital framework is appropriate given that the college enrollment process includes many procedural elements, and determinants of success are related to experience – or lack thereof – with this process.

An Ecological Model of Transition

Arnold, Lu, and Armstrong (2012) posit that improvements in access to college for low-income students can be strengthened if the interactions between personal, societal, and institutional factors are considered. They suggest that access to college should be viewed and understood as an emergent aspect of human ecology. Through this model of ecology, the authors state that the interaction between various systems that students experience collectively impact students' readiness for college. Through this model, they demonstrate that students undergo an ecological shift in the summer between high school and college as their systems and those who encompass these systems change during this timeframe. Specifically, students experience a change in their school environment, which also means a shift in those with whom they are typically surrounded, such as their high school teachers and counselors. The model presented by Arnold et al. (2015) is appropriate to consider for summer melt as it explains the ecological shift students undergo and how these shifts may impact whether or not a student's actual enrollment aligns with their intended enrollment. The authors present and use this framework in their own qualitative study of summer melt interventions. This is the second study to investigate summer

melt through this framework. This framework guided consideration of how the study was conducted as it considered the prevalent role of the exosystem, primarily represented by the intended institution, and the shift in the mesosystem supports, that occur in the summer between high school and college.

Arnold et al. (2015) build upon the model from Arnold et al. (2012) and present an ecological model of college readiness in the transition from high school to college. This model identifies factors – organized into six levels – that may influence an individual's readiness to transition from high school to college. Table 2.1 provides an overview of the ecological model of college readiness in the transition from high school to college. This framework begins with the *individual* at the center and indicates that a student's experience and decision prior to enrolling in college occurs within their immediate environment and close relationships. This first system is referred to as the *microsystem* and encompasses an individual's family, peers, and neighborhood; it can also include their high school support system. The microsystem is akin to capital as it encompasses both their social network and the expectations reinforced in their environment.

The interactions between multiple microsystems is explained as the *mesosystem*. Given the close relationship with those in their microsystem, a student has greater agency in the interaction and overlap of these microsystems to form a mesosystem. One example of this intersection may be between their family and the college access program staff to discuss next steps in the college application process. In this instance, the student is present and the convener of the two systems. A student's agency decreases when the exosystem comes into play. The *exosystem* is what occurs in areas in which the student is not present, such as policies that dictate how financial aid is distributed. This determination may be impacted by multiple parts of the

exosystem including federal, state, and the institution. A student who plans to attend college has no say in how financial aid is determined yet many are highly dependent on the outcomes of these decisions.

Table 2.1.
Overview of ecological model of college readiness in the transition from high school to college.

Level	Definition	Examples
Individual	Students' experiences are central and decisions are impacted by their immediate environment.	Gender Ethnicity Motivation College readiness
Microsystem	An individual's family, peers, and neighborhood.	Family and their exposure to college College-going culture of high school Peers and their postsecondary plans
Mesosystem	Interactions between multiple microsystems that the student convenes.	Family and college support network meet to complete college-related forms.
Exosystem	Areas in which the student is not present or part of the decision-making process.	Financial aid policies Institutional process and requirements Cost of college
Macrosystem	Takes into consideration the broader societal context.	Capitalism Social stratification Global pandemic
Chronosystem	This level runs parallel to the others as it accounts for time.	School calendars Timing of college and financial aid notifications Timing of policy changes

Note. Adapted from Arnold et al., 2015.

Beyond the exosystem is the *macrosystem* which is explained as the broader social context including cultural beliefs or the stance on whether or not higher education is a public or private good. The ecology that one experiences runs parallel to the *chronosystem* which accounts for time; what happens when.

Arnold et al. (2015) state that the various microsystems that students have in place during the college application and decision process change the summer after high school graduation.

Members of these systems might include their teachers, high school counselors, and college access service provider. This change in microsystems, combined with an increased presence and pressure of the exosystem, result in an ecological shift for students. Research points to gaps in knowledge about finances and college matriculation information as barriers to beginning college (Arnold, Fleming, De Anda, Castleman & Wartman, 2009; Rall, 2016). The combination of a change in microsystems while facing new barriers in the exosystem (e.g., the financial aid process and institutional requirements such as submitting a final high school transcript) can contribute to summer melt. This experience is an "ecological transition in which students face significant challenges in multiple microsystems at a point in time where key supportive microsystems have been withdrawn" (p. 9). The ecological shift a student may undergo, especially for those who may be the first in their family to attend college, is an important lens for this study.

Summer Melt

Summer melt is defined as students who graduate high school with the intent to enroll in college who do not begin college in the fall (Castleman et al., 2012). These students melt over the summer despite having successfully completed the various steps in the application and decision processes. The phenomenon of summer melt has become more prominent as high schools and college access programs have extended their services to support students as they transition to and enroll in college. The discrepancy between intent and actual enrollment was first conceptualized as the summer flood (Arnold et al., 2009) given the leak in the educational pipeline when transitioning from high school to college.

The earliest research on the flood, now referred to as melt, stems from the Big Picture Longitudinal Study (BPLS). This study followed a subset of students from Big Picture Learning

Schools and had an unexpected finding as nearly 100% were accepted to college, of which 90% expressed an intent to enroll and only 70% of the nearly 100% admitted, actually enrolled in college by September after high school graduation (Arnold et al., 2009). This qualitative study included focus groups of transition counselors and case studies with Big Picture graduates. As part of the study, transition counselors checked in with students over the summer; these check-ins provided early indicators of potential shifts in students' original college plans. They found that "Students' struggles with relationships, resources, and lack of knowledge appears to underlie the summer flood" (p. 25). This study is one of the first to bring forth the important topic of summer melt and set the stage for future studies related to melt. It should be noted that minimal information is provided on how the study was conducted. The authors report statistically significant findings although they do not provide details on how these findings were obtained.

Estimating Melt

The nationwide rate of summer melt is unknown. Castleman and Page (2014) created an estimate of the rate of summer melt using two data sources, Educational Longitudinal Study of 2002 (ELS:2002) and a subset of students who applied to uAspire's Last Dollar Scholarship. uAspire is a nonprofit organization that advises public school students in Massachusetts, primarily in Boston, specifically on financial aid and scholarships. Through a series of regression analyses, they estimate summer melt to range between 8% and 40%. Castleman and Page (2014) estimate that low-income students experience higher rates of summer melt compared to their wealthier counterparts. For students from the uAspire sample, there was an estimated enrollment difference, albeit not statistically significant, between those with an Expected Family Contribution (EFC) of zero compared to those who are not Pell-eligible, 78% versus 82.3%, p=.087. For this sample, they also found differences in enrollment based on

intended type of institution. For students who intended to enroll at a four-year, 81% did enroll compared to 63% who intended to and did enroll at a two-year institution. The attrition of the two-year intended students serves as the basis of their statement of the high end of estimated melt being 40%; it was 37% in this case. The overall fit for the model of uAspire findings is an R^2 of .0024.

For the ELS:2002 sample, the authors also estimated a difference in melt based on income, with 10% of higher-income students predicted to melt compared to 15% of lower-income students. This difference was after controlling for demographic factors and cognitive scores. Authors indicated that the ELS:2002 sample was wealthier than students in the uAspire sample with 42% Pell-eligible compared to 80% for uAspire.

Castleman and Page's (2014) study represents the best effort to-date in quantifying the rate of summer melt. Nevertheless, the findings from this study have limited generalizability and the ranges are based on two distinct datasets. The uAspire sample was limited to a group of 1,861 students from Boston who the authors indicate may not be reflective of that specific region and are unable to report on this in full as student demographic information was not available for this sample of students. These students applied for scholarship funding, indicating some level of interest in attending college and need for additional funding. The ELS:2002 tracks a nationally representative sample of students beginning in 10th grade through their transition into college or the labor market. There were 6,410 records from ELS:2002 that were used for this study. The data available for each sample varied. The uAspire sample had the intended institution on record from the scholarship application, this information was not available for the ELS:2002 sample. For ELS:2002 students, college-intention was constructed using additional variables, such as completion of the FAFSA and information about the colleges to which students applied and were

accepted. The ELS:2002 sample had substantial demographic data whereas this was not available for the uAspire sample. All of this contributes to uncertainty about the accuracy of the estimated rates of melt in the study.

The challenge to identify students who do not actually enroll results in limited research on summer melt. Efforts to quantify this occurrence come from analyses such as those of Castleman and Page (2014) which point to discrepancies in immediate college enrollment based on socioeconomic status. The majority of additional research related to summer melt focuses on interventions seeking to *minimize* the number of students who melt over the summer.

Summer Melt Interventions

In their seminal work on summer melt, Arnold et al. (2009) state that "the summer between college acceptance and matriculation is a vulnerable time during which no institution owns high school graduates who have been admitted to college" (p. 28). Studies have been conducted that test strategies to minimize summer melt (Castleman et al., 2012; Castleman & Page, 2015; Castleman, Page, & Schooley, 2014; Castleman, Owen, & Page, 2015). The primary focus of these interventions has been to offer students information and direct support over the summer; this information and support has been delivered both by individual summer counseling and via technology. Interventions were conducted in the summers of 2011, 2012, and 2013. Findings from these interventions are intertwined in four different articles (Arnold et al., 2015; Castleman & Page, 2013; Castleman & Page, 2015; Castleman et al., 2014). Castleman and Page (2015) provide the most thorough descriptions of the studies conducted in 2012 and 2013 and is detailed here. Specific findings are in the respective summer counseling and technology sections as this study conducted both interventions. Castleman et al. (2014) has a comprehensive description of the 2011 study and is described in the summer counseling section.

Castleman and Page (2015) examined two intervention methods thought to minimize summer melt: intensive advising via peer mentors and a text-messaging campaign that sent a series of text messages to remind students to complete tasks and offered access to a counselor. The study took place in the summers of 2012 and 2013 and participants were from three agencies in five different locations. Participants included 2,920 students from Dallas Independent School District (ISD), 568 students from Mastery Charter Schools in Philadelphia, and a combined 2,833 students spread across three uAspire sites (Boston, Lawrence, and Springfield, MA). The peer mentor intervention included personal outreach from current college students who served as peer mentors. The second intervention included a series of 10 text messages that were sent to remind students to complete tasks required by their intended institutions; these messages also provided a prompt for students to request support. Each agency used its own randomization process to assign students to treatment or control group; Dallas ISD only participated in the text messaging intervention and Mastery only participated in the peer mentor intervention. The results varied across sites and by intervention strategy. Several of the sites saw higher enrollment rates for treatment group but not at significant levels (e.g. 4.5 percentage points for peer mentor group in Philadelphia). Despite the varied results, there was an overall positive impact on college enrollment, especially with students who had minimal support with college access planning and those whose plans were not firmly in place.

The authors indicated that the impact between text and peer mentor interventions did not have significantly different impact on college enrollment, however that data is not presented. While the overall findings indicate higher enrollment between treatment and control groups, it is important to note that each of the three sites used different definitions of college-intending students. Dallas ISD identified students who completed the FAFSA as college-intending

whereas uAspire stated if a student met with an advisor twice as college-intending. The varied definitions pose a challenge when sharing pooled sample findings; the studies were conducted differently at each site and results should be limited to the site-specific results that are shared. Further, the identification of students varied and specifically for uAspire, was limited to students who had already engaged with advisors, presenting an inclination to take advantage of services. This is important to note as another study with a similar uAspire sample (Castleman et al., 2014) found that the uAspire sample had stronger outcomes and increased the overall findings.

Summer Advising

Researchers have posited that melt may occur at higher levels for low-income and first-generation students due to the lack of information and support during the summer between high school and college (Arnold et al., 2009; Castleman & Page, 2014). Research that tested the impact of summer advising on summer melt, generally found summer advising to be an effective intervention to minimize melt with the difference in college enrollment ranging from 5% to 14% between control groups and treatment groups who received advising (Castleman et al., 2012; Castleman et al., 2014; Castleman & Page, 2015). One study (Castleman et al., 2015) found summer counseling to have a null effect on summer melt.

Castleman et al. (2012) conducted a randomized controlled trial where 162 students from seven high schools were assigned to either receive proactive outreach from counselors or not. Those who did not receive proactive outreach could still ask for and receive help. Eighty-four percent of the treatment group met with a counselor compared to 21% of the control group. The immediate college enrollment rate of the treatment group was estimated to be 14 percentage points higher compared to the control group (about 59% versus 45%, $p<.10$). In addition to a higher immediate college enrollment, this study found that low-income students who received

summer advising enrolled at four-year institutions at higher rates (41% versus 26%) and more enrolled on a full-time basis (47% versus 32%) compared to those who did not receive summer advising. These findings suggest that summer advising can support with full-time enrollment at a four-year institution. It is noted that these findings are suggestive and cannot be applied to all students. The study was done with a group of students who attended a small high school that promotes going to college and provides a high level of support with this endeavor.

A summer melt intervention was tested in the summer of 2011 (Castleman et al., 2014). Participants in this study included 927 students from uAspire and 480 from Fulton County Schools (FCS), a large school district in the metro-Atlanta area. uAspire students were those who applied for their Last Dollar Scholarship, a scholarship available to students who participate in uAspire's advising program. The FCS sample was determined based on responses students provided on the FCS senior exit survey. For both groups, a separate randomization process took place to assign students to the treatment or control group. The treatment in this study was proactive outreach during the summer and the control groups did not receive outreach but did have access to advisors.

Overall, summer advising increased immediate college enrollment by 3.3 percentage points compared to the control group. It should be noted that the overall effect was impacted by stronger results with the Boston group; the treatment group in FCS was positive in direction but the findings were not significant (Castleman et al., 2014).

Findings from Castleman et al. (2014) found that 8% and 12% of low-income students melted from the uAspire and FCS sites, respectively. The two sites used different advising approaches, and it is unknown how these variations affected student participation and ultimately summer melt rates. Two elements that were different include the use of incentives for uAspire

participants and different advising frameworks between sites; the uAspire advisors were provided with a specific protocol for outreach and support. In contrast, FCS advisors did not receive these instructions and implemented different advising methods.

The results from the summers of 2012 and 2013 summer advising (Castleman & Page, 2015) found that across all sites, students who had a peer mentor were more likely to enroll in college by 4.5 percentage points compared to the control group. They report that the combined interventions of summer advising and text message campaign yielded an enrollment rate that was five percentage points higher than the control group who did not receive support.

Difference based on provider. Building on the impact of active summer counseling, Castleman et al., (2015) investigated whether the identity of the support provider yielded a difference in college enrollment. The experimental design implemented an intervention with Albuquerque Public Schools (APS) and the University of New Mexico. Counselors were contracted to support college-intending students over the summer; eight counselors were based at the university, and the remaining 13 were at APS high schools. Students were randomly assigned to receive no support, support from a counselor at the high school or support from a counselor based at the university. Caseload determinations varied based on counselor availability; those who indicated they had greater availability were given a larger caseload. Findings included significantly higher interaction with university counselors compared to those from the high school.

Results showed the intervention had an overall null effect; students who received support from the high school or college did not enroll in college at rates significantly higher than those who did not receive support. The overall null effect may have been impacted by variation among counselors. In addition to differences in caseload based on counselor availability, it was

also noted that the counselors had varying levels of experience with financial aid and college transition issues. The authors were not able to provide a breakdown of counselor characteristics. There was also evidence of variability in results by student subgroup. Latino males were positively impacted by the outreach from university counselors, with an 11% increase in enrollment compared to the same subgroup of students from the control group who did not receive proactive support.

It should also be noted that the treatment groups were not entirely equivalent to begin with. Each treatment group had an average GPA that was higher than the control group, and the difference was statistically significant for the group that was assigned to receive outreach from the high school. Despite the overall null effect, the authors posit that the issue of transition raises policy questions on how to distribute the responsibility to ensure college-intending students successfully transition to college – should high schools or colleges provide support?

Technology

Findings from several tests on the impact of summer advising concur that active summer advising helps to mitigate summer melt (Castleman et al., 2012; Castleman & Page, 2015; Castleman et al., 2014) while one showed an overall null effect (Castleman et al., 2015). Regardless of outcomes, findings from studies related to summer melt have led to discussion both about policy to implement such efforts and the associated cost. Castleman and Page (2013) estimated that the peer mentor initiative cost 80 dollars per student, whereas the study conducted between APS and the University of New Mexico cost approximately 100 dollars per student served (Castleman et al., 2015). The main drivers for cost are personnel as summer counseling requires having sufficient staff and paying them.

The use of a text messaging system was piloted as another method to provide information to students over the summer in a manner that does not require as much staff time. Castleman and Page (2015) tested a text messaging intervention in parallel to a peer mentor intervention. The text messaging intervention was tested with students who graduated high school in 2013 from Dallas ISD and three uAspire sites. There were 2,524 students assigned to the text messaging intervention. Fifty-six percent of Dallas students and 72% of uAspire students assigned to the text message intervention were reached via text message. This text messaging intervention yielded a rate of enrollment at two-year institutions that was three percentage points higher for students who received the treatment.

One finding is that text outreach had a greater impact at sites where students are less likely to have had college access support. The level of college access support for Dallas ISD students is unknown and presumed to be less prevalent. This differs from the uAspire sites, where participants received direct college access support. In Dallas, students who received either treatment enrolled in community college at five percentage points higher compared to students from their respective control group. Students who qualified for free or reduced lunch (FRL) were more likely to enroll in college by four percentage points compared to their peers in the control group. Students from Lawrence and Springfield (uAspire sites) who received the text message treatment were more likely to enroll in college by 7.1 percentage points compared to the control group from these same sites (Castleman & Page, 2015).

The authors state that this intervention cost seven dollars per student. It is not clear if the students who were not able to receive text messages were still included in the denominator when determining if students melted or not. This is an important note especially as the Dallas site reached less than 60% of students via text message.

The interventions yielded mixed results with respect to decreasing the frequency of summer melt. As technological advances increase, along with society's reliance on technology, the results from this intervention demonstrates an opportunity to leverage technology to make a positive impact on immediate college enrollment. It is one method in which critical information can quickly be relayed en masse to those who have access to this technology. The provision of information over the summer, whether through direct counseling or text messages, serves to fill in potential information gaps for students.

Factors that Influence Melt

The studies above have primarily focused on strategies to minimize summer melt and most of the findings are related to what percent of students melted or did not melt based on the interventions implemented. Learnings from these studies and two additional qualitative studies have pointed to finances and knowledge on processes as contributors to melt (Arnold et al., 2009; Arnold et al., 2015; Castleman et al., 2012; Rall 2016).

Finances

Financial aid and the ability to pay for college is an integral part in students' decision to enroll in college. This becomes most urgent in the summer prior to enrolling as that is when students need to respond to the financial aid offer made by their intended institution. The financial aid offer letter is a critical document as it outlines the cost of attendance, lists the aid that is being offered; aid may come from the state, federal, or institutional sources. These pieces of information allow students to determine how much they will need to borrow in loans or pay out of pocket to attend college. Pallais (2013) indicated that even minor barriers in cost can deter students from completing the college enrollment process.

Arnold et al. (2009) found that low-income students face challenges with evaluating financial aid offer letters. As part of their randomized control trial, Castleman et al. (2012) had counselors keep logs of the topics they discussed with students for approximately half of their interactions. These logs showed that 47% of their interactions with students were related to financial aid offers. Reviewing financial aid offers is an important step in the decision process and it requires an existing set of knowledge to decipher the document. The challenge to evaluate offers is exacerbated by the fact that offer letters vary by institution, from how they are formatted including where the cost of attendance is listed to how the various types of aid are listed and identified as grant aid or loans. In addition to understanding the aid offered, students may also experience an additional step in the financial aid process if they are selected for financial aid verification. The verification process requires students to submit additional paperwork to validate the information provided on their state or federal financial aid application. Students who have to complete this process may not receive their final offer letter until the summer when they no longer have access to their high school counselor and after they have already committed to enroll.

Arnold et al. (2015) conducted a qualitative study with participants of Castleman et al.'s (2014) study on the impact of proactive outreach and Castleman and Page's (2015) participants in the text message intervention. A primary finding was that conversations and challenges about academic readiness for college, personal issues, and strategies to be successful in college were nearly always set aside in order to focus on how to pay for the cost of college. These findings came from focus groups of uAspire advisors who shared narratives of students with whom they worked and respondents from the mobile survey of text message participants.

Knowledge and Resources

uAspire and the FCS school district conducted a pilot with over 2,000 students to determine if summer advising makes a difference in immediate college enrollment (Castleman et al., 2015). A primary finding was that students who received proactive summer advising had a higher rate of immediate college enrollment and lower rate of summer melt. Advisors in this study indicated that, in addition to having many conversations around financial aid, they also addressed questions about navigating the college's web portal, completing required paperwork, and the steps to take to fully enroll in college. The questions students posed were informational and critical to their ability to enroll in college. Castleman et al.'s (2012) study on proactive summer advising included counselor logs. After finances, the next topic where advisors spent their time aiding students was communicating with the college.

Additional studies (Page & Scott-Clayton, 2016; Rall, 2016) reinforce the importance of access to college knowledge and guidance with tactical items. Rall's (2016) qualitative study of 10 students who melted indicated that a lack of college knowledge was the main reason that these students did not enroll in college. Specifically, participants cited challenges with the need to submit additional paperwork, unfriendly signals from the institution, and trouble with selecting courses. During this critical time of transition, many students do not have a support system with experience with the college enrollment process; they typically do not have access to the high school counselor or teacher who helped with the application and decision process and are not yet enrolled in college (Castleman & Page, 2014).

Page and Scott-Clayton's (2016) review of the literature regarding interventions to address the challenges related to financial aid and knowledge about the college-going process identified two opposing challenges related to information. Some students experience a lack of information. Other students face the challenge of sorting through overwhelming amounts of

information. Both the void and abundance of information can be particularly challenging for low-income and first-generation students, who may not have someone in their household to fill in the void or decipher the volume of information and requests. This may contribute to the lower rates of college enrollment among these groups.

Importance of Immediate College Enrollment

This study focuses on immediate college enrollment, which is part of the traditional pathway. The impetus for this focus is due to the negative association between delayed college entry and college completion, especially for students from low-income households. Goldrick-Rab and Han (2011) analyzed high school and transcript data of a nationally representative subset of 1988 National Educational Longitudinal Survey (NELS) respondents. The NELS had data on educational trajectories from eighth grade until mid-twenties, which allowed researchers to trace postsecondary paths of over 8,000 individuals. Through a multinomial logistic regression, researchers found that 9% of students who delay immediate enrollment to college ultimately attain a bachelor's degree within eight years of high school, this is compared to 55% who begin immediately. Further, the authors indicate that students from lower socioeconomic status are more likely to delay enrollment compared to more affluent counterparts, 31% versus 5%, thus they are less likely to earn a degree. Roksa and Velez (2012) analyzed data from the 1997 National Longitudinal Survey of Youth. They used a discrete time hazard model to test predictor variables of delayed enrollment in college. Their analysis found that students who delayed college entry had an almost 30% lower odds of earning a bachelor's degree compared to those who began immediately. They suggest that one reason why individuals who delay enrollment are less likely to complete a degree is that these individuals experience life transitions, such as becoming parents.

While there has been an increase in discussion regarding the benefit of gap years prior to enrolling in college, it is important to note which profile of student can benefit from this time off. Gap years have been lauded as an opportunity to travel or engage in activities of interest – many of which require financial means. Low-income students who take time off are more likely to begin working. Similar to Goldrick-Rab and Han (2011), Bozick and DeLuca (2005) conducted an analysis of 1988 NELS data with a focus on the effects of delayed enrollment. Their analysis indicated that students who delay college enrollment have a lower probability of earning their bachelor's degree, even after controlling for academic and socioeconomic characteristics. Further, they found that Black and Hispanic individuals were more likely to delay starting college. In their analyses, they estimate that low-income students who take one year off after high school reduce their odds of completing their degree by 64%; even with all other factors being equal. The studies on delayed enrollment yield different estimates on the odds of degree completion, but they all point to a negative association, especially for low-income students. Bozick and DeLuca (2005) discuss that their findings about the negative impact of delayed enrollment are important as the students who are more likely to delay, and not complete college, are already at a disadvantage based on socioeconomic indicators. These findings point to the importance of immediate college enrollment for students from lower socioeconomic households.

Factors that Influence Applying to College

Given limited insight on the reasons why students melt, it may be possible to learn from the abundant research on college access, specifically on what factors influence whether or not a student applies to college. Applying to college can be complex, and the application process itself can be a barrier to attending college (French & Oreopoulos, 2017). The college application process includes completing an application (sometimes with essays), taking a college placement exam, and paying a fee to submit the application. Once a student is accepted and commits to attend an institution, there are additional steps to actually enroll. The ease of navigating the application process varies for students, depending on both their home and school environment. These collective environments encompass their systems of influence and contribute to their capital. Their social network, and their experience, or lack thereof, with the college application process can either make the process easier by providing direct support or require support from outside their internal network.

Parental Influence

Research confirms that parents who lack experience with higher education are less able to discuss the specifics of the college-going process with their children (Farmer-Hinton, 2008; McKillip et al., 2012; Roksa & Robinson, 2017). The lack of parental guidance on the college-going process can further leave first-generation and low-income students at a disadvantage, as they have to navigate the process on their own and compete with more affluent students who benefit from the capital provided by their parents who completed college (Farmer-Hinton, 2008; Kim & Nuñez, 2013; McKillip et al., 2012). For students who live in communities with few college graduates, their environment creates a void in students' social capital as it relates to attending college. Roksa and Robinson (2017) affirm the impact of parent-student discussions

on the probability of enrolling in college. Their study of 7,930 student survey respondents showed a statistically significant and positive relationship between parent-student discussions and the probability of enrolling in a four-year institution. Controlling for individual and school-level variables, they found that a one standard deviation increase in college-going conversations was associated with a 4% increase in the likelihood of attending a four-year institution ($p < .001$).

Parent support may come via encouragement, rides to testing locations or other actions that demonstrate support for their child to attend college. Despite best intentions from parents, there are systemic barriers that students may face, especially if their parents did not attend college. Kim and Nuñez (2013) analyzed student, high school, and state data of a nationally representative sample of 3,774 high school students at 360 high schools. Parental education level was used as a proxy for cultural capital, and researchers found significant effects between cultural capital with college enrollment, especially at four-year institutions ($p<.001$). This finding indicates that students whose parents have lower education levels are less likely to enroll in college.

The college enrollment process continues over the summer as students have to complete final steps. These steps may include engaging with their intended college and financial aid systems. Just as there was limited direct support during the application process, there is limited guidance through the enrollment process. For students whose parents did not attend college, the college-going support may come from their high school or college access providers; these are part of their microsystems. Those individuals and messages become part of their routine and once they graduate from high school, access to them may disappear. The difference in direct

experience, habitus and specific know-how for certain processes can result in a student's inability to finalize the various steps and not enroll at their intended institution.

Socioeconomic Status

In their study on how financial factors affect student choice based on social class, Paulsen and St. John (2002) found that lower-income students with high grades have lower educational attainment goals than higher-income students with lower grades. They found that lower-income students are less likely to attend four-year colleges (77% versus 92%), private colleges (38% versus 56%), attend full-time (76% versus 86%) or live on campus (23% versus 47%). This was true even for students who had higher academic outcomes in high school compared to their more affluent counterparts. One potential reason for this is the direct and indirect signaling about college expectations that higher-income students receive in their home. These messages may include that attending more competitive institutions and living on campus are both attainable and an expectation.

Differences in economic standing also impacted students' application process. Researchers found that college cost is a critical factor in the college selection process for low-income students, with 64% of low-income respondents reporting that they selected their college because of low tuition, financial aid or a combination of these two; this is compared to upper-income students for whom only 25% considered tuition and aid as part of their college choice process. The study also found that while the average financial aid package is sufficient to cover tuition, it is not enough to account for living expenses; this results in an unmet need for low-income students. The study exposed clear and meaningful patterns of enrollment decisions based on class (Paulsen & St. John, 2002), perpetuating the failure to convert capital.

Role of High Schools

Many studies have found that the college-going culture of a high school can add to students' capital and impact whether or not they attend college (e.g., Engberg & Gilbert, 2013; Kim & Nuñez, 2013; Martinez & Deil-Amen, 2015; Robinson & Roksa, 2016). Robinson and Roksa (2016) evaluated a sample of 8,980 students at 660 high schools from Education Longitudinal Study (ELS) respondents; this national survey collected data on students in 10th grade, 12th grade and two years after their expected high school graduation date. The analysis looked across a variety of control variables such as gender, race/ethnicity and students' academic achievement along with independent variables of socioeconomic status, frequency of counselor visits and the college-going culture of the high school. The study revealed that students who attend a high school with a strong college-going culture, defined by the percentages of students who matriculate to a four-year or two-year college, are 2.4 times more likely to apply to a four-year institution as opposed to not applying at all. This study substantiates the findings from Engberg and Gilbert (2013), who explored data from the High School Longitudinal Study and determined that the probability of enrollment at a four-year college increased substantially for students at schools with strong college-going cultures.

Research indicates that high expectations and frequent conversations about college change the preferences, knowledge, and expectations with respect to attending college; they augment cultural capital and can alter habitus (Farmer-Hinton, 2008; McKillip et al., 2012; Roksa & Robinson, 2017). High schools can shape students' behavior with a strong college-going culture that increases capital by providing information about the eligibility requirements (Belasco, 2013), direct support with the application and decision process (Farmer-Hinton, 2008;

McKillip et al., 2012), and reassurance about the students' ability to continue with their education.

High schools can play a critical role in the college application and decision process, especially for those who may be the first in their family to attend. High schools and college access programs can serve as important microsystems to support students' aspirations and transmit capital. These critical microsystems are removed over the summer as the student encounters more external pressures and may not have the necessary information to finalize their college enrollment. This presents challenges to enroll in college.

Summary

Despite the incremental increases in college enrollment of low-income and first-generation students, barriers still exist. For students who apply, gain admission and commit to college, there is still a chance that they may not begin college. The disruption in their immediate support structures during a critical juncture may contribute to this change of plans. It is difficult to know how many students actually melt and thus, challenging to identify the root causes. The efforts to quantify the rate of melt have limited generalizability, which means that substantial gaps exist in our understanding of the actual rates and patterns of change between intended and actual enrollment. As the phenomenon of summer melt has gained more interest, there are findings based on interventions that attempt to minimize summer melt. These studies point to finances and information gaps as potential causes for melt. Additional research is needed to more concretely identify students who are at the highest risk of melt. The inability to identify students who melted contributes to this gap in research. My study contributes to the literature by analyzing the frequency of changes that occur between intended and actual enrollment and testing predictors of melt.

CHAPTER THREE

Project Overview

Summer melt, when one commits to attend a college and does not actually enroll in the fall, is a phenomenon with limited existing research. To better understand the phenomenon, I conducted a quantitative study of four cohorts of graduating high school seniors and analyzed what types of change occurred between intended enrollment and actual enrollment. I conducted a series of multiple logistic regression analyses to test candidate predictors of melt for four-year intending students. This study took a more nuanced look at summer melt than prior research and specifically focused on change in type of plan. The following research questions guided this investigation:

1. How frequently do high school graduates' postsecondary enrollment plans change?
2. To what extent are student background characteristics, including demographics, academic record, and intended institution characteristics, predictive of summer melt?

Sample Selection

The study included students from a national public charter organization, Power Charter Network (PCN), with schools in over 20 states and the District of Columbia. PCN offers direct support to students all the way through college graduation. This guidance is available by the respective district's Power Through College (PTC) team which includes support with the college application process as well as individual advising for college students. The continuum support model is noteworthy because it meant that the requisite data for conducting the study was available. Specifically, it was necessary to have both students' intended enrollment and confirmed actual enrollment in the fall immediately after high school. PCN collects both of these data points; furthermore, PCN's data collection practices allow for comparison on *type* of

postsecondary plan – no college, two-year or four-year. The ability to compare type is a key element of this research.

The PCN sample included students from the high school classes of 2016, 2017, 2018, and 2019. There are two entry points to be part of a PCN high school class. The first is by attending a PCN middle school. Those who only complete a PCN middle school are assigned to a high school class based on the date they complete eighth grade with the expectation that they will complete high school in four years. The class or cohort they are part of does not change even if they complete high school off-track; they remain part of their assigned cohort. The second entry point is by attending a PCN high school. PCN high school students' class designation is based on when they actually complete high school. Many students attend both a PCN middle school and high school. In this instance, the high school approach to class designation prevails.

The final sample for this study included Power Charter Network (PCN) students from the high school classes of 2016, 2017, 2018, and 2019. Of these four high school classes, only students for whom there was evidence of high school completion were included in the final dataset. A recorded high school graduation date or the name of the high school from which they graduated served as proof of completing high school. There were 1,980 (10.2%) students for whom high school graduation was unconfirmed and who were excluded from the final sample. The final dataset used in these analyses included records for 17,343 students; this is 89.8% of the total number of PCN students from these four cohorts. Frequency distribution of categorical variables and mean and standard deviation for quantitative variables for all cases and confirmed high school graduation cases are available in Appendix A.

Ninety-five percent of PCN students are Black or Latino, and nearly 90% qualify for free or reduced lunch. While the ability to generalize findings is limited due to student's experience

with a charter school that offers additional college support, studying summer melt with this demographic is important, as existing research posits that students from low-income households are more prone to melt. This sample is different from prior research given its size and commonality of attending PCN schools. The small percentage of White students in this sample also make the group different from earlier research on summer melt.

Participant demographic information, elements of their academic record, characteristics of their intended institution, and actual enrollment data were received directly from the charter organization's national database. These data served as the foundation for the study. The key variables, how they were used in this study, and their accuracy are detailed below.

Variable Overview

Postsecondary Plan Type

Type of postsecondary plan is of primary importance to this study. The postsecondary plan options include – attend a four-year institution, attend a two-year institution, or do not attend college. A four-year institution is defined as one that offers a minimum of a bachelor's degree whereas a two-year institution has an associate degree as its highest offering. I compared changes in postsecondary plan type between students' intended enrollment and actual enrollment in order to determine what changes, if any, occurred. I did not examine changes between institutions of the same type (e.g., a student who originally intended to enroll at Cal State Fullerton but actually enrolled at Cal State Northridge – both four-year institutions) or count such cases as representing a change in enrollment. The intended institution type was compared to actual enrollment type.

Intended Enrollment

Students' intended enrollment is captured in Power Charter Network's database. This database has numerous "object areas" to record data in a categorized manner. Intended institution was collected from the "application" object in the database. The application object allows for each college the student is considering applying to have its own record. The student's application action is monitored via the "status" feature. A traditional application status path begins with wish list, as the student indicates interest in applying, then it can move to in progress once they begin the application, and finally to submitted once they submit the application. PCN counselors who work with high school seniors are tasked with entering each of the colleges on a student's wish list and updating the application status throughout the application cycle. There is a call to "close out" applications that are submitted. This means that counselors work to enter an application decision status of "accepted," "denied," or "waitlist."

Once a student decides on an institution, counselors are responsible for making the final update in the application object area. They update "matriculation decision" to indicate "Matriculated (Intent to Enroll)." This action is only completed with one application, as it indicates where the student committed to attend by submitting paperwork and making a financial deposit. When the matriculation decision is updated, this automatically creates an enrollment record on the student record with the status of "matriculated." Enrollment is a different object area in the database. The data from "Matriculated (Intent to Enroll)" was used to determine the intended enrollment as this field captures the first school to which a student committed. More specifically, the institution type associated with that institution served as the basis for intended enrollment type.

Accuracy and completeness. One challenge with the "Matriculated (Intent to Enroll)" variable is that no college, a value of zero has two meanings. It can either mean that the student truly did not intend to enroll in college or that the information was not obtained from the student. The latter is more likely for PCN middle school graduates who did not attend a PCN high school and for whom district counselors thus face a greater challenge to capture student's intended enrollment. The ability to obtain this information may also vary from one district to another depending on their Power Through College (PTC) staffing structure. Of the 4,673 students whose intended enrollment was identified as no college, 75% (3,508) only attended a PCN middle school; the other 25% were at a PCN high school and were more likely to be a definite 'no college'. It is not possible to discern between students who were not going to college or those whose intended enrollment was unknown. Any student without an intended enrollment plan on file was assumed to have a plan of no college.

Actual Enrollment

Student's actual enrollment is confirmed in the early fall. The primary method to confirm college enrollment of PCN students is through counselor interaction with the student. The National Student Clearinghouse is used as a secondary source for any students with whom counselors are not able to get in contact with to confirm actual enrollment. This information is also housed in the national database, under the 'Enrollment' object field which records all high school and college enrollments. If students begin at their intended college, counselors change the enrollment status from 'matriculated' to 'attending'. If students begin at a different institution, then a new enrollment is added with the institution they actually enroll at with a status of 'attending'. The status for the intended institution is updated to 'did not enroll'.

The database is configured to capture full enrollment history through college completion. For all students in the sample, I reviewed the date of enrollment to determine whether or not it was an immediate college enrollment – that is, an enrollment the fall after they graduated high school. This extra step was necessary to ensure all intended enrollments were compared to actual enrollments in the same time frame – the fall immediately after completing high school. Students from earlier classes may have stopped out, transferred institutions, or enrolled in college at a later time. I focused on the enrollment status in the fall immediately after high school graduation for all classes. For actual enrollment, I focused on the types of institution at which students were enrolled and not the specific institutions themselves. Those students who did not have an actual enrollment immediately after high school were assigned a value of zero, indicating the student was not attending college.

Accuracy and completeness. PCN puts a lot of effort to collect actual enrollment information, as college enrollment is a key performance indicator for the organization. The combination of direct reporting from students, many of whom with counselors meet on campus, and the National Student Clearinghouse contributes to a high level of completeness for this field; I estimate that this is at least 95% complete. College enrollment is a key indicator that is reported on across the network. Given the level of attention placed on this data point, I am confident in the accuracy of the data. There is a small margin of error that could be caused by data entry or misinformation but overall, the number of actual enrollments that are incorrect are expected to be small and a negligible percentage given the size of the sample.

Expected Family Contribution

Expected Family Contribution (EFC) is determined upon completion of the Free Application for Federal State Aid (FAFSA) and represents the dollar amount a family is assumed

to be capable of contributing toward the cost of college for that school year. The amount is determined based on family income and assets and the number of people in the family. Institutions use EFC, along with their cost of attendance (COA), to provide a financial aid offer to students. In this study, I use EFC as a proxy for family income and economic capital.

I recoded the actual EFC based on how it would translate to Federal Pell Grant Program eligibility, based on thresholds for the 2019-2020 school year (Pell Payment Schedule, 2019). An EFC of zero means that the family is expected to contribute zero dollars toward the cost of attending college. A student with a zero EFC would be eligible for a full Pell grant, all other requirements being met. The maximum EFC to be eligible for any portion of a Pell grant is $5,576. Using zero and $5,576 as the bounds and assuming a cost of attendance of at least $6,195 students were grouped as follows: full Pell-eligible (EFC = 0); eligible for 50% or more of Pell (EFC = $1–$3,100); eligible for less than 50% of Pell (EFC = $3,101–$5,576) and non-Pell eligible (EFC greater than $5,576). Grouping in this manner allowed for comparisons to be made based on range of Pell-eligibility.

Accuracy and Completeness

There are two considerations for EFCs that were on record, both linked to not knowing at what point in time they were collected and using 2019-2020 Pell thresholds. The lack of a date attached to the EFC means that for older students in the sample (classes of 2016-2018), the EFC may have been from as early as when they first applied to college and their family income and EFC may have changed over the years. The second is that if the EFCs were from an earlier year, there is a chance that some students were miscategorized as the thresholds from prior years may have been different. This would only happen for those that were on the border of the cutoffs put in place. While it is possible that this occurred, it is unlikely that it was a large number of

students. PCN counselors are asked to obtain this information on a yearly basis but that collection does not always happen. It is also important to note that while EFC was used to determine which groups students would be placed in for analysis purposes, this does not mean students actually received a Pell grant. It was for classification purposes only. Accessibility to the Pell grant has additional requirements including citizenship status and has to do with the institution a student attends.

An additional challenge with record completeness for this variable is specific to two-year intending students. For students who intend to enroll at a two-year college, there may not be as much urgency to submit their FAFSA; some states have later deadlines for two-year intended students to submit the FAFSA. In addition, the lower cost of two-year institutions may limit the number of two-year intended students who complete the FAFSA; thereby limiting the number of EFCs on file. There were 5,872 students without an EFC on file, 3,304 (56%) had an intention status of no college and 1,1011 (17.2%) intended to enroll at a two-year institution. For EFCs that are on file, there is a high level of accuracy as a PCN standard practice is for counselors to see the EFC on the student aid report (SAR) to record this in the database. Given this practice, the EFCs that are on file have a high level of accuracy.

Grade Point Average

Student's grade point average (GPA) was obtained from PCN's national database. To obtain GPAs from as many students as possible, I requested GPAs from three points in time: middle-of-junior year, end-of-junior year, and end-of-senior year. I also asked for both weighted and unweighted GPA for these three points in time. Collection of GPAs requires additional steps from PCN middle school graduates and the request for multiple GPAs increased the probability of obtaining GPAs for this group of students.

With multiple GPAs on file for some students, I prioritized using unweighted end-of-junior year GPA. This was the first preference as this is the GPA most often submitted during the college application process. The second preference was mid-junior year GPA as this was the next closest GPA to what was submitted during the college application process. The third option was the end-of-senior year GPA. In all instances, unweighted GPA was prioritized over weighted GPA to account for any differences in course offerings across high schools. GPAs were reported on a 4.0 scale.

Accuracy and Completeness

Completeness of records took precedence over ensuring all the GPAs used were from the same point in time. As described above, I used GPAs from varying points in time with the constraint between mid-junior and end-of-senior year; GPAs prior to junior year in high school were not used. Nearly 24% of records did not have a GPA; this made these students ineligible for inclusion in the logistic regression model. Of the remaining 76% with a GPA on file, 63% of GPAs were from end-of-junior year, 8.5% were from mid-junior year, and 4.5% were from end-of-senior year. There were some instances of multiple entries for the same point in time and level (weighted or unweighted), in these situations I defaulted to the highest GPA. The addition of GPAs from mid-junior and end-of-senior year allowed for an additional 13% of records to be completed with a GPA. There were 950 GPAs (5.5%) that were reported on a 100-point scale; 75% of these were from one district, 18.5% were from a second region and the remaining 6.5% were spread across 10 additional districts. I converted these to a 4.0 scale to have a uniform scale throughout. This was done using a tool offered by The College Board. This process does not always yield perfect conversions, but the recoded numbers are close to what the students' GPA would be on a 4.0 scale.

Applications Submitted

As shared in the intended enrollment section, application submission status is managed via the application object field in the database. This information is entered directly by counselors – either into the national database or PCN high school database which is synced with the national database. The data I received included a list of every application that a student submitted. Each application was linked to the unique identifier. I used the Pivot Table feature to determine the total number of applications each student submitted. For the logistic regression model, students were recoded into one of four groups based on the number of applications they submitted. The ranges used are: 1 – 3 applications submitted (Apps1); 4 – 8 (Apps2); 9 – 13 applications submitted (Apps3); 14 or more applications submitted (Apps4).

Accuracy and Completeness

The PCN encourages districts to closeout any college applications that are in the database. This focus on closing all applications helps to yield a higher percentage of known statuses of college applications. As with any manual data entry, there is always room for error. Another potential challenge with this variable is that zero applications submitted has two meanings: the student did not apply to any colleges or that this information was not collected. The latter is more likely with PCN middle school completers; as they are not in PCN high schools, it is more challenging to obtain this information and know all of the colleges to which students applied. There were 2,560 (14.8%) of students who did not have any submitted applications on record. Over 93% of these (2,387) were students who only attended a PCN middle school.

Institutional Characteristics

The two institution characteristics used in this analysis are institutional ranking and six-year minority graduation rate (grad rate). Both of these data points came from the PCN national database and are part of the institution record of the intended enrollment institution from 'Matriculated (Intent to Enroll)'. PCN categorizes institutions using Barron's Admissions Competitiveness ratings. I was unable to gain direct access to the admissions competitiveness index files due to their restricted use status; given this limitation, I deferred to the ratings in the PCN database. The dataset I used had institutions in eight different competitiveness categories. These categories, from most competitive to least, are: most competitive, most competitive plus, highly competitive, very competitive, competitive, less competitive, noncompetitive, 2 year (noncompetitive). For use in the logistic regression model, I collapsed the institutions by ranking and resulted with a total of four groups. Groups were determined by looking at the spread of institutions across the eight categories. Students in this sample intended to enroll at 2,337 different institutions. The top four most competitive categories were grouped into one, representing 20.2% of institutions, and are denoted in the findings as Rank1. Rank2 includes all institutions identified as 'competitive', 32.9% of institutions. 'Less competitive' and 'noncompetitive' institutions were combined and comprise 15.7% of institutions, they are denoted as Rank3 and 2 year (noncompetitive) is Rank4 representing 31.2% of institutions. Grouping in this manner facilitated analyses between various levels of competitiveness for admission.

For the institution graduation rate, I specifically used the minority student graduation rate as the majority of students in this study are students of color. It is not unusual for the graduation rate for minority students to be lower than the overall rate and it was important to have the

number that most closely relates to this sample. This variable was used in the logistic regression model without any modifications. This data was available for 97.7% of records used in the regression model.

Tables 4.6 and 4.7 provide an overview of the full sample and sample used for the regression for categorical variables and quantitative variables, respectively, for both four- and two-year intending students. Only full records were included in the analyses resulting in a reduction of 24% for the four-year regression sample. The reduction of the two-year intended student group was much larger, with 41.5% of files excluded from the regression analyses. EFC and GPA were large contributors to this reduction as 30.4% of two-year intended students did not have an EFC on file and 31.4% were missing a GPA.

Data Analysis

I prepared the data for analysis by organizing the data to ensure the information was uniform for all included records. This included making decisions about who to exclude (those with no evidence of high school graduation) and removing multiple entries for certain fields such as GPA (detailed above). The data were analyzed using Statistical Package for Social Sciences Version 26. The first research question was answered by running a crosstab between intended enrollment and actual enrollment, specifically using the type of enrollment – four-year, two-year or no college. I obtained descriptive statistics for the sample, including percentages, means and standard deviations. These are presented in Chapter 4.

Logistic Regression Model

The primary analysis for this study was a multiple logistic regression model that I developed based on students who intended to attend a four-year institution. This analysis was conducted to address my second research question that inquired about the ability to predict

summer melt from student and institution characteristics. A regression model is well-suited for this type of analysis as it allows for several candidate predictor variables to be evaluated simultaneously. This analysis investigated the extent to which these candidate predictor variables are associated with melt. The dependent variable for the model, referred to as "melt," was defined as 1 – student enrolled at a four-year institution and 0 – student either enrolled at a two-year institution or student did not enroll in college. This definition differs from the traditional definition of melt which defines melt as a student who intended to go to college and did not enroll. I used a different definition as I sought to investigate what factors are associated with four-year intending students experiencing a *change* from their intended enrollment type. Model 3 – the final model expressed the log-odds of melt as a function of demographic, academic, and institution variables. Model 1 included student demographic variables: gender, ethnicity, EFC, and high school class. Model 2 included student demographic variables and the academic variables: GPA, number of college applications submitted, and time with PCN (middle school, high school, or both). The final model, 3, included student demographic and academic variables and the addition of institutional characteristics: institution competitiveness ranking and six-year minority graduation rate of the intended institution. The final model is represented as follows:

$$log\left(\frac{P_{melt}}{1-P_{melt}}\right) = \beta_0 + \beta_{demo} \times X_{demo} + \beta_{acad} \times X_{acad} + \beta_{inst} \times X_{inst},$$

where P_{melt} is the probability of melt; X_{demo} is a set of student demographic variables (gender, ethnicity, EFC, high school class); X_{acad} is a set of student academic variables (GPA, number of applications submitted, time with PCN); X_{inst} is a set of characteristics for students' intended institution (competitiveness ranking, six-year graduation rate); β_{demo}, β_{acad}, and β_{inst} are slope coefficients for the various predictor variables; and β_0 is the model intercept.

The same model was fit to a second sample of two-year intended students. This secondary analysis was conducted to investigate if the relationship of the hypothesized predictors remained the same for students who intended to enroll at a two-year institution. For the two-year model, the dependent variable was defined as 1 – enrolled at a two-year institution or 0 – did not enroll in college; two-year intending students who enrolled at a four-year were not included in this analysis. This additional analysis allowed for comparisons to be made between groups based on their intended plan.

I evaluated all models and interpreted their results by comparing them on the basis of the log-likelihood and coefficient of determination (Nagelkerke R^2). I examined the slopes for each predictor to evaluate the influence of each. This evaluation included t-tests of the slope estimates; an alpha level of 0.05 was used as the threshold to judge statistical significance. To enhance the interpretability of the model coefficients, I converted change in log-odds to the change in the odds by taking the exponential of the slopes. The final step was to identify the "typical" values to plug into the regression equation so that changes in a specific predictor could be expressed in terms of a change in the expected probability of melt. For each predictor, the "typical" value was either the mode (for categorical variables) or the mean (for quantitative variables).

Validity and Reliability

Using a secondary data source can present challenges with reliability of the data used for analyses. I took multiple steps to ensure validity and reliability of the data collected and subsequent findings. This began with testing data from my own district to ensure my data request aligned to the research questions. Upon receipt of the data, I reviewed the file for accuracy and completeness. During this process I had to make decisions about which data to

include or exclude and how to recode certain variables. I kept detailed notes on the decision process and the information I used to finalize my decisions. Decisions that impacted what data were used or how they were used are detailed in the variable overview.

Considerations

I currently work for a district that is part of the Power Charter Network. In my role I oversee the college completion efforts for my district and work closely with leaders from other districts as well as individuals from the national team. As a staff member of PCN, I filled the dual roles of district lead and graduate researcher. With the national research team, my initial role was that of graduate researcher requesting access to student data. I completed a research request form in which I detailed the variables required for the study, indicated how the data would – and would not – be used, and described the measures I would take to ensure confidentiality of students and schools represented in the data. My role as district lead eventually became the primary role as I leveraged existing relationships to follow up with the appropriate individuals to obtain the data needed for this study.

The main ethical consideration for this study is ensuring the confidentiality of student data. The data were provided via a secure data share file, and all student records were given a unique case identification number prior to my receipt of the file. As a district lead, I only have access to students for my district. While I used data from my district to pilot my analyses, the final data used in my analyses came from the national PCN database (which has 21 districts, including my own). I was very clear that I did not need or want student names and instead requested a unique identifier to link student records. While there is a unique identifier for each student in the national database, the team that provided the data for this study created an alternate

identifier. This extra step ensured I was not able to personally identify students, including those from my own district.

Positionality

As a researcher, it is important to provide the lens through which I approached this study as there are many directions a study of this nature can take. My career has involved time in both college access and college success work, and my ultimate passion lies in bridging the gap between the two. K-12 and higher education operate in distinct manners. This lack of cohesion is to the detriment of many students who are "released" from one system, their high school, to their intended college. For students from low-income families and/or who are the first in their family to attend college, this shift in support often results in a change of course for students who were on track to enroll at a four-year institution. In this study, I sought to investigate what patterns exist among students who experience this change. I use the term "summer melt," as it aligns to existing research. However, I recognize that my definition differs given the focus on change in *type* of enrollment. Specifically, the inclusion of a student enrolling at a two-year college – instead of their intended four-year college – is a shift from the existing literature.

I focus on immediate college enrollment at four-year institutions, the traditional pathway, as college completion rates for those who begin at a two-year institution or delay enrollment are lower, especially for low-income students (Bozick & DeLuca, 2005; Doyle, 2009; Goldrick-Rab & Han, 2011). This is not to equate enrolling at a two-year institution with not going to college, but rather to highlight students who were positioned to enroll at a four-year institution and did not actually enroll. I acknowledge that two-year institutions have a critical role in higher education as they offer additional pathways to access higher education. However, the focus of

this study is on immediate enrollment at a four-year institution – as students committed to attend, signaling an interest in pursuing a bachelor's degree.

As a member of the PCN organization, I have insider knowledge on the context of the network and how data are collected. Over the last few years, PCN began more rigorous efforts to combat summer melt. The definition of melt used at PCN includes four-year to two-year; four-year to no college; and two-year to no college. This operational definition influenced my approach for this study. While each district receives a report on percent of students who melt in each category, the investigation does not go further. As part of a growing organization that needs to consider sustainable approaches, I sought to gain more insight on the profile of students who intend to enroll at a four-year institution and melt with the goal to use these findings to prioritize summer advising caseloads.

Summary

This quantitative study utilized 17,343 student records from four high school classes of a national charter school network. This was an appropriate sample for this study, as the organization captures the requisite data of students' intended enrollment plans and actual enrollment the fall immediately after high school. The sample was used to investigate how frequently students experience a change in enrollment and, through a multiple logistic regression model, to test candidate predictors of change in enrollment plans for four-year intending students.

CHAPTER FOUR

Introduction

I conducted a quantitative analysis to investigate what changes occur between intended college enrollment and actual enrollment and who experiences these changes. I looked at intended college plans and actual college enrollment for four graduating high school classes from the Power Charter Network (PCN). I first investigated changes based on *type* of plan – attend a four-year institution, attend a two-year institution, not attend college. Then, I focused on students who intended to enroll at a four-year institution and tested candidate predictors of expected probability of 'melt', defined as a change in their plan – either to a two-year or no college. This is a variation of the existing summer melt research, in which "melt" is defined as occurring when those who plan to attend college, regardless of type, do not enroll in the fall.

In this chapter, I describe the demographics of the sample utilized and provide findings for each research question:

1. How frequently do high school graduates' postsecondary enrollment plans change?
2. To what extent are student background characteristics, including demographics, academic record, and intended institution characteristics, predictive of summer melt?

I begin by discussing the types of changes that occur between intended enrollment and actual enrollment (Research Question1). I then describe findings from a multiple logistic regression analysis that tested candidate predictors of melt (Research Question 2).

Characteristics of the Sample

A demographic overview of the sample is available in Table 4.1. Approximately 55% of the students are female, and 45% are male. Nearly 60% of students in this sample identify as Black/African American; 35% identify as Latino and the remaining 5% are detailed in Table 4.1.

Table 4.1.
Demographics overview (n=17,343).

	n	%
Class (Year of Graduation)		
2016	3,633	20.9
2017	4,156	24.0
2018	4,808	27.7
2019	4,746	27.4
Gender		
Female	7,829	45.1
Male	9,501	54.8
Unknown	13	0.1
Ethnicity		
Asian	394	2.3
Black/African American	10,376	59.8
Hispanic/Latino	6,082	35.1
Other	214	1.2
White	277	1.6

There are two entry points to be part of a specific high school class. For students who attend and complete a PCN middle school only, they are assigned to a high school class based on the date they complete eighth grade with the assumption that they will finish high school in four years. For example, a student who completed eighth grade at a PCN middle school in 2013 is part of the 2017 cohort. For students who attend a PCN high school, their class determination is based on their progress while in high school and actual year of high school completion. If a student at a PCN high school began ninth grade in 2014 and completed in four years, they would be part of 2018; a student who begins at the same time and takes an additional year is part of the 2019 cohort. The total number of students from each class are detailed in Table 4.1. The class of 2018 had the highest number of students and represented 27.7% of the overall sample.

The Power Charter Network operates K-12 schools in 30 distinct regions across 20 states and the District of Columbia. Students who either completed eighth grade at a Power Charter

middle school or attended a Power Charter high school are eligible to receive support from PCN's college and alumni services, Power Through College (PTC). An overview of students' time with PCN is in Table 4.2. Just over 50% of students graduated from a PCN high school, and 36.9% attended both a PCN middle school and PCN high school.

Table 4.2
Power Charter Network schools attended by graduating classes 2016-2019 (n=17,343).

Power Charter Middle School	Power Charter High School					
	No		Yes		Total	
	n	%	n	%	n	%
No	0	0.0	2,519	14.5	2,519	14.5
Yes	8,428	48.6	6,396	36.9	14,824	85.5
Total	8,428	48.6	8,915	51.4	17,343	

The Power Through College (PTC) efforts begin with college counseling supports while in high school. Three primary factors in the college application process are a student's high school grade point average (GPA), whether they submitted applications to college, and a student's Expected Family Contribution (EFC). Figures 4a, 4b, and 4c show the distribution for each of these factors including the mean and standard deviation. Overall, students in PCN classes of 2016-2019 had an average GPA of 2.76 (Figure 4a) and submitted 9.51 college applications (Figure 4b). The mean EFC was just under $3,100 (Figure 4c). Fifty-eight percent of the sample had an EFC of 0, while 2.1% of had an EFC that was more than three standard deviations from the mean (i.e., above $28,487).

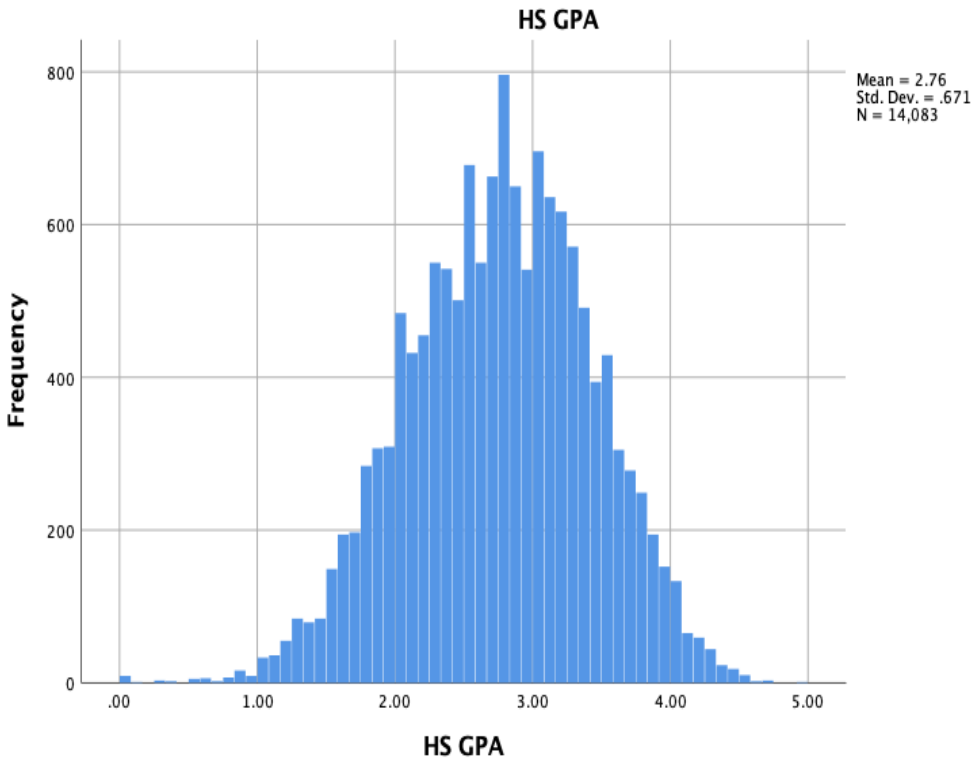

Figure 4a. Distribution of High School GPA for sample

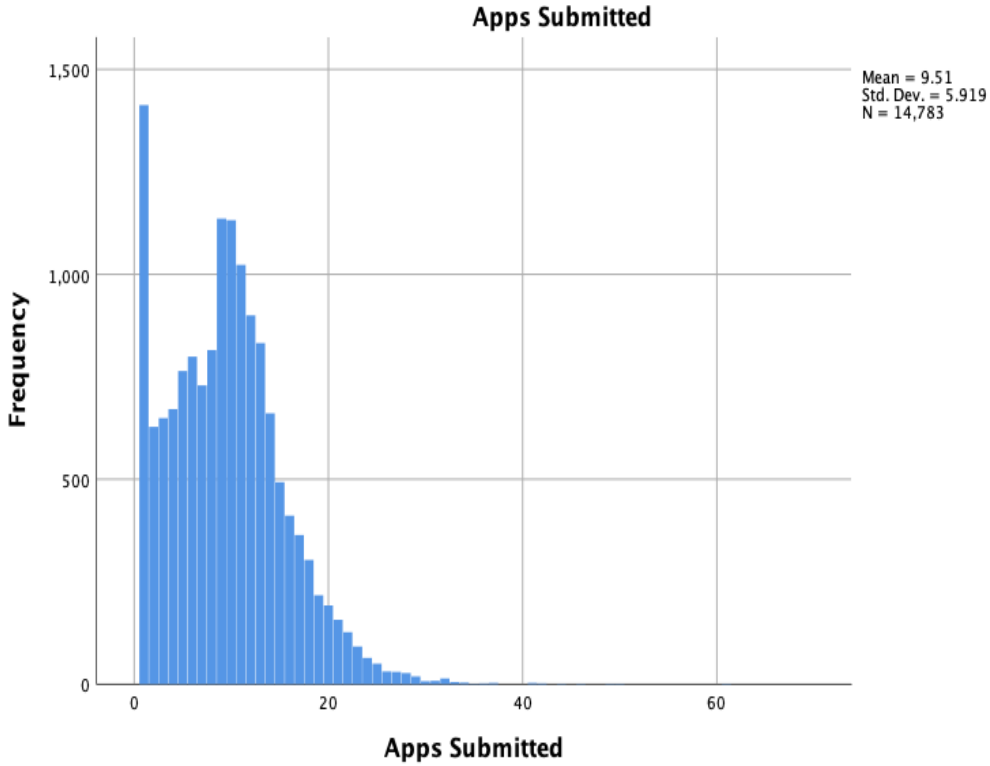

Figure 4b. Distribution of number of college applications submitted

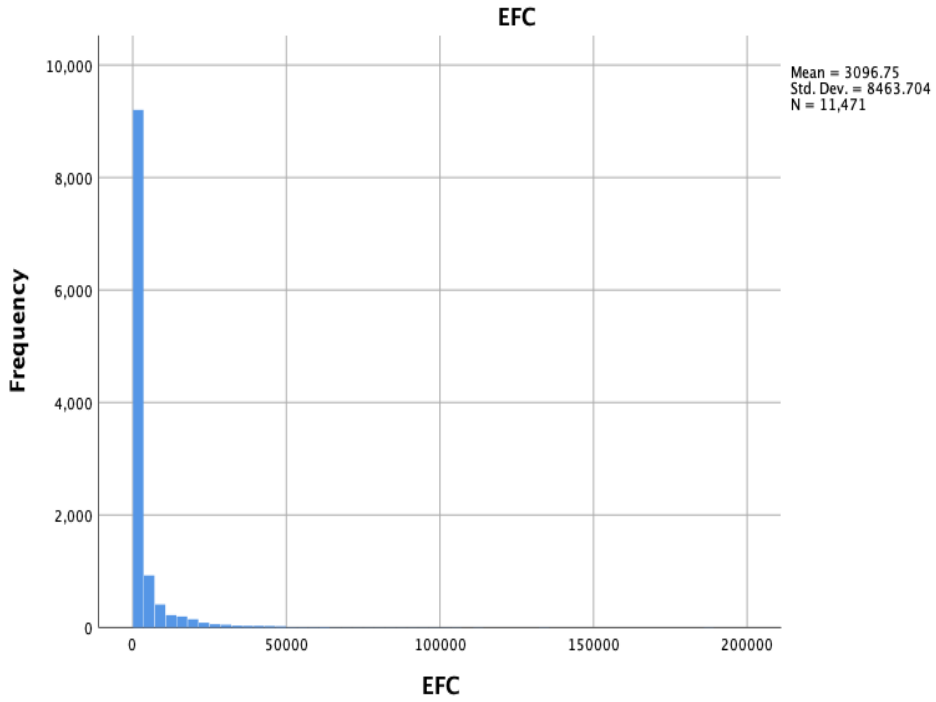

Figure 4c. Distribution of Expected Family Contribution (EFC)

This sample of students served as the basis to investigate what percent of students changed their post high school plans from what they intended to do while still in high school and details the types of changes that occurred. A subset of this sample was used for the regression analyses; specifically, those who intended to enroll at either a four-year or two-year and for whom all the variables used in the regression model were complete. A summary of characteristics between the full college-intending sample and regression analysis sample are available in Tables 4.6 and 4.7. The four-year intended group had a lower reduction of cases with 24% being removed for the regression whereas the two-year intended group size was reduced by 41.5%.

Intended Enrollment Versus Actual Enrollment

The 17,343 records that comprise this sample were used to answer the first research question, which concerns the percentage of students who experience a change in their college enrollment plans. An overview of this dataset is available in Appendix A. Intended enrollment

is captured prior to the student completing high school and based on whether or not a student committed to an institution by completing the steps specific to that institution. Actual enrollment is based on data from the fall term immediately after high school completion. For purposes of this study, change in enrollment plans (from intended to actual) are defined as a change in the institution *type* – no college, two-year or four-year college. Within this analysis, changes within the same type of institution (e.g., student actually attends a different four-year institution from the four-year institution identified as intended) are not considered as a change in plan.

Table 4.3 provides an overview of the full sample's intended enrollment plan compared to their actual enrollment. Actual enrollment matched the intended enrollment for 77.2% of students in the sample and differed for 22.8%. The 77.2% includes 48.0% who enrolled in a four-year institution, 13.2% who enrolled in a 2-year institution, and 16.0% who did not enroll in either a two- or four-year institution. The remaining 22.8%, whose plans differed from their intention, is inclusive of all changes that took place.

Table 4.3.
Intended enrollment versus actual enrollment.

Intended	Actual Enrollment							
	None		2-year		4-year		Total	
	n	%	n	%	n	%	n	%
None	2,769	16.0	868	5.0	1,036	6.0	4,673	26.9
2-year	956	5.5	2,295	13.2	71	0.4	3,322	19.2
4-year	593	3.4	432	2.5	8,323	48.0	9,348	53.9
Total	4,318	24.9	3,595	20.7	9,430	54.4	17,343	

Notes. None = no college, 2-year = institution with associates as highest degree; 4-year = institution that offers minimum of bachelor's degree. All percentages are based on the total sample (n=17,343).

Extant literature on summer melt defines melt as a student who planned to go to college (whether to 2- year or 4-year institution) and did not actually attend; this literature does not differentiate changes by the intended college type. Moreover, little attention has been paid to

students who did not intend to enroll in college but did enroll. This dataset allows for a more nuanced analysis given the available information on the type of institution a student planned to attend. Following is a discussion on the different types of changes that occurred with this sample.

Intended Four-Year

Table 4.3 shows the overall distribution of students in the sample based on intended plan and actual enrollment. Table 4.4 focuses on students who intended to enroll in college. The juxtaposition of these two tables allow us to see overarching change across the full sample and also more specific insight to changes that took place for college-intending students. Looking at the overall sample (Table 4.3), we see that the percent of students with actual enrollment at a four-year institution (54.4%) is closely aligned to the percent of students with intended enrollment at a four-year institution (53.9%) – a difference of only 0.5%. A closer look shows this near alignment was the result of a number of changes within the sample. These changes included students who intended to enroll at a four-year institution and enrolled at a two-year institution (2.5%) or did not enroll at all (3.4%). There were also students who had not intended to enroll in any college but then did enroll at a four-year (6.0%) and others who intended to go to a two-year but enrolled at a four-year (0.4%).

Analysis of only four-year college intending students shows a larger change in actual enrollment compared to intended enrollment. The second row of Table 4.4 shows that of the students who intended to attend a four-year, 10.9% did not actually enroll at that type of institution (4.6% enrolled at a two-year institution, and 6.3% “melted” in that they did not enroll in college at all immediately after high school). This 6.3% of students fit the existing definition of melt which only compares if a student intended to go to college and did not actually enroll;

these studies (e.g., Arnold et al., 2009; Arnold et al., 2015; Castleman et al., 2012; Castleman et al., 2015) refer to students as "college-intending" while other studies (e.g., Castleman and Page, 2015) indicate if the students actually enrolled at a two-year or four-year but did not have their intended institution and thus could not identify shifts from intended enrollment to actual or from a four-year to a two-year.

Table 4.4
Actual enrollment for students who planned to enroll at 2-year or 4-year colleges.

Planned	None		2-year		4-year		Total	
	n	%	n	%	n	%	n	%
2-year	956	28.8	2,295	69.1	71	2.1	3,322	100.0
4-year	593	6.3	432	4.6	8,323	89.0	9,348	100.0
Total	1,549	12.2	2,727	21.5	8394	66.3	12,670	100.0

Notes. Percentages are based on the totals within each row.

Intended Two-Year

Similar to the four-year college-intending group, the *overall* difference between intended two-year and actual enrolled two-year is small (Table 4.3) – 20.7% compared to 19.2%, respectively. This is also due to shifts among the sample as a whole; 5% of students who did not intend to go to college nevertheless enrolled at a two-year institution, which nearly offsets the 5.5% who planned to go to a two-year but did not actually enroll. An examination of the group of students who intended to enroll at a two-year institution (see first row of Table 4.4) shows that this group had a larger change than those intending to enroll at a four-year; nearly 29% of those who intended to go to a two-year college did not actually enroll in college the fall immediately after high school. The actual enrollment matched their intention for 69.1% of this group, while 2.1% experienced a change by enrolling at a four-year institution.

Inter-group Differences

The ability to categorize students based on their college intention plans allows us to see the various changes that occur that may have otherwise been masked by only looking at overall

percentage rates of intention plan compared to actual enrollment. Having intended plan and actual enrollment also offers insight to the difference in profile of students based on their intended plan. Table 4.5 shows that intention groups differed significantly in the group means for each of the variables examined: GPA (F_2=1960.05, p<.001), number of college applications submitted (F_2=988.18, p<.001), and EFC (F_2=21.86, p<.001).

Table 4.5.
Characteristics by intended type with ANOVA results.

	None			2-year			4-year			ANOVA		
	n	M	SD	n	M	SD	n	M	SD	F	df	p
Grade Point Average	2,709	2.45	0.69	2,906	2.31	0.56	8,468	3.01	0.57	1960.05	2	<.001
Applications Submitted	2,113	7.17	5.21	3,322	6.65	4.91	9,348	11.05	5.85	988.18	2	<.001
Expected Family Contribution	1,369	1,900	7,201	2,311	2,712	7,361	7,791	3,421	8,938	21.86	2	<.001

Within this study, 12.2% "melted" according to the traditional definition (i.e., students who intend to go to college, regardless of type, and do not actually enroll). This falls within the range observed in prior research, in which anywhere between 8% and 40% of college-intending students did not actually enroll in college (Castleman & Page, 2014). The inclusion of institution type indicates that melt occurs at a higher percentage for students who intended to go to a two-year institution. The 4.6% of students who enrolled at a two-year college instead of their intended four-year institution would not be accounted for in the traditional definition of melt. If the definition were expanded to include moving from a four-year to a two-year, the rate of summer melt for this sample would be 15.6%. This dataset allowed for a more nuanced review of change in enrollment plan and not simply whether or not a student went to college.

Table 4.6.
Frequency distribution for categorical independent variables, by college intention: Full sample and regression sample.

Variable	4-year Intending				2-year Intending			
	Full Sample (n=9,348)		Regression Sample (n=7,108)		Full Sample (n=3,321)		Regression Sample (n=1,994)	
	n	%	n	%	n	%	n	%
Gender								
Female	5,583	59.7	4,291	60.4	1,621	48.8	971	48.7
Male	3,757	40.2	2,817	39.6	1,700	51.2	1,023	51.3
Ethnicity (Recoded)								
Black	5,348	57.2	4,057	57.1	1,690	50.9	977	49.0
Latino	3,448	36.9	2,643	37.2	1,490	44.9	939	47.1
Other	552	5.9	408	5.7	142	4.3	78	3.9
High School Class								
2016	2,010	21.5	877	12.3	705	21.2	239	12.0
2017	2,391	25.6	1,971	27.7	799	24.1	504	25.3
2018	2,416	25.8	2,111	29.7	939	28.3	636	31.9
2019	2,531	27.1	2,149	30.2	879	26.5	614	30.8
Expected Family Contribution Category (Recoded)								
Level 0 ($0)	4,334	46.4	3,941	55.4	1,425	42.9	1,224	61.4
Level 1 ($0 - $3,100)	1,652	17.7	1,516	21.3	421	12.7	363	18.2
Level 2 ($3,101 - $5,576)	578	6.2	530	7.5	159	4.8	136	6.8
Level 3 (> $5,576)	1,226	13.1	1,121	15.8	306	9.2	271	13.6
Missing	1,558	16.7	0	0.0	1,011	30.4	0	0.0
PCN Enrollment								
Middle and High School	4,417	47.3	3,706	52.1	1,200	36.1	847	42.5
High School Only	1,544	16.5	1,245	17.5	589	17.7	427	21.4
Middle School Only	3,387	36.2	2,157	30.3	1,533	46.1	720	36.1
Number of Applications Submitted (Recoded)								
Group 1 (1 – 3 applications)	933	10.0	421	5.9	1,143	34.4	461	23.1
Group 2 (4 – 8 applications)	2,022	21.6	1,364	19.2	1,051	31.6	678	34.0
Group 3 (9 – 13 applications)	3,638	38.9	2,920	41.1	816	24.6	604	30.3
Group 4 (>13 applications)	2,755	29.5	2,403	33.8	312	9.4	251	12.6
Institutional Ranking (Recoded)								
Level 1 (highest rank)	2,593	27.7	2,013	28.3	0	0.0	0	0
Level 2	4,084	43.7	3,165	44.5	0	0.0	0	0.0
Level 3	2,456	26.3	1,907	26.8	1	0.0	0	0.0
Level 4 (lowest rank)	28	0.3	23	0.3	3,197	96.2	1,994	100.0
Missing	187	2.0	0	0.0	124	3.7	0	0.0

Table 4.7.
Mean and standard deviation for quantitative independent variables, by college intention: Full sample and regression sample.

Variable	Students Intending to Enroll at 4-year						Students Intending to Enroll at 2-year					
	Full Sample (n=9,348)			Regression Sample (n=7,108)			Full Sample (n=3,321)			Regression Sample (n=1,994)		
	n	M	SD	n	M	SD	n	M	SD	n	M	SD
High School GPA	8,468	3.01	0.57	7,108	3.02	0.57	2,906	2.31	0.56	1,994	2.31	0.56
Intended College's Graduation Rate	9,200	49.87	19.41	7,108	50.52	19.31	3,197	27.16	9.45	1,994	27.24	9.48

Table 4.8
Summary of logistic regression models.

	4-year			2-year		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Predictors in model						
Gender	X	X	X	X	X	X
Ethnicity	X	X	X	X	X	X
High school class	X	X	X	X	X	X
EFC	X	X	X	X	X	X
Time with PCN		X	X		X	X
GPA		X	X		X	X
Number submitted apps		X	X		X	X
Intended Ranking			X			
Intended Grad. Rate			X			X
-2xLog-Likelihood	4439.978	4171.313	4100.031	2313.745	2283.24	2277.826
number of predictors	4	7	9	4	7	8
degrees of freedom	9	15	19	9	15	16
Nagelkerke R squared	0.013	0.092	0.113	0.028	0.049	0.053
Cox & Snell R squared	0.006	0.043	0.053	0.019	0.034	0.036

Notes. X denotes that this predictor was included in that model. Intended ranking was not including in Model 3 for 2-year as all 2-year institutions are in the same category.

Logistic Regression Analyses

A series of multiple logistic regression models were used to examine the extent to which both student-level and institutional variables are associated with probability of melt within the sample of four-year intending students. The dependent variable, melt, is defined as those whose actual enrollment plan did not align with their intended plan of enrolling at a four-year institution; they either enrolled at a two-year institution or did not enroll in college at all. Descriptive statistics of the sample used to create this model, including frequency distribution for categorical variables and mean and standard deviation for quantitative variables, are in Tables 4.6 and 4.7, respectively. These variables were available for 76% of the full sample of four-year intended students.

The analysis conducted resulted in a set of three models with Model 3 serving as the final model used to determine expected probability of melt. Table 4.8 has a summary of each model including which predictors were included and the -2x Log-Likelihood and R^2 value. Model 1 was limited to student demographic information and Table 4.8 shows that Model 1 had a Nagelkerke R^2 value of .013.

Model 2 kept the student demographic information in Model 1 and added academic data. I expanded beyond GPA as an academic variable and also included the number of college applications a student submitted as part of this model. When these variables were included, the coefficient of determination (Nagelkerke R^2) increased from .013 to .092 (see Table 4.8).

Model 3 built upon Model 2 as it included the same predictors in that model and accounted for institutional characteristics of competitiveness ranking and six-year minority graduation rate. Model 3's coefficient of determination or effect size (using Nagelkerke R^2) is .113; this is an increase from Model 2's effect size of .092 (using Nagelkerke R^2). Fixing all

predictor variables at their typical value (i.e., at the mean value for quantitative variables and modal value for categorical variables), the expected probability of melt for this sample of four-year intended students is 8.5%. Table 4.9 shows that the mean of expected probability for those who melted is 14.8% compared to 9.0% for those who did not melt.

Table 4.9
Means of predicted probability between melt and did not melt for four-year intending students.

Actual	N	Model 0		Model 1		Model 2		Model 3	
		M	SD	M	SD	M	SD	M	SD
Melted	680	.096	.000	.101	.023	.140	.082	.148	.086
Did not Melt	6,428	.096	.000	.095	.023	.091	.062	.090	.067
Difference		.000		.006		.049		.058	

Findings from Logistic Regression Analysis: Four-Year Intended Students

Student Demographics

Male and female students who intend to enroll at a four-year institution were found to have similar odds of melt (e^b=1.035, p=.691). Fixing all other variables in the model to typical values (see Table 4.10), males have an 8.3% expected probability of melt, while females have an 8.5% probability.

In contrast to gender, there is significant variation in the odds of melt across different race/ethnicity groups. Students whose ethnicity was categorized as "other" are more likely to melt compared to Black students (8.5% vs. 13%, fixing other predictors to typical values), and this difference is statistically significant (e^b=1.597, p=.028). It is important to note that "other" ethnicity represents just under 6% of the students in this data sample. The expected rate of melt for Latino students is also higher than for Black students (9.6% vs. 8.5%, fixing other variables to typical values). However, the difference is not statistically significant (e^b=1.144, p=.149). Appendix B has coefficients for Models 1 and 2 for four-year intending students and show that

controlling for demographics and academic characteristics only, Model 2, there is no statistically significant difference between other and Black.

The class of 2018 was the only class to have a statistically significant difference in the odds of melt compared to the class of 2016 (e^b=1.362, p=.032). A student from the class of 2018 had a 10.3% expected probability of melt compared to 7.8% for a student from the class of 2016 when all other variables are fixed to typical values. It is possible that the class of 2018 faced different exosystem pressures due to policy changes that resulted in a disproportionate number of lower-income students being selected for financial aid verification.

The regression analysis affirmed that EFC is a significant predictor of melt for students who intend to enroll at a four-year institution. Holding other variables constant, students with an EFC higher than zero are less likely to melt compared to students with an EFC of zero (EFC1 e^b=.768, p=.016; EFC2 e^b=.646, p=.021; EFC3 e^b=.760, p=.038). Fixing all other variables to their typical values, a student with an EFC of zero has an 8.5% expected probability of melt compared to 6.7% for EFC1 (50% or more Pell-eligible), 5.7% expected probability EFC2 (49% or less Pell-eligible), and 6.6% for EFC3 (non-Pell eligible). The findings here indicate that students who are eligible for 50% or more of Pell grant (i.e., those with less family financial resources) have higher odds of melt compared to those who are eligible for less than 50% of Pell grant or not Pell-eligible (i.e., those with greater family financial resources).

Academic Record

Students who only attended a PCN high school are more likely to melt compared to those who went to PCN for both middle and high school (e^b=1.366, p=.004). Fixing other variables to typical values, the expected probability of melt for a student who went to PCN for high school only is 11% compared to 8.5% for a student who went to a PCN middle and high school.

Students who only went to a PCN middle school also have higher expected odds of melt compared to students who attended both a PCN middle and high school, but this difference is not statistically significant (e^b=1.130, p=.248). This indicates that the more time a student has with PCN, the lower their expected probability of melt.

Holding all other variables constant, the higher the GPA, the lower the expected odds of melt, and this relationship was statistically significant (e^b=.476, p<.001). Fixing other predictors to typical values, a student with a 4.0 GPA has a 4.3% expected probability of melt, whereas a student with a 2.5 GPA has a 12% expected probability of melt.

Students who submitted 14 or more college applications have lower expected probability of melt than those who submitted 1-3 applications, and this relationship was statistically significant (e^b=0.572, p=.004). Submitting at least 14 college applications (and fixing all other variables to their typical values) yields a 5.8% expected probability of melt. This expected probability rate is the lowest of all groups and the only one that is statistically significant. The 5.8% expected probability is compared to 8.6% for those who submitted 9-13, 10.1% for those who submitted 4-8, and 9.8% for those who submitted between 1-3 applications. It is notable that students who submit between 4-8 applications have the highest expected probability of melt, even compared to those who submit a maximum of three applications. While Apps2 (4-8 applications) has the highest expected probability of melt, it is not at a statistically significant level (e^b=1.036, p=.848).

Institution Characteristics

Overall, there are higher odds of melt as the competitiveness level of the institution decreases. For students who intend to enroll at a 'competitive' school (Rank2), the odds of melt are higher compared to students who intend to enroll at a more competitive school (Rank1) at a

statistically significant level (e^b=1.473, p=.007). Students who intend to enroll at a Rank3 or Rank4 institution have a higher probability of melt compared to students who intend to enroll at Rank1 schools, but not at statistically significant levels (Rank3 e^b=1.349, p=.073); (Rank4 (e^b=1.727, p=.270). With all other variables fixed to their typical values, the expected probability of melt for a student who intends to enroll at a Rank1 school (the most competitive), has a 6% expected probability of melt compared to 8.5% for student with plans to enroll at a Rank2 institution (competitive). This finding indicates that students who intend to enroll at the most competitive institutions have a lower probability of melt.

Institution graduation rate is a significant predictor of melt (e^b=0.980, p<.001). The higher the graduation rate, the lower the expected probability of melt. Fixing all other variables to typical values, students who intend to enroll at an institution with the mean graduation rate (50.52%; see Table 4.7) have an 8.5% expected probability of melt compared to 5.9% for an institution whose graduation rate is one standard deviation higher than the mean (69.8%) and 12.0% for an institution with a graduation rate of 31.2% which is one standard deviation lower than the mean.

Overall, this model answers the research question set forth about the extent to which student background and academic characteristics and intended institution characteristics predict melt. The focus was on four-year intending students and the probability of their intended enrollment aligning with their actual enrollment at a four-year institution. Following is a comparison of the same model with two-year intending students.

Table 4.10
Logistic regression findings for four-year intended students: Odds of summer melt.

Variable Name	*b*	SE(*b*)	*p*	exp(*b*)
Intercept (constant)	0.486	0.369	0.188	1.625
Gender (Reference=Male)				
Female^	0.034	0.086	0.691	1.035
Ethnicity (Reference=Black^)				
Latino	0.134	0.093	0.149	1.144
Other	0.468	0.213	0.028	1.597
High School Class (Reference=HS Class 2016)				
HS Class 2017	0.151	0.147	0.302	1.163
HS Class 2018	0.309	0.144	0.032	1.362
HS Class 2019^	0.100	0.148	0.499	1.105
Expected Family Contribution (Reference=Full Pell eligible^)				
50-99% Pell eligible	-0.264	0.109	0.016	0.768
<50% Pell eligible	-0.436	0.189	0.021	0.646
Not Pell eligible	-0.274	0.132	0.038	0.760
Time with PCN (Reference=MS and HS^)				
HS Only	0.312	0.110	0.004	1.366
MS Only	0.122	0.106	0.248	1.130
GPA	-0.742	0.087	0.000	0.476
Number of applications Submitted (Reference=1-3 apps submitted)				
4-8 apps submitted	0.035	0.184	0.848	1.036
9-13 apps submitted^	-0.146	0.181	0.418	0.864
14+ apps submitted	-0.558	0.194	0.004	0.572
Institutional Ranking (Reference=Rank 1, Most Competitive)				
Rank 2^	0.388	0.142	0.007	1.473
Rank 3	0.299	0.167	0.073	1.349
Rank 4, Least Competitive	0.546	0.495	0.270	1.727
Institution's Graduation Rate	-0.020	0.003	0.000	0.980

Notes. *b* is the expected change in the log-odds of melt given a unit change in the predictor and holding other predictors constant. SE(*b*) is the standard error of the estimated slope, *b*. *p* is the p-value for a t-test of the slope. exp(*b*) is the expected change in the odds of melt given a unit change in the predictor and holding other predictors constant. ^modal value within sample

Table 4.11

Logistic regression findings for two-year intended students: Odds of summer melt.

Variable Name	*b*	SE(*b*)	*p*	exp(*b*)
Intercept (constant)	0.247	0.314	0.431	1.28
Gender (Reference=Male)				
Female	-0.101	0.105	0.335	0.904
Ethnicity (Reference=Black)				
Latino	0.078	0.108	0.470	1.082
Other	-0.719	0.346	0.037	0.487
High School Class (Reference=HS Class 2016)				
HS Class 2017	-0.228	0.173	0.189	0.796
HS Class 2018	-0.101	0.167	0.543	0.904
HS Class 2019	-0.485	0.172	0.005	0.616
Expected Family Contribution (Reference=Full Pell eligible)				
50-99% Pell eligible	-0.039	0.136	0.775	0.962
<50% Pell eligible	0.151	0.197	0.444	1.163
Not Pell eligible	-0.505	0.174	0.004	0.603
Time with PCN (Reference=MS and HS)				
HS Only	0.470	0.132	0.000	1.600
MS Only	-0.086	0.136	0.531	0.918
GPA	-0.237	0.101	0.018	0.789
Number of applications Submitted (Reference=1-3 apps submitted)				
4-8 apps submitted	-0.017	0.141	0.906	0.984
9-13 apps submitted	-0.176	0.154	0.253	0.839
14+ apps submitted	-0.362	0.199	0.069	0.697
Institution's Graduation Rate	-0.013	0.006	0.022	0.987

Notes. Institutional ranking was not included as a predictor, since all two-year institutions are in the same ranking group. *b* is the expected change in the log-odds of melt given a unit change in the predictor and holding other predictors constant. SE(*b*) is the standard error of the estimated slope, *b*. *p* is the p-value for a t-test of the slope. exp(*b*) is the expected change in the odds of melt given a unit change in the predictor and holding other predictors constant.

Findings from Logistic Regression Analysis: Two-Year Intended Students

The same model was fit with two-year intending students to identify what similarities and differences exist with respect to variables that are associated with melt based on the type of institution a student plans to attend. The application and admission processes differ between two- and four-year institutions. Existing research indicates melt among "college-intending" students and does not distinguish between intended enrollment at a two- or four-year institution. I conducted this secondary analysis to investigate if the same variables that predict melt for four-year intended students are also predictive of two-year intended students. For this model, the dependent variable, melt, is defined as a student who did not actually enroll in college the fall immediately after high school. The coefficient of determination or effect size for this model (Nagelkerke R^2) is .053, compared to .113 for the model for four-year intended students (see Table 4.8).

There were some similarities to the four-year intended students such as the significance of GPA and institution graduation rate and differences, such as the effect of EFC. Key similarities and differences are noted below. Full findings for this model are in Table 4.11. Coefficients for Models 1 and 2 are available in Appendix C. Table 4.12 shows that the difference of predicted probability for two-year intending students melting and not melting is 3.6 percentage points; for four-year intended students the difference is 5.8 percentage points (see Table 4.9). Model 3 for two-year students had one fewer variable, as all two-year institutions have the same competitiveness ranking. The pending institution variable for two-years is six-year minority graduation rate. Table 4.7 shows that the standard deviation is 9.48 compared to a standard deviation of 19.31 for four-year institutions, for this sample. This points to greater similarity among two-year institutions.

Table 4.12
Means of predicted probability between melt and did not melt for two-year intending students.

Actual	N	Model 0		Model 1		Model 2		Model 3	
		M	SD	M	SD	M	SD	M	SD
Melted	544	.027	.000	.282	.054	.294	.082	.296	.086
Did not Melt	1,474	.027	.000	.265	.062	.260	.079	.260	.082
Difference		.000		.017		.034		.036	

Student Demographics

Similar to the four-year model, there is no statistical difference in expected probability of melt based on gender. In contrast to four-year intending students, two-year intending students of other ethnicity have significantly lower odds of melting compared to Black students (e^b=0.487, p=.037). Another finding related to student demographics is that students from the class of 2019 had significantly lower odds of melting compared to the class of 2016 (e^b=0.616, p=.005). This is in contrast to four-year intending students for whom the class of 2018 had a significantly higher expected probability of melt.

For four-year intending students, it was revealed that students with an EFC of zero had a statistically significant higher probability of melt compared to the other EFC groups. EFC had a varying effect on odds of melt for two-year intending students. Specifically, those with the highest EFC, EFC3, have lower odds of melt (e^b=0.603, p=.004). Students in the second highest EFC range, EFC2, have higher odds of melt, but this difference is not statistically significant (e^b=1.163, p=.444). Students with the second lowest EFC, EFC1, have lower odds of melt, but this difference also was not significant (e^b=0.962, p=.775). These findings suggest that EFC may not be as strong a predictor of melt for two-year intended students. One reason for this might be that the cost to attend a two-year institution is significantly lower than attending a four-year institution thereby minimizing cost and ability to pay as a factor in whether or not a student actually enrolls.

Academic Record

Similar to four-year intended students, the model for two-year intended students shows that students who attend a PCN high school only have statistically significant higher odds of melting (e^b=1.600, p<.001). Students who only attend a PCN middle school have lower odds of melting compared to those who went to both middle and high school with PCN but not at a statistically significant level (e^b=0.918, p=.531). GPA is a significant predictor of melt (e^b=0.789, p=.018) for two-year intended students. This finding suggests that GPA is associated with a student's probability of following through with their intended college plan, regardless of the type of institution at which they intend to enroll.

The number of college applications submitted was not a significant predictor of melt for two-year intended students. While directionally, the more applications a student submitted, the lower the odds of melt, none of the groups were significantly different from the reference group (1-3 applications). This may be related to the difference an application means for two-year institutions compared to four-year institutions. Most two-year institutions require an application for entry whereas four-year institutions require an application for *consideration* of admission.

Institution Characteristics

Institution ranking, which is based on competitiveness level is not a valid variable for this model as all two-year institutions are in the same competitiveness ranking category; there is no opportunity to compare between various ranking levels. This resulted in institution graduation rate as the sole variable to test for predictability of melt. Institution graduation rate is a significant predictor of melt (e^b=0.987, p=.022). Similar to four-year institutions, the higher the graduation rate, the lower the odds of melt.

Summary

The analysis found that 22.8% of the full sample resulted in actual enrollment that differed from their intended enrollment. A closer look at only those who intended to enroll in college with a specific focus on change in type of plan, shows that 16.2% of college-intending students' actual enrollment differed from their intended enrollment. Testing various predictors of melt found that GPA and the graduation rate of the intended institution are significant predictors of melt for both two- and four-year intending college students. Other variables such as ethnicity and EFC had varying effects on their ability to predict melt across both groups of students.

CHAPTER FIVE

Introduction

I conducted a quantitative analysis to investigate graduating high school seniors' intended enrollment and whether or not this aligned with actual enrollment. This study augments existing research on summer melt as it reports on what percent of students melted and offers a more detailed analysis of this phenomenon. The study differentiated by type of intended enrollment – enroll at a four-year institution, enroll at a two-year institution, or no plan to enroll in college. Through an analysis of 17,343 student records, I found that 22.8% of students' actual enrollment differed from their intended enrollment.

Using multiple logistic regression analysis, I found that Expected Family Contribution (EFC), high school grade point average (GPA), and the six-year minority graduation rate of the intended institution were all significant predictors of melt of four-year intending students. No significant differences were found in the expected probability of melt between male and female students or between Black and Latino students. In this section, I review key findings, identify the limitations of this research, discuss study implications, and offer recommendations to practitioners and institutions of higher education.

Discussion

I entered this study with some hypotheses about factors that contribute to melt. One of these hypotheses was that EFC is a critical variable and students with greater financial need have higher odds of melt. Financial need is more nuanced than EFC alone as it ultimately depends on the aid a student has access to in order to cover the cost of attendance. This study did confirm that those with the lowest EFC have the highest probability of melt and this is discussed in more detail below.

An additional finding that stood out is that there is no difference in expected probability of melt between male and female students. Research points to the lower number of males in higher education (Rogers & Freelon, 2012) and I was curious if this difference would also be present as students are on the cusp of beginning college. It was encouraging to see that gender is not a predictive factor of melt and that there were no significant differences between Black and Latino students. The findings on students from other ethnicity groups were mixed and may have been impacted by the small percentage that this group represents.

Focus on Change by Enrollment Type

Existing research on summer melt focuses on the macro level of students who intend to enroll in college and do not actually enroll in the fall immediately after high school. This concept was the inspiration for this study, and I wanted to conduct a more nuanced investigation about what changes occur and if we can anticipate who is more susceptible to these changes. Specifically, I focused the analysis on students who intended to enroll at a four-year institution and did not actually enroll at this type of institution. The expansion of the dependent variable to include students who enrolled at a two-year institution is not to equate attending a two-year institution with not attending college but instead to highlight the overall change that can happen with those who intend to enroll at a four-year institution. Using type in the analysis brought forth a group of students that was not identified in prior research approaches. It is important to consider that these students committed to enroll at a four-year institution – that means they went through the complex process to apply, gain admission, and tell the institution that they would be there in the fall. If students had a goal to earn a bachelor's degree, enrolling at a two-year institution still offers a path toward this goal, but research indicates that it can be less direct, and the chances of degree completion decrease (Doyle, 2009). This study also focused on immediate

college enrollment as studies show that a delay in enrollment has a negative relationship with college completion, especially for low-income students (Andrews, 2008; Bozick & DeLuca, 2005).

One of the first studies on summer melt was conducted by Arnold et al. (2009) who found that of the 90% of students in the study who planned to attend college, only 70% actually enrolled. This study, albeit with a different lens that focused on change between intended and actual enrollment, found that 22.8% of students had actual enrollments that differed from their intended enrollment. Using Arnold et al.'s (2009) same definition, 15.6% of this sample who intended to go to college, did not enroll in the fall. This rate is lower than the seminal work on summer melt but does fall within the estimated rate of national melt; Castleman and Page (2014) estimated that anywhere between 8% and 40% of students melt. They also suggested that low-income students melt at higher rates.

An analysis based on change in type of enrollment brought forth two findings not seen in prior work. The first is the percentage of students who change their plans from a four-year institution and enroll at a two-year institution. From this sample, 4.6% of students shifted their plans in this manner. This is noteworthy as these students were on the path to enroll at a four-year institution, even going as far as completing the commitment process for their intended institution. While the specific reasons for students making this change are unknown for this sample, in my more than 10 years of experience working to support students with their college plans, I have observed that such changes are often the result of financial concerns. It is important to note when students change course and to understand the reasons for this change – particularly since these reasons may be related to systemic barriers.

The other important finding is the rate of summer melt specifically for students who intended to enroll at two-year institutions. In this sample, nearly 29% of students who planned to attend a two-year institution did not enroll. There could be several reasons that contribute to this occurrence. One might be that students in an environment that encourages going to college may feel pressure to have an intended enrollment and indicate a two-year institution as their plan to ameliorate that pressure without actually wanting or planning to go. This is feasible due to the less stringent application and commitment processes for two-year institutions. On the flip side, two-year institution enrollment might be a default for counselors to use when the information is not known or confirmed. While this finding led to more speculation, the high percentage is noteworthy and an area for further investigation.

Role of Finances

There is a plethora of research on the role that finances and the ability to pay for college have on the college application, decision, and enrollment processes. The financial aspect of college is especially dominant in the process for low-income students. Paulsen and St. John (2002) found that the educational attainment goals for low-income students with high grades are lower compared to their wealthier counterparts. Further, they also reported that 64% of low-income students selected their college because of lower tuition and the associated financial aid they received. Findings from this study affirm that financial standing does play a role in the college enrollment process. Specifically, students with the lowest expected family contribution (EFC) have the highest probability of melt.

The finding that students with an EFC of zero have the highest expected probability to change their intended enrollment is important, as it reinforces that patterns of enrollment decisions are affected by socioeconomic class (Paulsen & St. John, 2002; Wells & Lynch, 2012).

Having an EFC of zero means that the family is not expected to contribute to the cost of attending college as their financial situation does not allow for this. It also means that financial aid is needed to cover the full cost of attendance. Accessing financial aid involves various steps, starting with the completion of the appropriate financial aid applications, to ultimately accepting or rejecting aid that is offered to the student. If loans are part of the aid the student accepts, there are further steps to take such as deciding on the amount and completing loan counseling. These required actions are pressures from the institution, what Arnold et al. (2015) would define as the exosystem.

Students face these pressures from an institution that is new to them at the same time that their micro- and meso-systems are shifting. As students leave high school, they may not have access to their teachers or same counselor who helped them with the college application process to ask for guidance or advice with these additional steps. These are the students whose family have the least financial means and they have additional steps they must complete. This is in contrast to students who do not have to worry about financing college and instead are able to focus on the social transition to college, allowing them to strengthen their new microsystem while low-income students struggle to make it to the first day (Arnold et al., 2015). A college degree is linked to longer-term benefits including higher earning potential. The fact that students from families with the least means are the most probable to melt, reinforces the notion of social reproduction.

One example of how interactions between an individual, policies, and institutions can compound in a student's decision or ability to follow through with their intended enrollment is with the class of 2018. For the 2018-2019 school year, there was a change in how the U.S. Department of Education's Federal Student Aid office identified students for financial aid

verification. This change resulted in a surge of low-income students who were selected for verification; a burdensome process where students have to submit additional paperwork to prove that what was reported on their FAFSA is correct. The impact was not just on students as institutions had to review and complete the verification process in order for students to access financial aid. As low-income students are more prone to select institutions with lower tuition (Paulsen & St. John, 2002), this also created a challenge for institutions to process a high number of verifications in a short timeframe. PCN has support available for students over the summer and the findings still show a greater probability of melt for this class compared to the class of 2016. As a national database of melt does not exist, it is unknown how many others were impacted by this change in policy. This serves as an example of the additional burden students with lower financial means might face to access college. It is critical to be aware that students with the lowest EFC, zero, have the highest probability of melt in order to enact change and minimize the transmission of social inequality.

Limitations

This study utilized a nomothetic approach in that I sought to identify general patterns in the factors that might predict a change in college enrollment. Identifying such patterns for this topic is helpful for practitioners to prioritize which students may need more intensive support to actualize their intended enrollment. The limitation with this approach is that the decision to continue with plans to enroll or to change plans is an individual one. The variables used in this study do not provide insight on the reasons why students change their plans.

Generalizability

The ability to generalize findings is limited due to the sample used for this study. Students in this sample attended a public charter school that emphasizes going to college and

provides college access and persistence support. While the majority of the students are students of color from historically under-resourced communities, the findings cannot be generalized to others who have a similar demographic profile due to the unique support that PCN provides its students and alumni with applying and transitioning to college, as well as continued support while in college; other students may not receive this level of support from their middle or high schools. A further note on the sample is that the logistic regression model only included student records that had all the variables used in the model on file. This means that for PCN middle school only students, they were likely engaged with the Power Through College (PTC) program in order for the data to be on file. This may have skewed the sample toward those who were more inclined to seek college as an option as they leveraged external assistance with the college-going process.

Time

This type of analysis cannot fully account for changes that occur in the exo-, macro-, or chrono-systems that may affect a student's decision to attend college. It can show the impact of these in a hindsight manner but cannot help to predict the probability of changing plans based on policy or other changes. An example of this is the finding for four-year intended students from the class of 2018 who had a higher expected probability of melt. As discussed above, one potential reason for this was the increased number of low-income students selected for financial aid verification. A model of this type cannot predict for these types of occurrences.

COVID Impact. Higher education is currently undergoing a substantial disruption. The global pandemic caused by COVID-19 required institutions to move to a virtual setting in the spring of 2020. At the time of this writing, there were varied plans among institutions regarding when students will return to campus. Blankenberger and Williams (2020) state that institutions

have a responsibility to support students to meet both financial and academic needs. The ability to do this requires additional resources at a time when institutions are also facing budget constraints. There are early reports of four-year intending students experiencing challenges with transitioning to college in a virtual setting. One barrier faced is the need to attend orientation virtually; some students' access to technology was from their high school and they no longer have the requisite technology to participate in a virtual learning environment.

Early reports point to an expected decline in enrollment (Blankenberger & Williams, 2020). The Art & Science Group published results from their *student***POLL** conducted in late April 2020 with a representative sample of 1,171 high school seniors. Of this sample, 70% are White and 58% female. Twelve percent of respondents who paid a deposit indicated that they would change their plans and not enroll full-time at a four-year institution in the fall. An additional 40% had not paid deposits and stated that they were uncertain about enrolling in their top choice college. Comparisons between the March and April polls showed a decrease in the percent who plan to take a gap year, from 35% to 16%, and an increase in those who plan to enroll in a two-year institution, from 7% to 16%.

Financial hardship also poses a threat to immediate college enrollment. The Expected Family Contribution (EFC) is determined based on taxes from the previous year; for the entering class of 2020, EFC is determined using taxes from 2018. Any changes in financial standing this year will require a financial aid adjustment which calls for additional paperwork from the students and for financial aid officers to review and make a determination. Respondents from April's *student***POLL** who were unsure about their plan for the fall indicated ability to afford the cost as the primary reason for doubt with their plans. Institutions are encouraged to provide an easier pathway to review student's financial situation (Blankenberger & Williams, 2020). A

longer-term impact may be the community college systems' ability to handle an influx of students if more opt to begin at a two-year institution. The impact of COVID-19 on fall 2020 enrollment and beyond remains to be seen.

Data Collected

An additional limitation of this study is that the data available to conduct the analysis did not closely align with the theoretical framework. I was unable to test the impact of capital or summer advising on the probability of melt. Data related to both of these measures were requested but were either completely unavailable or too incomplete to be analyzed. My analysis and ability to test candidate predictors was limited by the availability of data and the percentage of complete records.

Implications

The findings from this study affirm existing research about the role that finances play in student's ability to successfully enter college. Specifically, the finding that students with an EFC of zero have a higher expected probability of melt reinforces the need for systemic change. Bourdieu (1986) theorized that educational systems can play a role in either reproducing or dismantling existing social structures. Higher education is one method of mobility and if systems remain in place that block those with the lowest financial means from accessing college, this reproduces the existing structure that is a detriment to students who come from low-income families.

This study also shows the importance of looking beyond the binary classification of going to college or not. Looking at changes based on intended enrollment can reveal different change patterns. A cursory look at overall intended four-year enrollment compared to actual enrollment showed a difference of 0.5%. If we only looked at that number, it would suggest that

'melt' was a minimal problem. The analysis by institution type revealed the large percentage of melt that occurred for two-year intended students, nearly 29% did not enroll and encourages further research on this topic.

Practitioner Implications

As an individual who works in the field of college access and success, I have gained several insights that will support my work. Many of the findings confirmed hunches that guide how we approach summer advising efforts to minimize melt. One practice I want to reconsider is PCN's approach to counselor assignment. Currently, when students transition from high school to college, they are assigned a new counselor. This is a disruption in student's microsystem that might be avoided. I will re-evaluate what opportunities there are to minimize the number of shifts a student is experiencing.

An additional implication of this study is that it may be possible to identify students who are at the highest risk of melt. One data point to consider is a student's EFC. Internally, we prioritize students who do not have a financial aid offer for early advising. It will be important to layer in EFC as another data point to leverage for prioritization. Another factor to consider for caseload prioritization is the graduation rate of the intended institution. In practice, students who attend more competitive institutions tend to be more responsive. While meeting with these students contributes to input measures of number of advising sessions, it is important to focus on longer-term goals of college completion and focus on those who have higher odds of melt and prioritize summer advising with these students.

Future Research

The logistic regression model built for this study began the process of considering both student characteristics and institutional factors. There is a lot of opportunity to further

investigate how a student profile more fully interacts with an institution profile to predict odds of melt. There is research that indicates that low-income students are more prone to melt. Further research should consider the root of this. What are the systemic practices in place that make it more challenging for low-income students who commit to enroll at an institution to actually enroll? Interviewing students whose plans changed to gain deeper insight on why their plans changed would contribute to the existing literature base on summer melt. In addition, studies that take into account the cost of attendance and the total aid received, including type of aid (grants versus loans) would provide a more comprehensive understanding of how economic capital impacts summer melt.

Other research topics that this study has brought forth is to investigate the move from four-year to two-year and vice versa, the move from two-year to four-year. Who are the students that makes these changes, what are the reasons that contribute to this, and what differences, if any, are there with respect to college enrollment compared to those who move forward with their intended enrollment? There are multiple paths that students can take in higher education. These paths might be individual decisions, impacted by systemic pressures. Ultimately, more insight on the longer-term outcomes of students who take these various paths would strengthen the base of literature. This study focuses on initial enrollment and a follow-up study that can be done is to investigate whether or not the college completion rates differ between those who intend to enroll at a four-year and actually enroll at a two-year versus those who begin immediately at a four-year institution. Longer-term outcomes would offer more comprehensive insight on the impact of summer melt and provide additional recommendations for practitioners.

Recommendations

College Access & Success Practitioners/Organizations

There are many who are invested in helping students gain entry to and ultimately graduate from college. For those who dedicate effort to this work, it can be frustrating to see a student with the goal to earn a bachelor's degree have this cut short because of external factors, including the inability to pay for the cost of college. In the last few years, there has been more focus on summer melt, beginning with heightened awareness of this phenomenon and the use of technology in an effort to minimize summer melt. I have three recommendations for individuals or organizations that are committed to helping students follow through with their intended enrollment.

The first recommendation is related to record-keeping. I recommend having strong data collection practices that allow for the identification of students' intended enrollment or plan in a more specific manner. These following options are suggested – four-year institution, two-year institution, trade/certificate program, military, work, no college, unknown. More distinct insight to student intentions will allow for tailored resources based on the scope of support the organization provides. A second recommendation is to offer assistance to students over the summer so they can access support, should they need it. It is important for the organization or individual at a minimum to let students know that support is available, preferred that they reach out to students to inquire on completion of enrollment processes over the summer, and ideal if it is the same individual who supported with the college application process. The third recommendation is to prioritize students with the highest financial need. There may be strains on time and ability to contact all students, I encourage schools and organizations providing college counseling to begin with students who have the lowest EFC.

Institutions of Higher Education

Institutions of higher education can play a pivotal role in minimizing summer melt. This is important for them as well as they typically have enrollment targets they need to reach. Actions that institutions can take include proactively creating a sense of belonging for students as soon as they are admitted. Embedding transition specialists or offering a 'first stop call center' at the institution would be an important resource for students. Students who are either the first in their family to attend college, have financial need to actually enroll, or other extenuating circumstances typically have to navigate multiple offices. Offering a starting point with guidance on how to resolve outstanding issues would help students both feel more welcome at the institution and support with ensuring that required tasks are completed. If the addition of new roles is a challenge, consider how admissions offices can support with this over summer. These are students they recruited and selected; they can play an additional role to ensure they make it to campus in the fall.

Another step institutions can take is to provide financial aid offers to students as soon as possible – ideally with the notification of being admitted. For students who have an unmet need, include additional resources to help students plan for this unmet need. This information can include details on payment plans that outlines the specific amount that would need to be paid each month. The cost should explicit so students can make an informed decision early in the process and not face surprises down the road. Other resources to provide is information about scholarships or low-interest loans.

Institutions should bear in mind that not all students have the same habitus and knowledge about the college-going process – in particular those final steps in order to fully enroll. There is an expectation that they are now college students and adults, yet students are

going through multiple ecological shifts at the same time that they are facing new external pressures. Small changes such as requesting information and completion of various steps while the student is still in high school can help so students can seek support if needed.

Closing

As the daughter of immigrant parents, I have first-hand experience of the benefit of higher education. In research, this is often referred to as social mobility. Beyond the economic implications, what I truly value is having choice. I have always viewed education as a means to have more options, and even further, quality options. I have benefitted from the educational opportunities afforded to me and have dedicated my career to help others access higher education, if that is their goal. I know that college is not for everyone. However, I firmly believe it should be the individual's choice and not a systemic decision. As a student and in my career, I have seen and experienced the inequities of knowledge, choice, and the ability to access college. It has been most disheartening when students get so close to starting on this next step – they did well in high school, applied to college, got in and indicated their commitment to attend. Too often I learned that they did not actually enroll. The celebration of getting in and preparing to go to college was cut short. Many times, this is viewed as the student's failure – they did not submit a required document or take a placement exam on time.

The question still remains – what are the systemic practices that inhibit low-income and/or first-generation students from enrolling in college, especially when they are so close? Instead of stating that they fell "victim" to a phenomenon, we should consider what systemic changes need to be made to provide more equitable access to college and the benefits afforded from a college degree.

APPENDIX A

Table A1.
Frequency distribution for categorical independent variables

Variable	All Cases (n=19,323)		Confirmed HS Grad (n=17,343)	
	n	%	n	%
Gender				
Female	10,288	53.2	9,501	54.8
Male	9,022	46.7	7,829	45.1
Ethnicity (Recoded)				
Black	11,792	61.0	10,376	59.8
Latino	6,561	34.0	6,082	35.1
Other	970	5.0	885	5.1
High School Class				
2016	3,917	20.3	3,633	20.9
2017	4,496	23.3	4,156	24.0
2018	5,393	27.9	4,808	27.7
2019	5,517	28.6	4,746	27.4
Expected Family Contribution Category (Recoded)				
Level 0 ($0)	6,779	35.1	6,688	38.6
Level 1 ($0 - $3,100)	2,341	12.1	2,316	13.4
Level 2 ($3,101 - $5,576)	813	4.2	806	4.6
Level 3 (> $5,576)	1,665	8.6	1,660	9.6
Missing	7,725	40.0	5,873	33.9
PCN Enrollment				
Middle School and High School	6,396	33.1	6,396	36.9
High School Only	2,519	13.0	2,519	13.4
Middle School Only	10,408	53.9	8,428	48.6
Number of Applications Submitted (Recoded)				
Group 1 (1 - 3 applications)	2,788	14.4	2,690	15.5
Group 2 (4 - 8 applications)	3,846	19.9	3,778	21.8
Group 3 (9 - 13 applications)	5,059	26.2	5,023	29.0
Group 4 (>13 applications)	3,301	17.1	3,292	19.0
Missing	4,329	22.4	2,560	14.8
Institutional Ranking (Recoded) (n=12,405)				
Level 1 (highest rank)	2,594	13.4	2,593	15.0
Level 2	4,095	21.2	4,084	23.5
Level 3	2,463	12.7	2,457	14.2
Level 4 (lowest rank)	3,253	16.8	3,225	18.6
Missing	6,918	35.8	4,984	28.7

Table A2.
Mean and standard deviation for quantitative independent variables

Variable	All Cases (n=19,323)			Confirmed HS Grad (n=17,343)		
	n	M	SD	n	M	SD
High School GPA	14,723	2.72	0.70	14,083	2.76	0.67
Intended 4-year College's Graduation Rate	12,424	44.00	20.02	12,379	44.04	20.03

APPENDIX B

Table B1
Model 1 logistic regression findings for four-year intended students.

Variable	*b*	SE(*b*)	*p*	exp(*b*)
Intercept (constant)	-2.062	0.137	0.000	0.127
Gender (Reference=Male)				
Female	-0.151	0.082	0.067	0.860
Ethnicity (Reference=Black)				
ETHN=Latino	-0.101	0.086	0.237	0.904
ETHN=Other	-0.316	0.202	0.117	0.729
High School Class (Reference=2016)				
HS Class 2017	0.156	0.143	0.274	1.169
HS Class 2018	0.265	0.140	0.059	1.303
HS Class 2019	0.034	0.143	0.814	1.034
Expected Family Contribution (Reference=Full Pell eligible)				
EFC-1 (50-99% Pell)	-0.344	0.106	0.001	0.709
EFC-2 (<50% Pell)	-0.617	0.185	0.001	0.540
EFC-3 (Non-Pell eligible)	-0.512	0.129	0.000	0.599

Notes. *b* is the expected change in the log-odds of melt given a unit change in the predictor and holding other predictors constant. SE*(b)* is the standard error of the estimated slope, *b*. *p* is the p-value for a t-test of the slope. exp(*b*) is the expected change in the odds of melt given a unit change in the predictor and holding other predictors constant.

Table B2
Model 2 logistic regression findings for four-year intended students.

Variable	*b*	SE(*b*)	*p*	exp(*b*)
Intercept (constant)	0.699	0.290	0.016	2.011
Gender (Reference=Male)				
Female	0.069	0.085	0.416	1.072
Ethnicity (Reference=Black)				
ETHN=Latino	0.042	0.091	0.641	1.043
ETHN=Other	0.269	0.211	0.202	1.308
High School Class (Reference=2016)				
HS Class 2017	0.190	0.146	0.193	1.209
HS Class 2018	0.357	0.143	0.013	1.429
HS Class 2019	0.174	0.147	0.237	1.190
Expected Family Contribution (Reference=Full Pell eligible)				
EFC-1 (50-99% Pell)	-0.307	0.109	0.005	0.736
EFC-2 (<50% Pell)	-0.484	0.188	0.010	0.617
EFC-3 (Non-Pell eligible)	-0.321	0.131	0.015	0.726
Time with PCN (Reference=MS and HS)				
HS Only	0.368	0.109	0.001	1.445
MS Only	0.150	0.104	0.149	1.162
GPA	-1.058	0.078	0.000	0.347
Number of applications Submitted (Reference=1-3 apps submitted)				
Apps Submitted-2 (4-8 apps submitted)	0.125	0.181	0.490	1.133
Apps Submitted-3 (9-13 apps submitted)	-0.063	0.177	0.721	0.939
Apps Submitted-4 (14+ apps submitted)	-0.601	0.190	0.002	0.548

Notes. *b* is the expected change in the log-odds of melt given a unit change in the predictor and holding other predictors constant. SE*(b)* is the standard error of the estimated slope, *b*. *p* is the p-value for a t-test of the slope. exp(*b*) is the expected change in the odds of melt given a unit change in the predictor and holding other predictors constant.

APPENDIX C

Table C1
Model 1 logistic regression findings for two-year intended students.

Variable	*b*	SE(*b*)	*p*	exp(*b*)
Intercept (constant)	-0.595	0.157	0.000	0.551
Gender (Reference=Male)				
Female	-0.143	0.102	0.161	0.867
Ethnicity (Reference=Black)				
ETHN=Latino	0.105	0.103	0.309	1.110
ETHN=Other	-0.650	0.338	0.054	0.522
High School Class (Reference=2016)				
HS Class 2017	-0.282	0.170	0.097	0.754
HS Class 2018	-0.170	0.163	0.298	0.844
HS Class 2019	-0.581	0.169	0.001	0.559
Expected Family Contribution (Reference=Full Pell eligible)				
EFC-1 (50-99% Pell)	-0.053	0.135	0.693	0.948
EFC-2 (<50% Pell)	0.141	0.195	0.470	1.151
EFC-3 (Non-Pell eligible)	-0.580	0.172	0.001	0.560

Notes. Institutional ranking was not included as a predictor, since all two-year institutions are in the same ranking group. *b* is the expected change in the log-odds of melt given a unit change in the predictor and holding other predictors constant. SE(*b*) is the standard error of the estimated slope, *b*. *p* is the p-value for a t-test of the slope. exp(*b*) is the expected change in the odds of melt given a unit change in the predictor and holding other predictors constant.

Table C2
Model 2 logistic regression findings for two-year intended students.

Variable	*b*	SE(*b*)	*p*	exp(*b*)
Intercept (constant)	-0.122	0.269	0.651	0.885
Gender (Reference=Male)				
Female	-0.090	0.104	0.389	0.914
Ethnicity (Reference=Black)				
ETHN=Latino	0.099	0.108	0.358	1.104
ETHN=Other	-0.748	0.344	0.030	0.473
High School Class (Reference=2016)				
HS Class 2017	-0.272	0.172	0.114	0.762
HS Class 2018	-0.139	0.166	0.400	0.870
HS Class 2019	-0.520	0.171	0.002	0.594
Expected Family Contribution (Reference=Full Pell eligible)				
EFC-1 (50-99% Pell)	-0.055	0.136	0.688	0.947
EFC-2 (<50% Pell)	0.158	0.197	0.422	1.171
EFC-3 (Non-Pell eligible)	-0.521	0.174	0.003	0.594
Time with PCN (Reference=MS and HS)				
HS Only	0.480	0.131	0.000	1.615
MS Only	-0.053	0.136	0.693	0.948
GPA	-0.225	0.100	0.025	0.798
Number of applications Submitted (Reference=1-3 apps submitted)				
Apps Submitted-2 (4-8 apps submitted)	-0.021	0.141	0.883	0.979
Apps Submitted-3 (9-13 apps submitted)	-0.190	0.154	0.216	0.827
Apps Submitted-4 (14+ apps submitted)	-0.376	0.199	0.058	0.687

Note. Institutional ranking was not included as a predictor, since all two-year institutions are in the same ranking group. *b* is the expected change in the log-odds of melt given a unit change in the predictor and holding other predictors constant. SE(*b*) is the standard error of the estimated slope, *b*. *p* is the p-value for a t-test of the slope. exp(*b*) is the expected change in the odds of melt given a unit change in the predictor and holding other predictors constant.

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