Bridging High School and College:

Supporting Enrollment for College-Intending High School Seniors in Tennessee

By

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To the students, families, and staff of Match Charter Public High School

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Introduction

1.1 Objective

Practitioners and researchers have long identified the transition to college as a period rife with challenges that can derail students from their goal of obtaining a postsecondary credential (Braxton, 2000; Chemers, Hu, & Garcia, 2001; Upcraft & Gardner, 1989; Upcraft, Gardner, Barefoot, 2004). The pathway from secondary to postsecondary is particularly challenging for individuals from families with limited college experience and constrained financial resources. Such students may lack access to information about entrance requirements, selection criteria, and cost and financial aid, which may make it difficult to achieve their postsecondary goals.

Research in the past decade has empirically named and explored the low matriculation rate of high school graduates into college. College-intending high school students who fail to matriculate the fall after high school graduation are said to "melt" from their institution's anticipated enrollment numbers. Estimates by the U.S. Department of Education (2013) and others contend that somewhere between 10 and 40 percent of college-intending high school graduates do not arrive on campus in the fall (Castleman & Page, 2014a). As this summer melt disproportionately affects low-income and first generation college students (Castleman & Page, 2014b), mitigating summer melt represents both a moral and an economic imperative that warrants intervention and research. Summer melt has largely been attributed to aspiring students' lack of knowledge regarding what is required for successful enrollment (Arnold et al., 2009; Castleman, Arnold, & Wartman, 2012; Castleman & Page, 2014; Castleman, Page, & Schooley,

2014). For example, one of the areas in which students generally require counselor support is with initial completion of the Free Application for Federal Student Aid (FAFSA) and subsequent follow up that is necessary to ensure receipt of federal and state aid (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012; Bird & Castleman, 2016; Dynarski & Scott-Clayton, 2006).

The present dissertation examines the experience of a cohort of college-intending high school students beginning in the spring semester of the senior year of high school and following them through the spring semester of their first year of college in an effort to determine who is most likely to exit the college-going pipeline at what time, whether an informational intervention during the summer between high school and college reduces summer melt, and how students conceptualize and make sense of the resources they receive (and do not receive) during their pursuit of a postsecondary credential.

The site for this dissertation is Tennessee, which lends an innovative context because it is home to the Tennessee Promise free community and technical college scholarship. The TN Promise scholarship, one prong of a statewide campaign to increase the percentage of Tennessee adults with a postsecondary credential from 38 to 55 percent by 2025, funds tuition and fees for recent high school graduates pursuing associate's degrees and technical certificates. With the implementation of the TN Promise, Tennessee became the first state in the country to offer a statewide, tuition-free program for recent high school graduates. Consequently, Tennessee presents a unique context for the study of the path between high school and college.

1.2 Background and context

Some states and localities have turned to geographically based scholarship programs to provide grants to students who live in designated places, meet certain eligibility criteria, and/or

attend specific primary and secondary schools (Perna & Leigh, 2018). These programs provide grants to students who live in designated places, meet certain eligibility criteria, and/or attend specific primary and secondary schools. So-called "Promise" programs appeal to policymakers because of their potential to promote regional economic growth. Interest in these scholarship programs has burgeoned in recent years (Perna & Leigh, 2017), alongside popular discourse that condemns rapidly rising college costs. Such programs represent one way to reduce perceived barriers to postsecondary entry.

Tuition-free guarantees for two-year or four-year college are gaining ground across the country. While free college programs are not novel, they have grown increasingly popular since the Great Recession as reports of soaring college debt and forecasts for the future of work suggested that most future jobs will required postsecondary training. The programs range in size and scope from city-based, privately funded programs to state grants for workforce-oriented training, to a four-year scholarship for in-state residents to pursue a bachelor's degree and remain in state for work. Over a dozen states now cover college tuition for some students, and nearly two dozen state legislatures considered "free college" bills this legislative session (Quinton, 2019). These programs have been enacted by both Republican- and Democrat-controlled state legislatures, and a number of Democratic presidential candidates have expressed support for a federal tuition-free college program. Although there is some empirical evidence that suggests that the efficacy of free college programs in addressing social inequities is limited (e.g., Deming & Walters, 2017; Murphy, Scott-Clayton, & Wyness, 2017), they continue to grow in popularity.

The TN Promise Scholarship is perhaps the best-known example of a state tuition-free college program. Tennessee's last-dollar promise program guarantees a tuition-free two-year postsecondary education for Tennesseans who have just graduated with a high school diploma

and who enroll at a community or technical college (known as Tennessee Colleges of Applied Technology, or TCAT). Economic theory suggests that Tennessee should expect increases in enrollment at community and technical colleges by making postsecondary education tuition-free. By lowering the personal cost of attending college, the state reduces the cost of attendance to the opportunity cost of lost wages and time during enrollment. Indeed, early evidence suggests that enrollment in Tennessee has grown at least marginally for certain populations (Tennessee Higher Education Commission, 2017a).

The program, which is currently serving its fourth entering cohort, covers tuition and fees for recent high school graduates who enroll at the state's public community and technical colleges[1]. TN Promise is a broad-access scholarship program with limited eligibility criteria meant to ensure that all college-intending high school graduates can earn a two-year postsecondary credential tuition-free. High school seniors who graduate from an eligible Tennessee high school, complete a Tennessee home school program, or, prior to their 19th birthday, obtain a General Education Development (GED) or High School Equivalency Test (HiSET) diploma[2], must apply for the scholarship by the November deadline of their high school senior year or the year in which they will obtain the GED/HiSET. Students must submit the FAFSA by January of their senior year and begin working with a mentor and attending mandatory meetings in their counties. In order to maintain eligibility, students must enroll in college full-time, continue to participate in the mentoring program, and perform eight hours of community service prior to each term the award is received.

[1] There are also a limited number of TN Promise eligible associate's degree programs at public and private baccalaureate institutions in the state. For more information, see the list of eligible programs at http://tnpromise.gov/files/TNPromiseListofInstitutions_032217.pdf.

[2] The GED and HiSET are high school equivalency assessments that serve as alternative certifications of high school-level academic performance.

The scholarship program is facilitated in partnership with non-profit tnAchieves in 84 of 95 counties across the state. tnAchieves recruits and trains volunteer mentors and shares information via text and email with students, with a particular communications push focused on the summer months between high school graduation and college matriculation. The state of Tennessee has also dedicated financial resources and employees to improving supports for FAFSA completion among high school seniors.

Since TN Promise scholarship implementation in 2015-16, first-time enrollment in public postsecondary institutions has increased by 13 percent (THEC, 2017a). Enrollment gains in early years of the TN Promise suggest that barriers to entry may be mitigated through financial support or the simplification of messaging around the cost of college. Across the first three cohorts, roughly 80 percent of high school seniors have applied for the Tennessee Promise by the fall application deadline and roughly 90 percent of Promise-eligible students have filed their FAFSA by the January deadline (THEC, 2017a).

However, only 28 percent of initial TN Promise applicants and 30 percent of FAFSA-completers enroll for the fall semester. The high rate of college pipeline attrition among college-intending, Promise-eligible students indicates that there may be factors beyond finances that keep students from pursuing postsecondary education. Roughly 50 percent of seniors who complete the FAFSA remain eligible for Promise after the summer community service deadline, but only two-thirds of those students ultimately enroll in the fall (THEC, 2017a). While there is likely natural attrition as students elect to pursue other postsecondary options or enter the workforce, the burden of logistical and procedural tasks may contribute to this attrition among students who appear college-intending during their senior year.

1.3 Overview of papers

I undertook three studies in the TN Promise context to contribute to the literature on the high school-to-college transition. In all three studies, I focus on high school students who intended to enroll in associate's degree programs and technical colleges in the fall of 2017 under the TN Promise. Administrative data allows me to examine the characteristics of students who do not enroll in postsecondary education after completing the FAFSA in their senior year of high school and, grounded in the college choice literature, model whether these students are those who, theoretically and empirically, we would predict may not enroll. Through a randomized control trial informational intervention and qualitative study, I investigate the role of information and supports in the matriculation, persistence, and success of community college students. My dissertation is organized into three papers, as follows:

Paper 1: Stumbling at the Starting Gate: Post-FAFSA Completion Attrition in Tennessee

1. *Who are the TN Promise applicants who complete the FAFSA and subsequently fail to matriculate?*
2. *What timing and personal characteristics are related to not enrolling in college after successful FAFSA completion?*
3. *Are the patterns of attrition (by individual characteristics, timing, and geographic area) consistent with what is predicted by prior models of postsecondary transition?*

In the first study of my dissertation, I examine the observable characteristics of high school class of 2017 students who left the college-going pipeline after completing the FAFSA. In order to encourage college going and facilitate access to financial aid programs, the state of Tennessee has encouraged FAFSA completion in high school seniors in recent years through

informational outreach, state-sponsored FAFSA completion events, and the expansion of college counseling. This campaign has been incredibly successful: after average rates of completion in years past, Tennessee has had the highest statewide FAFSA filing rate for high school seniors the past three academic years. For the 2016-2017 academic year, nearly three-quarters of graduating seniors completed the FAFSA (Tennessee Higher Education Commission, 2017a). However, many of these seemingly college-intending FAFSA filers do not attend college in the fall after high school graduation. This paper seeks to determine the timing and factors that are related to failing to enroll in postsecondary training after completing the FAFSA during the senior year of high school. While the easy answer is that students were not interested in attending college in the first place, the commitment to navigating a complex financial aid application process indicates a certain level of commitment to college-going that even 10 percent of aid-eligible college-enrolling students do not reach (Kofoed, 2016).

While the Tennessee Higher Education Commission (THEC) has released raw counts and descriptive statistics related to take-up and success of the three cohorts of TN Promise students between the inaugural year and present, we know little about who completes the FAFSA and does not enroll in college. Consequently, this paper increases our understanding of attrition from the college-going pipeline among students in a free-college-for-all environment by addressing the descriptive and associational questions stated above. I utilize student-level administrative data obtained from tnAchieves. Using descriptive statistics and discrete-time survival analysis, I explore whether the observed associations between student characteristics and enrollment outcomes are consistent with the theoretical and empirical bodies of literature on the college transition process.

The results of this discrete time survival analysis are consistent with the transition and student development literature. The preferred model estimates that the odds of scholarship eligibility loss are roughly 22 percent lower for women than men, roughly 66 percent higher for Asian students and 54 percent higher for Black students relative to White students, and roughly 27% higher for students who intend to be the first in their families to enroll in college. There is evidence of a nonlinear relationship between ACT and risk of Promise scholarship eligibility loss, consistent with the college decision-making and student development literatures. These findings have implications for resource allocation for college-intending high school seniors and the timing of scholarship eligibility deadlines.

Paper 2: Experimental Evidence on the Effects of Informational Framing on the "Free College" Transition

1. *Do TN Promise-eligible, college-intending high school graduates who receive informational text messages in various behavioral frames maintain scholarship eligibility, enroll, and succeed in college at different rates?*
2. *Does the impact of text message framing vary by intended enrollment sector (community college, technical college, 4-year college) or individual characteristics?*

In the second study of my dissertation, I seek to determine whether the framing of informational supports affects student postsecondary matriculation and persistence. In collaboration with Tennessee's non-profit partner organization, tnAchieves, I designed, implemented, and evaluated a budget-neutral alternative to their informational text messaging campaign for TN Promise-intending graduating seniors. I leverage a randomized control trial of roughly 18,000 college-intending class of 2017 Tennessee high school graduates to determine

whether the behavioral framing of informational messaging successful maintenance of TN Promise eligibility.

In May of 2017, TN Promise students were randomized into four groups that all received informational messages, albeit in distinct behavioral frames:

1. Business-as-usual, in which they receive the same messages from prior year's informational campaign
2. Loss aversion, which emphasizes what students will lose if they do not act on the information
3. Reduction of implementation ambiguity, which provides details on the requisite steps for action, as well as the amount of time it will take to complete the task
4. Peer support, which encourages students to work with friends to ensure they are taking action, thus exerting normative social pressures.

I derive outcome measures from data obtained from tnAchieves and, where applicable, administrative enrollment data. I consider the effect of the informational frame on summer and first semester outcomes, including completion of required community service, college enrollment in the fall semester following high school graduation, fall semester community service completion, and fall academic performance as measured by GPA. For the primary analysis I use a linear probability model and leverage student-level demographic and academic information as covariates to increase the precision of the estimates. Secondary models test for differential effects by student characteristics and intended enrollment sector.

Estimated effects of the informational framing intervention suggest that the treatment frames do not affect the likelihood of successful college transition and persistence. There is no main effect of any of the treatment frames on student transition, first semester, or persistence

outcomes. Heterogeneity analyses reveal that, at certain eligibility checkpoints, the loss aversion frame negatively affected men and the peer support frame negatively affected first generation and Black participants.

Paper 3: Expectations of a Promise: The Psychological Contracts between Students, Institutions, and the State in a Tuition-Free College Environment

1. *Do Promise scholarship students perceive psychological contracts between themselves and key actors on- and off-campus?*
2. *If so, what are the terms of these exchange relationships?*

For the third paper, I undertake a qualitative study to explore student perceptions of the supports and resources during the transition and first year of community and technical college. I collected qualitative data through a web-based survey and in-person semi-structured focus groups with 60 first-year TN Promise students across the state. At the end of the fall 2017 semester, I recruited students via email and text message to participate in a survey about their perceptions of the informational supports during the transition, the resources and supports they accessed during the college transition and the first year of college, and their perceptions of the utility of these resources.

During the spring semester of 2018, I conducted focus groups with students across the state. These focus groups explored students' perceptions of the informational supports and other resources they leveraged during the postsecondary transition. The semi-structured focus group protocol was developed based on student responses to the online survey. All focus groups were audio-recorded and transcribed for analysis. I used an open coding approach in order to ground categories and themes in the data. Inductive coding captured participants' perspectives on the

college decision-making process, the transition to college, and the utility of resources and supports throughout these experiences. Constant comparative analysis was used to identify categories, natural variation, patterns, and themes that emerged from the data.

My qualitative study findings suggest that Promise programs, like Tennessee Promise, may reshape the expectations that students have for support from the state and their institution of enrollment regarding their support during their pursuit of postsecondary education and their successful attainment of a credential. The findings demonstrate the existence and content of psychological contracts between students, faculty, staff, the state, and the state's non-profit partner in facilitating the scholarship, tnAchieves. Unwritten psychological contracts are expectations of exchange that individuals believe to exist between themselves and another party. Previous literature focuses on psychological contracts that students perceive between themselves and on-campus actors. My qualitative findings also illuminate student expectations for an exchange relationship between themselves and the state, which is primarily mediated by more proximate actors (campus faculty and staff; tnAchieves). These findings have implications for the provision of support services by postsecondary institutions and the framing of Promise programs by their sponsoring entities.

1.4 Contributions

These dissertation papers yield policy-relevant insights that can inform state and institutional policies intended to ameliorate attrition from the postsecondary pipeline. In the first paper, I consider a much-examined area of interest, FAFSA completion, during the senior year of high school in a free community and technical college context. Findings reveal opportunities to reapportion supports for students who have successfully filed the FAFSA. The paper examines

the applicability of existing models of college choice and transition to the "free college" context.

Second, the randomized control trial contributes to the postsecondary behavioral science interventions literature, particularly the budding literature on the relative efficacy of differential framing. This study represents the first experimental study testing informational text messages in support of the postsecondary transition in a free community college context. The experiment examining tnAchieves' efforts to mitigate summer melt among TN high school seniors expands our understanding of the behavioral framing of informational interventions in the context of statewide college access efforts. The results of the experiment raise opportunities for policymakers and practitioners to consider the nature, framing, and personalization of informational interventions during the postsecondary transition.

Finally, the qualitative study demonstrates the existence and content of psychological contracts between students, faculty, staff, the state, and the state's non-profit partner in facilitating the scholarship, tnAchieves. Previous literature focuses on psychological contracts that students perceive between themselves and on-campus actors. This qualitative work also illuminates student expectations for an exchange relationship between themselves and the state, which is primarily mediated by more proximate actors (campus faculty and staff; tnAchieves). These findings have implications for the provision of support services by postsecondary institutions and the framing of Promise programs by their sponsoring entities that lend valuable insight to policymakers and practitioners with active or proposed tuition-free college programs.

Taken together, this work contributes to the body of research aimed at improving college enrollment and persistence, particularly for first generation and low-income students. The conclusions of this work stand to inform the future decisions of policymakers, as well as the work of high school advisors, community partners, and staff at postsecondary institutions, all of

whom are invested in ensuring that students have the information and resources necessary for their success. This dissertation is particularly relevant today, as more states are implementing or weighing the adoption of free college models and several presidential candidates for the 2020 election have named Free College as a key piece of their policy platform.

1.5 Structure of the dissertation

I present each study in a self-contained chapter with its own introduction, literature review, conceptual framework, methodology, data, results, and concluding sections. Papers 1, 2, and 3 are presented in Chapters 2, 3, and 4, respectively. In Chapter 5, I conclude with overall implications and potential extensions of this work for future research.

Chapter 2.

Stumbling at the Starting Gate: Post-FAFSA Completion Attrition in Tennessee

2.1 Introduction

Research has shown that the Free Application for Federal Student Aid (FAFSA) serves as a gatekeeper for prospective postsecondary students (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012; Dynarski & Scott-Clayton, 2006). Students may lack complete information about college costs and their likelihood of aid eligibility or they may be deterred from completing the FAFSA due to the complexity of the form (Avery & Kane, 2004; Dynarski & Scott-Clayton, 2006). Consequently, many eligible students do not apply for federal financial aid and forgo access to federal financial aid and other sources of funding that require FAFSA submission (King, 2004; Kofoed, 2017).

Indeed, in order to maintain eligibility for Tennessee's last-dollar tuition-free college scholarship, the TN Promise, students must complete the FAFSA by the end of January of their senior year. Students who do not complete the FAFSA by the deadline become ineligible for guaranteed tuition-free two-year college through TN Promise and cannot regain eligibility. In the interest of supporting scholarship eligibility and postsecondary enrollment of Tennessee's predominantly first generation and low-income student population, the state, high school staff, and non-profit partnering organizations provide informational supports and resources to encourage successful completion of the eligibility criteria, including successful FAFSA application. Likely due in combination to messaging about the "free college" program and the provision of FAFSA completion supports, Tennessee has been highly successful in increasing

FAFSA completion rates for high school seniors: the FAFSA filing rate has risen from 60.4% in 2014 to 81.7% in 2018 (Figure 2.1), and Tennessee now boasts the highest cohort FAFSA filing rate in the nation.

However, a distinct FAFSA completion problem has arisen in Tennessee: many high school seniors complete the FAFSA but do not enroll in college, even though community and technical college tuition are guaranteed to be paid for by the state. While there is great interest in the TN Promise scholarship program each fall, students depart from the Promise pipeline throughout the academic year and summer as they fail to complete requisite tasks in a timely fashion or choose other options for after high school graduation. College-going rates for the graduating high school cohorts since the advent of TN Promise have hovered in the vicinity of 63 percent (Figure 2.1), which is lower than the enrollment rate of high school graduates across the country (69.8% in 2016; NCES, 2017). After submitting the FAFSA, some 15,000 Tennessee seniors do not maintain eligibility for the state's Promise scholarship through the end of senior year (roughly 25% attrition).

Although Tennessee's high rate of FAFSA completion provides some evidence that targeted supports to alleviate the burden of aid application, student attrition from the postsecondary pipeline after application raises the question of other places in the college transition process where students need additional resources to succeed. By successfully navigating the labor-intensive FAFSA form (after also having completed the TN Promise scholarship application), we might reasonably assume that Tennessee high school seniors who complete the FAFSA are intending to enroll in college in the subsequent year.

Relying on this assumption that among Tennessee high school seniors FAFSA completion is representative of college intention, I use eligibility checkpoints for TN Promise to

model student progression through the postsecondary pipeline. The magnitude of postsecondary pipeline attrition that has come to light through the Promise eligibility checkpoints raises questions of equity with implications for advising and postsecondary pipeline supports:

1. *Who are the TN Promise applicants who complete the FAFSA and subsequently fail to matriculate?*
2. *What timing and personal characteristics are related to not enrolling in college after successful FAFSA completion?*
3. *Are the patterns of attrition consistent with what is predicted by prior models of postsecondary transition?*

With eligibility checkpoints for TN Promise serving as proxies for staying in the college-going pipeline, I use administrative data to examine the characteristics of college-aspiring high school seniors in the Promise era who depart from the postsecondary pipeline at various points after FAFSA completion. I use discrete-time survival analysis to determine the timing and factors that are related to failing to enroll in postsecondary training after senior year aid application. My analyses reveal that the odds of scholarship eligibility loss are roughly 22 percent lower for women and roughly 45 percent higher for students who intend to be the first in their families to enroll in college. This study contributes to better understanding of the postsecondary pathway in a tuition-free college environment, and, consequently, has implications that will help policymakers and practitioners to construct eligibility architecture that sets students up for success and better supports students in the realization of their postsecondary aspirations.

2.2 The college enrollment decision

Motivated by equity, economic development, and enrollment management, scholars have approached the question of college choice from a number of disciplinary perspectives and have constructed various theoretical models for the process (e.g., Chapman, 1984; Hossler, Braxton, & Coopersmith, 1989; Hossler & Gallagher, 1987; Perna, 2006). Models that conceptualize the enrollment process temporally may be particularly illuminating for the present analysis (Hossler & Gallagher, 1987; Hossler, Schmit, & Vesper, 1999; Perna & Titus, 2004). For example, Hossler and Gallagher's (1987) three-stage model identifies key phases in the college choice process from predisposition, when students make the decision to attend college; to search, when students investigate institutions and their characteristics to assess fit; to choice, when students complete their college applications and select a particular institution for enrollment. While the question of whether students enroll is informed by all three stages, predisposition, search, and choice, the search and choice phases are most relevant to the time period examined in this paper, senior year after Promise and FAFSA application submission through the beginning of the first year of college. The students examined in this study have demonstrated predisposition and enter the risk set when they are in the search stage of college choice (Hossler & Gallagher, 1987).

Critiques of early college choice models centered on the lack of attention to the experiences, environments, and networks of students from varied socio-economic, educational, and racial/ethnic backgrounds. Subsequent research examining the factors that contribute to persistent gaps in college access has highlighted the variation in the characteristics of students' social networks. Prospective postsecondary students do not have equitable access to informational resources, and thus may be differentially informed about the opportunities, costs, and benefits that constitute important dimensions of the college enrollment decision. For example, differential access to college-going social capital from social networks has implications

for student search and choice (e.g., Corwin, Venegas, Oliverez, & Colyar, 2004; McDonough, 1997; Roderick et al., 2008; Stanton-Salazar, 1997; Stanton-Salazar & Spina, 2003; Yosso, 2005).

The basic three-stage model has been empirically tested and refined over time to incorporate these findings. Research has revealed that various layers of context shape the college enrollment decision (Perna, 2006a). Perna's (2006a) updated model explicates four layers of influence: habitus (Layer 1); school and community context (Layer 2); higher education context (Layer 3); and social, economic, and policy context (Layer 4). Perna (2006a) posits that the outer layers inform the inner layers, which, in turn, affect college choice. Following a rationalized cost-benefit framework, Perna (2006a) argues that a student's demand for higher education is informed by academic preparation and achievement and stresses the importance of financial resources (both family income and financial aid).

While prospective college students theoretically have many options, many constraints limit these options, including academic or technical offerings, financial resources and aid, and personal and work responsibilities, among other informational and logistical barriers (Barnes-Teamer, 2003; Iloh & Tierney, 2014). Such factors may be particularly relevant for prospective community and technical college students, about whose college choice process much less is known (Iloh & Tierney, 2014). Community college students may uniquely conceive of short-term and long-term benefits, risks, and uncertainty relative to students considering other postsecondary options (Iloh & Tierney, 2014).

Recent work has incorporated an ecological perspective in an effort to better represent the experiences of prospective college students in the 21st century, for whom open-access institutions are more visible and who are more likely to have personal and work responsibilities and

transition between institutions and sectors (Iloh, 2018). By incorporating the perspective of the context that exists around the prospective student, the Iloh Model of College-Going Decisions and Trajectories (2018) was designed to better accounts for perceptions of reality and the interplay between individual and external forces that constrain and shape students. The Iloh Model is not sequential, as are the dominant models, but rather relates the ongoing interplay between time, information, and opportunity. Unlike previous models, the Iloh Model does not assume that all prospective students are subject to uniform considerations and life circumstances and does not include the word "choice" because of the privilege and discrete nature of the college-going experiences that the term connotes (Iloh, 2018). The individuals who comprise Tennessee's target population for postsecondary attainment aid and support interventions are embedded within personal, regional, and state contexts that shape their engagement with college-going checkpoints and their considerations for the postsecondary enrollment decision.

2.2.1 The enrollment decision under TN Promise

Tennesseans in the college enrollment pipeline are subject to unique higher education and policy contexts. While it may be argued that the demographic and economic characteristics of the state are similar to those of regional neighbors, the tuition-free community and technical college policy context constitutes a notable difference in the social, economic, and policy factors that inform college choice.

Tennessee's higher education system also presents distinct features for prospective students. With a relatively extensive, geographically-diffuse network of public community and technical college options, a palpable enthusiasm for postsecondary enrollment under the state's Drive to 55 initiative, and cross-sector collaboration between high schools, postsecondary

institutions, non-profit organizations, and the state to encourage college enrollment, Tennessee's would-be undergraduates are subject to a unique higher education context. These outer social, economic, and policy context layers inform the school and community context: perceived and actual resource availability and structural supports and barriers for students in the postsecondary pipeline have been reshaped in the TN Promise era. For example, the state has provided human capital resources to expand college advising in districts across the state, and collaborative emphasis on the importance of college and financial aid have increased Promise and financial aid application.

Taken together, these external layers shape prospective students' habitus, or perceptions of the world. In particular, changes to policy and practice since the statewide implementation of TN Promise may have shaped students' cultural capital (e.g., value placed on college attainment) and social capital (e.g., information about college-going process). The architecture of TN Promise, like other programs intended to increase college access, have been informed by these models of postsecondary choice and transition, as well as the ongoing research into the design and efficacy of other interventions.

2.3 FAFSA completion and college access

The FAFSA is the gateway to federally sponsored college aid programs, including Pell Grants, Stafford loans, Perkins loans, and work-study. Additionally, many states, institutions, and private organizations sponsoring scholarships require FAFSA completion to qualify for their financial aid programs. Access to these sources of financial aid is important for college access and success. There is abundant evidence that reducing the cost of college attendance through financial aid, particularly through the offer of grant aid rather than loans, encourages college

enrollment (e.g., Abraham & Clark, 2006; Gonzalez Canche, 2019; Park & Scott-Clayton, 2018). Students who are eligible for need-based aid are more likely to enroll at public, two-year institutions, such as those where the broad-access TN Promise scholarship can be used (Doyle, 2009; Long & Kurlaender, 2009; Melguizo & Dowd, 2009). Following the rational decision-making paradigm, these matriculated "adolescent econometricians" concluded that, in spite of foregone earnings due to postponing full-time employment, financial aid reduces concerns about the cost of postsecondary educational investment (DesJardins, McCall, Ott, & Kim, 2010).

However, many eligible students do not apply for federal financial aid and, consequently, forgo access to significant amounts of federal financial aid (King, 2004; Kofoed, 2017). Students who attend college but do not complete the FAFSA are more likely to be white, male, independent from parents, as well as come from families earning less than $50,000 per year than aid eligible peers who complete the FAFSA (Kofoed, 2017). Each year, these students forgo on average $1,281.00 in Pell Grant aid, $2,439.50 in subsidized student loans, $1,986.65 in unsubsidized student loans, and $1,016.04 in institutional grants (Kofoed, 2017).

These students may leave significant aid on the table because they have incomplete information regarding costs and student aid eligibility before enrolling in college. Prospective students may rule out postsecondary training or enrollment at particular colleges based on sticker price without ever learning of what their net price would be after merit- and need-based awards. This arises from both structural and temporal barriers: students may encounter limited or no information on particular kinds of financial aid or their likely eligibility, and even if they know that these types of aid exist the current timeline for financial aid application and package receipt leaves them without a clear understanding of what their aid package looks like until after college application and acceptance. This timeline is counter to the timeline in most investment decisions,

in which the prospective investor is clear on the cost of the investment before beginning the process of acquiring the investment (Boeckenstedt, 2015).

There is evidence that the lack of information about aid eligibility can reduce financial application and college going (Avery & Kane, 2004). However, misconceptions about the cost and affordability of public institutions can be corrected by outreach and informational campaigns (e.g., Tebbs & Turner, 2006). Consequently, there have been efforts to increase transparency before aid application through Net Price Calculators, standardize financial aid award letters, and to accelerate the financial aid timeline through earlier access to the FAFSA has contributed to the accelerated development of broad-access, tuition-free scholarship programs. These efforts to increase transparency assume that if prospective students had perfect information about their aid eligibility, we would expect that all interested and eligible students would complete the FAFSA and no financial aid would go unclaimed. Various financial aid and informational interventions, including clearly messaged tuition-free college scholarship programs like TN Promise, constitute the variety of contemporary interventions designed to increase college access.

2.3.1 Financial and informational interventions to increase college access

In the past three decades, concerns about equity and economic growth have fueled research and reform to increase college access. College affordability and information deficits have been examined and addressed from a variety of angles. A large body of associational and causal research has shown that college affordability is a critical piece of postsecondary access and success (Baum & Ma, 2014; Castleman & Long, 2016; Goldrick-Rab, 2016; Goldrick-Rab, Kelchen, Harris, & Benson, 2016; Page & Scott-Clayton, 2016; Scott-Clayton, 2015).

Consequently, financial aid and informational interventions now constitute key areas for empirical evaluation because of their centrality in practice and policy across sectors.

Financial and logistical barriers influence entry and persistence for lower-income students. Students with fewer resources are disproportionately burdened by the financial, procedural, and logistical components required for college entry. Supports such as financial aid and enrollment advising can contribute to greater student success in college as they help address procedural and logistical tasks that are required for aid receipt and successful enrollment, as well as the guidance necessary for academic progress (Castleman & Page, 2015).

Community college students, who, on average, have lower levels of academic skill, work longer hours, and have family commitments, may respond differently to financial aid. Research examining the implications of different aid policies for community college students found they are more sensitive to tuition and aid changes than peers pursuing baccalaureate education at 4-year public colleges and universities (Heller, 1997; Heller, 1999).

Unfortunately, students frequently do not fully understand the availability of financial aid and the net costs of attending college. Informational access acts as another barrier to postsecondary education for students from low-income backgrounds. Students from low-income families often overestimate actual tuition expenses (Avery & Kane, 2004; Horn, Chen, & Chapman, 2003; Grodsky & Jones, 2007). To compound this inflated conception of cost, many students are not aware of the magnitude of federal, state, and institutional grants funds that are available to support postsecondary study (Bettinger et al., 2012; Avery & Turner, 2012). Even when students are aware of these sources of financial support and the mechanisms for tapping into them, the complexity of the application and verification processes can keep college-intending students from utilizing financial aid and matriculating (Bettinger et al., 2012; Dynarski

& Scott-Clayton, 2006). For instance, research has shown that completion of the FAFSA is onerous: the application contains more than 100 questions that pertain to specific personal and family financial information that may not be readily available or known to high school students (Dynarski & Scott-Clayton, 2006). Even if students recognize the long-term benefits of college and the intermediate steps for enrollment and persistence, the costs of short-term efforts required to secure and keep financial aid (FAFSA and verification completion), may be prohibitive.

Transparent communication regarding aid packages positively influences access, particularly among low-income and first generation college aspirants (Dynarski & Scott-Clayton, 2013; Dynarski, Scott-Clayton, & Wiederspan, 2013; Tierney & Venegas, 2009). There is evidence that when need-based programs are transparent and easy to navigate, they are especially successful at boosting student attainment (e.g., Deming & Dynarski, 2009). Early and transparent information that simplifies the terms of aid programs and overall college costs for students and families could improve academic and financial preparation for postsecondary education during high school (Baum & McPherson, 2008; Bettinger et al., 2012; Dynarski & Scott-Clayton, 2013). A free community college program stands to ameliorate this barrier.

Accessing most forms of financial aid requires completion of the FAFSA. Researchers have found that filing the FAFSA can be a barrier to student application for and receipt of financial aid (Dynarski & Scott-Clayton, 2006; Dynarski, Scott-Clayton & Wiederspan, 2013). This is often attributed to the burdens of application completion. The FAFSA's roughly 100 questions relate to personal and family earnings, savings, receipt of social services, parental educational attainment, years of parents' marriage, drug-related convictions, social security number, and driver's license number.

With roughly 10 percent of college-going students who are eligible for financial aid failing to complete the FAFSA each year, and countless others failing to enroll because of the expense of attending postsecondary education without aid, many researchers and practitioners have endeavored to find ways to ensure that all high school seniors who aspire to attend college complete the FAFSA. Experimental evidence has demonstrated that help filing the FAFSA increases likelihood of FAFSA submission, enrollment, and receipt of financial aid (Bettinger et al., 2012). Students whose families were randomly assigned to receive FAFSA assistance while filing their taxes were eight percentage points more likely to complete their first two years of college than students whose families were offered informational pamphlets (Bettinger et al., 2012) In-school interventions may have the potential for even greater leverage: one study found that students who received in-school support for FAFSA filing were roughly 12 percentage points more likely to enroll in college than their peers in previous cohorts (Owen, 2012). In line with this research, high school counselors, non-profit partners, and the state of Tennessee work in collaboration to support financial aid application by high school seniors in order to maintain their eligibility for the Promise scholarship.

Technological development and application innovations also facilitate the financial aid application process. The IRS data retrieval tool has decreased the amount of time students need to complete the FAFSA and shortened their application's processing time through the IRS (Harger, 2015). Support in subsequent year completion is also important: first-year college students who receive informational text messages related to financial aid renewal were approximately 12 percentage points more likely to persist into sophomore year than peers who did not receive this intervention (Castleman & Page, 2014b).

Even among FAFSA completers, many do not ultimately receive financial aid because of complications that arise after completing the FAFSA. In order to ensure accuracy, some filers are randomly selected for verification of the information submitted. When selected for verification, college-aspirants are required to submit verification of income and asset information claimed in the original application, a multi-step process that involves each postsecondary institution to which the students has applied. The verification process can result in delay of financial aid packages during the time-sensitive decision timeline, or, if neglected, loss of eligibility for federal, state, and institutional aid. Thus, students who do not successfully complete all steps of FAFSA verification may not receive aid, may receive less than they are eligible for, or may receive aid later than anticipated, leading to complications at the time of matriculation. There is broad recognition among policymakers, practitioners, and researchers of the challenges that the aid application process presents. FAFSA completion is a necessary but burdensome step of the college application and matriculation process for the majority of college-intending students.

In addition to financial support, students benefit from advising during the transition period. There is a growing body of evidence of the role of supports, including informational interventions and advising in student postsecondary success (Bettinger & Baker, 2014; Castleman & Page, 2013; Page & Gehlbach, 2017). These resources can contribute to higher rates of matriculation, credit accumulation, persistence, and attainment because they help address procedural/logistical tasks that are required for enrollment and the guidance necessary for academic progress (e.g., Castleman & Page, 2013). Informational interventions stand to contribute to better outcomes for college-aspiring students during initial enrollment. There is evidence that text messaging, in particular, is a viable platform for delivering such interventions to 21st century youth (Castleman & Page, 2013). Information cannot be delivered "neutrally," so

as we move toward leveraging this medium, it's important to distinguish the highest leverage frames for delivering information. This can be particularly instructive in a free community college context in which students are assured of tuition and fees being covered, thus simplifying certain considerations during the transitional summer between high school and college.

2.4 The TN Promise enrollment pipeline

The requirements and provisions of the TN Promise scholarship are important to understand when examining the college enrollment pipeline. The TN Promise scholarship supplements existing grant aid programs: federal and state gift aid (e.g., Pell Grant, Tennessee Education Lottery Scholarships, and Tennessee Student Assistance Awards) are applied to a student's bill first. TN Promise funds cover the remaining balance of tuition and mandatory fees, where applicable.

College-intending high school students maintain eligibility for this broad-access scholarship program by completing a multi-step application process with deadlines throughout their senior year of high school and the summer after graduation. The process and deadlines include[3]:

1. Completion of an online application for the Tennessee Promise scholarship program (November of senior year of high school)
2. Filing the FAFSA (January of senior year of high school)
3. Attending a mandatory meeting coordinated by the non-profit partnering organization (Spring of senior year of high school)

[3] The defined eligibility checkpoints and timing applied to the high school class of 2017, who constitute the sample in this study. Deadlines and eligibility checkpoints may vary slightly from year to year.

4. Submitting an intended postsecondary institution to the state financial aid administrative body (Tennessee Student Assistance Corporation, or TSAC; spring of senior year of high school)
5. Apply to a community college, TCAT, or four-year campus associate's degree program (spring)
6. Complete and log 8 hours of community service (July after high school graduation)
7. Enroll full-time in associate's degree or technical certificate program (August after high school graduation)

Failure to complete one of these steps makes the student ineligible for the scholarship, without opportunity to regain eligibility.

Annually, approximately 80% of all public and private high school seniors in the state apply for the Promise scholarship (THEC, 2018). For class of 2017, the application rate was 83% and the FAFSA completion rate was 72% for public high school students. I first examine the demographic characteristics of the sample of Tennessee class of 2017 high school seniors who apply for Promise and complete the FAFSA. Growth of applicants and the high and increasing FAFSA completion rate can largely be attributed to the outreach efforts of state agencies and their partners. The Tennessee Higher Education Commission and non-profit partnering organizations have worked in collaboration with school-level staff to support and facilitate TN Promise application workshops and FAFSA workshop. In fact, state agency staff now hold application and FAFSA workshops in nearly every county across the state (THEC, 2019). These efforts provide students with critical support in application and FAFSA completion, as well as information about other state sources of college financial aid.

2.5 Hypotheses

In the interest of best serving prospective postsecondary students, practitioners and policymakers concerned with the success of college-aspiring Tennesseans may ask: Among students who express interest in postsecondary training by completing the FAFSA, who is at risk of failing to enroll and when do they exit the pipeline? I endeavor to answer questions around this issue through this analysis, and I look to the literature for guidance on relevant life conditions, characteristics, and socialized identities to consider in the analysis. I focus on gender, socioeconomic status, first generation status, prior academic achievement, and race/ethnicity.

Women's enrollment in college first began to overtake men's in the late 1970s, and had increased to 56% by the new millennium (King, 2000; Peter, Horn, & Carroll, 2005). Similarly, degree attainment rates reveal disparities between women and men, with the widest gaps at the undergraduate level at two- and four-year institutions (King, 2000). Research suggests that gender gaps in enrollment and attainment may be due to differential expectations and aspirations, the products of a combination of socialization and maturity (Blackhurst & Augur, 2008). Recent decades have seen a rise in programming to promote girls' career development, while popular culture promotes a masculinity that glorifies athletics and risk-taking at the expense of academic performance (Reynolds, 2001). Rather than pursuing a degree that would contribute to long-term wage growth, men are more likely to choose middle-skills jobs that provide short-term economic benefits relative to college enrollment (Glenn, 2004). Based on observed trends and research into underling mechanisms, college-intending men may be more likely to lose TN Promise eligibility at checkpoints after FAFSA completion.

Family income and financial support are important factors in the postsecondary enrollment decision and a student's ability to successfully matriculate. Students, particularly

those with fewer financial resources, are sensitive to college costs. Research has demonstrated that higher college costs are associated with lower likelihood that a prospective student will enroll in any college (Fuller et al., 1982; Leslie & Brinkman, 1987; Kane, 1995; Avery & Hoxby, 2004; Long, 2004). This body of research has contributed to the development and growth of various financial supports for postsecondary students. The TN Promise program reduces direct costs of tuition and fees to zero. However, books and supplies, transportation, and cost of living still represent significant expenses for enrolled students. Will low-income students have a similar risk of leaving postsecondary pipeline as their higher income peers? A key component of TN Promise program design complicates this prediction: TN Promise dollars flow not to the lowest-income students due to the last-dollar architecture of the scholarship program. Consequently, savvy low-income students may forgo TN Promise scholarship eligibility given that their funding will be derived from federal Pell Grant aid. Perhaps deriving from college-going cultural capital, price sensitivity, and financial savvy, I predict that low-income students will exhibit a higher risk of leaving the TN Promise eligibility pipeline during the summer months than their higher income peers. Higher income students will meet summer eligibility checkpoints, but have a greater risk of eligibility loss at the beginning of the fall terms due to failure to enroll in postsecondary.

While an increasing proportion of the U.S. population has enrolled in college in recent decades, the share of first generation students enrolled in postsecondary education and earning degrees has declined (Skomsvold, 2015; Cataldi, Bennett, & Chen, 2018; Staklis, 2016). Students who are the first in their families to attend college are less likely to access postsecondary education, succeed academically once they enroll, and ultimately earn a degree (Pascarella et al., 2004; Stephens et al., 2012; Woosley & Shepler, 2011). First generation

students have relatively lower access to college-related cultural capital, the intimate knowledge and support resources necessary to successfully enroll in college (Collier & Morgan, 2008). Additionally, proportionally fewer first generation students complete a college-focused academic curriculum in high school than their continuing generation peers. The correlation between educational attainment and financial security would also may lead to greater price sensitivity among students who will be the first in their families to attend college. Taken together, these factors may contribute to greater risk of scholarship eligibility loss for first generation prospective students who are TN Promise college intending.

During the choice stage of the postsecondary enrollment decision, prospective students must realistically assess their likelihood of postsecondary success. Students with higher prior academic achievement are more likely to enroll. Prior studies have used high school GPA or standardized admission exam scores to examine enrollment and attainment by academic achievement. Recent research suggests that enrollment chances may increase by roughly a third for every 10^{th} percentile increase in SAT scores (Skinner, 2019). These trends would suggest that students with higher prior academic achievement, as measured by ACT scores, would be more likely to maintain TN Promise scholarship eligibility. However, the relationship between prior academic achievement and college going may not be as straightforward in the TN Promise pipeline data as in other contexts. In the present context, we might expect that the lowest and highest achieving students are more likely to lose eligibility for the scholarship than the students of average academic achievement. The lowest achieving students may face similar impediments with regard to informational access and support and have similar cost-benefit considerations to attriting low achieving students in prior studies. Additionally, higher achieving TN Promise applicants may fall out of the eligibility pipeline as they secure admission to more selective

postsecondary options and determine that they no longer need to complete the requisite steps for state scholarship receipt. Consequently, I predict that the lowest scoring students and the highest scoring students will be more at risk for scholarship eligibility loss than students scoring in the middle of the ACT distribution.

Structures that perpetuate racism in the United States continue to contribute to systems of disadvantage for minoritized groups. Racial and ethnic minority students face structural barriers to postsecondary entry and success. Documented and undocumented immigrant students may face additional structural barriers to FAFSA completion, including lack of information about federal, state, and institutional financial aid programs and their eligibility for said programs, as well as difficulty accessing the forms or advising in a language that is accessible to them and their families. These barriers are reflected in lower relative levels of postsecondary preparation, enrollment, and completion (NCES, 2018). Tennessee's population is largely comprised of African-American/Black and White students. I predict that Black students will be more likely than White students to lose TN Promise eligibility as a function of the structural barriers they face as they consider and pursue postsecondary enrollment.

The timing of eligibility loss is another important component of the enrollment process that I examine in this discrete-time survival analysis. Both the identification of student groups likely to lose scholarship eligibility and the timing at which students drop out of the eligibility pipeline are valuable in combination. Informational access, guidance, and structure are important for the completion of prerequisite tasks for postsecondary enrollment. After graduation, prospective college students no longer have direct access to professional advising and school-based reminders of upcoming requirements. Consequently, I think that FAFSA completers will

be more likely to drop out of the postsecondary pipeline after high school graduation rather than missing eligibility checkpoints prior to graduation.

2.6 Data

Observing postsecondary enrollment intention is difficult, particularly on a month-to-month basis during the senior year of high school. When surveyed, U.S. high school students overwhelmingly report their intention to enroll in postsecondary training (90 percent; Wolniak, Davis, Williams, & Casano, 2016). However, individual postsecondary intention may change as students progress through high school and learn more about labor market conditions, grapple with their likelihood of college success, and consider other options for after graduation, and these changes are difficult to observe in administrative data. The TN Promise checkpoints, which align with requisite steps for college enrollment, may serve as observable proxies of the status of individual postsecondary intention throughout the senior year. Consequently, I use individual-level student eligibility data from partner organization tnAchieves to construct the sample of college-intending high school seniors, assemble relevant factors, and track postsecondary intention, as proxied by maintenance of TN Promise scholarship eligibility. The task alignment of TN Promise eligibility requirements with the in-state college enrollment process make TN Promise checkpoints observable proxies for remaining in the postsecondary enrollment pipeline. For example, student indication of intended institution of enrollment on the state financial aid platform, which would be unobserved in other contexts, constitutes an observable checkpoint during the spring of the senior year. For the 2016-2017 cohort of high school seniors, I observe 15 discrete periods of time in which loss of TN Promise eligibility is reported between January 2017 and September 2017.

The dependent variable in the hazards models represents the event of losing TN Promise scholarship eligibility after completing the FAFSA. Information about student eligibility came from state partner tnAchieves' records. The dropout event was linked to the month in which it occurred. I model the relationship between Promise eligibility maintenance and student characteristics and background using individual-level data administrative data. Research partner tnAchieves provided individual-level data on gender, race, first generation college status (defined as neither parent having postsecondary credential), expected family contribution (EFC), and ACT score. EFC is measured both as a dichotomous variable with sample students coded as having an EFC of 0 or a non-zero EFC, as well as a categorical variable with EFC 0 (39%) and five EFC ranges each with roughly 12% of the remainder of the sample.

2.7 Analytic strategy

I employ discrete-time survival analysis to examine factors related to postsecondary pipeline attrition. Survival analysis is an analytic tool to be used when the timing of the event of interest is of practical importance. Discrete-time survival analysis allows for the analysis of time in discrete chunks during which the event of interest, postsecondary pipeline attrition, could occur (Singer & Willett, 2003). I leverage discrete-time survival analysis rather than simple regression for a number of reasons related to both the data and the questions at hand. Survival analysis does not assume that time to event with have a normal distribution, and, thus, can easily accommodate differences in "hazard" across time periods. An additional methodological benefit of survival analysis is that participants who did not experience the event by the end of the study (or those who were lost to follow-up) contribute to the analysis up until the last point at which they are observed, rather than being coded as missing (Singer & Willett, 1993).

The terminology used in discrete-time survival analysis is derived from its methodological origins in the biomedical sciences modeling human lifetimes (e.g., Gross & Clark, 1975). We estimate the discrete-time hazard h_{it}, or the conditional probability that a randomly selected individual i will experience the target event in time period t given that the individual did not experience the event prior to t, for individuals in the risk set, or the group of people known to be eligible to experience the event in a particular time period t. The hazard rate is the set of discrete-time hazard probability parameters h_t that assesses whether and when the event of interest occurs in the sample. The survival probability examines the opposite: the proportion of the initial sample that survives through each of the successive times periods. The survival rate estimates the pattern of these probabilities in the sample over time.

The risk set is Tennessee high school seniors in the class of 2017 who completed the FAFSA by the state's Promise eligibility deadline, January 17, 2017. These individuals are at risk for experiencing the failure event, attrition from the college-going pipeline, at time t, prior to the required fall term enrollment under TN Promise eligibility guidelines. The dependent variable is the hazard rate for leaving the risk set, falling out of the college pipeline. This is operationalized as missing benchmarks for continued TN Promise eligibility (defined in section 2.4). Thus, students enter the risk set once they complete the FAFSA and remain in the risk set unless they lose eligibility for the TN Promise scholarship.

The research question is concerned with a discrete period of time that runs from FAFSA completion during the senior year through the first semester in which postsecondary enrollment can be anticipated. Thus, time begins when students complete the FAFSA. I include time indicators for each month after the January FAFSA completion deadline in the model. All individuals who enter the risk set are equally likely to experience the event by the end of

observation, the beginning of the fall semester following high school graduation, thus the right censoring inherent in this particular research question is independent, or noninformative, because it is unrelated to event occurrence.

I run a number of models in stepwise format, with each progressive model including more individual or institutional characteristics. I also run a model for the subsample of students who took the ACT, as prior research has used this as another indicator of college-intentions, particularly baccalaureate intentions. I cluster standard errors at the high school level to account for potentially unobserved correlations in the error terms across students who attended the same high school. The model is specified:

$$(1) \qquad log(\mathrm{h}_{it}) = [\alpha_1 D_{1_{it}} + \alpha_2 D_{2_{it}} + \cdots + \alpha_{15} D_{15_{it}}] + X_{it}\beta_1$$

where h_{it} is the instantaneous proportional hazard of attrition for individual *i* in time period *t*, $\boldsymbol{\alpha}_{1\text{-}15}$ are estimates on the time indicators (eligibility checkpoints from January to September). $\boldsymbol{X}_{it}$ represents a vector of individual characteristics for individual *i* in period *t*.

2.8 Results

Before modeling the discrete-time survival analysis, I describe the demographic makeup of FAFSA completers and TN Promise matriculants in the high school class of 2017 who are served by tnAchieves. I compare these groups of students to the overall class of 2017 high school cohort and all TN Promise applicants. In Table 2.1, descriptive statistics show that TN Promise applicants, FAFSA completers, and TN Promise matriculants are generally demographically similar but that the proportion of Promise-eligible Black and Hispanic students declines throughout the postsecondary pipeline. The average ACT score declines from 19.8 in the entire high school class to 18.8 in both the FAFSA completers and Promise matriculants sample.

To begin the analysis, I computed the survival and hazard estimates for the analytic sample. Survival estimates are nonparametric estimates of the probability of survival, in this case, remaining eligible for the TN Promise Scholarship, past a given time *t*. Table 2.2 provides a simple summary of the data by displaying the proportion surviving, the cumulative hazard function, and the hazard rates of the sample over time. This analysis is traditionally referred to as the Life Table because it accounts for subjects who die (experience the event of interest and fall out of the risk set) as well as subjects who are censored (do not lose eligibility during the period of observation). From February through June 2017, virtually all students in the risk set remain eligible for the TN Promise Scholarship. During the eligibility update periods from January through June, fewer than 20 students in the sample lost TN Promise eligibility. Fewer than five students lost eligibility in periods one through three and roughly 10 students lost eligibility in period four, the required spring informational meeting. Time period 5, the summer community service submission deadline, is when the greatest proportion of the individuals in the risk set lose eligibility for the scholarship and, coincidentally, is also the mean survival time for the subjects in the risk set (as seen in column 5). The increased hazard of scholarship eligibility loss at the July community service deadline is again evident in Figure 2.2, where the estimated hazard of TN Promise eligibility loss spikes during July.

I estimate the hazard rates for individuals by sex (Figure 2.3), first generation status (Figure 2.4), and EFC (dichotomous EFC 0 or non-zero EFC; Figure 2.5) in each time period between the January FAFSA deadline and fall semester enrollment. In Figure 2.3, the estimated hazard curves by sex suggest that the hazard rate is higher for men across most time periods, particularly at the summer community service checkpoint when it is roughly 5 percentage points higher for men than women. In Figure 2.4, the hazard rates by family educational attainment

suggest that the hazard rate is consistently higher for first generation students, with a gap of roughly 7.5 percentage points at the July community service deadline.

In Figure 2.5, the observed hazard rates for students with an EFC of $0 and those with a non-zero EFC. As shown in Figure 2.5, the estimated hazard of Promise eligibility loss is virtually zero for both EFC 0 and non-zero EFC students through the first four eligibility checks after FAFSA completion. However, at the time of July community service completion, both hazard rates spike, with EFC 0 students having a higher hazard of TN Promise eligibility loss from summer service completion through the fall enrollment and eligibility checks. In Figure 2.6, I further explore differences by EFC as I compare the cumulative hazard function of EFC 0 vs. non-zero EFC (panel A) as well as students by more fine-grained EFC groupings (panel B) in order to examine the overall level of risk of TN Promise pipeline departure over time. Students with the highest EFCs in the sample are much less likely to lose eligibility at the summer community service checkpoint but ultimately have the second highest hazard of eligibility loss as the fall semester enrollment deadline approaches (cumulative hazard of roughly 25%). The spike in the hazard rate at the time of enrollment for non-zero EFC students is driven by eligibility loss among middle-income students (EFC $10,000-$23,000), who constitute just over 10% of the sample. Students whose EFCs fall into the categories outside of EFC 0 and EFC $10,000-$23,000 have fairly similar hazards of eligibility loss throughout the time period between FAFSA completion and fall enrollment.

In order to further explore the experience of students along important dimensions of TN Promise program architecture, I examine cumulative hazard of TN Promise eligibility loss by intended postsecondary sector. Figure 2.7 shows that while community college and TCAT intending students have a higher hazard of losing scholarship eligibility before and including the

July community service deadline (time period 5), students who intend to enroll in four-year private institutions have the highest hazard of Promise eligibility loss overall. The students with the lowest hazard of Promise eligibility loss are those who intend to enroll in public four-year institutions. Taken together, the hazard function and cumulative hazard figures suggest that gender, EFC, first generation status, and intended postsecondary sector are related to scholarship eligibility loss between FAFSA completion and fall term enrollment. I next estimate these relationships using discrete-time survival analysis.

2.8.1 Discrete-time survival analysis

To model the loss of Promise scholarship eligibility, I begin by estimating an empty (naïve) model. I then estimate a model that includes only the parameter for each of the major predictors of interest and test model fit (Table 2.3). Table 2.3 shows that each of the predictors, female, first generation, EFC 0, and ACT, is a significant predictor of hazard of TN Promise eligibility loss. The goodness-of-fit statistics reported aid in the comparison of the extended models relative to the naïve model using the likelihood ratio test, a decrement-to-chi-square test that is based on the asymptotic distributional properties of the -2 times the log-likelihood statistic (-2LL; Singer & Willett, 1993) and the Wald test. In examining these statistics, we look particularly for decreases in the -2LL statistic as an indication that the addition of a new parameter has significantly improved the overall fit of the hazard model. We also consider the magnitude and significance of the Wald hypothesis test, a goodness-of-fit statistic that leverages a *t*-test for testing the significance of a particular regression coefficient in logistic regression modeling. In large samples, the -2LL and Wald tests perform similarly (Singer & Willett, 2003). Table 2.3 displays the goodness-of-fit tests for the one predictor models and shows that first

generation status, which has a relatively low –2LL and the highest Wald hypothesis test statistic, may be the best fit among these initial models (Singer & Willett, 1993).

After evaluating the fit statistics for the single factor models, I made stepwise additions to the naïve model to determine the fit of time-invariant, individual-level predictors. In Table 2.4, I display exponentiated coefficients representing the multiplicative effects on the hazard ratio from a series of six estimated models. Exponentiated coefficients greater than 1 indicate that a covariate is associated with an increased risk of eligibility loss, while those less than 1 indicate a reduced risk of eligibility loss. Model A simply regresses the hazard of eligibility loss on the time periods and female. The estimate indicates that a female student has a scholarship eligibility loss risk that is 23 percent lower than that of male students. The -2 log likelihood is lower in Model A than in the empty model, which shows that the addition of the female predictor results in a better fit.

In Model B, I added indicators for race and ethnicity, omitting the indicator for White as the reference category. The estimates suggest that Black (87%) and Hispanic students (53%) have a much greater risk of scholarship eligibility loss than White students (controlling for gender). The coefficient for Asian students is not significant, which indicates that there is not a statistically significant difference between the risk of scholarship eligibility loss for Asian and White students (controlling for gender). For Model C, I included an indicator for first generation status in the model, which revealed that the odds of scholarship eligibility loss are 45% higher for first generation students relative to continuing generation students, ceteris paribus. When the first generation indicator is added to the model, the estimate for Hispanic students is no longer significant.

For Model D, I added a continuous measure of EFC.[4] Model fit continues to improve and reveals similar patterns of significance and magnitudes of association between the predictors and odds of scholarship loss (24% lower for women; 73% higher for Black students; 33% higher for first generation students) and the model is the best fit yet. When the continuous EFC predictor is added to the model, the estimated hazard ratio for Asian students becomes marginally significant, indicating that Asian students risk of scholarship eligibility loss is 59% lower than White students, holding gender, first generation status, and family economic profile (EFC) constant. Model fit continues to improve when I add composite ACT to Model E; magnitude and significance of estimated hazard ratios also remain relatively constant. The estimate on ACT indicates that the risk of scholarship eligibility loss is slightly lower (0.001%) for every one-unit increase in ACT composite.

As an iterative test, I test models with second order terms for EFC and ACT. The squared continuous EFC parameter was significant but did not improve model fit, so I do not add it to the model, but I do not rule out a non-linear relationship between EFC and risk of scholarship eligibility loss. In Model F, the estimates for ACT suggest a non-linear function: the first-order term has an estimated odds ratio of less than 1.0 while the squared term has an estimated odds ratio greater than 1.0 (albeit only slightly). This serves as evidence that there is a slight U-shaped pattern for the relationship between ACT and the hazard of Promise scholarship eligibility loss. Model F is the preferred model because it is the best relative fit based on parameter significance and its lower -2 times the log-likelihood relative to the empty model (Singer & Willett, 1993).

As a final modeling check, I test whether to relax the proportionality assumption and add higher order time polynomials to the model. In order to do this, I add interaction terms for time and explanatory variables (female, first generation, EFC 0, ACT total) into the model. I find that

[4] I first added the EFC 0 dichotomous indicator, and the model fit did not improve.

there are not differential hazards by demographic characteristics or prior achievement by time period. I conclude that there is not an association between the explanatory variables and time and, as such, I do not model time as a higher order polynomial.

2.9 Discussion

For the class of 2017, I observe low rates of scholarship eligibility loss prior to high school graduation. This is likely a function of the formal supports in place in schools and through the design of the TN Promise program: while students can lose eligibility prior to high school graduation, requirements are designed to facilitate students' continued eligibility. For instance, the required spring TN Promise informational meeting takes place during the academic day in the student's high school so that students are extremely unlikely to miss this checkpoint. Analysis reveals that the July community service check point presented the highest risk of departure from the Promise enrollment pipeline. Figures 2.2 and 2.3 provide a visual representation of the overall finding that the summer community service deadline presents a particular challenge for students in the Promise enrollment pipeline. I find that there are various characteristics that differentially predict hazard overall and at this time period in particular. The overall risk of departure was lower for women (22-27%) and higher for Black students (54-87%), and first generation students (27-45%). Figure 2.4 displays the higher hazard of scholarship loss for men and women, which is consistent with the human development literature that suggests that young men have a more difficulty completing tasks for long-term benefits at this stage of development.

The preferred model estimates in Table 2.4 reveal that the odds of scholarship eligibility loss are roughly 22% lower for women than men, roughly 66% higher for Asian students and

54% higher for Black students relative to White students, and roughly 27% higher for students who intend to be the first in their families to enroll in college. There is evidence of a nonlinear relationship between ACT and risk of Promise scholarship eligibility loss. These findings are generally consistent with the literature on college decision-making and transition and predictions made based on the architecture of the TN Promise program. The hazard of scholarship eligibility loss being consistently higher for first generation students is consistent with literature about college-going social capital and the completion of requisite tasks for enrollment, as well as research that examines the evolution of college aspirations to expectations in high school students and recent graduates.

The much higher odds of TN Promise Scholarship eligibility loss for first generation college students is troubling given that the TN Promise scholarship is intended to increase statewide attainment by encouraging college enrollment for students at the margins of enrolling. Based on the extant higher education literature, we know that first generation students aspire to attend college, but oftentimes fall short because they do not believe their aspirations to be feasible because of financial constraints or lack of guidance toward that goal. Based on these results, it would likely be beneficial if organizations and staff working in support of TN Promise eligible HS seniors redouble their efforts in working with first generation college aspirants.

There is not a clear picture that emerges from the analysis with regard to the role of financial need in TN Promise eligibility. This may be a function of both the type of analysis and the last-dollar scholarship architecture, which makes for a complex incentive structure for low-income, would-be Promise students. This complexity is particularly evident when considering the perspective of students with very low EFCs, whose tuition and fees are covered by the federal government, not the state: Should they work to maintain eligibility (undertaking an

additional community service burden) in order to ensure they will continue to go to college for "free" or do they trust that their family income will remain low enough that federal funds will result in a zero balance?

There are a number of considerations that limit the internal and external validity of this study. First, this paper makes the assumption that individuals are college intending when they complete the FAFSA application. The emphasis placed on FAFSA completion by the state and high school staff may have contributed to the successful completion of the FAFSA by individual who did not have true intent to enroll in college. Students had personalized support from college counselors and state sponsored "FAFSA Frenzy" events intended to encourage widespread FAFSA completion. Thus, FAFSA completion in the state of TN may not be a great indicator of college-going intention, so constructing the risk set based on the assumption of college intention may be flawed. While it is unlikely that individuals without any postsecondary intention would complete the FAFSA given the degree of personal investment that is necessary to complete the laborious application, it is possible that in this context students who do not intend to enroll in postsecondary education file a FAFSA, and will, consequently, be classified as college-going in my analytic sample. Additionally, some of the FAFSA completers in the sample who lose TN Promise access may have maintained scholarship eligibility in case other college enrollment plans (e.g., four-year or private college options) did not come to fruition. These support and motivational considerations may contribute to the overestimation of the hazard of departing the postsecondary pipeline, and the estimates of which students are at the greatest risk of postsecondary pipeline departure may be biased. Students exhibiting the various characteristics examined in this study may not have been equally likely to complete the FAFSA in the absence of the significant supplemental supports. Therefore, these results should be interpreted with

knowledge of the state's FAFSA completion agenda and provisions, as well as financial aid and enrollment strategy on the part of students. This context is relevant to the interpretation and generalizability of these findings, but does not invalidate the importance of the estimation of who may be at risk of departure during the postsecondary transition under Promise and when.

With regard to data, measures on individual characteristics and institutions are available on an annual, not daily, basis. Consequently, my individual-by-day metrics rest on the assumption of the district and the state that the student characteristics collected annually do not vary throughout the academic year. This is a reasonable assumption that is quite common in the literature.

2.10 Conclusion

The relationships that I estimate in these models point to a number of implications for program architecture and student supports that may reduce the risk of Promise eligibility loss for the student groups examined herein. The state and districts are expending many resources to ensure that students are completing FAFSA, but students are losing TN Promise eligibility at other checkpoints, namely at the summer community service deadline. This summer service deadline is the first TN Promise checkpoint that occurs when prospective students do not have in-person access to a professional advisor. Individuals with less college-going capital, such as first generation and low-income students, or individuals who may be less likely to attend to important enrollment details for developmental reasons, such as young men, may benefit from additional, personalized support during the summer months. The organizations and individuals who support Promise-intending students have finite time and resources, so it may be advantageous to reapportion resources to support community service completion by the July 1

deadline rather than, for example, expending an abundance of resources for FAFSA completion and leaving little programmatic support for later in the enrollment process. For example, state partnering organizations, agencies, or high schools may consider organizing large group service opportunities for the class before high school graduation in order to support students in satisfying the eight-hour requirement. If students were to be more intentionally supported in completing and submitting community service prior to graduation, even if July deadline remained the same, potentially more likely to persist.

Alternatively, the pipeline could be changed. The TN Promise scholarship application and enrollment process is more complex, active, and front-loaded than other state aid programs both in and outside of Tennessee. While the eligibility checkpoints are aligned with requisite tasks for college enrollment, the program architecture imposes false deadlines in what is otherwise a relatively fluid process for open-access college enrollment. In order to facilitate TN Promise eligibility and take-up, policymakers and program administrators should consider simplifying the application and enrollment process and converting the process to an automated, opt-out structure. For example, automatic eligibility for all high school seniors and elimination of the burdensome community service requirement may promote enrollment for the roughly 6500 seniors who do not apply for TN Promise and the roughly 5000 students who lose eligibility at the summer community service submission deadline.

TN Promise's "maintain it or lose it" design with firm deadlines for the requisite components contribute to permanent loss of scholarship eligibility that runs counter to Tennessee's Drive to 55 postsecondary access and attainment goals and may result in additional barriers for prospective students. Rather than penalizing prospective college students with permanent loss of TN Promise eligibility if they miss a deadline, program architecture would be

more access-oriented if designed to account for the different timelines on which individuals decide to enroll in postsecondary training and find themselves equipped to act on this intention. This may be particularly important with regard to the FAFSA completion deadline. Permanent loss of eligibility for TN Promise due to missed deadlines during the senior year may contribute to individual decisions to delay postsecondary training until students are eligibility for TN Reconnect, the tuition-free scholarship for financially independent adults. Extending program eligibility to allow for seamless program access for all Tennesseans with a high school credential whenever they determine that pursuit of postsecondary training aligns with their career goals and personal considerations would best guarantee college access and promote postsecondary attainment.

Such changes to program architecture may also lower the likelihood that students would incur risks associated with early, large-scale FAFSA completion efforts. The TN Promise eligibility structure and formal supports at present may contribute to rushed FAFSA completion. As students and families speed through submission to meet the imposed deadline, they may commit errors, which would necessitate cumbersome follow up and corrections at the time of FAFSA verification or institutional enrollment. A more open-ended, less punitive eligibility process may limit the imposition of additional barriers for prospective students by allowing for greater time and care at the time of submission.

However, such changes may not be politically feasible in Tennessee or other states in the process of designing or implementing similar Promise programs. If larger-scale changes are not possible, I would recommend that policymakers consider a number of student-centered changes to program architecture to facilitate the successful enrollment and scholarship receipt of TN Promise application. In particular, legislators and program administrators should consider the

reasoning behind the deadline for first semester service falling after students have finished high school. It may be advantageous, particularly for certain subgroups of students, to move the deadline to prior to high school graduation or push it to early in the first semester of enrollment. In these scenarios, high schools, whose staff have existing relationships with students and avenues for communication, and colleges, who already advertise and encourage community service completion and have a captive audience during orientation programming, could encourage or incorporate service opportunities at a time and in a way that better supports Promise eligibility maintenance.

Additional study will reveal important information about the Promise enrollment pipeline, its challenges, and the ways in which students navigate those challenges. Future research should combine eligibility and enrollment data with indicators from high school counselor tracking systems, like Naviance, or application submission information to continue to work toward better approximating the checkpoints and potential points of departure along the postsecondary pipeline. Other work may consider a multi-cohort analysis of TN Promise students in order to increase the external validity of estimates and examine whether there are differences in eligibility maintenance as the Promise enrollment process is continually tweaked. There are a number of indicators that it would be interesting to consider in estimating the risk of eligibility loss, for example urbanicity, distance to nearest community or technical college, and county economic distress (Jaquette & Salazar, 2019; Skinner, 2019). Qualitative work should be undertaken to engage with individuals who exit the TN Promise pipeline at various checkpoints to elucidate the enrollment decision-making process and the nature of potential pain points that can be ameliorated for future cohorts of students.

Among Tennessee high school seniors, FAFSA completion is high and continues to rise. Completion of the aid application ensures that prospective students maintain scholarship eligibility and get access to federal and state need-based aid to which they are entitled. While practitioners and researchers have traditionally thought of FAFSA completion as a barrier to entry to the postsecondary pipeline, in the state of Tennessee, FAFSA completion alone is not enough to help students overcome challenges associated with various parts of the Promise enrollment process. The discrete-time survival analysis I undertake in this paper does not reveal any surprising associations between demographic characteristics, time, and postsecondary pipeline departure, but does begin to identify time periods during which the state and districts can provide additional support for Promise-eligible college aspirants.

Table 2.1. Demographic characteristics of TN high school class of 2017, TN Promise applicants, FAFSA completers, and TN Promise matriculants

Variable	TN High School Class of 2017 Cohort	Class of 2017 TN Promise Applicants	Class of 2017 FAFSA Completers	Class of 2017 Promise Matriculants
	(1)	(2)	(3)	(4)
Male	49.0%	50.2%	48.0%	47.7%
Female	51.0%	49.8%	52.0%	52.3%
White	65.7%	63.5%	72.1%	77.0%
African-American	25.1%	22.0%	19.8%	12.0%
Hispanic	6.8%	4.6%	4.7%	3.5%
Asian/Pacific Islander	1.7%	1.3%	1.1%	1.1%
Average ACT	19.8	19.2***	18.8***	18.8***
Total	72,290	57,660	24,060	16,210

Note: Data derived from 2017 THEC TN Promise Annual Report and Tennessee Department of Education High School Cohort data. Cell sizes rounded to the nearest 10. FAFSA Completers comprises all FAFSA completers served by partnering organization tnAchieves. Notation of statistical significance refers to comparisons between full cohort (column 1) and subsequent group means (columns 2, 3, and 4, respectively). ^ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2.2. Life Table displaying proportion surviving, the cumulative hazard function, and the hazard rates over time

Interval	Beginning total Number of students	Number lost eligibility	Hazard Rate	Survival Rate	Cumulative probability of eligibility loss
	(1)	(2)	(3)	(4)	(5)
1	24060	0	0.000	1.000	0.000
2	24050	0	0.000	1.000	0.000
3	24050	0	0.000	1.000	0.000
4	24050	10	0.000	1.000	0.000
5	24050	5310	0.221	0.779	0.221
6	18740	0	0.000	0.779	0.221
7	18740	0	0.000	0.779	0.221
8	18730	390	0.021	0.763	0.237
9	18350	20	0.001	0.762	0.238
10	18330	570	0.031	0.739	0.262
11	17770	0	0.000	0.738	0.262
12	17760	0	0.000	0.738	0.262
13	17760	720	0.040	0.709	0.292
14	17040	740	0.044	0.678	0.322
15	16300	0	0.000	0.678	0.322

Note: Data derived from tnAchieves administrative data. Intervals represent time periods from January 17, 2017 to September 2017 in which TN Promise eligibility was reported. Cell sizes rounded to the nearest 10.

Table 2.3. Characteristics predicting hazard of TN Promise eligibility loss, model baseline

	Female	First Gen	EFC 0	ACT
Estimate	-0.224***	0.439***	0.639***	-0.060***
	(.0395)	(.0408)	(.0395)	(.0059)
Goodness-of-fit				
-2LL	-13686.924	-12885.025	-13574.807	-12271.854
Deviance	27373.849	25770.051	27149.615	24543.709
n parameters	12	12	12	12
AIC	27397.849	25794.051	27173.615	24567.709
BIC	27520.226	25915.925	27295.993	24689.341
Wald hypothesis test				
H0: B[var] = 0	32.10***	115.22***	271.74***	102.41***

Note: * p<.05; ** p<.10; *** p<.001

Table 2.4. Characteristics predicting hazard ratio of TN Promise eligibility loss

Variable	Model A: Female Only	Model B: With Race	Model C: With First Generation	Model D: With EFC	Model E: With ACT	Model F: With ACT^2
Female	0.774***	0.729***	0.726***	0.759***	0.763***	0.783***
	(0.039)	(0.039)	(0.040)	(0.045)	(0.047)	(0.048)
Asian		1.285	1.383	1.587^	1.664*	1.661*
		(0.308)	(0.351)	(0.404)	(0.424)	(0.423)
Black		1.865***	1.808***	1.727***	1.624***	1.541***
		(0.114)	(0.115)	(0.118)	(0.122)	(0.117)
Hispanic		1.530***	1.225	1.110	1.041	1.043
		(0.177)	(0.165)	(0.165)	(0.167)	(0.167)
First Generation			1.448***	1.332***	1.274***	1.270***
			(0.081)	(0.080)	(0.081)	(0.081)
EFC 0				1.000**	1.000***	1.000***
				(0.000)	(0.000)	(0.000)
ACT					0.999	0.665***
					(0.009)	(0.035)
ACT^2						1.01***
						(0.001)
-2LL relative to empty model	-12.92	-824.74	-1352.76	-1993.60	-2494.56	-2519.76
df	1	4	5	6	7	8
p	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Note: Estimates shown as odds ratios. In models including race, White students are reference category for race. EFC is a continuous measure of FAFSA Expected Family Contribution. The -2 times the log-likelihood statistics is reported relative to the naïve model. * p<0.05, ** p<0.01, *** p< 0.001.

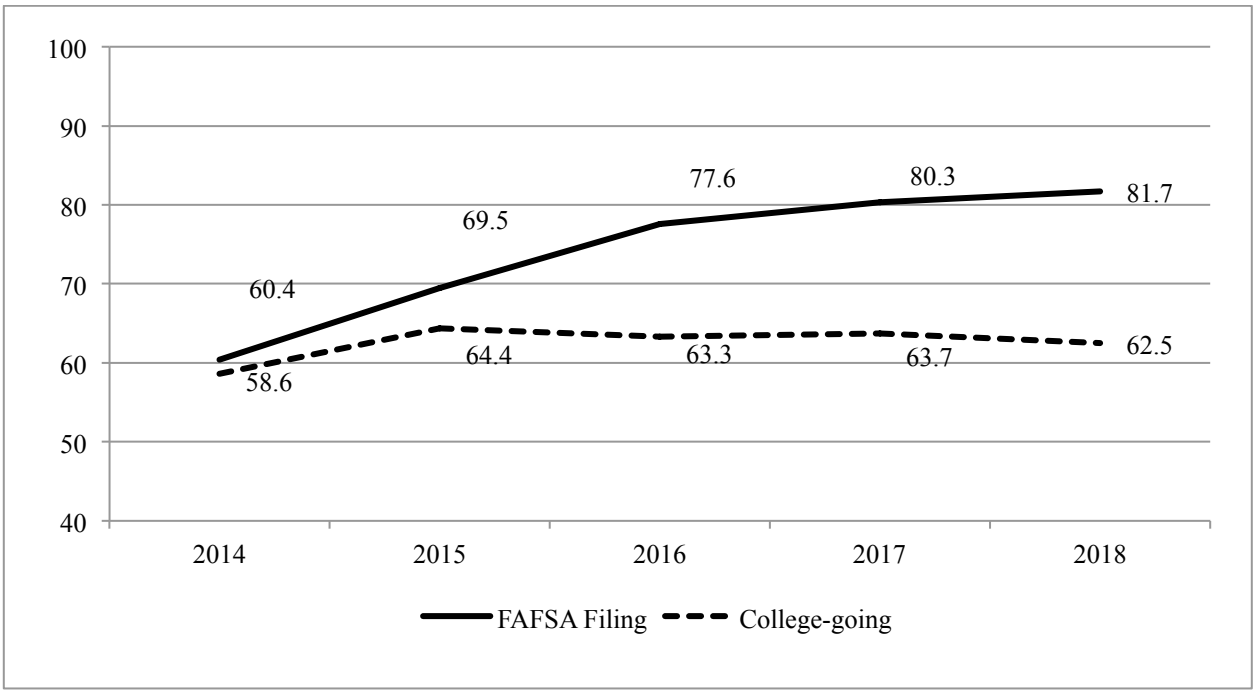

Figure 2.1: Tennessee high school seniors' FAFSA filing rate and college-going rate, 2014-2018

The figure above shows the trends in Tennessee graduating high school cohort FAFSA filing and college-going from 2014 to 2018. Data were derived from the 2019 Tennessee Promise Annual Report and the Tennessee Higher Education Fact Book. FAFSA Filing rate was calculated as the percentage of the high school graduating cohort that completes the FAFSA prior to the fall semester in their graduation year. Tennessee Promise was implemented in 2015. Prior to 2016, the FAFSA filing rate included first-time filers aged 18 and younger. Beginning in 2016, the FAFSA filing rate includes first-time filers age 19 and younger. College-going rate represents the percentage of the high school graduating cohort that enrolls in any higher education institution (community college, technical college, university, in-state, out-of-state, public, or private), based on matches found within National Student Clearinghouse and the Tennessee Higher Education Commission Student Information Systems.

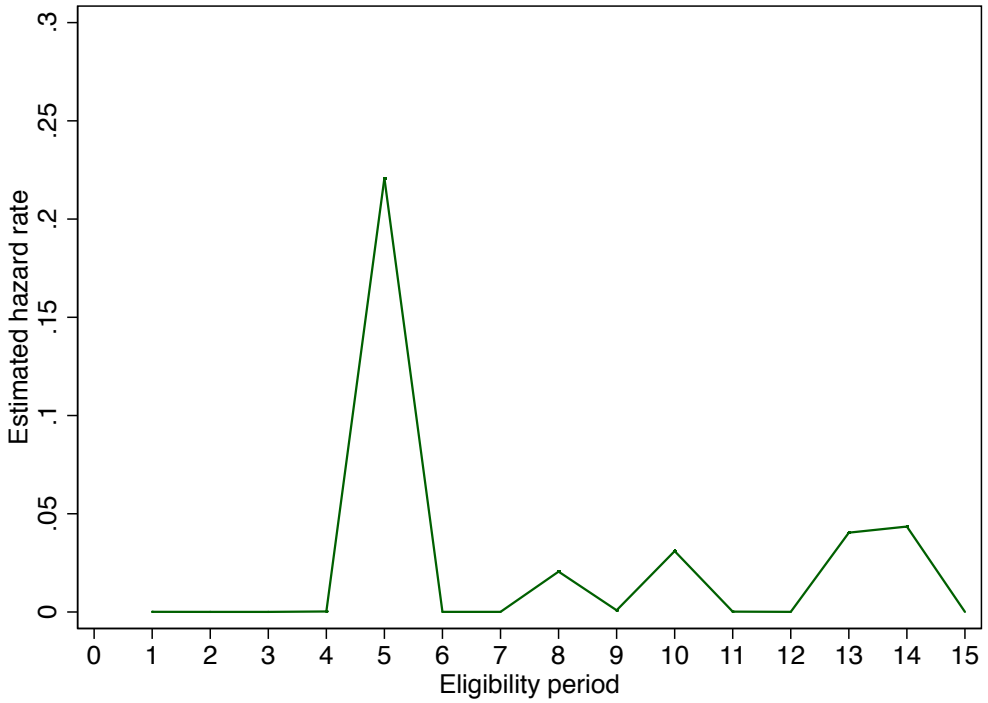

Figure 2.2: Estimated hazard of Tennessee Promise eligibility loss

The figure above displays the estimated hazard of TN Promise eligibility loss for the sample in discrete time periods from January 2017 to September 2017. Time period 5 is the summer community service hours submission deadline, and time periods 7-11 involve financial aid-related tasks, and time periods 13-15 are postsecondary enrollment verification check points.

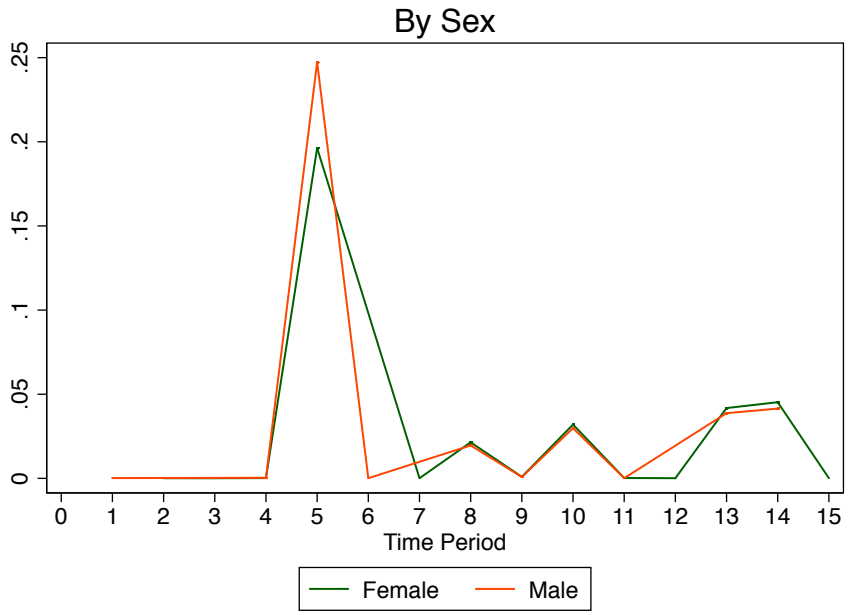

Figure 2.3: Estimated hazard of Tennessee Promise eligibility loss by sex

The figure above displays the estimated hazard of TN Promise eligibility loss by sex in discrete time periods from January 2017 to September 2017. Time period 5 is the summer community service hours submission deadline, time periods 7-11 involve financial aid-related tasks, and time periods 13-15 are postsecondary enrollment verification check points.

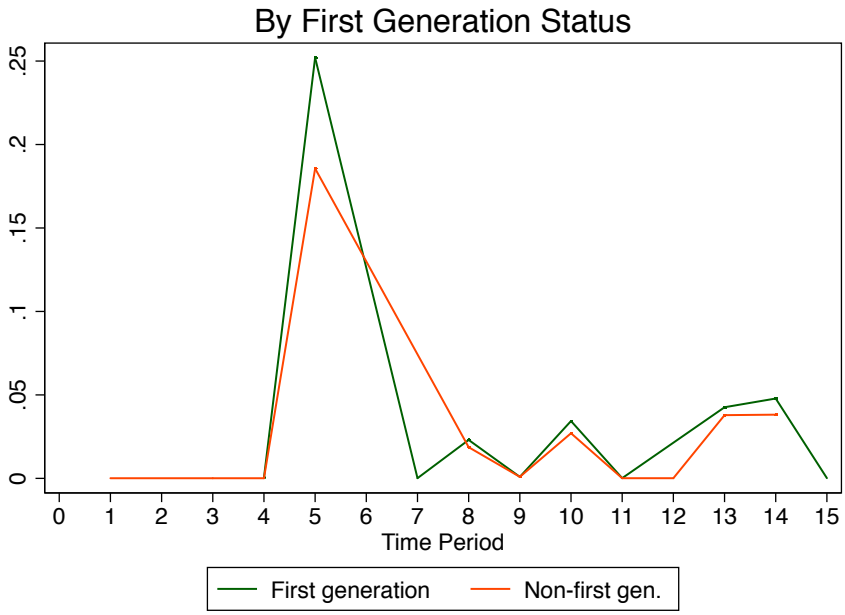

Figure 2.4: Estimated hazard of Tennessee Promise eligibility loss by first generation status

The figure above displays the estimated hazard of TN Promise eligibility loss by first generation status in discrete time periods from January 2017 to September 2017. Time period 5 is the summer community service hours submission deadline, time periods 7-11 involve financial aid-related tasks, and time periods 13-15 are postsecondary enrollment verification check points.

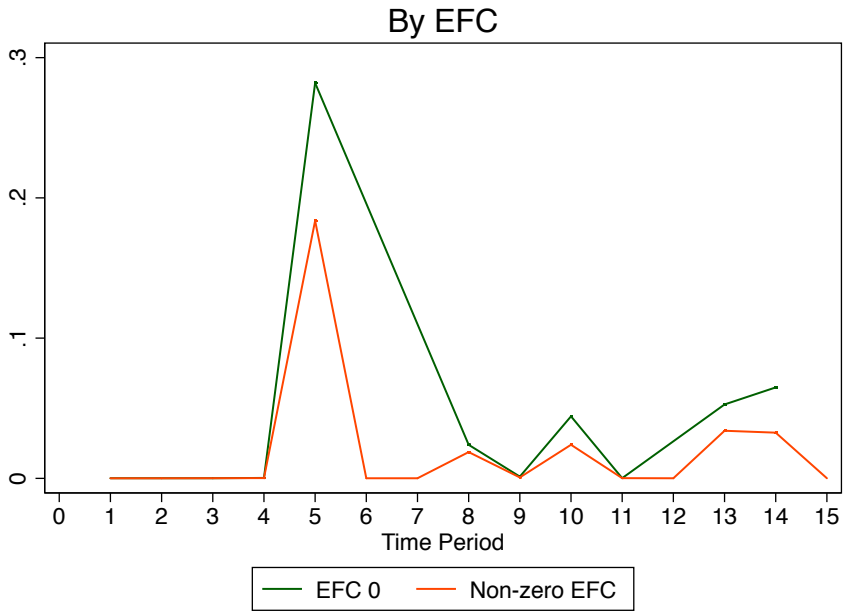

Figure 2.5: Estimated hazard of Tennessee Promise eligibility loss by EFC

The figure above displays the estimated hazard of TN Promise eligibility loss by EFC in discrete time periods from January 2017 to September 2017. EFC is operationalized as a dichotomous indicator of whether or not EFC was 0 (modal EFC value in the sample). Time period 5 is the summer community service hours submission deadline, time periods 7-11 involve financial aid-related tasks, and time periods 13-15 are postsecondary enrollment verification check points.

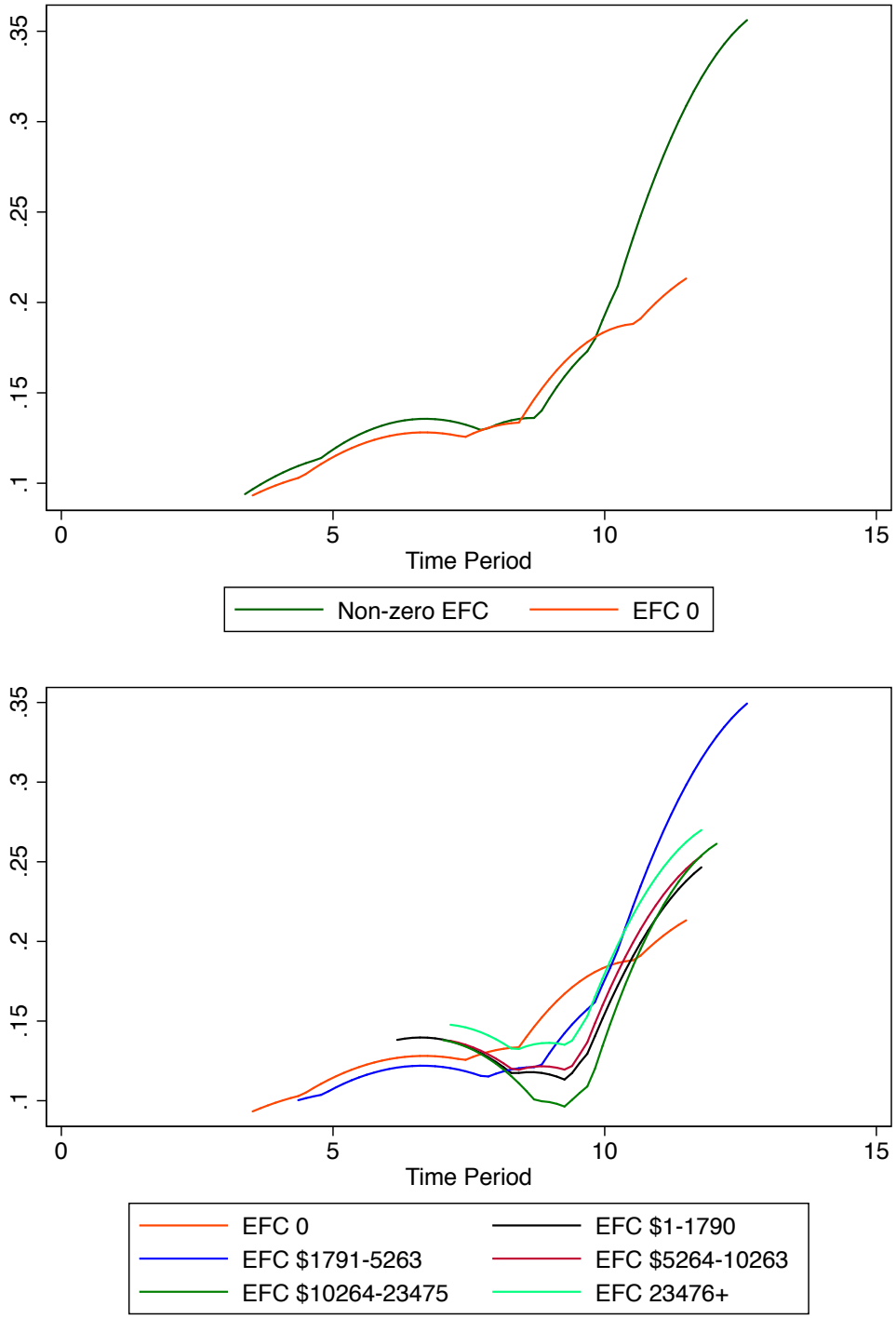

Figure 2.6: Smoothed cumulative hazard of Tennessee Promise eligibility loss by EFC

The two panels above display the cumulative hazard of TN Promise eligibility loss by EFC in discrete time periods from January 2017 to September 2017. Time period 5 is the summer community service hours submission deadline, time periods 7-11 involve financial aid-related

tasks, and time periods 13-15 are postsecondary enrollment verification check points. Cumulative hazard curves begin once there is a cumulative hazard to be measured and end when all departing individuals in a given category (who are not censored) have experienced the event.

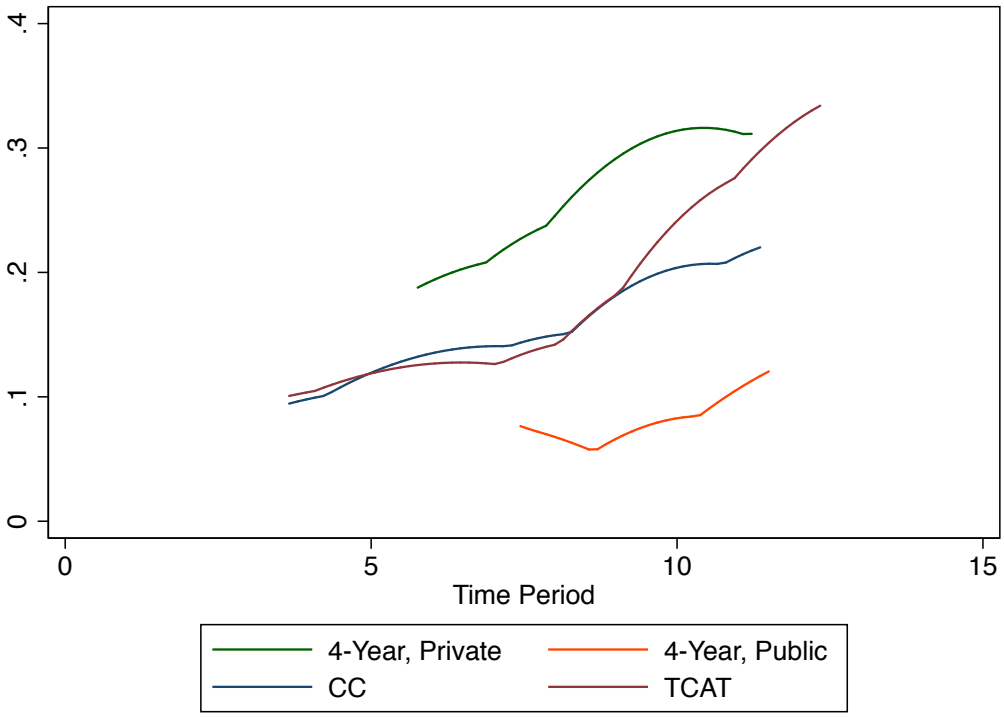

Figure 2.7: Smoothed cumulative hazard of Tennessee Promise eligibility loss by intended postsecondary sector

The figure above displays the cumulative hazard of TN Promise eligibility loss by intended postsecondary sector in discrete time periods from January 2017 to September 2017. Time period 5 is the summer community service hours submission deadline, time periods 7-11 involve financial aid-related tasks, and time periods 13-15 are postsecondary enrollment verification check points. Cumulative hazard curves begin once there is a cumulative hazard to be measured and end when all departing individuals in a given category (who are not censored) have experienced the event.

Chapter 3.

Experimental Evidence on the Effects of Informational Messaging on the "Free" College Transition

3.1 Introduction

Attrition from the postsecondary pipeline underscores the need for more than financial support during the transition between high school and college, particularly for underrepresented groups. In addition to scholarship funding, the design of the TN Promise program supports recipients' development of college-going knowledge through mentoring and informational intervention. The state has partnered with non-profit organizations to support Tennessee high school seniors through the Promise application, FAFSA completion, college application, and enrollment. tnAchieves is the state's non-profit partner in 84 of 95 counties. In addition to facilitating a mentoring program that connects college-intending students with college graduates in their home county, tnAchieves communicates directly with students, utilizing various touch points starting in August of the senior year of high school. During the senior year, tnAchieves sends weekly informational emails and facilitates a series of informational meetings. After graduation, tnAchieves sends each college-intending student text message reminders twice per month between May and December to inform their actions during the postsecondary transition. These supports may prove to be the driving force behind enrollment gains, as low-income students derive their aid from the federal government, not from program sources (Carruthers & Fox, 2016).

In spite of this investment of time and resources, only half of the class of 2016 graduates who were TN Promise-eligible at the time of high school graduation matriculated in August of 2016 (THEC, 2017). This attrition, commonly known as "summer melt", concerns policymakers and practitioners across the state, and they have identified summer informational interventions as an area ripe for improvement. Although TN Promise scholarship recipients receive informational text messages, the efficacy of this intervention has been limited.

While research has shown that text messaging can be a high-leverage intervention to promote college matriculation, the framing of such messages is likely to be a factor in their efficacy in inducing student action and, ultimately, success. The text messages sent by tnAchieves to the first two cohorts of Promise students contain useful information but offer little guidance on how to complete required actions and do not emphasize the consequences of failing to complete them. For instance, a June 1st message regarding financial aid paperwork reads: "Make sure to check in with your financial aid office to be sure all required paperwork has been submitted!" Without greater detail regarding what is at stake, how and when to take action, or social motivation for doing so, college-intending students may fail to act. Changing the behavioral frame of messages may better induce students to take action and, in so doing, contribute to better matriculation outcomes.

Three theories suggest ways to increase the likelihood that students act on information. First, messages may motivate action by emphasizing what students stand to lose by failing to do so (Kahneman & Tversky, 1979). Alternatively, providing additional guidance to clarify next steps may make decision-making less complex and increase the likelihood that individuals will take action (Nickerson & Rogers, 2010; Milkman et al., 2012). A third theory encourages students to work with peers on academic and logistical tasks related to college, which may tap

into peer support networks and contribute to students' socio-academic integration (Deil-Amen, 2011). Strategic framing of informational text messages may increase the power of this transition support (Bird, Castleman, Goodman, & Lamberton, 2017; Bergman, Denning, & Manoli, 2017).

In the interest of building a body of evidence on the relative utility of alternately framed informational text messages during the college transition, this study leverages a randomized control trial of college-intending class of 2017 Tennessee high school graduates. In May of 2017, students were randomized into four groups that all receive informational messages, albeit in distinct behavioral frames: business as usual, in which they receive the same messages from prior year's informational campaign; loss aversion, which emphasizes what students will lose if they do not act on the information; reduction of implementation ambiguity, which provides details on the requisite steps for action, as well as the amount of time it will take to complete the task; and peer support, which encourages students to work with friends to ensure they are taking action, thus presenting the opportunity for socio-academic integrative moments (Deil-Amen, 2011). This study, thus, endeavors to answer the following questions: *Do TN Promise-eligible, college-intending high school graduates who receive informational text messages in various behavioral frames enroll and succeed in college at different rates? Does the impact of text message framing vary by student characteristics?*

With consistent evidence pointing toward the utility of text message nudging in encouraging student enrollment behaviors (see Castleman, 2015), this study contributes to the literature by considering the relative efficacy of a messaging intervention in distinct behavioral frames. To my knowledge, this is the first experimental study testing informational text messages in support of the postsecondary transition in a free community/ technical college context. In discussions of student considerations during the college choice and transition process, cost

considerations are central. A no-tuition postsecondary environment may fundamentally change the nature of student considerations during the transition to college. Consequently, this study also endeavors to contribute preliminary work to considering the factors that facilitate postsecondary transition in a tuition-free college context.

3.2 Prior research on mitigating summer melt

Estimates by the U.S. Department of Education (2013) and leading researchers contend that somewhere between 10 and 40 percent of college-intending high school graduates do not arrive on campus in the fall (Castleman & Page, 2014). Summer melt can be considered a manifestation of the information gaps that have been increasingly documented by researchers and practitioners. As this melt disproportionately affects low-income and first generation college students (Arnold et al., 2009; Castleman & Page, 2014), mitigating summer melt represents both a moral and an economic imperative that warrants intervention and research. Fortunately, innovative programming and individualized, automated supports have been shown to ameliorate summer melt (Castleman & Page, 2015).

A body of research in behavioral economics has gathered substantial evidence of the importance and efficacy of the framing of information in decision-making processes (see Thaler & Sunstein, 2008). College-related tasks that students must complete for successful matriculation can hinder enrollment, and the provision of appropriately-timed information has been shown to mitigate rates of summer melt. Researchers contend that experimental interventions that encourage students to complete requisite steps for enrollment have increased student success by crafting choice architecture in a way that optimizes behavior for postsecondary transition. Such

interventions hold promise for increasing college going among students at the margins of enrollment, particularly for first generation college students.

Practitioners, researchers, and policymakers have explored various methods for increasing the likelihood of completion of these important tasks. Interventions designed to mitigate summer melt often focus on informational interventions and building social connections between would-be college students and individuals with college-going social capital. Advising and mentoring have long been popular place-based interventions, aimed at connecting college-intending students with a social connection to a professional or a peer who can provide information about important tasks and emotional support (Avery, Howell, & Page, 2014). Some empirically tested interventions have explored the utility of principles of behavioral economics in encouraging action on the part of students in transition.

3.2.1 Behavioral economics & text messaging as an informational intervention

While the provision of information is important to reducing disparities in postsecondary success between student populations and institutional sectors, the delivery and construction of information has increasingly been a focus of attention in the academic literature. There is a growing body of evidence that informational interventions can be strategically constructed to increase the likelihood that individuals act on information. Research in the field of behavioral economics has presented compelling evidence that the way in which information is presented impacts decision-making. This work in psychology and economics, pioneered by Richard Thaler and Cass Sunstein (2008), has shown that humans act on the same information in different ways depending on its presentation. Strategic, low-cost changes in choice architecture can make information more transparent and personalized. Researchers have empirically demonstrated the

validity of this theoretical work across a number of fields, including finance, healthcare, and education (e.g., Beshears et al., 2009; Hastings & Weinstein, 2008). Proponents of choice architecture maintain that the framing of information can optimize its use for choices that prove to be more beneficial for individuals. How information is delivered, accessed, and framed matters.

The ubiquity of cell phone ownership has provided a low-cost, high leverage platform for the deployment of strategies grounded in the field of behavioral economics. There is mounting evidence that text messaging is a viable platform for delivering interventions to 21st century youth. To date, a number of researchers have employed behavioral principles in technological interventions on multi-agency or curated samples of high school students. For example, in a study of automated text messaging "nudges," Castleman and Page (2015) found that overall enrollment in two-year institutions rose by over three percentage points and four-year college enrollment increased by 4.5 percentage points. Castleman and Page (2014) also built upon earlier findings (Bos et al., 2012; Carrell & Sacerdote, 2012) regarding the efficacy of near-peer advising by pairing an informational text message intervention with near-peer outreach to encourage matriculation.

Research in this domain is predicated on the notion that individuals intend to complete tasks but fail to do so because they are inattentive to the future expenses they will face. Reminders, or nudges (Thaler & Sunstein, 2008), may reduce the attentional failure (Karlan et al., 2010) that causes students to misestimate the time needed for tasks and or miss deadlines. Accordingly, this failure of attention can be mitigated through regular reminders. Text messages can focus students on important benchmarks and encourage proper time management during the college matriculation process. Students who are the first in their families to attend college are

less likely to receive these reminders from parents and advisors. Text messaging interventions have also been successful outside of the domain of college enrollment facilitation. Messaging has been used to encourage following through on intentions to save money (Karlan et al., 2010), receive vaccinations (Stockwell et al., 2010), and increase parental involvement in schooling (Kraft & Dougherty, 2013; Kraft & Rogers, 2014).

With consistent evidence of the utility of informational text messaging, it is natural to extend the literature to consider whether efficacy of these interventions can be improved. One way in which researchers and practitioners have endeavored to increase the leverage of informational interventions is through optimizing the framing of information delivery. Early evidence exploring the relative efficacy of various strategic frames for prospective college students is mixed (Bird, Castleman, Goodman, & Lamberton, 2017; Bergman, Denning, & Manoli, 2017). Bird et al. (2017) harnessed the far-reaching power of the Common Application to high school seniors across the country who, given the reach of the Common Application, are likely to enroll at a wide variety of institutions. The researchers leverage four treatment arms (control, financial benefit, identity/norms, and planning) to examine effects on the college application behavior of students through the Common Application, the probability of enrolling in college, and the average quality and costs of the colleges in which students enrolled. They find a modest (2 percentage point), significant impact of the planning condition, which they conclude is consistent with the behavioral economic literature related to concrete planning prompts encouraging individuals to follow through on intentions.

Bergman, Denning, & Manoli (2017) also test the relative efficacy of varied informational interventions on college affordability at a large scale. Their campaign intended to change the salience of tax benefits for postsecondary students. They designed and facilitated an

intervention for 1 million students or prospective students in Texas in three samples: rising high school seniors, enrolled postsecondary students, and students who had previously applied to college but were not enrolled. Unlike Bird et al. (2017), Bergman et al. (2017) do not find that their treatment arms change student outcomes. With consistent evidence of the efficacy of text messaging interventions on the whole, the nascent and inconclusive evidence on the relative efficacy of different informational frames warrants additional exploration.

This study considers the relative efficacy in the behavioral framing of messages, particularly for students who are eligible to attend community or technical college for free. Recipients will perceive informational messages as more or less attractive depending on how they highlight certain aspects of a decision. Examples of such theoretical frames include loss aversion (which maintains that the pain of losing is more powerful than the pleasure of gaining; Smith, 1759; Kahneman & Tversky, 1979), reduction of implementation ambiguity (which contextualizes actions in a time frame and provides details on process before asking students to articulate their plans for completion; Nickerson & Rogers, 2010), and peer support (which draws on students' connections to social networks, deepens campus integration, and signals behavioral expectations; Deil-Amen, 2011). Taking as given the premise of informational nudge efficacy in general, this experiment aims to contribute to the literature around the relative impact of distinct behavioral frames on student outcomes.

3.2.2 Informational frames

There is suggestive evidence that consistent and strategic communication of information pertinent to the procedural tasks of college enrollment can increase the proportion of college-intending low-income high school graduates who enroll in college in the fall after high school

graduation. Informational messages can be framed to highlight the positive or negative aspects of a decision, which may change their perceived attractiveness. With mounting evidence of the role of automated, mobile-based informational interventions in success during the postsecondary transition, this study considers whether the content of these messages can be optimized. It stands to reason that if the way in which things are framed contributes to take up, that there may be developmental or environmental reasons that a particular frame would contribute to greater action by target individuals. A number of different theories suggest that there are ways in which to increase the likelihood of acting on information.

Loss aversion. Loss aversion is a well-documented phenomenon through which the magnitude of a person's negative reaction to the loss of a quantity is far greater than the magnitude of their positive reaction to the gain of that same amount (Smith, 1759; Kahneman & Tversky, 1979). Individuals generally place a higher value on things that they "own" than they would put on an item prior to ownership, and they are wont to give up that possession once they have it. Consequently, representing ongoing eligibility for the TN Promise scholarship more saliently may induce student action in multiple ways. A loss aversion frame may both increase the salience of the magnitude of scholarship benefits, as well as amplify feelings of ownership, such that loss of eligibility would be perceived as a loss of money that previously "belonged" to the student. With consistent framing that represents scholarship eligibility or achievement of grades as something to be lost, rather than gained, students may be encouraged toward task completion and postsecondary success.

Reduction of ambiguity. One reason that students may fail to complete logistical and procedural tasks necessary for college matriculation is lack of clarity or direction around how to complete the tasks. This lack of clarity may be exacerbated by the trend that people are natural

procrastinators: individuals hesitate to make sacrifices at present in the interest of reaping returns at a later date (O'Donoghue & Rabin, 1999). Empirical research has shown that concretized planning information can increase the likelihood that individuals will take action, whether for voter turnout or preventative medical screenings (e.g., Milkman et al., 2012; Nickerson & Rogers, 2010). Students may plan to go to college, but, for instance, fail to complete FAFSA verification or attend campus orientation. They may believe that enrolling is the right choice for their future, but their commitment wavers when the time comes to dedicate the time and energy to do so. Informational text messaging may combat the ambiguity of implementation and curtail the influence of time inconsistency through the provision of more concrete planning information. By defining the amount of time it is likely to take to complete a task and pointing students toward resources that will facilitate the task's completion, an informational intervention may induce timely and successful completion. An informational frame that reduces implementation ambiguity through the provision of completion details may elicit implementation intention, and, consequently, may positively impact students' successful matriculation.

Peer support. There is a long-standing literature that contends that the support of peers contributes to the academic adjustment of college students (Astin, 1993; Deil-Amen, 2011; Tinto, 1993). Community and technical college-intending students are disproportionately first generation postsecondary students, and thus may have less access to information about the college transition and success from family and friends (Bailey, Jenkins, Leinbach, 2005). Tinto (1993) explains that when students dropout or fail academically, it is due to lack of belonging, or integration with the college community. Interacting with peers about academic matters has been shown to be important to academic performance and persistence. Deil-Amen (2011) refers to these opportunities for peer support as socio-academic integrative moments. In a qualitative

study of community college students, Deil-Amen (2011) finds that such moments not only induce feelings of attachment and belonging, but also enhance students' acquisition of knowledge that enables them to make more effective choices for their college careers along academic and procedural dimensions. Consequently, framing of informational messages to encourage students to engage in conversations with their peers about campus academic success and logistical tasks may present an opportunity for such meaningful contact to occur and bear fruit in the form of inducing action and encouraging student enrollment and persistence.

This study builds on the body of research on informational interventions by examining how behavioral framing of informational text messages affects the ways in which students perceive and leverage informational supports and resources during the transition to publicly funded postsecondary education (Bird, Castleman, Goodman, & Lamberton, 2017; Carruthers & Fox, 2016; Castleman & Page, 2015; Deming & Dynarski, 2009). Research in this area stands to contribute to the literature on free college programs and informational interventions for college-intending youth, support the state's attainment of ambitious postsecondary completion goals, and to inform the work of school and community partners focused on college access and attainment.

3.3 Background and context

An educated labor force benefits individual states and the country as a whole. To this end, policymakers have introduced legislation and other initiatives to make college more affordable for most of the past century. While scholarship dollars may contribute to enrollment gains, simply lowering financial barriers to enrollment is unlikely to increase college persistence and graduation, particularly for traditionally underserved populations. There is abundant evidence that, even with lowered cost, the transition to postsecondary education presents

obstacles for some student populations (Braxton, 2000; DesJardins, Ahlburg, & McCall, 2002). Low-income or first generation college students have fewer connections to individuals and networks with intimate knowledge of the college transition or who can facilitate requisite tasks (see Coleman, 1988). Tuition-free community college without requisite supports is unlikely to realize the postsecondary attainment goals that Tennessee seeks. Consequently, the scholarship program was designed to also facilitate access to information pertinent to the college transition.

The TN Promise Scholarship is facilitated in partnership with non-profit organizations, including tnAchieves, in order to reach all high school graduates across the state. The organization leverages the energy and dedication of roughly 7,500 volunteers who serve as mentors to nearly 60,000 TN Promise applicants during their transition from high school to college. tnAchieves sends texts and emails to students and mentors, with a particular communications push focused on the summer months between high school graduation and college matriculation.

In spite of the communication of important information via text and email in previous summers, rates of summer melt are high among Tennessee Promise-eligible college-intending students. While some natural attrition may occur as students elect to pursue other postsecondary options or enter the workforce, the burden of financial aid follow-up and other logistical and procedural tasks may contribute to this attrition among students who appear college-intending during their senior year. Strategic framing of informational messages may increase the leverage of this high touch postsecondary transition support.

3.4 Research design and sample

During the 2017-18 academic year, I collaborated with tnAchieves to conduct a text-based informational campaign to determine whether their delivery of enrollment- and persistence-focused text messages could be optimized through strategic framing.

3.4.1 Data and sample

The text message intervention focused on college-intending high school graduates with whom tnAchieves was working to facilitate postsecondary enrollment and success. Students resided in 84 of Tennessee's 95 counties. The analytic sample includes prospective students who had, through high school graduation, maintained eligibility for the TN Promise scholarship and had expressed their intention to enroll in college by indicating an institution of enrollment on the state's student aid portal. I also restricted the sample to individuals who consented to receive the text messaging intervention and for whom tnAchieves had a cell phone number on file. Across the state, the experimental sample includes roughly 18,400 college-intending high school graduates.

I utilize de-identified administrative data derived from tnAchieves' records and state of Tennessee records reported to tnAchieves. These records include demographic and prior academic achievement data as well as on-going scholarship eligibility information. In particular, I observe gender and race/ethnicity, high school GPA, and ACT score. I also observe EFC as calculated by the U.S. Department of Education upon completion of the FAFSA.

As of May 2017, there were just over 24,000 Class of 2017 graduates who were eligible for TN Promise in the 84 counties served by tnAchieves. However, roughly 5,700 students who were excluded from the experimental sample did not provide tnAchieves with cell phone numbers or permission to send informational text messages. These students constitute a non-

random sample of individuals who did not receive treatment but who are part of the population to which I would optimally like to generalize the results. Thus, in the interest of both describing the sample and considering the degree to which the sample is representative of the whole, Table 3.1 shows descriptive statistics for all eligible students and students in the experimental sample. The two groups are observationally similar; no significant differences are detected when comparing the eligible students and experimental sample group means using t-tests.

In Table 3.1, I provide descriptive statistics for students included in the experimental sample and all TN Promise eligible class of 2017 high school graduates. Fifty-two percent of the experimental sample students are female. The majority of students in the experiment are White (71.2%), and roughly one-fifth are African-American or Black (20.8%). The proportion of students who are White is higher among the TN Promise Eligible HS graduates and the experimental sample than among TN Promise applicants and the high school cohort overall (THEC, 2019). The plurality of students in the experimental sample are the first in their families to attend college (45.8%), which differs from the proportion of TN Promise applicants who identified as first generation (36.8%) and Class of 2017 students who ultimately enrolled in college with Promise (40.6%). Over one-third of students in the experimental sample have an Expected Family Contribution (EFC) of 0 (35.3%). Just over two-thirds of students (66.9%) intend to enroll in a community college.

3.4.2 Measures

I estimate the effect of the three treatment arms on summer, enrollment, and persistence outcomes. I derive outcome measures from data obtained from tnAchieves detailing TN Promise scholarship eligibility loss date and reason for all students in the experimental sample. Students

who do not lose eligibility at the criterion checkpoint are coded as successfully meeting that deadline. The first outcome is completion of summer community service; students were required to submit 8 hours of community service by July 1, 2017. The next outcome of interest is Fall 2017 eligibility, which is dependent on both fall term postsecondary matriculation and enrollment in a TN Promise eligible program (i.e., two-year degree program at an eligible public or private institution). Students who lose eligibility at this checkpoint may have done so either if they did not enroll or if they enrolled in a non-eligible degree program. Thus, in order to approximate Fall 2017 enrollment, the next outcome of interest, I code students as having enrolled in the fall if they maintained Promise eligibility (by enrolling in an eligible program) or by losing eligibility with the stated reason for eligibility loss being their enrollment in a non-eligible program. Although this enrollment is not National Student Clearinghouse verified, it is based on financial aid disbursement and, thus, can be considered a reliable approximation of fall enrollment. The next eligibility checkpoint and outcome of interest is completion of fall 2017 community service by December 5, 2017. Similar to the summer deadline, students are coded as successfully meeting this deadline if they submitted hours to retain their ongoing Promise scholarship eligibility.

The final two outcomes are Spring 2018 eligibility and Fall 2018 eligibility, two persistence-related outcomes that are limited due to tracking only Promise scholarship eligibility. For these two outcomes, students are coded as either remaining eligible by returning to a TN Promise eligible program for the spring term and fall term, or losing eligibility due to attrition or enrollment in a different, non-eligible program. I cannot see in my data whether students who lost eligibility for the fall semester due to non-eligible program enrollment returned to their campuses for their second and third term. Future analyses will integrate data from the Tennessee

Higher Education Commission in order to use true indicators for initial enrollment, within-year persistence, and between-year persistence.

The explanatory variables of interest are the indicators for experimental intervention. The business-as-usual condition is the reference group against which students in the Loss Aversion, Reduction of Ambiguity, and Peer Support conditions are compared. I leverage student-level demographic, background, and academic information as covariates to increase the precision of the estimates in my statistical models. Student-level demographic and background information includes gender, race, EFC, and I use cumulative ACT scores as a measure of prior academic achievement.

3.4.3 Intervention design

In May 2017, the randomized control trial began. In partnership with tnAchieves, I implemented a text-based informational intervention to encourage success during the postsecondary transition. The intervention was implemented with roughly 18,400 high school graduates (class of 2017) from 452 public, private, and home-based high schools who were identified as eligible for the TN Promise at the time of high school graduation. May 2017 eligibility depended on TN Promise application, FAFSA completion, and mentor meeting attendance.

Due to evidence of the utility of informational text messages for student success, tnAchieves was committed to ensuring that all eligible students receive important transition information via text message after they no longer have access to their high school counselor. However, tnAchieves had concerns about the efficacy of text campaigns for previous cohorts, so

our goal in this study was to determine whether we could improve the informational intervention by strategically framing information to induce action.

It is important to understand the overall communication strategy of the TN Promise scholarship program in order to understand the context of the present intervention. Each cohort of TN Promise students has received informational messaging via email and cell phone. Due to knowledge of the ubiquity of cell phones and primacy of their usage for communication, bimonthly text messaging was identified by tnAchieves as an important medium of communication, particularly after high school graduation. Students also receive weekly emails beginning after TN Promise application submission and continuing for the duration of their scholarship eligibility.

The intervention text messages were designed in order to encourage the acquisition of important information or to encourage student action. All students who provided a cell phone number and consent for contact received text messages. Students were randomized at the individual-level to one of three treatment arms or the business-as-usual group, which received the same message content as prior cohorts. Messages covered a number of broad topics, including enrollment, admissions, financial aid, scholarship eligibility, and retention/success. Messages were sent on the 1st and the 15th of each month from May 2017 to December 2017. The business-as-usual messages contained the same text as messages sent by the research partner to the 2016 graduating cohort during the prior year. The treatment condition messages were framed to be consistent with the literature on loss aversion, reduction of ambiguity, and peer support. Appendix 3.A provides examples of text message content for the four randomized conditions. The text-messaging service, SMS Magic, allows for two-way texting. tnAchieves advisors were able to monitor incoming responses and answer student questions directly.

Randomization and baseline equivalence. The 18,400 eligible students who consented to receive text messages and provided a cell phone number were randomized at the individual level to balanced groups. In Table 3.2, I present the mean values of baseline covariates by treatment arm. In no instance was I able to detect significant differences in mean values of baseline covariates between each treatment group and the business-as-usual group. I conclude that baseline equivalence was achieved on observables. Consequently, I am comfortable proceeding with the assumption that the treatment groups are equivalent, on average, on all observed and unobserved, known and unknown factors related to the outcomes of interest. For example, while I cannot observe the quality or level of engagement with tnAchieves staff or volunteer mentors, baseline equivalence would suggest these factors are randomly distributed among participants in the various treatment arms.

Power analysis. The sample constitutes the high school class of 2017 TN Promise eligible population in the counties served by research partner tnAchieves who consented to participate and provided a cell phone number. My sample size is smaller than those in recent national studies (e.g., Bird et al., 2017) and, thus, may raise concerns about power. I conducted an a priori power analysis using PowerUp's *MDES Calculator for Individual Random Assignment (IRA) Designs* for randomized controlled trials (Maynard & Dong, 2013). Assuming power of 0.8 and alpha of 0.05, the minimum detectable effect size (MDES) for the main model is 0.058. A recent study of a text message framing intervention for prospective college applicants found positive effects of framing on college enrollment overall and at two-year institutions on the magnitude of roughly 1 percentage point over the control group mean, (large effect size; Bird et al., 2017; Cohen, 1988). Thus, the total sample of 18,400 (4,600 by treatment arm) should be adequate for the main models of the study. In order to determine whether I should run

heterogeneity analyses by limiting the sample by subgroup or adding interaction terms to the baseline model, I also ran power analyses for the relevant subgroups by gender, race, and intended postsecondary sector. The sample size for even the smallest subgroup among those to be tested, TCAT-intending students (N=2390) is sufficiently large to detect a MDES of 0.099 (Maynard & Dong, 2013). I proceed by assuming that with power of 0.8 and alpha of 0.05, the sample is sufficiently large to detect hypothesized effects for the main model and subgroups of interest.

3.4.4 Analytic strategy

To estimate the effect of treatment, I use a linear probability model, which estimates the intent-to-treat effect of each of the treatment arms relative to the business-as-usual condition. I also test the sensitivity of the results to a logistic regression modeling approach. The primary model is an intent-to-treat model in the following form:

(1) $\mathrm{OUTCOME}_{ij} = \beta_0 + \boldsymbol{\beta_1}\,\mathbf{TX_{ij}} + \mathbf{X}_{\gamma} + \epsilon_{ij}$

where for student *i* in high school *j*, $\mathrm{OUTCOME}_{ij}$ is an indicator for the enrollment-related outcomes defined above. The $\mathbf{TX_{ij}}$ term is a categorical indicator for the three experimental conditions to which students were randomly assigned, with the business-as-usual sample serving as the reference group against which I estimate the effect of treatment. $\mathbf{X}_{\gamma}$ serves as a vector of student-level covariates. The coefficient of interest is $\boldsymbol{\beta_1}$, which represents the causal effect of a text message framing condition on the outcome of interest. I cluster standard errors by high school to account for potentially unobserved correlations in the error terms across students who attended the same high school.

I also examine whether the framing of the informational intervention has differential effects by running the sample model with the sample limited to subgroups of students. I focus on whether the intervention effects varied by gender, race, and intended postsecondary sector. TN Promise is a scholarship for students enrolling in two-year colleges (community and technical colleges), and it is possible that there is variation in the effect of the treatment arms for students intending to attend different postsecondary institutions.

3.5 Results

3.5.1 Descriptive analysis

First, I examine the proportion of the sample that maintained eligibility for the scholarship at each of the eligibility checkpoints. As shown in Table 3.3, the percentage of individuals meeting the summer community service eligibility checkpoint in the sample (78.6 percent) is marginally higher than the overall percentage in the cohort of prospective TN Promise students across the state (74.4%; THEC, 2017). However, there are not significant differences in scholarship eligibility maintenance between the business-as-usual group and each of the treatment groups.

3.5.2 Intervention effect estimation

In Table 3.4, I estimate the effect of the intervention on successful maintenance of TN Promise eligibility through six scholarship checkpoints, including three early outcomes on the path to college success: completion of summer 2017 community service hours, fall 2017 semester scholarship eligibility, and completion of fall 2018 community service hours (columns 1-3). The treatment arms of the informational campaign appear not to have affected scholarship

eligibility maintenance behaviors relative to the business-as-usual text messaging condition. Baseline intent-to-treat estimates regressing the outcome on treatment arm show no effect of the texting frames relative to the business-as-usual frame, loss aversion and reduction of ambiguity, on summer community service completion (Table 3.4). When considering the estimated effect of the treatment arms on Summer Community Service completion, I find small, non-significant positive estimates for the Loss Aversion and Reduction of Ambiguity conditions and a small, non-significant negative estimate for the Peer Support condition, relative to the business as usual condition. Results are qualitatively similar when modeled via logistic regression (See Table 3.A.1).

In order to determine whether there are later-emerging effects of the intervention, which ran throughout the 2017-2018 academic year, I estimate the effect of the intervention on within-year scholarship maintenance, or students' TN Promise eligibility in the spring semester, and between-year scholarship maintenance, or eligibility in the fall term of the second year (Table 3.4, columns 5 and 6). It does not appear that the treatment arms had an effect on student persistence relative to the business-as-usual condition. Looking at student outcomes by condition across all eligibility checkpoints, the Peer Support condition has a fairly consistent negative, non-significant point estimate, while the Loss Aversion and Reduction of Ambiguity conditions generally have positive, non-significant point estimates.

Most of the estimates in Table 3.4 are based on measured TN Promise scholarship eligibility maintenance. However, students who enroll in postsecondary training programs that are not TN Promise-eligible, namely baccalaureate programs, are not captured as fall semester enrollees because they lose scholarship eligibility. In order to better model the effect of the intervention on fall semester enrollment, I estimate whether there is an effect of the intervention

on enrollment at any Tennessee postsecondary institution in the fall of 2017 (Table 3.4, columns 3). The point estimates are negative relative to the business-as-usual condition, but not significant. I do not find an effect of any of the treatment arms on fall semester enrollment.

3.5.3 Heterogeneity analysis

The main models may mask heterogeneity in the effect of the text message frames by aspects of participant identity or postsecondary plans. I tested for heterogeneity by gender, race, and intended postsecondary sector by estimating models in which the sample was limited to subgroups of interest.[5] Comparing the upper and lower panels of Table 3.5 shows that men were negatively affected by the loss aversion condition on the magnitude of roughly 2 percentage points at time of fall 2017 eligibility and enrollment, fall 2017 community service submission, and fall 2018 eligibility. The treatment frames did not differentially affect women.

I also estimate the effects of the text messaging frames on TN Promise scholarship eligibility by participant race or ethnicity. Table 3.6 shows that White participants were generally not differentially affected by the frames, with the exception of two marginally significant negative point estimates on the magnitude of 2.0-2.5 percentage points at the time of fall 2017 community service and spring 2018 enrollment. Black participants randomized to the peer support condition were less likely to complete July 2017 community service (-5.4 percentage points), maintain fall 2017 semester eligibility (-6.1 percentage points), and enroll in fall 2017 (-6.4 percentage points).

When modeling heterogeneity by intended postsecondary sector, I examine whether the treatment arms differentially affect participants intending to attend community colleges,

[5] Results are qualitatively similar when I interact treatment variables with these factors. See Tables 3.A.2 and 3.A.3.

technical colleges, and baccalaureate institutions. As shown in Table 3.7, I find that TCAT-intending participants randomized to the peer support condition were less likely to complete July 2017 community service (-5.5 percentage points), maintain fall 2017 semester eligibility (-7.0 percentage points), and enroll in fall 2017 (-7.1 percentage points). The estimates do not suggest differential effects for community college-intending and baccalaureate institution-intending students. In order to ensure that detected differences did not result from imbalance in subgroups, I checked for balance in the tested subgroups and found that there were roughly as many differences as would be expected by chance (7 of 90 tests, or under 8 percent).

3.6 Discussion

In spite of lowered financial barriers to entry, many college-intending students who are eligible for the TN Promise scholarship at the time of high school graduation do not matriculate for the fall semester. In an effort to mitigate summer melt, I implemented a randomized control trial in partnership with non-profit tnAchieves in order to test whether the strategic framing of a text message intervention affects the maintenance of scholarship eligibility.

Estimates show no main effect of any of the treatment frames on student transition, first semester, or persistence outcomes. I estimated differential effects of strategic informational framing on students by gender, race, and intended postsecondary sectors. In particular, Black participants and TCAT-intending participants in the peer support condition were less likely to complete summer service, maintain fall semester eligibility, or enroll in the fall semester. Previous literature has suggested the importance of peer socio-academic integration (Deil-Amen, 2011), but in the context of this intervention messages that evoke support for peers had a negative effect relative to other frames. The messages may not have been constructed well to

evoke peer support, or perhaps the support of professionals and those with college experience is more important than the support of peers for the completion of tasks necessary for successful enrollment. Additionally, men in the loss aversion condition were less likely to maintain fall 2017 eligibility, enroll in fall 2017, complete fall 2017 community service, and maintain fall 2018 eligibility. This finding may be connected to the tendency for women to be more risk averse than men (e.g., Rau, 2014).

The differential framing in this study may not have been sufficiently fine-tuned or targeted to induce greater student action toward scholarship eligibility maintenance. Alternatively, the heterogeneous effects may suggest that strategic framing should be personalized based on dimensions of student identity or, perhaps, personality. A previous intervention leveraging artificially intelligent two-way messaging was effective in stemming summer melt (Page & Gehlbach, 2017). As I will discuss in Chapter 4, students' lack of use and knowledge of the two-way feature of the messaging service may have impeded progress toward the completion of important enrollment-related tasks. The combination of personalization and responsiveness are likely both important components of such an intervention's success.

Prior research has provided strong, consistent evidence that the provision of mobile-based informational interventions supports successful postsecondary enrollment for college-intending students. This study sought to determine whether strategic framing of such messages could serve as a budget-neutral, scalable improvement for organizations and institutions that have already begun to implement text messaging campaigns to mitigate summer melt and support students during the academic year. While I did not observe a main effect of the treatment arms in this randomized control trial, there were differential effects for by gender and intended postsecondary sector. The null main effects and positive interaction effects for women and open-access-

intending students contribute to a nascent literature examining the relative effects of framing of technology-based informational interventions.

3.6.1 Limitations

There are a number of factors that limit the internal and external validity of the experiment. The analytic sample constitutes all eligible high school seniors who consented to receive text messages and provided a mobile number, however, the comparative treatment design reduces the size of each treatment arm. While this may prove to increase the likelihood of Type II error, initial power analyses do not raise cause for concern, identifying an MDES of 0.058. The multiple treatment arms and repeated measures also raise the possibility of issues related to multiplicity. In order to address multiple hypothesis testing, I make multiplicity adjustments as outlined by Romano and Wolf (2005). With adjustments, the estimated significant effects for Black and TCAT-intending students become marginally significant, with p-values between 0.05 and 0.1. The marginal significance after multiplicity adjustments necessitates caution in the interpretation of the subgroup effect. Rather than being interpreted independently in their magnitude and significance, this evidence should be taken into consideration as part of a nascent literature on the potential for differential effects in the framing of informational interventions.

Generalizability is limited by the study context and sample. Models of college choice and persistence consistently identify financial burden and environmental context as important factors in student postsecondary transition and success. Consequently, a study of the enrollment and first semester success of college aspirants under Tennessee's free community and technical college scholarship program are limited to students whose choices are informed by similar financial and social supports. Fortunately, this work coincides with increasingly interest in the effects and

viability of Promise programs at the local and state levels. Additionally, tnAchieves is only the state's partner for TN Promise support services in 84 of 95 counties. Therefore, the effect of this intervention cannot be generalized to students in the remaining 11 counties.

Another limitation of the intervention is lack of knowledge of whether students read the messages. The text messaging platform tracks the proportion of text messages received but not whether or not students accessed the information. However, the text messaging provider reported that over 95% of text messages were delivered to the mobile numbers provided. Rather than estimating the effect of treatment-on-the-treated, which is unknowable with the given intervention set up, I estimate the intent-to-treat effect of the intervention.

As an alternative measurement of student engagement with the intervention, I examine student responses to text messages. Intervention text messages received a response from less than 1% of recipients. This overall rate of reply is much lower than that reported in other informational interventions (e.g., Castleman & Page, 2016; Castleman & Page, 2014). However, students were not informed of the two-way functionality of the text messaging service, the messages in three of the conditions (Loss Aversion, Peer Support, Business-as-Usual) did not explicitly prompt students to respond, and the Reduction of Ambiguity frame raised questions of students but did not explicitly ask for a response. Data collected in on-campus focus groups during the spring semester revealed that many students were unaware that the text messaging platform was capable of two-way communication. Taken together, this suggests that, overall, students who could benefit from access to additional information or advising may underutilize the text messaging resource. Additionally, students should be informed of the full range of functions of the text messaging service in order to ensure that they can fully leverage

opportunities for professional support of college enrollment and scholarship eligibility maintenance.

3.6.2 Contributions

These limitations are balanced by the contributions of this study. Informational text messaging has shown promise not only in its estimated impacts, but also in its accessibility to target individuals (given the ubiquity of cell phones), affordability to implement, and ease of scale. This experiment examines a way in which a widely used behavioral intervention may be fine-tuned by leveraging mechanisms related to choice architecture. In so doing, it builds on a budding literature that considers the relative efficacy of informational framing of informational interventions for prospective postsecondary students. In particular, this study builds on the work of Bird et al. (2017) and Bergman et al. (2017). This study is unique in the timing of the intervention, testing the relative efficacy of frames during the summer between high school and college; the intended sectors of enrollment of the sample, community and technical college; and the free college context. This study is the first to consider the effect of technology-based intervention scaled to a statewide free college program.

The present study raises questions with the same premise as those of Bird et al. (2017) and Bergman et al. (2017), and has a very similar treatment structure to Bird et al. (2017). These first two studies in this area paint an inconsistent picture: Bird et al. (2017) found significant effects of differential framing while Bergman et al. (2017) did not. The evidence provided herein complicates this picture by suggesting that there may be an added benefit of differential framing for particular groups of students. This is suggestive of the boon of personalization of

informational interventions, another improvement upon mass text messaging that has received positive attention in recent years.

The participants in this study were distinct from those in the prior studies of behavioral framing in notable ways. Bird et al. (2017) subjects are high school seniors who, due to their registration with the Common Application, are likely to be baccalaureate-intending. Students in the present study sample are recent high school graduates who intend to enroll in community or technical college and thus must complete the requisite steps to do so. Students in the present study have already completed the FAFSA, the major goal of the campaign run by Bird et al., and are navigating enrollment in open access institutions. Bird et al. also limit sample to first generation, low-income students from high-need schools.

In terms of context, individuals who are registered for the Common Application and received Bird et al.'s (2017) intervention are subject to a wide variety of state and local college affordability contexts. The present study examines an informational campaign implemented in a free community and technical college context. Affordability remains central to discussions of the postsecondary pipeline and student enrollment decisions. A no-tuition postsecondary environment may fundamentally change the nature of student considerations during the transition. This study is poised to add to the literature based on evidence of informational framing in a free college context.

The last-dollar scholarship program context in Tennessee also presents a time-sensitive dimension to the tasks and nudges that is not present in the same way in the other studies: Students are only eligible for the Tennessee Promise scholarship if they enroll in community or technical college immediately after HS graduation. Bird at al. (2017) nudge students toward FAFSA completion and college application. However, if they don't act on the information

immediately, the informational campaign could still prove useful to their acquisition of admission and aid in the future. Similarly, Bergman et al.'s (2017) informational campaign focuses on tax credits, which (barring changes to those credits) are still available to individuals even if they defer acting on this information.

Each of these studies leverages the evidence on informational campaigns to facilitate action on the part of potential college students, but to different ends. Bird et al. (2017) aim to affect FAFSA completion, and Bergman et al. (2017) gear their campaign toward enrollment. This study also implemented a campaign to facilitate college enrollment, but it is also focused on completion of other requisite tasks that allow students to maintain their eligibility for the Tennessee Promise scholarship and achieve postsecondary success.

3.7 Conclusion

This study contributes to a growing body of literature about informational campaigns for prospective college students, generally, and, more specifically, the relative efficacy of varied framing of information. This study poses a question about mechanisms that contribute to prospective postsecondary students acting on their intentions in the unique context of a free college environment. Bird and colleagues (2017) contend that the question of nudging mechanism remains an open one where there is room for additional exploration, particularly considering the variety of contexts in which text messaging is now being implemented. This study contributes to this growing area of research by examining potential strategies for improving student success by unpacking the mechanisms that may make such informational campaigns successful. While a clear main effect did not emerge in this randomized control trial, there is evidence that groups of prospective and current students may react differently to text

message frames. Continued attention of practitioners and researchers may lead to the optimization of informational delivery for the improved success of students.

Table 3.1: Descriptive statistics for the experimental sample and all TN Promise eligible class of 2017 HS graduates

Variable	Experimental Sample N = 18400	All TN Promise Eligible HS Graduates N = 24080
Female	52.1%	52.0%
Asian/Pacific Islander	1.1%	1.1%
Black/African-American	20.8%	19.8%
Hispanic/Latino	4.5%	4.8%
White	71.2%	72.1%
First generation	45.8%	46.5%
EFC of zero	35.3%	35.9%
Intention to enroll in CC	66.9%	66.7%
Intention to enroll in TCAT	13.0%	13.4%
Intention to enroll in 4-year	16.5%	16.3%

Note: All data derived from measures obtained from tnAchieves. Students included in column 2 did not provide tnAchieves with a mobile phone number. Sample sizes rounded to the nearest 10. Notation of statistical significance refers to t-test comparisons between sample and eligibility group means. ^ $p < 0.10$, * $p<0.05$, ** $p<0.01$, *** $p< 0.001$.

Table 3.2: Assessment of balance in covariates across the three treatment groups

	Business-as-usual N = 4600	Loss Aversion N = 4600	Implementation N = 4600	Peer Support N = 4600
Female	51.6%	53.1%	51.9%	51.9%
Asian/Pacific Islander	0.9%	1.2%	1.2%	1.2%
Black/African-American	19.8%	21.3%	21.3%	21.0%
Hispanic/Latino	4.4%	4.6%	4.5%	4.5%
White	72.3%	70.9%	71.0%	70.7%
First generation	46.2%	45.8%	45.1%	46.4%
EFC of zero	33.9%	35.8%	35.8%	35.6%
Intention to enroll in CC	66.6%	66.7%	66.3%	67.9%
Intention to enroll in TCAT	13.4%	13.4%	13.1%	12.2%
Intention to enroll in 4-year	16.5%	16.7%	16.6%	16.1%
ACT	18.71	18.63	18.71	18.68

Note: Cells report group means. Sample sizes rounded to the nearest 10. Notation of statistical significance refers to comparisons between control and each of the individual treatment group means. ^ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3.3: Percentage of sample maintaining TN Promise eligibility by treatment group

Treatment	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Business-as-usual (N=4600)	78.8%	69.3%	57.8%	46.6%	31.1%
Loss Aversion (N=4600)	78.7%	68.6%	57.8%	47.0%	29.6%
Reduction of Ambiguity (N=4600)	78.9%	68.4%	57.8%	47.4%	30.2%
Peer Support (N=4600)	77.9%	67.7%	57.9%	45.6%	29.7%
Total (N=18400)	78.6%	68.5%	57.5%	46.9%	30.1%

Note: Cells report group means. Sample sizes rounded to the nearest 10. Eligibility updated through December 2018. Eligibility status can be corrected or appealed. Notation of statistical significance refers to comparisons between control and treatment group means. ^ $p< 0.10$, * $p< 0.05$, ** $p<0.01$, *** $p< 0.001$.

Table 3.4: Overall impact of text intervention on community service, fall scholarship eligibility, & persistence outcomes

	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment[+]	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
	(1)	(2)	(3)	(4)	(5)	(6)
Overall						
Loss Aversion	0.011	0.007	-0.006	0.013	0.007	-0.011
	(0.012)	(0.012)	(0.010)	(0.014)	(0.014)	(0.012)
Reduction of Ambiguity	0.005	-0.001	-0.009	0.002	0.003	-0.005
	(0.012)	(0.012)	(0.010)	(0.014)	(0.014)	(0.013)
Peer Support	-0.007	-0.013	-0.005	0.002	-0.003	-0.007
	(0.012)	(0.012)	(0.010)	(0.014)	(0.014)	(0.013)
Business-as-usual Group Rate	0.606	0.597	0.787	0.522	0.476	0.311
N	18400	18400	18400	18400	18400	18400
R^2	0.033	0.031	0.017	0.052	0.059	0.065

Note: Coefficients estimated from linear probability models. Approximated enrollment Fall 2017 estimates count individuals as enrolled if they began college with TN Promise or lost scholarly eligibility due to enrollment in a non-eligible degree program. Heteroskedasticity robust standard errors. ^ $p< 0.10$, * $p< 0.05$, ** $p<0.01$, *** $p< 0.001$.

Table 3.5: Estimated effects of treatment frames by gender

	Men					
	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment+	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Overall						
Loss Aversion	-0.013	-0.029*	-0.024^	-0.025^	-0.023	-0.023^
	(0.013)	(0.014)	(0.014)	(0.015)	(0.015)	(0.014)
Reduction of Ambiguity	0.001	-0.011	-0.008	-0.013	0.001	-0.019
	(0.013)	(0.014)	(0.014)	(0.015)	(0.015)	(0.013)
Peer Support	-0.009	-0.017	-0.017	-0.013	-0.013	-0.012
	(0.013)	(0.014)	(0.014)	(0.015)	(0.015)	(0.014)
Business-as-usual Group Rate	0.765	0.681	0.701	0.504	0.453	0.288
N	8800	8800	8800	8800	8800	8800
R^2	0.002	0.005	0.004	0.003	0.004	0.004

	Women					
	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment+	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Overall						
Loss Aversion	0.008	0.011	0.004	0.015	0.008	-0.010
	(0.011)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)
Reduction of Ambiguity	0.001	-0.009	-0.006	0.002	-0.006	-0.002
	(0.011)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)
Peer Support	-0.010	-0.017	-0.015	-0.018	-0.027^	-0.017
	(0.011)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)
Business-as-usual Group Rate	0.810	0.705	0.738	0.540	0.498	0.332
N	9600	9600	9600	9600	9600	9600
R^2	0.003	0.005	0.002	0.005	0.007	0.002

Note: Coefficients estimated from linear probability models. Approximated enrollment Fall 2017 estimates count individuals as enrolled if they began college with TN Promise or lost scholarly eligibility due to enrollment in a non-eligible degree program. Heteroskedasticity robust standard errors. ^ p< 0.10, * p< 0.05, ** p<0.01, *** p< 0.001.

Table 3.6: Estimated effects of treatment frames by race

	White					
	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment+	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Overall						
Loss Aversion	-0.002	-0.010	-0.010	-0.012	-0.013	-0.013
	(0.010)	(0.011)	(0.011)	(0.013)	(0.013)	(0.012)
Reduction of Ambiguity	0.005	-0.012	-0.010	-0.011	-0.005	-0.009
	(0.010)	(0.011)	(0.011)	(0.013)	(0.013)	(0.012)
Peer Support	-0.000	-0.005	-0.004	-0.020^	-0.025^	-0.012
	(0.010)	(0.011)	(0.011)	(0.013)	(0.013)	(0.012)
Business-as-usual Group Rate	0.818	0.734	0.755	0.577	0.533	0.355
N	12440	12440	12440	12440	12440	12440
R^2	0.000	0.001	0.001	0.002	0.004	0.001

	Black					
	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment+	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Overall						
Loss Aversion	-0.007	-0.006	-0.016	0.023	0.014	-0.032^
	(0.022)	(0.023)	(0.023)	(0.023)	(0.022)	(0.018)
Reduction of Ambiguity	-0.007	0.004	0.001	0.029	0.018	-0.004
	(0.022)	(0.023)	(0.023)	(0.023)	(0.022)	(0.018)
Peer Support	-0.054*	-0.061**	-0.064**	-0.014	-0.016	-0.026
	(0.022)	(0.024)	(0.023)	(0.023)	(0.022)	(0.018)
Business-as-usual Group Rate	0.710	0.573	0.631	0.362	0.312	0.185
N	3640	3640	3640	3640	3640	3640
R^2	0.002	0.002	0.003	0.001	0.001	0.001

Note: Coefficients estimated from linear probability models. Approximated enrollment Fall 2017 estimates count individuals as enrolled if they began college with TN Promise or lost scholarly eligibility due to enrollment in a non-eligible degree program. Heteroskedasticity robust standard errors. ^ $p< 0.10$, * $p< 0.05$, ** $p<0.01$, *** $p< 0.001$.

Table 3.7: Estimated effects of treatment frames by intended postsecondary sector

	Community College-Intending					
	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment+	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Overall						
Loss Aversion	-0.002	-0.010	-0.010	-0.007	-0.007	-0.011
	(0.009)	(0.010)	(0.011)	(0.013)	(0.013)	(0.012)
Reduction of Ambiguity	0.009	-0.005	-0.004	0.005	0.008	0.000
	(0.009)	(0.011)	(0.011)	(0.012)	(0.013)	(0.012)
Peer Support	-0.000	-0.007	-0.007	-0.001	-0.015	-0.009
	(0.009)	(0.011)	(0.011)	(0.012)	(0.013)	(0.012)
Business-as-usual Group Rate	0.846	0.785	0.785	0.606	0.555	0.362
N	12290	12290	12290	12290	12290	12290
R^2	0.002	0.001	0.001	0.002	0.003	0.001

	TCAT-Intending					
	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment+	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Overall						
Loss Aversion	0.015	0.026	0.025	0.011	0.002	-0.043^
	(0.024)	(0.026)	(0.026)	(0.029)	(0.028)	(0.025)
Reduction of Ambiguity	0.003	-0.005	-0.007	-0.021	-0.012	-0.047^
	(0.025)	(0.027)	(0.027)	(0.029)	(0.029)	(0.025)
Peer Support	-0.055*	-0.070**	-0.071**	-0.037	-0.042	-0.039
	(0.026)	(0.028)	(0.028)	(0.029)	(0.029)	(0.026)
Business-as-usual Group Rate	0.759	0.689	0.690	0.501	0.455	0.279
N	2390	2390	2390	2390	2390	2390
R^2	0.004	0.006	0.006	0.001	0.001	0.002

	Four-year Intending					
	July 2017 Community Service	Fall 2017 Semester Eligibility	Fall 2017 Enrollment+	Fall 2017 Community Service	Spring 2018 Enrollment	Fall 2018 Semester Eligibility
Overall						
Loss Aversion	-0.030	-0.034	-0.042	-0.006	-0.014	-0.019
	(0.025)	(0.026)	(0.026)	(0.024)	(0.023)	(0.020)
Reduction of Ambiguity	-0.029	-0.009	-0.015	-0.013	-0.022	-0.011
	(0.025)	(0.026)	(0.026)	(0.024)	(0.023)	(0.020)
Peer Support	-0.021	-0.022	-0.022	-0.024	-0.035	-0.027
	(0.025)	(0.026)	(0.026)	(0.024)	(0.023)	(0.020)
Business-as-usual Group Rate	0.655	0.472	0.549	0.312	0.276	0.200
N	3030	3030	3030	3030	3030	3030
R^2	0.001	0.001	0.001	0.001	0.001	0.001

Note: Coefficients estimated from linear probability models. Approximated enrollment Fall 2017 estimates count individuals as enrolled if they began college with TN Promise or lost scholarly eligibility due to enrollment in a non-eligible degree program. Heteroskedasticity robust standard errors. ^ p< 0.10, * p< 0.05, ** p<0.01, *** p< 0.001.

3.A Sample texts for the experimental conditions

May 1: Admissions-focused Reminder
Condition 0 – Business-as-usual: "tnAchieves: Make sure your TSAC student portal has the correct institution! If your school choice has changed, update that TODAY!"

Condition 1 – Loss Aversion: "tnAchieves: If the wrong school is listed on your TSAC portal your money will be sent to the wrong place. You'll lose $4k of financial support. Update NOW!"

Condition 2 – Reduction of Implementation Ambiguity: "tnAchieves: Does your TSAC student portal have the correct institution? 20min task. When will you update it (date & time)? Put this in your calendar!"

Condition 3 – Peer Support: "tnAchieves: Are you and friends attending the colleges that you entered into your TSAC student portal? Check to make sure that they update their TSAC portal if their college has changed."

June 1: Financial Aid-focused Reminder
Business-as-usual: "tnAchieves: Make sure to check in with your financial aid office to be sure all required paperwork has been submitted!"

Loss Aversion: "tnAchieves: If you are missing paperwork, you'll lose your scholarship (as much as $4k). Call financial aid office to ensure all paperwork has been submitted!"

Reduction of Implementation Ambiguity: "tnAchieves: Call your financial aid office to ensure all paperwork was submitted! 15 min task! When will you call to check on paperwork (date & time)?"

Peer Support: "tnAchieves: Have your friends checked with the financial aid office to ensure all required documents have been submitted? Remind them to call financial aid ASAP!"

September 1: Retention-focused Reminder
Business-as-usual: "tnAchieves: Remember tutors are FREE on college campuses! Make sure to use them if you are starting to struggle in ANY class. It is best to start early!"

Loss Aversion: "tnAchieves: Not visiting your college's FREE tutors early loses you points on exams if you begin struggling. Make sure to use tutors for questions!"

Reduction of Implementation Ambiguity: "tnAchieves: Tutors are FREE on campus! Have you visited tutors yet? 60min task. When (date & time) will you visit a tutor? Put reminders in your calendar to see a tutor!"

Peer Support: "tnAchieves: Have you and your friends visited the FREE tutors on your campuses yet? Remind them that there is free academic support to ensure their success."

Table 3.A.1 Logistic regression estimates for main analyses

	Summer Community Service	Fall Semester Eligibility	Fall Community Service	Spring Enrollment	Second Year Enrollment
Overall					
Loss Aversion	-0.007	0.971	0.987	-0.024	-0.074^
	(0.051)	(0.047)	(0.041)	(0.042)	(0.045)
Reduction of Ambiguity	0.006	0.975	0.981	-0.011	-0.046
	(0.051)	(0.047)	(0.041)	(0.042)	(0.045)
Peer Support	-0.056	0.930	0.939	-0.08	-0.068
	(0.051)	(0.044)	(0.039)	(0.042)	(0.045)
Business-as-usual Constant	1.315	3.026	1.095	-0.095	-0.794
N	18400	18400	18400	18400	18400
Pseudo R^2	0.0001	0.0001	0.0001	0.0002	0.0001

Note: Exponentiated odds ratios estimated from logistic regression models. Sample sizes rounded to the nearest 10. Heteroskedasticity robust standard errors. ^ p<0.10 * p< 0.05, ** p<0.01, *** p< 0.001.

Table 3.A.2: Impact of treatment frames by condition and gender

	Summer Community Service	Fall Semester Eligibility	Fall Community Service	Spring Enrollment	Second Year Enrollment
Loss Aversion, Men	-0.013	-0.029*	-0.025	-0.023	-0.023^
	(0.012)	(0.014)	(0.015)	(0.015)	(0.014)
Loss Aversion, Women	0.053***	0.035**	0.052***	0.053***	0.035**
	(0.012)	(0.014)	(0.015)	(0.015)	(0.013)
Reduction of Ambiguity, Men	0.001	-0.010	-0.012	0.001	-0.018
	(0.012)	(0.014)	(0.015)	(0.015)	(0.013)
Reduction of Ambiguity, Women	0.045***	0.016	0.039**	0.038**	0.043**
	(0.012)	(0.014)	(0.015)	(0.015)	(0.014)
Peer Support, Men	-0.009	-0.017	-0.013	-0.012	-0.012
	(0.012)	(0.014)	(0.015)	(0.015)	(0.014)
Peer Support, Women	0.035***	0.008	0.019	0.018	0.028*
	(0.012)	(0.014)	(0.015)	(0.015)	(0.014)
Women	0.045***	0.025^	0.037*	0.045**	0.045***
	(0.012)	(0.014)	(0.015)	(0.015)	(0.014)
Business-as-usual, Men	0.765	0.681	0.503	0.453	0.288
N	18400	18400	18400	18400	18400
R2	0.004	0.002	0.004	0.003	0.003
F-test	0.001	0.001	0.001	0.001	0.001

Note: Coefficients estimated from linear probability models. Heteroskedasticity robust standard errors. Sample sizes rounded to the nearest 10. * p< 0.05, ** p<0.01, *** p<0.001.

Table 3.A.3: Impact of treatment frames by condition and intended postsecondary sector

	Summer Community Service	Fall Semester Eligibility	Fall Community Service	Spring Enrollment	Second Year Enrollment
Loss Aversion, Four-year	-0.03	-0.034	-0.006	-0.014	-0.019
	(0.025)	(0.025)	(0.024)	(0.023)	(0.020)
Loss Aversion, CC or TCAT	0.177***	0.293***	0.273***	0.256***	0.131***
	(0.018)	(0.019)	(0.019)	(0.018)	(0.016)
Reduction of Ambiguity, Four-year	-0.029	-0.009	-0.013	-0.022	-0.011
	(0.025)	(0.026)	(0.024)	(0.023)	(0.020)
Reduction of Ambiguity, CC or TCAT	0.185***	0.292***	0.278***	0.268***	0.141***
	(0.018)	(0.019)	(0.019)	(0.018)	(0.017)
Peer Support, Four-year	-0.021	-0.022	-0.024	-0.035	-0.027
	(0.025)	(0.026)	(0.024)	(0.023)	(0.020)
Peer Support, CC or TCAT	0.169***	0.281***	0.263***	0.244***	0.136***
	(0.018)	(0.019)	(0.019)	(0.018)	(0.016)
CC- or TCAT-intending participants	0.176***	0.296***	0.277***	0.262***	0.148***
	(0.018)	(0.019)	(0.019)	(0.018)	(0.017)
Business-as-usual four-year intending	0.655	0.472	0.312	0.276	0.136
N	17,710	17,710	17,710	17,710	17,710
R2	0.035	0.065	0.046	0.043	0.016
F-test	0.001	0.001	0.001	0.001	0.001

Chapter 4.

Expectations of a Promise: The Psychological Contracts between Students, Institutions, and the State in a Tuition-Free College Environment

4.1 Introduction

Individuals form expectations based on the information they gather from their environments. We may make meaning of language, observation, and prior experiences to shape our expectations for future. When individuals enroll in college, they develop expectations for their postsecondary institution. On a basic level, students expect to receive a degree or skill development in exchange for tuition, fees, and effort expended in pursuit of course credits. This exchange agreement between students and their institution is facilitated through encounters with various campus-based partners. Faculty provide instruction, assessment, and feedback in and outside of coursework. College staff provide information, advising, and support to encourage student academic and professional success.

Previous research has found that students perceive various psychological contracts relevant to their postsecondary education (Wade-Benzoni et al., 2006; Bordia et al., 2010; Koskina, 2013; Bordia et al., 2015; Knapp & Masterson, 2018). Students view themselves as in exchange with a variety of partners both inside and at the boundaries of their institution (Knapp & Masterson, 2018). These exchanges, or expectations of said exchanges, form the terms of psychological contracts between students and their postsecondary institutions. Psychological contracts are the deals that individuals believe to exist between themselves and another party (Rousseau 1989, 1995). While this perspective has historically been leveraged in the

management literature, researchers increasingly have leveraged the framework of psychological contracts to examine relationships in other fields, including the expectations that students have for the exchanges between themselves and parties at their colleges and universities.

The framework of psychological contracts holds great potential for revealing the patterns of expectations held by postsecondary students, their perceptions of who and what are responsible for their successes and failures, and the implications of meeting and breaching expectations for student performance and departure behaviors. Given the nature of the scholarship programs and the language used to promote them, **s**tudent perceptions of unwritten exchanges may be even more salient in a tuition-free "Promise" college scholarship context. Fulfillment of expectations or obligations in these psychological contracts may influence students' persistence and performance.

The rapid adoption of place-based, tuition-free "Promise" scholarship programs is driven by the belief that such programs will increase college access and success. However, the nature, function, and framing of these programs may lead to unfulfilled psychological contracts. In this qualitative study, I explore the perceptions of first-year TN Promise students with regard to the resources and supports that they receive from the state, postsecondary institutions, educational support organizations, and family members for their postsecondary training. In this study I address the primary research questions: *Do Promise scholarship students perceive psychological contracts between themselves and key actors on- and off-campus? If so, what are the terms of these exchange relationships?* I use qualitative data from student focus groups at three technical colleges, six community colleges, and one four-year institution in Tennessee to explore the nature and components, financial and otherwise, of psychological contracts that students

perceive between themselves and various individuals and groups internal and external to the postsecondary institution.

I begin by detailing the systems and assumptions that serve as the foundation for federal and state financial aid for college and exploring the literature on the role of parental willingness to pay in college enrollment and success. I continue by defining key terms and profiling findings that provide the theoretical underpinnings for psychological contracts literature. I then leverage student-related psychological contracts work to illustrate the ways in which this framework is useful for exploring the dynamics between students and parties relevant to their postsecondary enrollment and attainment. I then describe the design, facilitation, and analysis of the qualitative study that I conducted to examine the ways in which students make sense of their postsecondary enrollment decisions and resources and supports for success in Tennessee's tuition-free college context. I conclude by discussing the findings and limitations of this work, drawing practice and policy implications, and making recommendations for future study.

This paper draws attention to emergent evidence that students' perceive obligations between themselves and the state, with institutional actors and state-affiliates serving as mediators of these exchanges. I build on foundational and recent college-related psychological contract research with findings about perceived obligations that may enable colleges and universities and state systems to better support exchanges and manage student expectations in their delivery of services. This study illuminates the existence and content of psychological contracts between students, faculty, staff, the state, and the state's non-profit partner, tnAchieves, and begins to shed light on the way in which more proximate actors mediate the relationship between students and the state. The findings described herein may be particularly useful for institutions that are tuition dependent and funded through performance-based formulas, as

students constitute both a primary stakeholder and product; such institutions would be well-served to be able to respond to students' expectations and reshape them to better align with their mission and capabilities, if necessary.

4.2 Financial aid policy, logistics, and assumptions

Students derive financial support for postsecondary education from a number of sources. In addition to personal income, many students draw on federal, state, and institutional financial aid as well as family resources to fund their college-related expenses. Eligibility for federal financial aid is based upon the demonstration of financial need. Prospective and enrolled students demonstrate need by submitting detailed information about personal and parental income and resources via the Free Application for Federal Student Aid (FAFSA). When the Cost of Attendance (COA) at the student's intended postsecondary institution exceeds their calculated Expected Family Contribution (EFC), then they may receive federal grants or loans in order to cover the cost of college.

The most common federal grant is the Pell Grant, a need-based grant that functions as a voucher for part-time and full-time college students across postsecondary sectors. The Pell Grant has a maximum award of $6,195 for the 2019-2020 award year (Federal Student Aid, n.d.). Pell funds are applied to the student's tuition and fee balance first before other federal, state, and institutional aid. Depending on the postsecondary institution, a student's Pell Grant may cover all or only part of the COA. For students with great financial need who attend public community and technical colleges with low relative COA, the Pell Grant may cover their entire balance for tuition and fees. At the higher-cost, four-year institutions, the Pell Grant will not pay a student's entire balance, and thus students may draw on state aid, institutional aid, or federal loans to cover

their remaining college attendance costs. Drawing on multiple sources of funding is quite common for college students, and student debt has become increasingly prevalent.

Generous and innovative state-funded "free college" programs are framed to lower financial barriers to college entry with the goal of ultimately increasing the proportion of state residents with a postsecondary degree or credential. State-funded financial aid is primarily awarded in the form of grants. State grant aid programs award funds on a need or merit basis to students to cover remaining balances for tuition and fees after federal grant aid has been applied. Need- and merit-based aid for resident students is primarily awarded when for those students who attend public institutions in the state. While the magnitude of state awards varies, the most generous state aid programs will award full tuition and fees to eligible students. Whereas historically these "full ride" aid programs were targeted to high-performing students enrolling in four-year degree programs, recent years have seen a growing interest in the development of broad-access scholarship programs to make college "free" for all or nearly all state residents with a high school credential.

Tennessee's last-dollar community and technical college promise program, TN Promise, guarantees a tuition-free two-year postsecondary education for Tennesseans who have just graduated from high school. In order to maintain eligibility, students complete the FAFSA (so that federal aid can be applied before state aid), participate in 8 hours of community service each semester and participate in a mentoring program (facilitated by non-profit organization tnAchieves). In exchange, the state's pays the remainder of their tuition and fee bill after federal and other state grants have been applied. The program's design leads to the bulk of Promise funding being directed to middle- and upper-income students. In fact, students who receive Pell Grants receive little, if any, Promise scholarship funding. Roughly half of TN Promise students

receive $0 in Promise funds, and the bulk of these $0 Promise students are Pell Grant recipients (98%; TBR, 2018). The scholarship covers only tuition and fees, not non-tuition expenses associated with the total cost of attendance. The state partners with non-profit organization tnAchieves in order to facilitate the mentoring and service components of the scholarship program.

Previous research has shown that the complexity and lack of transparency of the financial aid application process can make it difficult for young people to anticipate the expenses they will encounter as college students. The state of Tennessee and tnAchieves collaborate to ensure that TN Promise scholarship is widely advertised and complemented by financial aid and college application supports in order to ensure that all potentially eligible students know about the program and are prepared to participate. Students are responsive to changes in the cost of college (e.g., Heller, 1999), and clear knowledge of the existence and provisions of the scholarship program may shape enrollment intentions and follow-through.

In the absence of a last-dollar scholarship, students would be responsible for covering the remaining tuition and fee balance after federal and other state grants are applied. Knowledge of parents' plans to pay for college costs can modify children's perceptions of these costs and have a measurable impact on their college-going in the semester after high school graduation (Flaster, 2018). In fact, the average undergraduate student derives the greatest proportion of her financial backing for college from parents (Sallie Mae, 2014). This support can pay off: Undergraduate students are more likely to persist and earn a degree when they receive greater financial support from their parents (Flaster, 2012; Hamilton, 2013; Kim, 2007).

Given the literature on parental willingness to pay, it stands to reason that clear communication of state-funded "free" college may induce students to act on their intention to

enroll in postsecondary training. Statewide broad-access scholarship programs, like Tennessee and Oregon's Promise programs and New York's Excelsior Scholarship, are widely advertised and clearly communicated. Each state has implemented substantial informational campaigns in order to make it clear to make the scholarship terms and benefits clear to each eligible student. One of the potential benefits of Promise or free tuition scholarship programs is increasing transparency of college costs.

However, students' expectations for their exchange agreement with the state may extend beyond the advertised provisions of the scholarship. A substantial financial commitment on the part of the state stands to alter student expectations around supports (financial or otherwise) and inform institutional selection. The language used by the state to justify the financial support of students to enroll and complete college may lead to additional dimensions along which students have expectations of the state, their institution, and college faculty and staff.

In the context of the present study, the state has made a de jure commitment of lottery proceeds to fund tuition-free community and technical college for recent high school graduates. This commitment aligns with policy recommendations to make commitments of financial aid to students at an earlier age so that they can focus on academic and social preparation for college rather than concerning themselves with the question of whether they will secure sufficient funding to enroll (Heller, 2006). When a tuition-free college scholarship program is clearly communicated and offered without conditions, prospective students will come to understand the broad-access terms of the state's offer and may shift their college aspirations and expectations. Such financial aid commitments have the potential to shift the postsecondary-going culture of a state through the widespread development of beliefs in the value and feasibility of college attendance.

The commitment on the part of the state government to cover tuition and fees may be misinterpreted, particularly given that such programs are typically widely touted and politically popular. Students who enroll in college under a statewide "promise" program may expect that college will be "free" as advertised. The word "promise" may come to be imbued with additional meaning, as students learn of the attainment-oriented motivation of such a policy: they may believe the state has committed to doing everything in its power (and then some) to ensure their success. Thus, the terms of the state's "promise" may come to involve unspoken dimensions that form the psychological contract between students and the state or their postsecondary institution.

Similarly, using "free college" in the description of scholarship provisions helps to clarify the accessibility of a zeroed tuition and fee balance, but fails to explicitly acknowledge the cost of supplies and living expenses that students will incur while enrolled. The simplicity of the messaging may encourage college-going behaviors in students at the margins of postsecondary enrollment, but perhaps at the cost of misaligning student expectations with reality. Although the detailed explanation of a program would explain that the state's offer is for tuition and fees, students, particularly those with limited financial resources, may interpret the marketing and informational language such that they perceive additional financial dimensions as a part of the psychological contract between themselves and the state or their institution. The qualitative data collected for this study shows that students do in fact make meaning of the "promise" made by the state in a manner that is consistent with the literature on psychological contracts.

4.3 Psychological contract theory

Contracts guide exchanges between individuals and organizations. By definition, contracts must have a promise, payment, and acceptance. Contracts can, thus, reduce uncertainty

by creating clear expectations about parties' behaviors and outcomes. Legal contracts are an enforceable promise or set of promises that, if violated, allow the injured party access to legal remedies. While all contracts set expectations, all expectations that parties have for one another do not constitute contracts (Rousseau & Parks, 1993).

Psychological contracts arise when individuals develop expectations outside of a legal contract as they imbue additional meaning and expectations into the agreement. Psychological contracts are a type of social exchange relationship; the centrality of perception and mental models of contracts are a distinguishing characteristic of psychological contracts (Petersitzke, 2009; Gabler, Turnley, & Feldman, 2000).

4.3.1 Definition and assumptions

The term *psychological contract* was a metaphor initially developed to describe an employee's relationship with her employing organization to clarify the ways in which informal expectations that individuals develop and subsequently affect employee performance and relations (Rousseau, 1995). Argyris (1960) introduced the concept of an employment relationship existing beyond legally sanctioned responsibilities of the employer and employee in order to describe the unwritten expectations of reciprocal exchange held by both factory employees and their line managers. Rousseau (1989) extensively developed the theory and defines the psychological contract as "individual beliefs in a reciprocal obligation between the individual and the organization" (p. 121). In contrast with the legal perspective on contracts as having clearly defined, mutually agreed upon terms, psychological contracts are derived from individual perceptions of the informal dimensions of interparty exchange.

Psychological contracts are comprised of individual beliefs about reciprocal obligations to which both the individual and the other party are believed to have committed themselves (Robinson, Kraatz, & Rousseau, 1994; Rousseau, 1998). Thus, a psychological contract forms when an individual believes that an agreement exists because a promise has been made and considerations have been offered in exchange (Robinson, Kraatz, & Rousseau, 1994; Tekleab & Taylor, 2003). Perception is central to this conceptualization of psychological contract promises, obligations, and reciprocity. Psychological contracts are subjective and may be implied. Obligations may range from those that are clear and explicitly stated, to others that are more informal and implicit (Guest, 2007). The explicit dimensions of the psychological contract are typically close to the legal components of the formal written contract or explicit verbal contract between the parties (Conway & Briner, 2005). Implicit terms, on the other hand, are typically related to each party's perception of what the other party owes them separate from the terms specified in the explicit contract.

Scholarly debate over the conceptualization of psychological contracts have led to the articulation of five key assumptions undergirding psychological contracts (Rousseau, 1995):

1. individuals can have many different psychological contracts, each with a different party;
2. psychological contracts are beliefs;
3. psychological contracts are about exchange;
4. psychological contracts are perceived promises; and
5. psychological contract terms guide attitudes and behaviors.

Following Assumption 1, psychological contract theory is not limited in its application to the relationship between an individual and a specific entity. Rather, the theory can be applied to an individual's relationships with ''...a client, customer, supplier, or any other interdependent

party'' (Rousseau 1995, p. 34). In fact, individuals are likely to have psychological contracts with many individuals with whom they have formal contracts and relationships. Applied to the postsecondary context, students may have psychological contracts with each of the individuals and groups with whom they interact at their institution (e.g., advisors, instructors, classmates, staff, etc.). While much of the existing psychological contracts literature focuses on the exchanges between an individual and one entity (e.g., an employee and employer) recent contributions push this conception to triadic relationships or more complex webs of exchange (e.g., Knapp & Masterson, 2018).

Following Assumption 2, psychological contracts are beliefs about an exchange that reflect an individual's perception of a deal and, thus, may exist only in the individual's mind. The beliefs that constitute a psychological contract form when an individual makes meaning of an observation or assumption about their relationship to an individual or entity (Rousseau, 1989, 1995). Consequently, previous researchers have contended that individuals themselves are the best source of information regarding the nature of psychological contracts (Knapp & Masterson, 2018). It is also noteworthy that psychological contracts are one-sided, intrapersonal phenomena, and, thus, are not enforceable by law (Conway & Briner, 2005; Rousseau, 1995). Psychological contracts between Tennessee Promise scholarship recipients and relevant parties are not codified by law, but rather exist between each scholarship recipient and parties that they perceive as relevant to their educational experience.

Assumption 3 maintains that psychological contracts are about exchange: individuals perceive an obligation between themselves and exchange partner (Rousseau, 1995). Over time, they come to see the obligations between themselves and their exchange partners as reciprocal. In the context of the present study, students may come to believe that they make contributions to

the college (through, e.g., effort and attendance) that are linked to and given in exchange for the benefits provided by that college (e.g., classes, academic supports, and, eventually, a degree).

Under Assumption 4, those obligations are perceived as promises. Individuals come to believe that they and their exchange partner are obligated to a given set of exchange terms (Rousseau & Tijoriwala, 1998). For college and university students, when they come to believe that the exchange is promised, failing to fulfill obligations may magnify dissatisfaction and disappointment relative to students who have not come to expect the promises contained in a psychological contract based on that exchange. These negative feelings in response to "broken promises" may lead to student disengagement or lack of satisfaction with their college or relevant exchange partners. In fact, research on postsecondary students has shown that expectation fulfillment predicts student satisfaction and retention (e.g., Crisp et al., 2009; Longden, 2006). I revisit this assumption and the way in which scholarship program language may facilitate the development of particular psychological contracts or contract saliency as the paper proceeds.

Assumption 5, which posits that contract terms guide individuals' attitudes and behaviors, has important implications for student success in the context of this study. The content or terms of a psychological contract serve as a mental model for exchange-related behavior and, consequently, may influence individuals' attitudes and conduct. The terms of exchange may serve as behavioral goals to which individuals aspire in order to receive expected benefits (Shore & Tetrick, 1994). Fulfilling the terms of a contract contributes to better performance (Turnley et al., 2003), while unfulfilled terms may contribute to turnover and neglect of job duties (Kickul, 2001). Even the anticipation of benefits may contribute to citizenship-oriented employee behaviors (Coyle-Shapiro, 2002).

Like in the management context, postsecondary students may invest in study hours in order to uphold their end of the deal. For instance, students may think that if they work hard on their assignments for a course, they will be rewarded with good grades. A semester-long contract, such as that between a course instructor and student, may naturally have a different influence on attitudes and behavior than a contact of a different length or nature. For instance, the management literature has demonstrated that employees with long-term and stable contracts are more committed to their organizations (Raja et al., 2004) and more likely to exhibit citizenship (Hui et al., 2004; Shih & Chen, 2011). In the context of postsecondary, relationships may be life-long, particularly for students at four-year institutions that have donation and volunteer expectations of alumni.

4.3.2 Dimensions of psychological contracts

Psychological contracts have historically been defined in the literature as having relational, transactional, or ideological dimensions. Transactional expectations are narrow and materialistic in scope (Rousseau, 1990). Such psychological contracts may be economic in focus, short-term, and low-commitment for the parties involved. It is possible that some postsecondary students, particularly those in shorter degree or credential programs, may perceive their psychological contracts with their postsecondary institutions and affiliated parties to be transactional in nature.

Relational psychological contracts involve the expectation of exchange of both socio-emotional and monetizable terms. Perceived terms of the contract may be more open-ended and flexible. In the management literature, research has shown that employees are more committed to their organizations (Raja et al., 2004) and more likely to exhibit citizenship (Shih & Chen, 2011)

when they perceive that they are party to long-term, trusting, and relationship-like contracts (Rousseau & Parks, 1993). Previous literature exploring the psychological contracts of baccalaureate degree seekers and graduate students has concluded that these students are likely to perceive themselves as parties in relational psychological contracts (Knapp & Masterson, 2018).

While some researchers maintain that transactional and relational psychological contracts are distinct (Herriot et al., 1997; Conway & Briner, 2005; Wade-Benzoni et al., 2006) others contend that these types of contracts may not be universally distinct or even readily identifiable (Rousseau, 2000; Coyle-Shapiro & Kessler, 2000; Bunderson, 2001; Raja et al., 2004). The employment relationship or student-university exchange may consist of both transactional and relational elements (Rousseau, 1990; McDonald & Makin, 2000; Bunderson, 2001). This multidimensional conceptualization of the psychological contract is consistent with social exchange theory (Blau, 1964), which posits that both social and material resources are central to reciprocal exchange in social relationships.

Psychological contracts may also have ideological dimensions (Rousseau, 2001; Thompson & Bunderson, 2003; Koskina, 2013). Ideological psychological contracts may be founded upon expectations of terms that pursue a valid cause or principle (Koskina, 2001). Ideology can play a formative role in the developmental of psychological contracts (Rousseau, 2001), and the ideological dimensions of contracts may represent moral rewards to those who share an ideology (Koskina, 2001).

Knapp and Masterson (2018) push beyond the transactional, relational, and ideological paradigm in their multi-sample study of university students. They conclude that the contract dimensions reflected in the foci of student psychological contracts were not distinguished as

relational and transactional, but rather as role-based or extra-role obligations. Role-based terms reflect the definitional components of an individual or group's role in the exchange that a partner could be reasonably expected to provide, while extra-role conceptions involve items that go beyond basic role expectations and may not be wanted by or offered to all students (Knapp & Masterson, 2018). The authors argue that defining contract terms as either relational or transactional may be too narrow to accommodate a wide variety of exchange relationships. Rather, they argue that the dimensions of a contract are defined by the nature of the interaction between the two parties, which allows for temporal and contextual changes to the perceived deal over time.

4.3.3 Parties to the exchange

Other recent developments in psychological contracts research posit that exchanges may not happen based on distinct one-on-one relationships, but rather in more complex, multi-faceted agreements between three or more parties. Koskina's (2013) qualitative single-case study described students' exchange beliefs in a manner that appears to reflect a single education-related contract representing a triadic exchange between students, instructors, and institution. Knapp and Masterson (2018) find that inducements are foci-specific (i.e., are conceptualized as pertaining to one exchange partner) but that contributions may be owed to multiple foci (e.g., the state contributes money and the institution contributes teaching and support, so the student gives them both effort and performance in exchange). Thus, consistent with social exchange theory, distinctions between exchange partners are not as definitive when individuals consider the obligations they owe. Consequently, individuals sometimes reciprocate to multiple parties with some of the same actions. This individual conceptualization of exchange makes sense from an

economic perspective, as self-interested individuals seek to efficiently fulfill their obligations to multiple parties. Applied to postsecondary settings, students may perceive themselves as the focal person in a triadic student–instructor–university psychological contract in which the university is the principal and instructors and staff are mediators (Koskina, 2013).

In complex exchange relationships, the psychological contract may be distributed (Alcover, Rico, Turnley, & Bolino, 2017). Focal individuals may develop a network of expectations, promises, and obligations with multiple agents who represent the organization to differing degrees. In the case of undergraduate psychological contracts, students may enter into exchange relationships with faculty, advisors, and other institutional actors that mediate their overall contract with the college. In some cases, the college or university may be the referent although individual actors are identified as those responsible for fulfilling the perceived obligation. It is possible that the distributed nature of the psychological may extend to individuals in other organizations who also contribute to individual's development and success, as has been found in the complex contracts of university faculty (Alcover et al., 2017).

4.3.4 College and university student psychological contracts

Taken together, the literature on psychological contracts illuminates the potential for undergraduate student expectations to shape postsecondary experiences and outcomes. There is a growing literature that examines students' psychological contracts while enrolled in postsecondary education. This literature has interpreted student expectations as deriving from the role of students as customers (Koskina, 2013; Longden, 2006; Prugsamatz, Pentecost, & Ofstad, 2006). While there have been strong objections to this transactional conceptualization of the student-institutional relationship, college and university administrators are increasingly adopting

strategies and language that frame students as important customers and stakeholders for the institution (Hill, 1995; Redding, 2005).

Recent work by Knapp and Masterson (2018) has extended the study of reciprocal relationships related to teaching and learning (Bordia et al., 2010; Bordia et al., 2015; Wade-Benzoni et al., 2006), advising relationships (Blackmore, 2009; Feldman & Theiss, 1982; Ulriksen, 2009), university services (Arena, Arnaboldi, & Azzone, 2010; Prugsamatz, Pentecost, & Ofstad, 2006), and student experiences and outcomes (Bean & Eaton, 2001; Crisp et al., 2009; Darlaston-Jones et al., 2003; Willcoxson, Cotter, & Joy, 2011; Yorke, 2000). Psychological contracts between students and faculty members are the most explored exchange relationships in the undergraduate psychological contracts literature, and the majority of previous studies focus on graduate students. Taken together, the postsecondary students-focused psychological contracts literature illuminates the informal expectations that students develop for faculty, staff, and their institutions, and the ways in which the fulfillment of these expectations predicts student satisfaction and success.

Koskina (2013) found that graduate business students' conceptions of the psychological contract emphasized expectations rather than explicitly defined obligations. In a qualitative case study, Koskina (2013) concludes that individual students' subjective understandings of reciprocal exchanges are comprised of informal promissory (transactional) and non-promissory (relational and ideological) expectations. These expectations may shape student attitudes and behaviors, ultimately contributing to attrition and performance. Students articulated that they interpreted promissory expectations as obligations; they believed that the university had made promises to them before registration and that, in spite of not appearing in a formal agreement, these promises should have been fulfilled once students enrolled.

Scholars have explored the underlying reasons why such informal expectations may develop between students and the staff and faculty of their colleges. Some maintain that student expectations are derived from the role of students as customers of the institution (Korczynski, 2002; Longden, 2006). Korczynski (2002) developed the concept of universities as customer-oriented bureaucracies in order to illuminate psychological contracts in Britain's market-driven system of higher education. The competitive pressures of higher education markets may contribute to satisfaction and outcomes-oriented advertising that showcases the services and rewards students will access if they enroll and graduate.

Students may develop expectations that interactions on campus are part of service exchanges and that their institutions must appeal to their wishes. If colleges are customer-oriented bureaucracies, then service exchanges are part of a triadic relationship between customer-employee-employer; front-line employees provide a service to customers that is determined and guaranteed by the employer (Korczynski, 2002). In the case of the present study, the TN Promise scholarship is sponsored by the state and facilitated with logistical and advising support from a non-profit organization in order to aid access to services provided by faculty and staff at community and technical colleges. This web of exchange partners may contribute to more complex expectations than found among students in previous studies.

Knapp and Masterson's (2018) mixed methods study of undergraduate student psychological contracts extends the literature by pushing beyond the traditional dyadic conception of contracts to explore the network of exchange partners with whom college students engage. Knapp and Masterson (2018) study both an entering cohort of freshman undergraduate students and upper-level students in marketing, finance, and accounting majors at a large, research-oriented university. They find that students articulate role-based and extra-role

dimensions of contract with parties both inside and at the boundaries of the university setting. This conclusion is particularly relevant to the present investigation, as I explore the expectations that scholarship students have for the state and a non-profit partner, both operating outside the bounds of the university setting.

This study of student expectations and the contextual experience of postsecondary enrollment in a tuition-free college environment extends the literature in a number of ways. First, the bulk of the literature examining psychological contracts in educational contexts considers the experiences and exchange agreements of students at four-year institutions (Knapp & Masterson, 2018) and graduate students (Bordia et al., 2010; Wade-Benzoni et al., 2006). The modal postsecondary student in the United States is enrolled at community college, so exploring the expectations that the "new majority" students have of their faculty, staff, institutions, and the state stands to inform the way in which each of these parties interacts with students and frames their role. There may be important distinctions between the expectations of students not only between contexts but also based on aspects of identity. My sample in this study is more diverse in terms of race and gender than the predominantly white male samples in the Knapp and Masterson (2018) paper. Further, the tuition-free college environment may reshape student expectations for exchange partners, shifting the nature of psychological contracts in ways that can inform the design and implementation of future place-based and tuition-free scholarship programs. The distinctive context of "free college" is particularly important for this analysis and makes unpacking TN Promise student contracts compelling for consideration of the implications of federal and state financial aid policy assumptions and practices.

There are also important distinctions with regard to research design and analysis. Knapp and Masterson (2018) expand the psychological contracts literature by not limiting students'

contract perspectives to an a priori relationship identified by the researcher. Koskina's (2013) qualitative single-case study examines triadic pattern of exchange between students, instructors, and learning institutions. I build upon these important texts by exploring whether and how students perceive themselves to be in a multi-dimensional contract with individuals and groups at their institutions, family and significant others, and the state in a tuition-free college through inductive, grounded theory analysis.

The timing of study is also distinct from prior research. I collected focus group data at the end of students' second semester of enrollment, rather than in the first weeks of the first semester or among students nearing graduation. Consequently, students in my sample have greater experience on which to found their expectations but are still relatively early in their postsecondary careers. Additionally, my multiple case focus group design explores students' conceptualizations of exchange relationships at multiple postsecondary institutions, extending the typical single institution design. Finally, in contrast with recent work related to student psychological contracts, the focus group protocol for this study did not explicitly name contracts, obligations, or agreements between students and exchange partners. Rather, student articulation of expectations was more organic and the notion of contractual obligation between parties emerged from the findings.

This study draws attention to students' perceptions of the obligations between themselves and other stakeholders. Evidence of this nature may enable colleges and universities and state systems to better support exchanges and manage student expectations in their delivery of services. This may be particularly useful for institutions that are tuition-dependent or funded based on performance where students constitute a primary stakeholder and institutions need to be able to respond to their expectations and reshape them if necessary.

4.4 Research design and sample

I collected data in two phases: web-based survey and in-person semi-structured focus groups with first-year TN Promise students across the state. In the first phase, I administered a 35-question online survey during December of 2017 using the Qualtrics online platform. At the end of the fall 2017 semester, students were recruited to participate in a survey asking their perceptions of the informational supports during the transition, the resources they accessed during the college transition, and their perceptions of the utility of these resources. Survey questions were developed based on the literature and conversations with stakeholders or adapted from the UCLA Higher Education Research Institute's Your First College Year Survey (HERI, 2017; see Appendix A for survey). The survey was designed with two goals: to construct a descriptive picture of first-year TN Promise survey completers and to facilitate the development of a focus group protocol.

A link for the fall 2017 end of semester survey was distributed via text message and email to reach all TN Promise eligible students remaining in the randomized control trial in December 2017 (N=18,790). The survey was administered via Qualtrics, and participant anonymity was maintained. Participating students were eligible to earn one hour of community service for their participation (toward eight required hours each semester) and to enter a raffle for a $100 gift card. Roughly 1400 students participated, representing 8 percent of first-year TN Promise students.

Based on analysis of the survey responses that explored the relative importance of different topics and resources and students, I constructed a protocol for on-campus focus groups to be facilitated during the spring term of 2018. The analysis of responses motivated research questions for semi-structured focus groups. Focus group participants did not necessarily

complete the anonymous survey. The focus group protocol was open-ended and semi-structured to encourage students to speak openly about their backgrounds, college decision-making process, expectations for and experiences in the first semester of college, and perceptions of resources and information during the college transition (see Appendix B). Questions were structured to minimize leading students toward particular responses.

I facilitated 19 focus groups at 12 campuses of 10 public colleges (60 total participants) in March and April of 2018. Sites were selected in order to achieve maximum variation in order to explore the potential heterogeneity of experiences of TN Promise scholarship students. As shown in Table 4.1, I visited three technical colleges, six community colleges, and one four-year institution that serve students across all regions of the state. The community colleges included the institution that serves the largest service area; a large, diverse urban institution; a large, diverse, urban institution that has struggled with performance; a rapidly growing suburban institution; a rural institution main campus; and two rural satellite campuses. The community colleges were in different geographic settings, were of different sizes, and have different enrollment concentrations of TN Promise students. The technical colleges were also located in different geographic settings, of different sizes, and had different dominant programs of study. The four-year college is home to the greatest density of TN Promise scholars enrolled in a university-based associate's program. Through my visits to this range of institutions, I aimed to capture the diversity of student motivations, experiences, and perspectives at campuses that educate TN Promise students. I concluded data collection after visiting 10 focus groups because iterative initial analyses confirmed that I had reached informational saturation; no new information and themes were emerging from additional cases.

At each institution, I conducted 60-90 minute focus groups with first-year TN Promise students and observed communal campus areas, such as the campus center, library, and cafeteria. Campus staff assisted with coordinating and advertising the focus groups. All first-year TN Promise students were invited to participate via text, email, and on campus flyer. Focus groups were scheduled in rooms in centrally located campus buildings during periods when institutional course-taking patterns suggested that most students could potentially attend. I assured participants that their comments and remarks were to be anonymous; the source of opinions was not tracked and would not be identified under any circumstances. Students were offered an incentive of a meal and one service hour toward their TN Promise eligibility for their participation.

4.5 Analysis

All focus groups were audio recorded and transcribed as verbatim transcripts. After each site visit, I gathered field notes and wrote a reflective memo on the visit. I added field notes to the transcriptions in order to integrate observational data with the audio-recorded data. I used an inductive, open coding approach in alignment with grounded theory techniques. This coding approach grounded categories and themes in the data through initial and focused coding (Charmaz, 2006; Strauss & Corbin, 1990). I entered data collection without preconceived notions about the student experience and I worked to minimize expectations throughout my analysis. I did not hypothesize prior to data collection that the analysis would reveal emergent findings related to contracts between students and the state. Consequently, as this finding emerged through coding, I critically explored the breadth and depth of contract-related themes within and across focus groups.

In the first stage of the coding process, I thoroughly read each interview transcript. I developed an initial coding framework derived from conceptual understanding and key elements of the transcripts that were grounded in the literature (constructed codes) and the language used by focus group participants (in-vivo codes). I then systematically read and coded each transcript, using constant comparative analysis to identify categories, natural variation, patterns, and themes. I revisited the emergent codes and coding framework frequently during analysis. In the subsequent round of coding, I employed axial coding in order to account for connections between categories. This inductive coding approach captured participants' perspectives on their interactions, expectations, and considerations during the college decision-making process, the transition to college, and the first year.

I presented the emerging findings to stakeholders from the Tennessee Department of Education, Tennessee Higher Education Commission, and non-profit partner, tnAchieves, as well as scholars in the field. The aim of these discussions and memos was to give stakeholders the opportunity to raise perspectives and concerns based on their understanding of the realities faced by students during the postsecondary application, transition, and first year success processes. Based on these exchanges, I clarified the codes, resolved discrepancies, and used comparative analysis to identify categories, natural variation, patterns, and themes that emerged across the transcripts during iterative rounds of coding.

Through these discussions, I engaged in theoretical sampling, returning to the data to refine and validate the major categories. Once categories were finalized, I wrote memos to explore the way in which our categories spoke to the existing empirical and theoretical literature. I integrated the memos and diagrammed connections between the categories, identifying emergent themes. I converged on a set of themes that were validated by this iterative,

triangulated process. I sought representative quotes to illustrate the collective voice of participants (Rousseau, 2001; Thompson & Bunderson, 2003), as well as counter-examples to explore contrast and nuance in the data. I have included Table 4.2 as an example of the codes and themes that emerged from data analysis.

4.6 Findings

The analysis of the data highlighted the key relationships and expectations that TN Promise students have of stakeholders in their postsecondary success. In addition to perceived exchange relationships with on-campus actors that are consistent with prior literature, TN Promise students perceive role-based and extra-role contracts between themselves and the state with tnAchieves, campus actors, and their parents serving as mediating agents of that exchange (Figure 4.1). Exchanges with the state and a non-profit college access organization have not previously been documented, and I explore the ways in which expectations for these agents may illuminate shifting expectations for parents in the tuition-free scholarship program context.

4.6.1 Exchanges with the state and its affiliates

Across all focus groups, TN Promise students clearly articulated their perception that they are party to an exchange agreement with the state. The foundational terms of the exchange are such that students contribute community service and hard work for the cost of college. These role-based terms are in line with the explicitly defined eligibility criteria for the TN Promise, which has requirements for community service completion, enrollment concentration (12 credits per semester), and a minimum cumulative GPA. Evidence of student understanding of these terms arose as students discussed the architecture of the TN Promise scholarship program. One

community college student summed up his explanation of Promise by stating, “When you're making grades…making good enough grades, you can get [state] scholarships.” This student conveys that the state expects dedication to education on the part of Promise scholarship students, and in exchange has agreed to pay for college. Students also cited completion of community service as a key term of their exchange agreement with the state. A technical college student described the effort necessary for him to maintain eligibility for the Promise: “You do the community service, and that's it. You're basically done.” This student articulates that for him the most salient contract term to maintain scholarship eligibility is the completion of 8 hours of community service per term. The other requirements, such as maintaining full-time enrollment and satisfactory academic performance, represent important undertakings but may not be perceived as burdensome because of their likely inclusion in any contract students enter when enrolling in college independent of a scholarship program.

Students’ comments conveyed that full-time enrollment, satisfactory performance, and community service completion are fair terms for their contract with the state. One technical college student summed up all of the requirements and assessed the terms stating, “Well, I have the TN Promise, which that pays for everything. You have to have over a 2.0 GPA. You have to have eight hours of community service every trimester…that right there is pretty easy for me, so…it's a good deal.” A community college student made a similar expression regarding the explicit terms of the scholarship, “I mean, the eight hours community service, it makes up for itself because you're getting free schooling.” Students continually reiterated that the state’s commitment to fulfill the terms of the scholarship made college free. Some, in expressing their interpretation of the fairness of the terms, cited that attending college tuition-free was fair at least partially because it was far beyond what most prospective college students could reasonably

expect. One community college student articulated this sentiment, saying, “I feel like since I'm attending here for free…all I did was like community hours, eight hours, which I think is not bad at all. I mean, they are holding up their end of the bargain here, and I feel like it's really helpful, especially if you don't have to pay, like most people do.” Through expressions such as this one, and others that cited that the typical cost of college can be a deterrent to apply or make it difficult to remain enrolled, students demonstrated their appreciation for the terms of their exchange relationship with the state.

There was some variation as to the perception of the fairness of the scholarship program architecture. Some students felt that the state was giving money to individuals who did not hold up their end of the exchange of hard work for scholarly funds. One student pursuing an associate’s degree at a four-year college explained:

> *See, I think it's kind of annoying, because like I feel like if you are getting good grades and you get the HOPE [scholarship], you get less [Promise money]. Well, you don't get less money, but like you don't get the full 2,000 [dollars of Promise scholarship money]. But if you are making bad grades, you get 2,000. So you get the same amount of money for lower scores.*

This student expressed that she feels short-changed by the “reduction” in Promise dollars received because her HOPE (merit) scholarship dollars are applied to her bill first. This frustration that the last-dollar architecture of the program discounts the prior efforts of Promise scholars was expressed by roughly 10% of participants in the sample, though typically with a less nuanced and intimate knowledge of the logistics of financial aid than showcased by this savvy participant. Notably, it was primarily students in focus groups at a four-year college who expressed this sentiment. It is possible that this pattern arises from discrepancies between the framing of the program as making college “free” and the financial reality faced by Promise students who attend a four-year college for their associate’s degree. Though TN Promise allows

students to enroll in associate's programs at four-year public colleges, students who choose this arrangement are advised that scholarship funds will not cover their entire bill. Rather, when students enroll in an associate's program at a baccalaureate institution, the state will only pay up to the same dollar amount as their charges would be at a two-year institution. While this variation was evident in the data, the overwhelming sentiment of participants was that the provision of Promise scholarship dollars was done in a just manner.

In fact, students expressed that the appealing role-based terms of the contract make it difficult to turn down. Participants voiced the impression that TN Promise may encourage students who would not otherwise attend college to go, even if they might not be successful. One community college student summarized his sentiment in brief, "If you're getting two years for free, like why wouldn't you?" Students articulated that the Promise scholarship may induce students who are at the margins of enrollment to matriculate at community or technical colleges because they find that the scholarship provides them with greater financial access. One community college student articulated, "I feel like some people don't want to go to college because they don't want to pay for it. So, [Promise] encourages more people to go." This comment conveys the impression that the Promise scholarship is contributing toward the state's goal of greater postsecondary attainment by expanding the pool of individuals who endeavor to earn a postsecondary degree or credential.

However, access does not necessarily beget success. Students expressed that, given the expectations for students in the exchange, the TN Promise contract might not be suitable for everyone. One community college student's description of the terms of the contract captures the sentiment that while TN Promise is open to all, it might not be attainable for all:

> *There's like a million steps, but the list of criteria to have it was pretty simple. Live in Tennessee. It might be 2.0 or 2.5 GPA to maintain it. And you have to…take a minimum*

> *of 12 credit hours. You have to go to college right after high school, and you can't take time off. You have to get your associate's done quick to maintain it. So, it is only for the motivated.*

This comment demonstrates that students recognized the TN Promise scholarship as a contract they entered into an individual basis with the state that proves to be suitable for some individuals but not for others. As students who enroll and would not have otherwise, they may find that the provision of financial support is not sufficient to guarantee their success in college. This realization may contribute to the development of additional extra-role terms of the psychological contract, which I discuss in further detail below.

In addition to expressing that the explicit terms of the contract are fair, students also expressed that they feel that they are making substantive contributions by fulfilling their contract terms. This was particularly salient as they discussed their completion of the community service requirement each semester (community college students) or trimester (technical college students). Students expressed that they were contributing to the betterment of their communities and the state through service, as captured by the words of one technical college student:

> *Because the state's giving you something for free. Not really for free, because you're helping out. But I mean, you've got to do something. It's a whole lot better than getting it handed to you basically. You still have to do something prior to helping it like expand — help other people within the state. That's why they call us the Volunteer State.*

In this comment, the student expresses that through the exchange of community service for college tuition and fees, individuals are able to help others in their community and embody the ethos of the state.

4.6.2 Extra-role terms of the exchange

TN Promise students also articulated expectations of the state, postsecondary institutions, and tnAchieves to support their college success that go beyond the provisions of the TN Promise

scholarship program. When asked about their likelihood of success and the structure of the program, first-year TN Promise students articulated requests of the state and its partners that included additional financial (books, supplies, transportation costs), academic (additional advising, tutoring, and technological resources), and logistical (e.g., shuttles between satellite campuses) supports. The nature and framing of these requests suggests that TN Promise may have reshaped or made more salient the expectations that students have for the state and their postsecondary institution of active, multi-dimensional contributions to their successful attainment of a postsecondary degree or credential.

Most frequently students expressed that to make college "free," the state should cover ancillary expenses or services related to college success. One such expense was transportation to/from campus and between campuses. Students articulated that commuting is expensive and sometimes untenable, particularly in remote counties. A number of students expressed that the state should cover transportation. One student attending a satellite branch of a rural community college captured this view when she suggested a way for the state to satisfy this expectation: "If [the state] had like -- if they could pick you up at one of these schools that they have, that would be useful. Like it can -- at least you can get to one of the stops, then you can make it to [campus across county]. I think that would be really useful." Other students presented the related solution that the state provide funding for gas money in order to satisfy the expectation of facilitating attendance by subsidizing their commute.

Students most frequently recommended that the state pay for textbooks in order to satisfy the contract term of support for student academic success. Students commonly cited semester book expenses of 400 to 800 dollars, depending on their discipline and enrollment concentration, and the sentiment that the state should cover these costs was commonly expressed across

community colleges and four-year campus-based associate's degree programs. Coverage of books was seen as a relevant piece of the postsecondary success puzzle and a fair thing for the state to cover, particularly for students who draw on federal and other state funds and get very little from Promise's last-dollar coffers. One community college student articulated this perception of a more appropriate balance of Promise accounting:

> *And it's like -- like if Promise is kicking in heavily on your tuition, then yeah, I can see not covering books then. But my Promise is only covering like $282 and not even that now. It's less than that now. So, it's like $2,000, man. We can -- You know, $500 for some books that you know. It's there. School-related.*

Relatedly, some students expressed that the state's fulfillment of the Promise contract was not as generous as expected, particularly for students who attend four-year institutions. Students articulated that they expect clear communication on the terms of the agreement as they enter into a psychological contract with the state. A four-year college-enrolled Promise student expressed distaste for the opaque presentation of terms: "Clarify that if you are going to a four year university and you get the HOPE, as well, you are not getting $2,000 extra dollars. Because that was never straightforward. Ever. Like we had to figure that out." This student's emphatic comment conveys a strong reaction to a perceived violation of the anticipated financial terms of the psychological contract. Based on the perceptions of this student and others across campuses, it appears that marketing for the scholarship may be getting in the way of communication about how funds are allocated and what students can expect to pay. This confusion is rooted in the complexity of communicating the specific terms of the contract to a group of students when the financial support that they receive is determined on an individual basis. The differences in the financial backgrounds and experiences of students is captured in this brief exchange between two community college students:

> *P1: Financial aid was all [I needed] -- it paid for everything pretty much.*

P5: Didn't for me. I don't have enough scholarships for that.

When I explored these differences in the context of focus groups, it emerged that there were differences in the perceptions of generosity of the program that were rooted whether or not students were eligible for federal grant aid, which forms the basis for how much state aid students receive. This was a particularly stark contrast when students were eligible for the maximum Pell grant, in which case they received a refund check from their institution so that they could put those federal dollars toward related educational expenses. One community college student articulated her experience, which was echoed in focus groups across the state: "I was being able to pay for my books [with the Pell] refund…I [was also able to] to pay for like other stuff like food and stuff and school supplies that I need." For those students with a Pell Grant refund, coverage of the cost of books and transportation were key to feeling financially stable and prepared to succeed in college. The framing of college as "free" combined high transportation and supplies costs left non-Pell Promise students feeling that the state had not fulfilled a term of their exchange agreement.

Students also communicated that the state's investment in their postsecondary success should include more attention to their preparation for college-going and scholarship eligibility maintenance. Many students articulated that they had little prior knowledge of postsecondary education and that it was difficult to navigate the college and financial aid application processes without that knowledge. While the partnership between the state and tnAchieves gave them access to opportunities to learn and prepare, it was commonly expressed that more preparation was necessary to encourage student success. In a discussion of the state's postsecondary attainment goals and how Promise was enabling students to contribute to achieving them, one

student's comment captured the types of knowledge and experiences that students thought should be a part of the Promise experience:

> *I'll just say definitely preparation. All forms of preparation from advising, to what the homework's going to be like, to what the environment's going to be like. Mandatory [experiences] like you've got to tour five colleges your senior year before you can get the scholarship, and you have to do this, do that. Just definitely more preparation things.*

Overall, students expressed that they believe that the state's role in their exchange relationship was not limited to the provision of scholarship dollars. Students articulated beliefs that Promise should support them financially beyond the last-dollar provision of the scholarship, as well as through supports that would contribute to college success and gainful employment. When pushed on how such supports should be provided, it was clear that students saw other stakeholders as mediating parties to the exchange between themselves and the state. In particular, students represented the fulfillment of extra-role terms as being the responsibility of campus actors or tnAchieves.

4.6.3 The institution and tnAchieves as mediators of extra-role exchange terms

Students' discussions of resources and their experiences indicate that they perceive themselves to be party to an exchange relationship between themselves, their institution, tnAchieves, and the state. Faculty, advisors, and other campus staff mediate campus-based components of the exchange between students and the state. tnAchieves plays its part in facilitating fulfillment of terms of the exchange through via in-person meetings, electronic communication from professional staff, and electronic communication volunteer mentors. One student's description of the roles of these various actors captured the balance of responsibilities:

> *tnAchieves, they contact me numerous times, because they always like keep track, like 'Hey, make sure you're doing community service. These are opportunities that you can volunteer at.' They're just like making sure that I'm on track with my courses and hours*

that I'm getting for class…And then here on campus I know that financial aid will like talk to me. 'Hey, this is a form that we're missing,' or just like other offices, they would like say, 'If you would like to help to volunteer here,' or 'If you wanted to like join [a club]' things like that.

This student articulates the division of tasks between on-campus and off-campus exchange partners. By serving in these capacities, tnAchieves and campus actors fulfill terms of the psychological contract between students and the state.

The examination of undergraduate student psychological contracts has historically focused on individuals within the formal boundaries of the institution. Evidence suggests that students' most salient exchange relationships were with individuals on campus because campus actors were in most frequent contact with students (Knapp & Masterson, 2018; Koskina, 2013). Similarly, I find evidence of the importance of campus-based relationships in the data, as students articulate what they expect and receive from faculty, advisors, and staff.

Students expressions that on-campus actors are facilitators of a distributed exchange between themselves and the state go beyond previous evidence of the student-institution relationship that centers on terms related to classroom and advising center role-based exchanges. Campus actors help students to fulfill their contract obligations and deliver on promises made by the state. One example of student role-based term fulfillment facilitated by extra-role action is the opportunities that campuses provide for students to complete their community service hours on campus. One group of students discussed the abundant on-campus opportunities to fulfill this important term of their contract with the state:

P4: And we have people on campus that can help…find places to do [service], too.
P3: Yeah.
P5: Don't they have that checklist on one of the boards somewhere, and it's like 'Community Service Suggestions'? I saw that somewhere.
P4: You can do them in the library. We have a pantry that like stores food, a garden.
P3: The food pantry, they always need help. So, if you ever need service hours.
P4: We have a lot of on campus community service.

Across campuses, I observed flyers and heard students articulate that campus offices provide opportunities to perform community service so that students could remain Promise eligible. In this way, these on-campus actors were taking extra-role action to facilitate students' fulfillment of their role-based obligation to the state as Promise scholars.

Students expect campus actors to fulfill extra-role terms on behalf of the state. One common example is the expectations of campus actors' ongoing commitment to helping students find stable employment. Technical college students in particular emphasized the role of their faculty members in ensuring that their commitment to earning a credential resulted in gainful employment after graduation and into the future. A discussion among three students of future contact with their teacher captures this sentiment:

> *P3: I [can] text my teacher, ask if I need a job. He'll let me know if there's a job opening. Or even if I don't text him, he'll just let me know what's going on. I'll send him how my job's going and even when I graduate, let him know how it's going for me, so --*
> *P1: Mhm.*
> *P4: Definitely. [In the future, I'll] tell him how my career's going, and see if he can find me a better job.*

These three students in various technical training programs articulate the widely held expectation that instructional staff on campuses would take an active role in facilitating the fulfillment of the extra-role term of helping students secure post-graduation employment. Students across the state articulated the expectation that they would access better employment opportunities and that key actors would support them in securing such opportunities. It is possible that these employment-centered extra-role terms were shaped by the state's framing of TN Promise or on-campus admonitions about student commitment to skill and knowledge development. This expectation is well aligned with the state's individual prosperity and economic development motivations for such a generous commitment of resources to individuals pursuing postsecondary education.

Previous analysis has primarily identified family and close friends as the key off-campus exchange partners in undergraduate students' psychological contracts (Knapp & Masterson, 2018). However, this analysis supports the notion that tnAchieves, a non-familial off-campus actor, plays a key role in facilitating the student-state psychological contract. tnAchieves communicates with students at least once per week with an informational email, and often more frequently depending on upcoming eligibility deadlines and relevant temporal reminders to encourage student academic success. Through these electronic exchanges, tnAchieves has become more proximate, perhaps shaping student perceptions of who constitutes their closest advisory contact.

tnAchieves is relationally closer to students than the state, but perhaps still more distant than campus actors. When I asked focus group participants what tnAchieves could do to contribute to their success, oftentimes students' responses suggested that they believed tnAchieves to be a mediator between themselves and the state. One community college student's definition of tnAchieves captured widespread imprecise conceptions of the organization, "I don't really know who they are. I just know they're the bridge between me and TN Promise." While students did not necessarily know the particular boundaries between tnAchieves and the state, they had firm beliefs in tnAchieves' role in mediating that divide and facilitating their success. One community college represented a common conceptualization of tnAchieves' role when he said "There's two Ss in college, support and studying…It's my job to do the things I need to do [to graduate]. But yet it can also be [tnAchieves' responsibility] just to sort of guide the pathways." This student articulates that an important term of the student contract with the state is putting forth effort to be successful in the classroom. One of the extra-role terms of the student-

state exchange, in turn, is that key actors, such as tnAchieves, support students' current and future success.

Students across campuses and institutional sectors were quick to identify the ways in which tnAchieves fulfills its role as a mediator of the student-state psychological contract particularly by providing timely information about college success via text message and email. Students expressed perceptions of the importance of contact from tnAchieves. Many students articulated the sentiment that, "If it's tnAchieves, I usually do open it, because I'm like thinking it's probably going to be important." Beyond being important, students' comments about tnAchieves' communications acknowledge the helpfulness of message content and its role in the fulfillment of the psychological contract: "If it's from tnAchieves, I usually read [the email] right then because it's from them, and that's someone that's helping me, trying to make sure that I'm on track." Students articulated that tnAchieves is not only the provider of logistical information about Promise and college; students recognize the central role that tnAchieves plays in their continued scholarship eligibility.

Frequency of contact blurred the lines between the responsibilities of tnAchieves and campus actors in facilitating fulfillment of the terms the student contract with the state. The blurring of roles and expectations between tnAchieves and campus actors was particularly salient in an exchange between two students who expressed that tnAchieves should engage in more personalized academic advising:

> *P2: [tnAchieves] should also like give us classes that we need to take. Proper classes that we need to take for our major.*
> *I: So, some advising that's specific to your campus?*
> *P2: Yeah.*
> *P4: Someone advising to like make sure that we are taking the classes that…like what we want to try to do later on in life.*

The role that students expect tnAchieves to play is one that is traditionally played by academic and career advisors on college campuses. Undergraduate students are often required to communicate with campus-based advisors once per semester, typically as they determine subsequent term course plans. It is possible then that tnAchieves is in touch with students more frequently, albeit likely with less personalization, than campus advisors. It is possible that the nature of communication from tnAchieves has blurred the lines between the roles of campus advisors and tnAchieves staff, and that communication frequency has made tnAchieves a more proximate actor for whom students have higher expectations. Consequently, students may perceive that campus advisors and tnAchieves have similar roles in mediating the fulfillment of contract terms.

Students articulated that tnAchieves and on-campus actors are key parties to their exchange relationship with the state and serve to shape and manage the terms of the psychological contract. While the contract was initially articulated by the state through its marketing and communication during their senior year of high school, students conveyed a belief that their engagement with campus faculty, advisors, and staff and tnAchieves as matriculating and enrolled students served to define the terms and boundaries of their psychological contract. Like in previous research, this indicates that students perceive the contract as being facilitated through the student-institution and student-tnAchieves relationships (Koskina, 2013). Along the dimensions that these key mediating actors could satisfy the terms of the psychological contract between students and the state, the state became a less salient contractual partner. When terms of the exchange went unfulfilled, students articulated frustrations of breach of contract by the state and proposed solutions whereby more the proximate key actors could rectify the violation.

4.6.4 Expectations for parents

In the context of the TN Promise scholarship program, expectations for tuition and fee payments reside squarely within the role-based terms of the student-state psychological contract. Outside of a tuition-free college environment, students traditionally expect financial support of this nature to come from their parents. TN Promise student perspectives on the expectations they have for parent support of college-going and success suggest that the terms of the undergraduate student-parent exchange relationship are different in the Promise context.

In fact, many students articulated that in the Promise era, their parents expressed reticence to pay for college whereas they had previously expressed willingness to do so. One community college student's comment captures this broadly articulated position, "They said if I didn't get the two years free then I was paying for all four, so I was like, 'Yes, ma'am.'" This student and others in associate's degree programs across the state expressed that their parents told them they were not going to pay for the first two years of college. Without a state-funded last dollar scholarship, parents taking such a position would be likely to dissuade students from enrolling. In the Promise context, however, the expectation of financial support for college became firmly associated with the student-state psychological contract and students hold different expectations for the terms of their exchange with their parents/guardians.

On the occasions when students referenced parental financial support as an expectation, it was with regard to a source from which they received funds to pay for books. Among the entire sample of focus group participants, it was equally as common for students to articulate the role that the state should play in covering these costs as for students to express an expectation for parental support. Roughly one quarter of participants expressed that they did not receive any financial support from their parents for school.

However, students had other expectations for parental support during college. Parents of Promise students generally satisfied student expectations of support through socio-emotional and logistical support. One student shared:

> *[My parents have] been a great support. They were just like, 'Okay, you know, you've done it already. You can do it again. You can get your classes done and everything,' so you know, 'You've got this.'...And I'm just like, 'Okay, I know my family, and my coaches, and my friends, they all are on this ride with me.' So I mean, that's good for me.*

Rather than being identified as the primary funders of the collegiate experience, as found in other qualitative and quantitative studies, Promise-receiving students identified their parents as supportive agents. This was a common expectation and pattern of contractual fulfillment, that parents would "[ask] me how it is, how I'm doing in class. Just making sure I'm still doing good, and I'm liking it."

In addition to socio-emotional support, students also expected parents to dedicate time and energy to ensuring they successfully navigated the logistics of college. Parents were cited as exchange partners for terms such as the commute to campus, financial aid application tasks, and keeping track of deadlines. One technical college students expressed the expectation of a daily ride to campus (and implied current fulfillment of that expectation) when she shared, "I have transportation issues...So currently I'm dependent on family to take me [to class]." When conversation turned to FAFSA completion and verification or enrollment paperwork, many students were quick to volunteer the role of parents in managing that aspect of the college experience, as captured by one student who when describing FAFSA completion and verification stated, "I didn't even do it. I had my mom do all that."

While many students expected parents to fulfill logistical dimensions of psychological contracts to support their success as students, others expressed a clear disapproval of such expectations. One student captured this sentiment saying, "A lot of people are babied, I think.

And the more you're babied, you're going to have to put some big boy pants on and get out there." Another shared that, "A lot of [my peers] just come out of high school still with that, 'Oh, mom and dad will do that for me' mentality, or whoever."

Students articulated that parents offered their socio-emotional and logistical support in exchange for postsecondary and career success. Frequently, student expressions of their parents' expectations of college success were couched in terms that demonstrated their role as a trailblazer for the family. Two rural community college students shared:

> *P3: I [am] the only one in my family that's been to college, so they're all like saying that they're very proud of me because I'm actually doing something with my life. So like no one else in my family has like -- they've all wanted to go, but they never actually did it. So that's motivated me.*
> *P2: I can relate to her, yeah. Everyone in my family is like -- they're expecting me to go high.*

TN Promise students interpret their parents' expectations for their postsecondary success as being terms to an exchange agreement through which they receive non-tuition financial, socio-emotional, and logistical support for college. The content and nature of the student-parent exchange agreement may shed light on the way in which the Promise context shapes the expectations of students for their parents/guardians.

4.7 Discussion

In the context of Tennessee's state-sponsored free college program, students articulate expectations of the state and affiliated organizations that go beyond the defined parameters of the scholarship program. At a foundational level, students articulated exchange relationships through which they contribute their hard work and community service in exchange for not only for tuition-free college enrollment, but also for support services that would ensure their successful completion of a degree or credential and a smooth transition to the workforce. These

expectations indicate that students perceive themselves to be party to an exchange agreement with the state that goes beyond the explicit parameters of the TN Promise scholarship.

When pushed to articulate how these expectations are or should be satisfied, students spoke of the actions of faculty, advisors, and other college staff, as well as staff from the state's non-profit partner tnAchieves. Through their descriptions of their relationships with these key actors on and off campus, it is clear that these individuals serve to mediate the psychological contract between students and the state by fulfilling extra-role expectations for the Promise scholarship experience and outcomes. Students' role-based expectations for faculty and other campus staff are fairly consistent with the prior literature. However, Promise students expressed career development-related expectations of instructional and advising staff that might indicate a broadening of expectations relative to prior literature. These career-focused expectations may be rooted in the Promise program's framing as a tool for individual advancement and statewide economic development. These findings extend prior work that focuses on psychological contracts between students, professors and staff, and the institution. The existence and parameters of an exchange relationship between students and the state extends the web of parties to undergraduate students' psychological contracts beyond those contracts with campus actors that are explored in the previous literature.

Students' conceptualization of the state as an important actor in their college experience is distinct from previous interactionalist views of college engagement. Tinto's (1975) student integration model and related subsequent research (e.g., Bean & Eaton, 2000; Braxton, 2000; Napoli & Wortman, 1998; Wolf-Wendel, Ward, & Kinzie, 2009) have established the importance of the academic and social experiences in the collegiate environment. Interactions with on- and off-campus actors inform student perceptions of postsecondary education and,

ultimately, their performance and persistence. This study explores evidence that TN Promise scholarship students, whose interactions with high school and campus staff and personal relations are supplemented by communication and support from the state and its partners, identify the state as an important exchange partner with particular responsibilities for their college access and attainment.

The perception of the state as an exchange partner and actor in the college experience may be unique to the context of TN Promise, in which state and non-profit partners are quite active in the dissemination of information and support of students. By continually tying postsecondary opportunity and experience to the state, TN Promise, and the Drive to 55 postsecondary attainment campaign, the state of Tennessee may emerge as a more present and salient actor for TN Promise students than for students in other state-sponsored scholarship programs in Tennessee and across the country. Additional research on student perceptions of the funder in other state, regional, and local scholarship programs would lend insight into the generalizability of this finding to other contexts.

As we consider the implications of the range of expectations for the state that students articulate, we might ask whether Promise students truly expect the extra-role terms of their contract to be fulfilled. Prior literature has interpreted student expectations as deriving from the role of students as customers (Koskina, 2013; Longden, 2006; Prugsamatz, Pentecost, & Ofstad, 2006). In their study of undergraduate students expectations for teaching, Sander and colleagues (2000) leverage the customer-oriented literature around ideal, predictive, and normative expectations. Ideal expectations are those terms that the customer would like to occur, whereas predictive expectations are those terms that the customer assumes are probably going to occur. Normative expectations are those terms that the customer comes to expect because of service

provision by other similar providers (see Prakash, 1984; Thompson & Sunol, 1994). In the case of TN Promise students, their expressions of extra-role obligations of the state may be ideal rather than predictive expectations. For instance, when students speak of the provision of campus shuttles or gas money for their commute, they may not believe that this term of the contract is likely to be fulfilled, but rather hold the provision of this service as an ideal for state satisfaction of the Promise exchange agreement. When students articulate expectations that the state will cover the cost of their textbooks, this may again be an ideal expectation or, alternatively, a normative expectation that forms as students observe their peers leverage federal Pell refunds pay for their textbooks with financial aid dollars. As students are increasingly viewed as stakeholders or customers in higher education, institutions and college systems may find success by undertaking research that examines student expectations for institutional services and the roles of on- and off-campus entities (following Zeithaml et al., 1990; Sander, Stevenson, King, & Coates, 2000).

Students' role-based and extra-role financial expectations of the state are costs that are commonly covered by parents of young adult undergraduates. In the present study, students' expectations for parental support centered instead on socio-emotional and logistical supports, with some students citing support from parents for books and transportation. Students express that in exchange for their hard work on academic- and career-development related tasks, their parents (and family members) encourage them and facilitate their completion of forms and other logistical tasks required for enrollment. Like in prior literature on the employee-employer and student-institution relationships, students articulate that they fulfill terms of multiple psychological contracts (student-state, student-institution, student-parents) through their hard work on academic- and career development-related tasks. This "many birds, one stone"

orientation toward student exchange relationships implies that students make meaning of the ways in which their efforts to be earn a degree or credential and enter the workforce serve the expectations and needs of multiple parties.

In the previous literature, parental willingness to pay and financial support of college going emerge as important factors that predict both student enrollment and success (e.g., Flaster, 2018). The perspectives shared by students in this study suggest this may not be as salient for TN Promise students. Thus, it seems that the context of a publicly funded tuition-free scholarship program constitutes an important distinction between this study and prior research on financial expectations for college-going. This is early evidence that, when the state covers students' tuition and fees, students' expectations for parents may be different than contexts in which parents are partners in the financial undertaking of college financing.

Federal financial aid calculation assumptions have established a system of parental postsecondary financial obligation. Parental financial support is not only common, but also necessitated, de facto, by the federal financial aid process: parental contribution to undergraduate education expenses is one of the main assumptions undergirding federal financial aid policy. When dependent young adults apply for federal financial aid, the FAFSA collects information on their parents' earnings and assets in order to generate a picture of the family's "financial strength." This picture determines whether and how much federal aid a student qualifies to receive and how much a student and their family should expect to pay for college overall (Federal Student Aid, n.d.).

4.7.1 Limitations

This study has several limitations. First, the institutions at which I conducted site visits and the students with whom I spoke constitute a purposive sample. While I selected institutions of varied geographies and sizes and worked with tnAchieves and campus administrators to recruit a range of Promise scholarship students, there are limits to the generalizability of my findings. Although I took care in developing the protocol and recruiting participants, it is inevitable that there is some selection bias due to the decisions that I made regarding our line of questioning and recruitment. Although I endeavored to offer equal opportunity for participation for all TN Promise students, the timing of the focus groups may not have been feasible for all students, and students self-selected into the sample. Additionally, the framing and balance of questions contributes to selection bias. Nonetheless, my intentionality in the development and facilitation of the focus group protocol and recruitment of participants gives me confidence in the emergent picture of the overall experiences of TN Promise students.

By facilitating focus groups, I made the strategic decision to generate a group discussion around each question. In doing so, I was able to draw from the experiences of a group of students at each campus, rather than focusing in-depth on the experiences of one or two individuals. However, there are limitations of focus groups relative to in-depth interviews. Focus group participants may not feel comfortable expressing unpopular opinions or potentially embarrassing experiences in front of peers. It may also be difficult to ensure that focus groups capture the perspectives of underrepresented or hard-to-recruit individuals. The nature of the data and analysis may contribute to conclusions about individual perceptions and beliefs being made based on trends observed in group discussion. Nevertheless, focus groups are better suited the goals of the study for a number of reasons. Focus group participants may be more candid than they would be in a one-on-one setting, in which they may be more inclined to respond in a way

that they believe will please the interviewer. Additionally, focus group participants can build upon one another's ideas to construct a detailed picture of the student experience. When participants have contrasting experiences, the interviewer can probe consensus or lack of consensus on topics of interest.

This study is unlike other recent studies of psychological contracts in that I did not explicitly use the term contract or agreement in my questions of students. Rather, the conceptualization of exchange agreements was derived from the language of "agreement," "deal," "bargain," and "expect/ation" that students used in their responses to questions about actors in their college experience and their expectations for college. This limits the degree to which the nature, content, and boundaries of these perceived agreements can be interrogated. Nonetheless, I find consistent, emergent themes related to exchanges between students and the parties discussed throughout the paper. The lack of contract-specific language in the framing of questions reinforces my confidence in the validity of the results. Also, establishing exchange relationships with on-campus actors is likely to be tied to engagement on the part of faculty, staff, and students. Some students may be more inclined to form extra-role expectations of on-campus staff, and the participants in the study may not be a representative sample.

A couple of limitations arise due to the sampling strategy for this study. By facilitating focus groups in the spring semester of the first year, I focus on the experiences of students who successfully enrolled in college and persisted to the second term. Consequently, I do not capture the experiences of prospective students who ultimately did not enroll, as well as students who did not persist to the second semester. The intent of Promise programs is to lower barriers to postsecondary entry and attainment for students at the margins of enrollment. The data in this study may not capture the perspective of these students, and, thus, cannot represent a full picture

of the perceptions of psychological contracts on the part of prospective and current TN Promise students. Given the existing literature suggesting that failure to fulfill terms of psychological contracts contributes to lackluster performance, future work exploring the psychological contracts of Promise students should make efforts to recruit non-enrolled students and those who enroll in the first semester. Additionally, in this study I did not focus explicitly on the experience of students through the lenses of gender and race due to the small sample size. Students' backgrounds play an important role in their postsecondary experiences and perceptions of exchange partners, and thus are likely to shape the formation and interpretation of any psychological contracts and contract fulfillment. Future research should focus in particular on the role of race, gender, age, socioeconomic status, and other student characteristics on student perceptions of the exchanges between themselves and key actors in their Promise scholarship experience.

This study, in the tradition of psychological contract theory, focuses on the "employee" perspective rather than both sides of the reciprocal agreement. Critics of psychological contract theory argue that both sides of the psychological contract offer relevant perspectives to the study of this phenomenon, and to study psychological contracts without both sides denies the assumption of reciprocity and relevance (e.g., Guest, 1998). I chose to focus on the perspective of students because, although it is time-intensive and costly to gather student perspectives, their experiences and opinions are invaluable to understanding educational and program outcomes. Student perspectives on this widely advertised and much-lauded program are important to the ongoing evaluation and strategic improvement of the scholarship program. In fact, municipal and state staff recommendations that aligned with sample students' extra-role expectations

contributed to the adoption of a book scholarship and transportation costs for one county's Promise students in the months after data collection for this study.

4.7.2 Implications and recommendations

The evidence in these data suggests that tuition-free college programs, like TN Promise, may upend assumptions about parental support embedded in federal financial aid policy. The state's commitment, de jure, to students through the TN Promise scholarship may reshape expectations that students have for parents that are rooted in the assumptions of federal aid calculations and cultural practice. In other contexts, students typically hold expectations for parental financial support, and parental willingness to pay influences student enrollment and success. In the present context of tuition-free college, students articulate expectations for parents that are more aligned with socio-emotional and logistical supports. When parental financial support is referenced as an expectation, it was by students whose parents have expressly committed to paying for their books and other supplies and costs. Among the entire sample of focus group participants, it was more common for students to articulate the role that the state should play in covering these costs than for students to express an expectation for parental support.

Consequently, tuition-free scholarship programs may reshape student expectations for the sources from which they derive primary supports (financial or otherwise) for college enrollment and success. Federal financial aid policy assumes that parents' ability to pay is the primary determinant of how much financial support children receive from parents. When another entity, such as the state government, steps in to pay the "last dollar" of a college tuition and fee bill that entity takes on the responsibility otherwise assumed by the parent or guardian.

This notion evokes the on-going discussion of *in loco parentis* and implications for the degree to which institutions of higher education and their agents stand in for the parent with regard to the physical and emotional welfare and development of students. The concept of in loco parentis, like the relationship between students and their postsecondary institutions, has evolved over time. Traditionally, this notion has applied to the student-institution relationship at residential campuses and campus regulations over student conduct and lifestyle. However, the concept of what type of educational experience is "college" has also evolved in recent decades to now include open-access postsecondary institutions, namely community and technical colleges. The parties and terms of the exchange relationships articulated by TN Promise students suggest that in a free college environment, students may make meaning of the state's financial role in such a way that suggests the state stands in for the parent beyond the parameters of the scholarship program.

This preliminary evidence of the reshaping of the student-parent and student-state relationships in a free college context holds important implications for students, policymakers, and practitioners. The student expectations and psychological contracts literatures both suggest that when their expectations for the Promise contract go unfulfilled, students may be less committed to postsecondary performance and completion. Lower levels of postsecondary success from Promise students would be detrimental to individual success and the state's economic development goals.

These data reveal straightforward opportunities for the state to either adjust its policies to meet students' expectations for Promise or to clarify the boundaries of scholarship provisions in order to ensure better alignment of student expectations and the legal terms of the scholarship program. The evidence provided in this paper suggests that the provision of a number of key

extra-role financial and logistical provisions would better align state action with student expectations. The provision of a book scholarship and transportation subsidy would better align Promise provisions with students' expectations for these financial supports. Further, these supports would better align with the "free college" moniker of the Promise program and, importantly, lift the burden of book and transportation costs from students. Indeed, Davidson County plans to implement the Nashville GRAD program to provide financial assistance and wraparound supports for full-time students pursuing higher education in the county. The program will offer financial assistance in purchasing textbooks, transportation, industry certification fees, and emergency needs for community college students or in paying for industry certification fees and tools and equipment for technical college students. These provisions align well with the expectations for the state that TN Promise students articulated in this study and provide a blueprint for how municipalities may supplement the provisions of state-level supports for college students.

Students also expressed an expectation that they would be able to seamlessly access all necessary coursework once enrolled on campus. Students whose campus of enrollment did not offer all of the necessary or desired coursework (e.g., lab sciences; foreign languages) expressed frustration that this expectation was unfulfilled. In order to better align provisions with logistical support expectations, the state should work with campus administrators to institute or expand shuttles between an institution's campuses within a county. Provision of services in line with these expectations may not only serve as a lever to improve student investment and performance by fulfilling terms of the psychological contract, but also by easing the financial, academic, and logistical burdens of college-going that complicate the lives and studies of postsecondary students.

TN Promise, like most other free college programs, covers only a small fraction of a student's total cost of attendance by paying for tuition and fees. Students and families with fewer financial resources are less prepared to cover other college costs and, under the last dollar architecture, receive less Promise scholarship funding due to coverage provided by the Pell Grant and other state grants. One of the current criticisms of the popular last dollar architecture is that the bulk of state funds are directed to middle- and upper-income students. Taking together the evidence provided here and equity-oriented considerations, the state may consider adapting its last dollar award architecture to accommodate a cost of attendance grant for Promise's least resourced students. A Promise program could both meet the expectations of students and combat this common critique by adopting a sliding scale grant or a hybrid first-last dollar approach to support student access to supplies and transportation.

If the program cannot support the additional capital required to provide book and transportation resources for low-income students, policymakers might consider instituting an income cap to redirect scarce funds from students whose families would otherwise be able to pay for college to those students with the most pressing financial needs (see Poutré & Voight, 2018). In this way, the state would reorient the program toward primary investment in low-income students.

If disinclined to change the architecture of the program to better serve less resourced students, policymakers may consider adjusting the language surrounding "free" college programs to more clearly depict the magnitude of financial undertaking that college will be for students and families. The straightforward messaging and eligibility criteria of TN Promise are a boon for their simplicity. The messaging that college is free may effectively expand access to students who would otherwise believe that college is beyond their reach. However, clarity regarding the

parameters of "free" and upfront discussion of the magnitude and frequency of other costs of college are equally as important as lowering initial barriers to access. Shifting language from "free" to "tuition-free" may be a first step in signaling to prospective scholarship recipients that they are likely to be responsible for costs outside of those covered through governmental financial aid. Collaboration between the state and school districts should focus on clear, consistent communication with students and families from middle or early high school regarding the costs for which they will be responsible. Postsecondary recruiters, advisors, and faculty, who serve as mediators of the distributed contract between the state and students, may leverage the picture of student expectations formed by this study's evidence in order to reshape students' extra-role expectations for on- and off-campus actors. As marketing materials from the state and individual institutions now frequently evoke the financial payoff of postsecondary credentials, states and institutions should continue to increase supports for academic and career advising to facilitate job placement for students and graduates.

Promise students may have lower relative cultural capital than business school students and graduate students, who constitute the samples under study in the bulk of the student psychological contracts literature. Consequently, these individuals may have more fragile trust in or differential expectations of public institutions. These differences may have implications for the content and strength of perceived exchange relationships. Future work may explore whether there are measurable differences in the nature and content of psychological contracts by background characteristics of the focal individual.

4.8 Conclusion

The changing structure, generosity, and language surrounding financial aid programs may shape students' perceptions of the role of government in providing access to higher education and supporting student success while enrolled. Promise programs represent a continuation of the evolution of the relationship between higher education institutions and the citizenry (Loss, 2012), and may, consequently, shape prospective and enrolled students' expectations for the state and those individuals who serve to mediate the student-state exchange relationship.

This qualitative study illuminates the perceptions of TN Promise scholarship students with regard to the obligations between themselves and various parties relevant to their postsecondary success. The emergent findings demonstrate the existence and content of psychological contracts between students and the state and its affiliate, tnAchieves, as well as more traditional exchange partners such as teachers, advisors, and parents. Previous literature on the exchange expectations of college students focuses primarily on psychological contracts that students perceive between themselves and on-campus actors. This study advances the literature by exploring the existence and terms of the student-state exchange relationship and offers evidence that proximate actors mediate the fulfillment of this relationship. These findings have implications for the provision of support services by postsecondary institutions and state and municipal scholarship programs, as well as for the framing of tuition-free "Promise" scholarship programs by their sponsoring entities. Continuing study of students' psychological contracts in the context of broad-access, tuition-free scholarships is critical to the success of individual students and fulfillment of program goals.

Table 4.1: Description of focus group sample

Sector	Urbanicity	Enrollment	Total Participants	Race/Ethnicity	Gender
Public, 2-year	Suburb: Large	10,000 - 19,999	9	Black/African-American (1); White (8)	Female (6); Male (3)
Public, 2-year	Suburb: Large	5,000 - 9,999	7	Black/African-American (1); Hispanic (1); White (5)	Female (6); Male (1)
Public, 2-year	Rural: Fringe	5,000 - 9,999	2	White (2)	Female (1); Male (1)
Public, Technical	Rural: Fringe	0 - 999	9	White (9)	Female (2); Male (7)
Public, 2-year	City: Small	1,000 - 4,999	3	Black (3)	Female (1); Male (2)
Public, 2-year	City: Small	5,000 - 9,999	9	White (9)	Female (5); Male (4)
Public, Technical	City: Large	1,000 - 4,999	6	Black/African-American (3); White (3)	Female (4); Male (2)
Public, 2-year	City: Large	5,000 - 9,999	6	Black/African-American (3); White (3)	Female (5); Male (1)
Public, 4-year	City: Midsize	10,000 - 19,999	6	Black/African-American (5); White (1)	Female (5); Male (1)
Public, Technical	City: Large	1,000 - 4,999	3	White (3)	Female (1); Male (2)

Note: Institutional sector and urbanicity are derived from IPEDS 2016-2017. Two- and four-year college sizes are derived from IPEDS 2016-2017. Technical college size is derived from THEC 2017 Factbook.

Table 4.2: Examples of data coding and theme formation

Example of Raw Interview Data	*Codes*	*Explanation of Codes*	*Theme*
"With my English teacher last semester, she was nice and all, but whenever she taught, we didn't really learn anything...We had to write a paper every time we were in the class, but we didn't know what to write about, and like we just fluffed a paper up and send it, and then we would get a 100. She wouldn't really like grade it."	Expectations of faculty	Students describe the role that faculty play and note discrepancies between reality and their expectations	Role of campus actors
P1: "My advisor is in [campus across the county], and I can't get [there]. So like okay, I guess I'll just have to figure this out on my own. P2: Then you have to go find another advisor or another person to help you, and then you end up swamping them...And I just wish they had an advising center on each, you know, campus or something strictly for that."	Expectations of advisors	Students express their expectations for the quality and accessibility of advising	
"If you have any trouble financially or with schedules or an advisor, you go to [head financial aid officer] and she'll help you...She pretty much kind of runs [campus]. She does everything. It's crazy."	Expectations of staff	Students describe the role that other campus staff (financial aid, administrative staff) play and how that aligns with expectations	
"I know [the college] -- at least I've heard they're like — one of the hang out areas, they're trying to make it more like open, and social, and better to where you can use it when it's winter, too. That's good for them to do."	Expectations of the institution	Students anthropomorphize the institution, referring to expectations of the college and actions taken by "they" or "them"	
"I would say [the state should offer scholarship help for] more than two years. That would be very helpful, too, because some people can't get other scholarships...I think that if it's available for older people that's been out of school, because I guess you have to go into college right after with TN Promise. Right after school. Like my mom, she wants to go back, but she can't because she doesn't have the money."	Expectations of the state	Students describe their experiences with the TN Promise scholarship program and ways in which the state could enhance program provisions to make them more successful.	Role of off-campus actors

"I would think having more [tnAchieves] meetings, like talking about discussing things, like how we're doing as a class, like a group, like consistently, cohesively…just having more meetings to discuss like ways we can come together, I guess, and increase our personal potential."	Expectations of tnAchieves	Students describe their communication and interaction with tnAchieves and the ways in which the organization could better serve them.	
"[tnAchieves] should just [check] in with the students and [make] sure that they're comfortable where they are with their classes and if they need help to come see them. Just a more kind of cordial or personal level with the student."	tnAchieves mediating the contract between students and the state	Student expressions of expectations for tnAchieves reveal perceptions that the organization serves as a mediator between themselves, as recipients, and the state, as the provider.	
"[My parents have] been a great support. They were just like, 'Okay, you know, you've done it already. You can do it again. You can get your classes done and everything,' so you know, 'You've got this.'...And I'm just like, 'Okay, I know my family, and my coaches, and my friends, they all are on this ride with me.' So I mean, that's good for me."	Expectations of family	Students describe their engagement with family members about college and the expectations that develop based on these experiences	Role of relational agents
"Me and my friends, like we would literally sit there [in] group chats and be like, 'Okay, hey, who does not get this? This is how I explained it. This is the video that I used to help.' And like we just all like one big family. (laughs) So when it came time for the exam, we were all prepared, and like we can all pass with flying colors."	Expectations of friends	Students describe the support they derive from relationships with their friends and the ways in which these interactions inform their campus experience	
"I have a mentor, and like he's been telling me good things...I have to have someone to motivate me. I can't just do it by myself, so I've been having a mentor help me. And he's not helping me with my like -- my assignments, but he's been telling me, you know, what his ideas are about it, and then it would just help me."	Expectations of high school and community	Students describe their engagement with networks in the community and how the fulfillment of this support role contributes to their success	

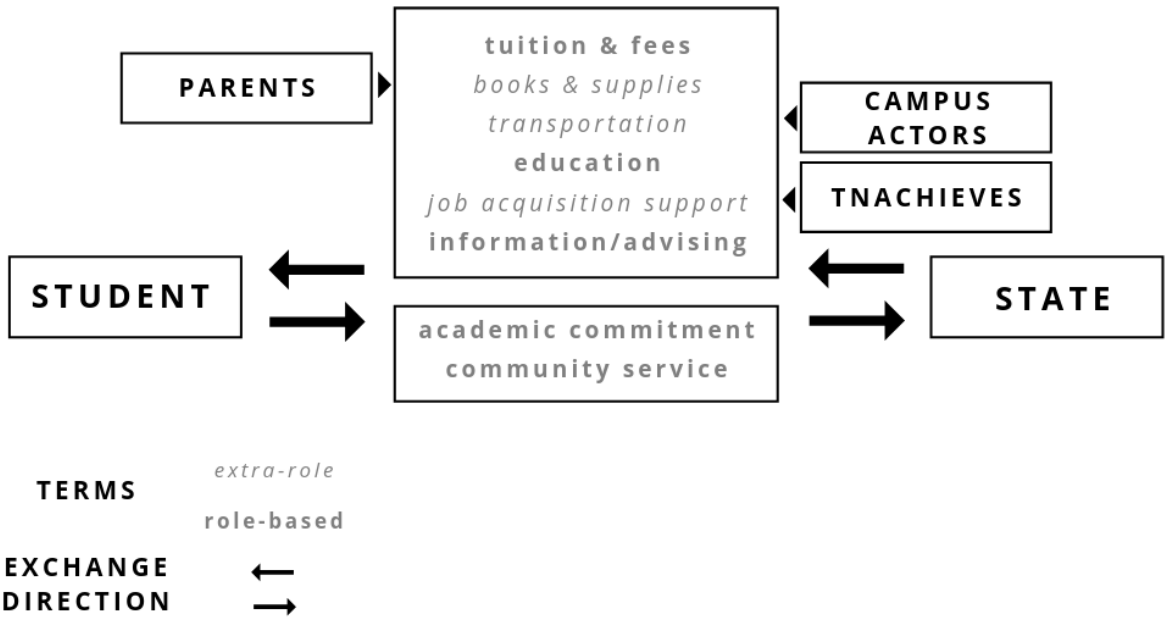

Figure 4.1 TN Promise students' psychological contracts with the state and key actors

The figure above represents the terms and key actors that students perceive in their psychological contract with the state under the TN Promise scholarship. Extra-role terms are represented in italics while role-based terms are bolded. Parents, campus actors, and tnAchieves mediate the relationship between the student and the state and contribute to the fulfillment of extra-role and role-based terms of the exchange.

4.A Semi-structured protocol for student focus group

1. Introduce researcher: former college counselor, now I study college transition and success
    a. Introduce assistants, if applicable
2. Introduce topic: Our topic is the transition to college and the resources and supports that you've used during the transition.
    a. The results will be used to inform discussions between community partners, like tnAchieves, your college, and the state in order to improve and expand resources available to better support student success.
    b. We are talking to first-year students because the transition is most recent for you.
2. Guidelines for our conversation:
    a. There are no right or wrong answers, only differing experiences and points of view
    b. We realize that you won't always agree with others; we ask that you listen and consider their experiences and how they are different and similar to your own.
    c. I am recording this focus group and I will use this recording for our analysis. When I write about my findings I might use direct quotes from this focus group but I will not identify you individually.
    d. We're tape recording, so please
        i. only one person speak at a time
        ii. state your name before you speak – this will help us when we transcribe the conversation later
        iii. turn off your phones -- if you cannot and if you must respond to a call, please do so as quietly as possible (outside of this room) and rejoin us as quickly as you can.
    e. My role as moderator will be to guide the discussion
    f. Talk to each other – ask one another questions, build on a peers' ideas, etc.
3. Introductions:
    a. Start by telling us your name and what you would like to do after college.
4. Key questions: *We're going to think about your transition to college in three time periods: before college, the time of enrollment, and your first semester*.
    a. *We're going to start by talking about information and resources that were important for you during your first semester.*
        i. Going to college is hard for many reasons. Are there things that made starting college easier or more difficult for you?
        ii. What took you by surprise/caught you off-guard about college?
            Probe to get at potential misconceptions about **cost, coursework, paperwork** *for enrollment*
        iii. Have there been things about your [academic/social] experience on campus that have been very different from what you expected? (What? How?)
        iv. Where do you get information that you need to be successful?
            What resources have you used here on campus to get the information that you need to be a successful college student?
        v. Do you meet with an advisor on campus? When did you first meet your

advisor? What are the benefits of advising? What else could your advisor be doing to help you?

Have you picked a major? Did anyone help you?

vi. Can you think of some ways in which [your high school counselor, tnAchieves, your college] communicates well with students and some ways in which they communicate poorly?

vii. Why do you think that so many students [don't make it to college/dropout]? What keeps you going? What has made you successful?

b. *For the remainder of our time, we're going to think about our experiences before you arrived at college. First, let's talk about information and resources you used <u>this past summer – June, July, and August</u> - when you were just matriculating in college.*

i. Many students who intend to go to college after HS graduation do not end up enrolling when the fall semester starts. Did you face challenges during the time between graduation and the fall semester?

ii. Sometimes it can be hard to get information when school is out. What information was most helpful during the summer between high school and college? Where did you get this information?

iii. What is the best way to communicate with students who are about the enroll in college? What will get their attention? What's the appropriate medium and frequency?

iv. Did you find tnAchieves helpful? What did you find useful? What did you find less useful?

v. What do you think could be done to encourage greater understanding of the college application and transition processes for high school students?

c. *Now we're going to roll back the clock even further. Think about yourself <u>at this time last year, or even last fall</u>. We're going to talk about the information you received and tasks you completed before going to college in order to get here.*

i. Where did you get information about college while you were in high school?

ii. What were the most helpful sources of information when [deciding whether or not to go to college / applying to college / applying for financial aid]?

iii. Was there information or a resource that you didn't have access to that would've been helpful?

iv. How do you determine which sources of information and support about college and career are trustworthy?

v. Thinking back to when you [applied to college/applied for financial aid/registered for coursework], how was the process similar to how you expected it would be? How was it different?

vi. Were there requirements or things that surprised you as you were considering going to college during high school?

5. Ending questions

a. If you were in charge of resources for first-year students on campus and could make one change that would make the transition better, what would you do?

b. Of all the things we discussed today, what is the most important?

c. If you had one minute to talk to the [your HS principal/president of your college/the governor] about the transition to college, what would you say?
d. Have we missed anything in our discussion today?

Chapter 5.

Conclusion

In this dissertation I answer questions related to the experience of students transitioning from secondary to postsecondary education in a free community college environment. The first paper considers who completes the FAFSA in a tuition-free college context and, importantly, does not subsequently enroll, in order to explore the characteristics and timing of attrition from the college enrollment pipeline. The second paper examines an informational intervention and student perceptions in the context of a statewide policy intervention intended to contribute to college affordability, equity, and economic growth. The third paper explores students' expectations of the state and its intermediaries in their postsecondary enrollment and success, connecting student perceptions to the literature on unwritten psychological contracts.

In this chapter, I briefly review the findings of each study separately and then in conversation with one another. I conclude by suggesting pathways for future research relevant to practice and policy in this area.

5.1 Discussion of results

The ever-increasing cost of tuition and disparities in college enrollment and graduation are widely debated public policy issues nationwide. Taken together, this dissertation contributes to the empirical literature on FAFSA completion, text messages as an informational intervention, and students' perceptions of the college transition, as well as our theoretical understanding of the postsecondary pipeline attrition and success particular to the tuition-free college context. The

conclusions of this work stand to inform the decisions of policymakers, as well as the work of high school advisors, community partners, and staff at postsecondary institutions, all of whom are invested in ensuring that students have the information and resources necessary for their success. This dissertation is timely, as more states are implementing or weighing the adoption of free college models.

This work has implications for interventions and research in this and other related areas. Findings related to departure from the TN Promise enrollment pipeline after FAFSA completion may inform communication with college aspirants during the senior year, as well as the way in which resources are allocated for student support during this important search and decision-making process. Time is a significant component of any individual's college enrollment decision, and this paper identifies various aspects of identity and circumstance that are related to time and loss of scholarship eligibility. The emphasis on FAFSA completion may be to the detriment of students who make it past FAFSA completion but who could benefit from higher-touch advising, career planning, and informational interventions during the remainder of the academic year and through the summer before college enrollment.

Low touch text messaging interventions may not be optimized through strategic behavioral framing, but informational messaging should be personalized to students. The differential effects of messaging frames for individuals along social dimensions suggest that there may be an advantage to targeting messages to students by particular characteristics. However, this text messaging experiment does not provide enough sufficient evidence on heterogeneity to make particular recommendations for the tailoring of informational interventions. It may be more productive to consider, for example, the ways in which various

personality testing paradigms could be leveraged to design a tool for determining the optimal messaging frame for delivering information to prospective students.

Students' perceptions of the state and its fulfillment of "promises" made, perceived as psychological contracts, can guide information dissemination and investment in academic and social supports for students during the college transition. The results of the qualitative study reveal that the messages explicit and implied in marketing for TN Promise are important not only to recruiting students, but perhaps also for retaining them. Promise programs of various shapes and sizes are being developed and implemented around the country. As architects and community members endeavor to bring postsecondary access and success to their communities and regions, the must keep in mind that the messaging and provisions are not just marketing, but constitute an important informational resource upon which "adolescent econometricians" (Manski, 1993) rely in order to make informed postsecondary enrollment decisions.

Access to and possession of information is critical to college achievement. Scholarly research on informational availability, advising, and peer and professional networks converge on the notion that information and social networks are important to an individual's postsecondary success. In the United States, the process of attaining a postsecondary degree involves coordinating decisions along many dimensions, including high school coursework, participation in extracurricular activities, saving for and financing postsecondary education, college search, college and financial aid applications, and postsecondary school choice. Successful navigation of this complicated system depends, in part, on assistance from knowledgeable adults. TN Promise students rely upon a network of trusted adults, both proximate and distant, in order to make their postsecondary enrollment decision and succeed in college. The state is an important actor in the postsecondary landscape in the era of Promise. Students perceive the state as an exchange

partner and member of their support network in reaching their ultimate goals of postsecondary attainment, job placement, and financial prosperity.

High school students with the fewest social and financial resources have less access to family members and friends who have experience navigating the postsecondary transition, as well as the expert help and mentorship of college counselors (Dynarski & Scott-Clayton, 2006; Hoxby & Avery, 2013; Hoxby & Turner, 2015). These students may lack access to information about postsecondary options, college finance, or pathways to workforce success. Without timely and accurate information on college application and financial aid, students may miss key deadlines in the application and enrollment processes, find themselves without sufficient resources to finance college, or may not apply to college altogether. The combined results of these dissertation chapters demonstrate the ongoing need to thoughtfully design, disseminate, and evaluate informational resources and other supports for postsecondary aspirants and enrolled students, particularly in contexts like Tennessee, where the bulk of high school seniors will be the first in their families to pursue a college degree.

The qualitative findings reinforce that the source from which information is received is also important to its effectiveness. Student perceptions of various actors and communication media reinforce the notion that "the wrong messenger can make the right information ineffective" (Baum & Schwartz, 2015, p. 42). Prior research has shown that students with access to multiple sources of credible information and support may be better equipped to make informed decisions (Iloh, 2018). Efforts by the state of Tennessee and its partners to lower financial barriers to college, encourage financial aid application, and eradicate college-going information deserts contribute to the democratization of higher education, but may fall short of their potential as of yet.

5.2 Future research

The findings regarding the hazard of eligibility loss after FAFSA completion raise alarm regarding supports for first generation students, students from historically underrepresented backgrounds in higher education, and racial and ethnic minority students. Qualitative study of the enrollment decision and process that follows college aspiring students who may be vulnerable to Promise scholarship eligibility loss from the beginning of senior year through the first semester of college may shed light on the relationships estimated by the discrete-time survival models.

The college enrollment decision of Promise students is also an important area that is ripe for future study. As states and localities continue to design, implement, and operate tuition-free college scholarship programs, qualitative and quantitative study of prospective students, enrolled students, and post-college outcomes will elucidate salient factors for students as they determine whether to enroll and persist in "free" college and illuminate their experiences in college and their workforce outcomes.

Scholars should continue to think about dimensions along which we have not empirically tested information delivery through low touch interventions, particularly the potential relationships between message receipt, timing, and geography. Is it better for students to receive a message first thing in the morning, during lunch, or at the end of the day? Does it matter where students are when they receive a message? These answers may have answers rooted in geography and connected to both availability and productivity. Tennessee is a very rural state and students may not always have text message receipt capabilities if they lack mobile service in particular areas that they travel in a given day. Greater knowledge about mobile service and

message receipt patterns for rural students would be advantageous for informational campaigns for this and similar populations. Additionally, it is possible that productivity in acting upon information is related to an individual's location at the time of message receipt. Geo-fencing technology exists such that the state and its partners could push informational notifications to students when they are near college campuses, their home wireless network, or other key locations that may relate to their interest and productivity in completing requisite tasks for enrollment. Existing knowledge of the efficacy of messaging relative to non-messaging is just the tip of the iceberg; this text messaging study reveals that while strategic framing may not be a silver bullet, personalization may contribute to future optimization efforts and greater student success.

The randomized control trial findings in combination with the timing of eligibility loss revealed by the discrete-time survival analysis and the perspectives shared by students in the qualitative study reveals the importance of continually revisiting informational interventions with the student perspective in mind. It is possible that the content of the text messages that comprised the intervention did not address the pain points of prospective TN Promise students. Future interventions and research should consider the utility and personalization of messages related to other obstacles that arise in the postsecondary pipeline by, for example, FAFSA verification, first semester course selection, registration for orientation and support for follow up questions, access to information on academic progress, support for financial aid reapplication, and connections between students and academic, social, and career resources.

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