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Expanding Student Success: The Impact of a Comprehensive College Transition Program on Psychosocial Outcomes

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ABSTRACT

This study examines the impact of a comprehensive college transition program, the Thompson Scholars Learning Communities (TSLC), on psychosocial outcomes using an experimental design. We estimate overall and heterogeneous effects of program participation on students' sense of belonging to campus, feelings of mattering to campus, sense of academic self-efficacy, and sense of social self-efficacy. Participation in TSLC, as compared to receiving a substantial college scholarship without comprehensive support, leads to large increases in both mattering and sense of belonging to campus during students' two years in the program. We find no impact of TSLC participation on students' academic or social self-efficacy. We demonstrate the program effects on students' feelings of mattering to campus were largest for traditionally underrepresented student groups; however, we find no evidence of heterogeneous effects on students' sense of belonging to campus, academic self-efficacy, or social self-efficacy. Our findings suggest that comprehensive college transition programs can promote students' psychosocial outcomes.

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Introduction

While policy conversations about higher education are often restricted to student retention and graduation, researchers and practitioners are increasingly expanding their focus to examine not just academic outcomes, but the processes, environments, and experiences students have while enrolled in undergraduate study. In particular, student engagement, belonging, relationships with others, inclusiveness of campus spaces, instructional mindsets and practices, civic engagement, and social and emotional well-being are increasingly viewed as critical aspects of students' postsecondary success (Brown McNair et al., 2016; Bunting, 2020; Cook-Sather, 2018; Duran et al., 2020; Hu & McCormick,

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2012; Kuh, 2009; Kuh et al., 2007; Pendakur, 2016; Quaye & Chang, 2012). As with more traditional measures of student success, there are inequities when considering an expanded and more holistic definition of student success. Prior research has shown that, even conditional on enrolling in higher education, students of color, first-generation students, and students from low-income families feel less welcomed and accepted on campus than their white, continuing-generation, and higher-income peers (Ostrove & Long, 2007; Ribera et al., 2017). By examining whether interventions build psychosocial outcomes, higher education institutions can provide opportunities for student flourishing that are arguably a core purpose of educational experiences (Brighouse et al., 2018, p. 21) and make student success more inclusive and equitable.

In line with this expanded conceptual understanding of student success, universities are experimenting with comprehensive college transition programs (CCTPs) that combine financial, academic, and social support for students (e.g. Angrist et al., 2016; Clotfelter et al., 2016; Scrivener et al., 2008). CCTPs are focused not only on student persistence and degree completion, but also the process by which students succeed and the quality of students' experiences on campus. It is therefore important to understand not just whether CCTPs improve student academic outcomes, but also the impact of these interventions on students' psychosocial outcomes to gain a richer understanding of how CCTPs affect students' college transition experience. Psychosocial outcomes are often discussed as intermediate outcomes that may lead to academic outcomes, and there is evidence linking psychosocial and academic outcomes for students (Kuh et al., 2008; Swanson et al., 2020; Yeager & Walton, 2011). However, psychosocial outcomes provide an important measure of overall student wellbeing and thriving (Schreiner, 2010, 2013) and should be considered as distal outcomes in their own right. While there is an emerging body of literature evaluating the effectiveness of CCTPs for improving academic outcomes, the effect of these programs on psychosocial outcomes is less well-understood and deserving of additional scrutiny.

This study examines the impact of a CCTP, the Thompson Scholars Learning Communities (TSLC) on psychosocial outcomes. We focus specifically on psychosocial outcomes to highlight the importance of entering students' experiences and nonacademic outcomes when considering measures of student success. Additional lines of inquiry into TSLC will evaluate the impact of the program on traditional measures of student success, such as GPA, persistence, and degree completion. The Thompson Scholars Learning Communities program, with its mission to serve low-income students, is the largest of its kind in the country, and was developed as part of a larger initiative implemented by the Susan Thompson Buffett Foundation (STBF). For five decades, the STBF has offered scholarships, awarded based on financial need and academic merit, to Nebraska high school graduates who attend the state's public colleges and universities (Angrist et al., 2016). A longitudinal evaluation of the scholarship beginning in 2012 leveraged the fact that more students apply for the scholarship each year than there is funding available to implement a randomized control trial; beginning in 2013, an additional treatment arm was introduced to systematically vary whether scholarship recipients were offered the scholarship or the scholarship plus a place in the CCTP. We describe the experiment in greater detail later in the article.

The TSLC CCTP provides intensive supports for students throughout their first two years on campus that are designed to meet students' academic, social, and personal

needs (Cole et al., 2019). These include orientation activities before the first semester, a first-year seminar course taught by TSLC staff that focuses on college success strategies, and shared academic courses taught by university faculty in small class settings; additionally, students typically live together in on-campus housing and have regular contact with program staff for advising and mentoring to support academics, social life, and career preparation.

Our focus on psychosocial outcomes stems from a large literature documenting the myriad difficulties students from low-income backgrounds face when they start college. These challenges include a sense of alienation, difficulty forming social bonds, and academic struggles (Mayhew et al., 2016). To examine whether TSLC may ameliorate these difficulties, we examine the impact of the program on a number of psychosocial factors including sense of belonging, mattering, and academic and social self-efficacy. Sense of belonging, mattering, and social self-efficacy assess the extent to which students feel connected to their institution and have strong relationships with peers, staff, and faculty, all of which are integral to the social connectedness aspect of the concept of thriving (Schreiner, 2013). Academic self-efficacy captures students' confidence in their academic abilities and study skills, in line with the academic determination facet of thriving (Schreiner, 2013). In addition to providing important measures of students' wellbeing, all of these factors are associated with college persistence, attainment, and early labor market outcomes (Astin, 1984, 1993; Chickering & Gamson, 1987; Deming, 2017; Gore, 2006; Heckman et al., 2006; Kuh et al., 2008; Mayhew et al., 2016; Melguizo, 2010; Oyserman, 2015; Pascarella & Terenzini, 1991, 2005; Sedlacek, 2004; Tinto, 1975; Wolf-Wendel et al., 2009; Yeager & Walton, 2011). A key aim of TSLC is to provide scholarship recipients with the support they need to successfully transition to higher education, both personally and academically, and our study examines whether the program successfully developed these intended psychosocial outcomes. Specifically, we estimate the impact of TSLC participation on students' sense of belonging, or the extent to which they feel like a part of the institution; students' feelings of mattering, or the extent to which they feel like others at the institution care about them; and students' feelings of academic and social self-efficacy, or the extent to which students feel confident in their ability to navigate the academic and social demands of college.

To carry out the study we collected longitudinal survey data collected on a sample of STBF applicants who participated in a randomized control trial (RCT) evaluation of the program (Angrist et al., 2014, 2016, 2020). We surveyed RCT participants who enrolled at one of the three University Nebraska campuses. The first survey was administered in the fall of the students' first year, followed by two follow-up surveys administered at the end of students' first and second years in college. The surveys collected detailed information on students' experiences and perceptions of themselves and others in college. We used the survey responses to generate indices measuring psychosocial constructs (e.g., sense of belonging) which are the dependent variables in our analyses.

Our analysis leverages experimental variation to estimate the causal effect of participating in TSLC (which includes the scholarship) relative to receiving only the scholarship among potential scholarship recipients. The main threat to identification is differential attrition from the full RCT sample. Such attrition could arise because the survey was only administered to program applicants who enrolled at the University of

Nebraska campuses, because students drop out of college before the follow-up surveys were administered, or because of survey nonresponse. Fortunately, total attrition rates are similar for the TSLC participants and non-participants among students who received the scholarship.¹ Furthermore, among the students for whom we observe outcomes and who are included in the impact estimation, average baseline covariates are similar between the two groups. Controlling for these covariates has little effect on the estimated impacts of TSLC. Altogether, this evidence suggests we are able to generate credible estimates of the effect of TSLC relative to the scholarship-only condition.

In addition to estimating the treatment effect of participating in TSLC across all students, we estimate heterogeneous effects of TSLC across race/ethnicity, sex, prior achievement, first-generation status, and family income. Our results provide some of the first evidence on whether a comprehensive college transition program serving a diverse population of students can be equity-enhancing on campuses that traditionally privilege white, higher-income students.

We find large, significant, and positive impacts of participating in TSLC on students' reported feelings of mattering and belonging to campus in their first and second years (about 15–30% of a standard deviation). We find the effects on mattering are largest for students of color, first-generation students, female students, students with below-median ACT scores, and students with a zero expected family contribution. On the other hand, we find no impact of TSLC participation on students' academic or social self-efficacy, and no evidence of heterogeneous effects on belonging, academic self-efficacy, or social self-efficacy across student groups.

Description of the TSLC Intervention

TSLC is funded by a private foundation but hosted at and administered by public, 4-year universities. The size of the program varies across the three campuses, with approximately 200 first- and second-year students participating in TSLC at the smallest campus and roughly 500 first- and second-year students participating in TSLC at the two larger campuses each year between 2015 and 2016; note that these figures include students admitted to TSLC as well as those directly selected by the STBF. The size of the permanent staff for each program ranges from 3 at the smallest campus to 9 at the largest campus; program directors train staff members on the program's goals, practices, and events as part of the onboarding process. The programs also draw on student peer mentors, a faculty coordinator, shared academic courses instructors, and an administrative assistant to support students. The TSLC CCTP includes a variety of activities and services offered during the student's first two years of college, which are offered frequently to give students a range of options regarding when and how to engage.

¹The RCT included a third "control" arm of students who received neither the CCTP services nor the scholarship. Angrist et al. (2014, 2016, 2020) use the full RCT sample to estimate the effect of the scholarship on college enrollment, persistence, and completion. We find strong evidence of differential and nonrandom attrition between scholarship recipients and the control group, consistent with the Angrist et al. (2016) findings on the effects of the scholarship on college choice and college persistence. Therefore, we are not able to credibly estimate impacts of the CCTP + scholarship or the scholarship relative to the no scholarship control group. Consequently, we exclude the control group from all analyses. Note that differential attrition in survey completion is not relevant for the analyses described in Angrist et al. (2014, 2016) because they do not use the survey measures.

These are designed to foster the academic and social wellbeing of program participants, and reach groups of five to 100 students at a time, depending on the event and purpose. Before their first semester, students participate in an orientation that introduces them to the program's requirements and expectations. During students' first year on campus, they take a first-year seminar course taught by TSLC staff that fosters peer connections and teaches college success strategies. Students also take two shared academic courses, which are general education courses taught by university faculty to a small group (around 20 students) of TSLC students. Faculty are selected based on their interest in the program, use of active learning techniques, or shared identities with TSLC students. Students also typically live together on campus during their first year; each program reserves one or more floors in an on-campus dormitory specifically for TSLC students. During their first year, students also have regular contact with program staff and student leaders, through midterm meetings in which students discuss their current grades, one-on-one meetings, and at community events. These events offer students opportunities to socialize, engage academically, explore majors or careers, or participate in community service. Two of the three campuses also have a peer mentoring requirement, where students build personal and academic connections amongst each other and with the peer mentors. Peer mentors are TSLC program alumni who go through a competitive application process with the program to be hired as peer mentors. At one campus, peer mentor groups consist of about five students, meet at least three times a semester, and have a small budget to organize social events. At the other campus, peer mentor groups consist of about eight to 10 students; mentors attend the students' first-year seminar course, sit with students during monthly community dinners, coordinate two to three events per semester for group, and regularly meet one-on-one with each mentee.

Take up rates for the program components are high. While most components are required to maintain program eligibility (such as the first-year seminar, shared academic courses, and attending a certain number of events), students have choice in what types of community events they choose to attend. Among students randomized to participate in TSLC, 46% of students reported attending academic events, 32% reported attending wellness activities, 72% reported attending social activities, 25% reported attending major and undergraduate planning events, and 34% reported attending career planning events in their first year. In their second year, 58% of students reported attending academic events, 38% reported attending wellness events, 51% reported attending social events, 28% reported attending events focused on major and undergraduate planning, and 36% reported attending events focused on career planning.

The support provided by TSLC in students' second year is similar, but less intensive. For example, students take one shared academic course a semester rather than two, and students typically do not all live in the same dormitory. While the focus of the first year is helping students transition into college, the focus of the second year is helping students explore majors and careers. This occurs through an emphasis on major and career planning in one-on-one meetings as well as in workshops and at career-focused events, where staff guide students through Skills Navigator and other tools. We estimate the impact of TSLC on students' psychosocial outcomes while they are exposed to the structured support of the program (e.g., students' first and second years).

Existing Evidence on Comprehensive College Transition Programs

Comprehensive college transition programs (CCTPs) provide students with financial support as well as resources designed to assist students navigate the challenges of attending college, such as academic support, resources for travel, and advising services (Hallett et al., 2020). [Supplemental Appendix Table B.1](#) presents a brief summary of CCTPs operating around the country, including their location and program elements. In this section, we review the evidence of these programs on student outcomes.

Previous experimental evaluations of CCTPs operating at two-year colleges in New York, Texas, Maryland, Florida, and California consistently find that these types of programs lead to increases in course grades and GPA, but results are mixed when looking at enrollment, persistence, and degree completion (Bertrand et al., 2019; Bloom & Sommo, 2005; Evans et al., 2017; Scrivener et al., 2008, 2015; Visser et al., 2012; Weiss et al., 2014). Experimental evaluations of Opening Doors in New York, Accelerated Study in Associate Programs (ASAP) in New York, and Stay the Course in Texas have found positive effects on enrollment, credit accumulation, and degree completion, although the increases in degree completion at Kingsborough (Opening Doors) were only observed for students without English remediation requirements at the time of their initial enrollment (Evans et al., 2017; Scrivener et al., 2008, 2015; Weiss et al., 2014). Similarly, Bertrand et al. (2019) found positive effects of One Million Degrees in Chicago on student enrollment and persistence. Additionally, Scrivener et al. (2008) found positive impacts of the Opening Doors program on students' sense of belonging and engagement at Kingsborough Community College. There is some evidence of heterogeneous effects of participating in CCTPs at two-year campuses by prior academic achievement, race/ethnicity, gender, and financial dependence (Scrivener et al., 2008, 2015; Weiss et al., 2019; Visser et al., 2012).

The Carolina Covenant, Dell Scholars program, and EASE learning community all target students at four-year universities and have been evaluated using quasi-experimental designs. In North Carolina, Clotfelter et al. (2016) find positive impacts of the Carolina Covenant on students' GPA and positive but insignificant effects on degree completion. In California, Xu et al. (2018) estimated the impact of the EASE learning community on academic and psychosocial outcomes, finding positive effects on students' biology grades, overall GPA, persistence, and sense of belonging, but no impact on students' self-reported academic integration, academic and social concerns, or interest. Finally, in an evaluation of the national Dell Scholars program, Page et al. (2017) find no impact of the program on enrollment or persistence, but positive effects on six-year graduation rates.

There is some evidence to suggest students differentially benefit from participating in CCTPs at four-year institutions. In North Carolina, Clotfelter et al. (2016) found larger effects of the Carolina Covenant for men when looking at credit accumulation, but larger effects of the same program for women when looking at GPA. In California, Evans et al. (2017) found larger effects of the EASE learning community for women across all outcomes examined and larger effects on enrollment for students with below-median incomes and students of color, but no differences by the number of incoming credits students held or by students' initial outcome propensity (based on their demographic and background characteristics). In their evaluation of the Dell Scholars

program, Page et al. (2017) found some evidence suggesting the program had larger effects on white students and first-generation students, but no evidence of heterogeneity by gender. The question of whether CCTP participation has differential effects across subgroups remains unsettled in the literature, and prior studies have examined a somewhat limited number of subgroups. This article helps address this gap by estimating program effects across various student subgroups defined by race/ethnicity, first-generation college student status, gender, prior achievement, and family income.

The Thompson Scholars Learning Community program is the only CCTP targeted at four-year institutions that has been evaluated experimentally. Angrist et al. (2016, 2020) randomized TSLC applicants into one of three conditions: (1) the TSLC group, which received the full CCTP along with a scholarship, (2) the College Opportunity Scholarship (COS) group, which received the scholarship only, and (3) a control group. Assignment to either of the scholarship groups led to increases in enrollment and persistence relative to the control group, and effects were larger for students of color, first-generation students, and students with bottom-decile high school GPAs (Angrist et al., 2016, 2020). However, there was not a statistically significant difference between the TSLC group and the students who only received a scholarship on these measures, either overall or for specific subgroups (Angrist et al., 2016, 2020).

This article makes several contributions to the literature on CCTPs. First, there are few evaluations of CCTPs that support causal inference, and the majority of those evaluate programs in large urban areas (e.g. the Opening Doors learning community and the Accelerated Study in Associate Programs (ASAP), both located in New York City). Our evaluation focuses on a CCTP implemented in areas of varying urbanicity², which contributes to the external generalizability of all of these findings taken together. Second, the majority of prior evaluations of CCTPs have focused exclusively on academic outcomes, missing an important part of the student experience. By focusing on psychosocial outcomes, we provide additional nuance on the ways CCTPs affect college students. Third, we estimate program effects by student race/ethnicity, first-generation status, gender, prior achievement (measured by ACT score), and family income (measured by expected family contribution). This type of analysis allows us to investigate whether CCTPs can be equity enhancing (e.g. close gaps in postsecondary outcomes) or whether they raise outcomes on average but leave inequalities intact. Fourth, most of the prior literature evaluates CCTPs implemented at two-year colleges rather than four-year universities, even though almost twice as many students in 2018 enrolled in four-year universities than in two-year colleges (NCES, n.d.). Our work is among the first experimental studies to examine the impact of a CCTP operated exclusively at four-year campuses.

Psychosocial Outcomes

Tinto's (1997) institutional departure model argues that institutions have a responsibility to support student development and success. He argues that in order to do so, faculty, student affairs, and academic affairs professionals need to design programs that help

²The largest metropolitan area with a campus hosting the TSLC program is home to around one million residents, while the smallest city has fewer than 34,000 residents.

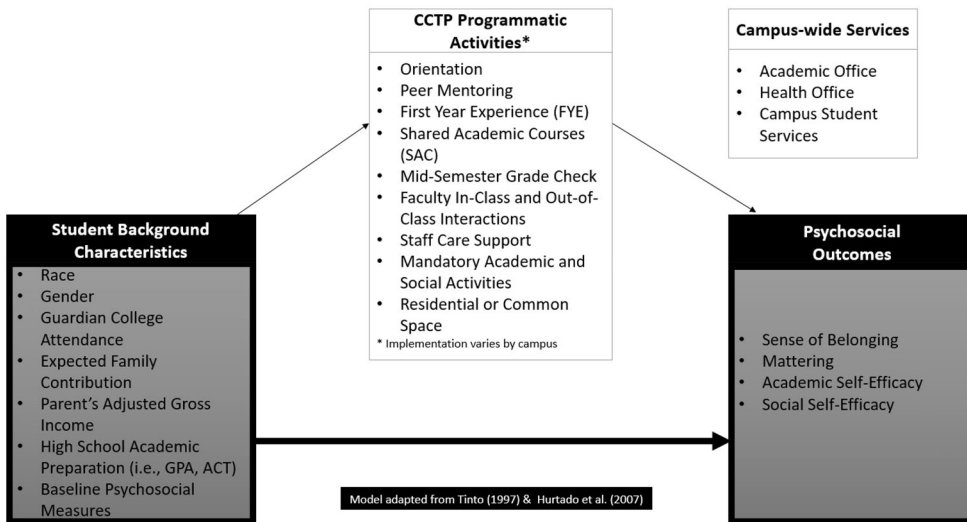


Figure 1. Comprehensive college transition program theory of change.

students integrate into the institution both academically and socially. The theory of change behind TSLC is that students, in particular low-income and first-generation students, can get lost on large campuses, where they need to take large general education courses and generally do not receive additional pedagogical or mentoring support. A CCTP counters those challenges by creating a clearly defined and supportive community for students. Figure 1 presents a visual representation of the theory of change of TSLC as it relates to the development of critical psychosocial outcomes.

We illustrate how the different programmatic elements of TSLC are hypothesized to support students in their academic and social engagement, while helping them feel that they belong at and matter to the institution. TSLC provides substantially more supplemental services (e.g., light-touch contact during the summer, orientation, mandatory activities and events to foster student-faculty interactions, first year experience, shared academic courses, peer mentoring, and residential living-learning communities or other common spaces) than the campuses offer to the broader population of students (e.g., academic office, health office, and campus student services). We hypothesize that exposure to these additional activities and tailored support services will result in the development of psychosocial outcomes that are representative of students' thriving and that may be related to college persistence and attainment: (a) sense of belonging to campus; (b) mattering to campus; (c) academic self-efficacy; and (d) social self-efficacy.

Sense of Belonging to Campus

Sense of belonging has conceptual roots in psychology and mental health studies. It is defined as a "sense of personal involvement in a social system so that persons feel themselves [an] indispensable and integral part of the system" (Anant, 1966, p. 21). In post-secondary settings, sense of belonging is defined and operationalized as students' active participation in school and classroom activities and a concomitant feeling of identification with their institution (Finn, 1989). This construct was popularized by Hurtado and

Carter (1997) in contrast to the concepts of separation and integration proposed by Tinto (1993). Sense of belonging, including to an educational institution, is a protective factor against depression and other mental health issues for adolescents and college students (McBeath et al., 2018; Moeller et al., 2020; Parr et al., 2020). Additionally, a number of empirical studies have documented an association between sense of belonging and traditional academic outcomes for first-generation and students of color (Hausman et al., 2007; Hoffman et al., 2002; Spanierman et al., 2013; Strayhorn, 2012; Walton & Cohen, 2011).

Many of the programmatic elements of TSLC were designed to support students' sense of belonging to campus. In particular, the repeated social activities, shared living and study spaces, first-year seminar, and interactions with TSLC staff, peer mentors, and faculty show students that they are part of a larger community of Buffett scholars. Students may also be encouraged to connect with other offices and organizations on campuses through program activities designed to help students integrate into the larger campus community.

Matting

Matting is characterized by the relationships that exist between a student and others at the institution (Rosenberg & McCullough, 1981; Schlossberg, 1989). This construct refers to an individual feeling of importance to others, that other people care about their well-being, which in turn creates a feeling of reliance as others depend on the individual. Rosenberg and McCullough (1981) contend that matting consists of three distinct elements: (a) awareness that the individual commands the interest or notice of others; (b) the belief that others take what he or she has to do or say as important; and (c) the notion that others depend on the individual. Students feel like they matter when institutional agents and peers take notice of them and validate their actions and presence. The types of relationships encapsulated in the concept of matting are important contextual factors for thriving (Brown et al., 2017). Additionally, matting is positively associated with academic achievement and positive school climate and is negatively associated with academic stress (Rayle & Chung, 2007).

The messages that students receive from TSLC staff, faculty, and students, particularly in one-on-one meetings, activities, peer mentoring, and in shared academic courses, affirm to students that they are valued, that their success matters, and that they are an integral part of the CCTP community.

Academic and Social Self-Efficacy

Bandura's social cognitive theory asserts that self-efficacy relates to "[a] learner's judgment about his or her ability to successfully attain educational goals" (Bandura, 1977, p. 12). Social self-efficacy focuses on students' confidence in building relationships with their peers. The strength of students' relationships with their peers is predictive of their psychological wellbeing (He et al., 2018; Miething et al., 2016). While social self-efficacy focuses on students' confidence in social situations, academic self-efficacy captures the extent to which students feel like they have the skills and capabilities to meet the academic demands of college. Higher levels of academic self-efficacy have been linked to

higher levels of happiness and lower levels of mental distress (Grøtan et al., 2019; Mahmoodi et al., 2019). Academic and social self-efficacy are also positively associated with college persistence and attainment, both theoretically and empirically (Chemers et al., 2001; Gore, 2006; Inkelas & Associates, 2008; Krumrei-Mancuso et al., 2013; Zajacova et al., 2005).

There are specific TSLC activities that support the development of academic self-efficacy, such as the first-year seminar, mid-semester grade checks (Kitchen et al., 2020), and shared academic courses (Perez et al., 2017). TSLC could develop students' social self-efficacy by promoting opportunities for peer engagement in the required activities (e.g., required social outings), shared living or program space, as well as in the first-year seminar and shared academic courses that facilitate the formation of strong friendships during students' first year.

Data and Methods

We leverage data from a broader, mixed methods evaluation of the Thompson Scholars Learning Community (TSLC) program, which focused on two cohorts of students who entered college in the 2015–2016 and 2016–2017 academic years. We leverage the randomization implemented by Angrist et al. (2014, 2016, 2020) and utilize the survey data collected by Cole et al. (2019). We make a unique contribution by estimating the causal impact of TSLC on psychosocial outcomes. We pool data across both cohorts in all analyses presented here.

Data Sources

Our data are drawn from three sources: students' initial application to the scholarship program, which includes information from the Free Application for Federal Student Aid (FAFSA); administrative data from the University of Nebraska system; and student responses to a survey administered electronically by the research team at the beginning of students' first year on campus and end of each subsequent year for which students are enrolled. We utilize data from the first two year-end surveys, administered at the end of students' first and second years on campus, respectively. These rich data sources allow us to measure students' gender, race/ethnicity, first-generation status (defined as students who do not have a parent/guardian with a bachelor's degree), whether the student took the ACT, the student's ACT composite score, the student's high school GPA, and the student's expected family contribution (EFC) in addition to our outcomes of interest.

Measuring Psychosocial Outcomes

Finding scales that produce valid and reliable scores across different contexts is one of the challenges associated with measuring psychosocial outcomes. For some of the constructs of interest (i.e., sense of belonging), we found a set of items that had been consistently used successfully by other researchers and organizations, such as the OECD (OECD, 2015). In the case of other constructs (e.g. mattering), the available scales had

Table 1. Psychosocial constructs.

Construct	Items	Sample items	Response scale
Belonging to Campus	8	<ol style="list-style-type: none"> 1. I feel I am a member of the {INSTITUTION} community 2. I make friends easily 3. I feel like an outsider (reverse coded) 4. I believe other students like me 	1 (Strongly Disagree) – 7 (Strongly Agree)
Mattering to Campus	8	<ol style="list-style-type: none"> 1. There are people at {INSTITUTION} who are generally supportive of my individual needs 2. There are people at {INSTITUTION} who are sad for me when I fail in something I set out to do 3. There are people at {INSTITUTION} who are concerned about my future 4. People I value at {INSTITUTION} are disappointed when I don't accomplish all I should 	1 (Strongly Disagree) – 7 (Strongly Agree)
Academic Self-Efficacy	14	Thinking about your experience as a student at {INSTITUTION}, please rate how certain you are that you can do the following: <ol style="list-style-type: none"> 1. Meet the academic demands of college 2. Be completely satisfied with your academic performance 3. Always keep up-to-date with your schoolwork 4. Motivate myself to do schoolwork 	1 (Cannot do this at all) – 7 (Absolutely can do this)
Social Self-Efficacy	8	Thinking about your experience as a student at {INSTITUTION}, please rate how certain you are that you can do the following: <ol style="list-style-type: none"> 1. Make friends you can talk about your very personal problems with 2. Feel at ease with others 3. Meet people and make friends 4. Get involved in interesting activities 	1 (Cannot do this at all) – 7 (Absolutely can do this)

Full psychometric report and items available upon request.

not been rigorously evaluated. Table 1 summarizes the items included in each psychosocial construct. Future work should continue to revise these measures, with a particular focus on shortening the instruments to make it easier for institutions to regularly survey students' regarding their perceptions and psychosocial outcomes to provide timely, programmatic responses to student needs.

We conducted a psychometric analysis of our psychosocial outcomes of interest to determine if there was evidence of “good fit” between the data we collected and an *a priori* model that asserts the presence of a latent construct measured by our assembled items. Because we utilize longitudinal survey data in which some items within a construct change over time³, we calculate Rasch scores for each construct, which compares responses to a theorized model to assess item difficulty and person ability to calculate a score for the underlying trait (Bond & Fox, 2007). We examine several psychometric properties of these scores to assess whether the scales are a good fit for our data (Andrich, 1978; Wright & Masters, 1982).⁴ Although the definition of “good fit” varies,

³In particular, psychometric results from the initial survey were used to modify the scales in the first and second follow-up surveys. Modifications included re-wording questions to clarify meaning, dropping questions with very low factor loadings from preliminary confirmatory factor analyses, and increasing the range of response options for items asking students to rate their ability to complete a task (i.e. “Cannot do this at all” to “Absolutely can do this”).

⁴Rasch score construction and testing was using WINSTEPS. The full psychometric report is available upon request.

there is general agreement that a variety of diagnostics should be used when judging the soundness of a Rasch score. We evaluate item difficulty, construct reliability, construct dimensionality, item fit, average person ability by response category, rating scale thresholds, and differential item functioning. In general, Rasch scores exhibit better fit when the item difficulty is closer to zero (on scale of negative to positive 5), the reliability coefficient is higher, the percent of variance explained by the items is higher (indicating a unidimensional latent construct), the mean square is close to one (on a scale of zero to two, indicating item fit), the average person ability by response category indicates higher ability (on that construct) respondents agree with higher response categories, the rating scale thresholds (in this case, Andrich thresholds) indicate a proper and distinct ordering between response categories (category peaks are at least one logit apart), and there is minimal evidence of differential item functioning.

We find that our psychosocial measures perform well in our sample. We find high Rasch reliabilities⁵ for each construct, ranging from 0.80 for our social self-efficacy scale to 0.88 for our academic self-efficacy scale. We find no evidence of differential item functioning by gender or race/ethnicity, and that there is an increasing and positive relationship between students' ability and likelihood of responding to higher response categories (e.g. a student with a higher social self-efficacy score is more likely to respond with a seven on an item in the construct than a student with a lower social self-efficacy score). We find that there is proper ordering for all scales, and the Andrich thresholds for both belonging and mattering are at least one logit apart. However, because of the numerous response categories for the items in the academic and social self-efficacy scales, not all category response peaks are at least one logit apart; therefore, we use standardized scores for each outcome variable rather than categorical scale scores. Results suggest each construct is unidimensional, with the share of variance explained by the items ranging from 53.2% for the sense of belonging scale to 58.6% for the social self-efficacy scale, which is more than 20% of variance (Reckase, 1979).

Item difficulty represents students' degree of agreement with an item response category. For example, students with higher levels of sense of belonging would be more likely to consider a response category of 1 (strongly disagree) as more difficult to endorse than 2, a response category of 3 as more difficult to agree with than 4, and so on. Similarly, students who demonstrate lower degree of sense of belonging would be expected to consider 7 (strongly agree) as more difficult to endorse than 6, and so on. Observed item difficulties range from -0.62 for an item in the academic self-efficacy scale to 0.93 for an item included in the mattering scale. This indicates that our items can adequately measure moderate levels of our constructs of interest, but may not be sensitive enough to measure extremely high or low levels of belonging, mattering, academic self-efficacy, or social self-efficacy. Future work should consider developing scales that are more sensitive to these types of extreme responses.

Finally, we examined the item quality of each scale based on the individual mean square (MS) error statistic that shows the extent to which each item represents the underlying construct. The ideal value of the MS error statistic (Infit and Outfit) is 1.00 with a standard deviation around 0.20 (Engelhard, 2009). An MS error statistic greater

⁵Rasch reliabilities convey similar information as Cronbach's alpha, and also range from 0 to 1, with higher values indicating greater reliability.

Table 2. Study samples from original funding group assignment to initial through second follow-up surveys, combined.

	# in RCT	# Initial survey sampling frame	% of RCT (%)	# Respondents, FFU	% of RCT (%)	# Respondents, SFU	% of RCT (%)	# Respondents, FFU & SFU	% of RCT (%)
TSLC	712	622	87	481	68	403	57	359	50.42
COS	444	383	86	293	66	245	55	219	49.32
Control	1,680	1,177	70	734	44	638	38	511	30.42
<i>Total</i>	<i>2,836</i>	<i>2,182</i>	<i>77</i>	<i>1,508</i>	<i>53</i>	<i>1,286</i>	<i>45</i>	<i>1,089</i>	<i>38.40</i>

Note. TSLC: Students randomized to the Thompson Scholars Learning Community (recipients of both the scholarship and the TSLC program); COS: College opportunity scholarship (students randomized to scholarship-only condition); Control: students randomized to not receive a scholarship or the TSLC program. Students are in the initial survey sampling frame if they enrolled in the NU system. FFU: First follow-up survey, administered at the end of students' first year on campus; SFU: Second follow-up survey, administered at the end of students' second year on campus. The main analytic sample we use in subsequent analyses is the one consisting of respondents to both the first and second follow-up surveys.

than 1.00 indicates wider variation in students' responses to a particular item, while an MS error statistic less than 1.00 suggests less variation (Linacre, 2005). We obtained reasonable fit for most of the items in this study. One item on the social self-efficacy scale has an outfit MS error statistic of 1.56; all other MS error statistics were between 0.60 and 1.40, indicating good fit (Linacre & Wright, 1994).

Analytic Strategy

Our approach uses random assignment to estimate the causal effects of TSLC. In the broader evaluation of TSLC, students were randomized into one of three treatment arms: the TSLC group, in which students received a generous college scholarship as well as comprehensive supports for their first two years; the COS group, in which students received the same college scholarship but not the comprehensive supports; and the control group, in which students received the financial aid and supports for which they qualified on their own. Given this design, and the longitudinal nature of our data, there are three main sources of attrition from the full RCT sample that might introduce selection bias: (a) differential enrollment into college (which affects membership in the survey sampling frame), (b) differential survey non-response conditional on being enrolled, and (c) differential persistence in college (which affects whether students were in the sampling frame for the follow-up surveys).

Table 2 shows attrition from the initial RCT sample. We began with the full sample of students ($N=1,156$) who were part of the RCT and targeted UN-Lincoln, UN-Omaha, or UN-Kearney, the campuses offering TSLC. Focusing on the TSLC and COS groups, we lose about half of the original RCT sample when limiting the sample to students who completed both the first and second follow-up surveys. Crucially, however, attrition rates are nearly identical for these two groups. Furthermore, attrition at each of the survey stages is also quite similar for these two groups (Supplemental Appendix Table A.1 reports the detailed breakdown of the sources of attrition). The attrition we observe for the TSLC and COS samples meet the What Works Clearinghouse's optimistic attrition standards (What Works Clearinghouse, 2020). In contrast, only 30% of the students assigned to the control group remain once we limit to those who responded to

both of the follow-up surveys. Partly this reflects the strong effect of the scholarship on NU enrollment (Angrist et al., 2016, 2020), but even conditional on being part of the initial survey sampling frame, response rates are much lower in the control group than in either of the two groups that received the scholarship (43% vs. 57%). Because of the differential attrition between the control group and the two scholarship groups, we exclude the control group from our analyses. After restricting the sample to students who responded to both follow up surveys, our analytic sample consists of 578 students.⁶ In [Supplemental Appendix C](#), we present results of analyses that retain all respondents at each wave rather than maintaining a consistent sample over time; results do not change.

To further investigate possible bias from differential attrition, we examined means of baseline covariates across the TSLC and COS groups. [Table 3](#) shows that the differences in means are small in magnitude and only marginally statistically significant in a few cases. This supports the view that, despite relatively high overall attrition rates, selection into the final sample does not appear to be generating systematic differences which could bias our estimates.

Estimating Overall Treatment Effects

Because students were randomly assigned to either the TSLC or COS group, we can use a straightforward ordinary least squares regression framework to estimate program impacts on students' psychosocial outcomes. Our preferred model includes controls for the following individual characteristics: sex, race/ethnicity, level of education of the guardian, expected family contribution, ACT score, and high school GPA, as well as indicators for randomization blocks, as suggested in the econometrics and program evaluation literature (Angrist & Pischke, 2009; Bloom, 2006; Murnane & Willett, 2011; Shadish et al., 2002). The randomization blocks are a combination of students' cohort and the institution they targeted on their initial application to for a scholarship.⁷ Responses were not weighted for survey nonresponse, as such weights would not correct for differential selection into the sampling frame; including background characteristics accounts for both differential selection into the sampling frame and survey nonresponse. Missing responses to individual survey items were imputed using hot deck imputation (Andridge & Little, 2010).⁸ Imputation was not used to fill in missing background information (such as race/ethnicity); observations missing background information are excluded from the analysis. Only a small share of observations in our analytic sample include imputed values: less than 6% of the sample has an imputed value on an item in the mattering or belonging scales at either timepoint, less than 5% of the sample has an

⁶We also conducted analyses where we included all respondents to a particular survey wave even if they did not respond to the other wave (e.g., include all respondents to the first follow-up even if they did not complete the second follow-up), and obtained similar results. In the extreme case, students who only responded to one item would be included and responses to other items would be imputed. Our results are robust to excluding students with imputed values.

⁷Randomization was blocked based on students' applications in order to ensure students knew of their scholarship award prior to making enrollment decisions, in line with the foundation's theory of change that the scholarship itself could influence college enrollment.

⁸Students were grouped into cells based on nine background characteristics (race, ethnicity, gender, ACT composite score, ACT English score, ACT math score, ACT reading score, treatment condition, and campus). Within each cell, observations were randomly drawn to fill in missing items for students who skipped an item.

Table 3. Comparison of baseline characteristics by treatment status, combined cohorts.

	Initial survey sample frame				Respondents to first and second follow-up				
	COS		TSLC		COS		TSLC		Difference p-Value
	M or %	n	M or %	n	M or %	n	M or %	n	
Female	62.0%	382	62.1%	622	63.5%	219	68.8%	359	0.188
Latina/o/x, Any Race	24.9%	382	28.3%	622	20.5%	219	27.0%	359	0.096 ⁺
Black/African American Only	5.8%	382	7.9%	622	5.5%	219	6.4%	359	0.784
White Only	58.4%	382	53.7%	622	61.6%	219	57.4%	359	0.445
Other/Multiple Races, Non-Latina/o/x	4.7%	382	4.7%	622	4.1%	219	3.9%	359	0.913
Unknown Race	2.1%	382	0.6%	622	2.3%	219	0.6%	359	0.079 ⁺
Guardian(s) Have Not Attended Any College	23.3%	382	21.9%	622	20.1%	219	20.1%	359	0.966
Guardian(s) Have Not Earned a Bachelor's	68.1%	382	71.7%	622	63.5%	219	68.2%	359	0.283
Took ACT	97.1%	382	97.7%	622	98.2%	219	97.8%	359	0.704
ACT Composite	21.2 (6.33)	382	21.1 (6.26)	622	21.9 (6.48)	219	21.8 (5.88)	359	0.692
High School GPA	3.42 (0.44)	382	3.45 (0.42)	622	3.49 (0.42)	219	3.55 (0.38)	359	0.054 ⁺
Expected Family Contribution (\$)	2,761.7 (2,923.73)	382	2,612.9 (3,010.74)	622	3,008.8 (3,003.32)	219	2,778.3 (3,049.85)	359	0.430
Parent's Adjusted Gross Income	45,101.3 (27,269.38)	382	43,899.0 (28,572.85)	622	47,405.2 (28,328.48)	219	45,427.1 (28,300.81)	359	0.486

+p < .1; *p < .05; **p < .01, ***p < .001.

Note. COS: College Opportunity Scholars (students who only received the scholarship); TSLC: Thompson Scholars Learning Community Scholars (recipients of both the scholarship and the TSLC CCTP); M: mean; %: percent. Means reported for continuous-scale variables. Proportions (in percent) reported for categorical variables. Standard deviations reported for continuous variables in parentheses. P-values indicate the significance of the difference between TSLC and COS groups as determined by composite Wald tests regressing the indicated variable on a treatment indicator and randomization strata (e.g. targeted campus by cohort) fixed effects. Regressions estimated using ordinary least squares.

imputed value for an item on the social self-efficacy scale at either timepoint, and less than 7% of the sample has an imputed value for an item on the academic self-efficacy scale at either timepoint. Our results are not sensitive to including observations with imputed values. Results from models excluding observations with any imputed items are available upon request. Our preferred specification is given by:

$$Y_{it} = \beta_0 + \alpha X_i + \beta_1 TSLC_i + \tau Strata_i + \varepsilon_i \quad (1)$$

where Y_i represents the psychosocial outcome of interest in year t , β_0 is the constant, X_i is a vector of student background and demographic characteristics, $TSLC_i$ is an indicator for TSLC participation, $Strata_i$ is a vector of randomization strata fixed effects, defined by students' intended campus of enrollment and cohort, and ε_i is a stochastic error term. The coefficient of interest is β_1 , which estimates the impact of participating in TSLC on the psychosocial outcome of interest.

Estimating Heterogeneous Effects

We estimate heterogeneous program effects by including interactions between the treatment indicator and an indicator of students' inclusion in the subgroup of interest. We limit the analytic sample used to estimate the overall effects of the program to students with complete demographic information.⁹ This restricts our sample to 568 students. We include two subgroups when looking at both race/ethnicity (students of color and white students), sex (female and male students), and ACT (above and below median scores). When looking at EFC, we split students into three groups: students with zero EFC, since the variable is censored at zero, students with below-median values, and students with above-median values. This allows us to distinguish between students with moderate to low incomes (below-median but above zero EFC) and students with low incomes or extreme circumstances (zero EFC). When calculating the median EFC, we exclude zero values. We test for significance at the 5% significance level and use the Benjamini-Hochberg procedure to control the false discovery rate.

Results

We present the average effects of TSLC participation on students' psychosocial outcomes, followed by our results examining heterogeneous effects of TSLC participation.

⁹We exclude seven students who did not indicate a race/ethnicity and one student whose gender identity was nonbinary. Additionally, we exclude two students who are missing an ACT score. We include these students in our estimation of the main program effects (students coded as "not students of color" and "not female"; students missing an ACT score are coded as zero and a dummy variable is included to note whether or not students have an ACT score); their inclusion introduces measurement error, but will not bias our coefficient of interest (β_1). However, for our analysis of subgroup effects, precise measurement of student characteristics is critical, as we are focused on estimating program effects for each subgroup. 67 percent of students in the sample are female, 40% are students of color, and 66% are first-generation students. Average adjusted gross income is \$46,130, with an average expected family contribution of \$2872. Among students who took the ACT, the average composite score is 23.

Table 4. Impact of TSLC participation, relative to COS, on psychosocial outcomes: effect size estimates after first and second years.

	End of first year		End of second year	
	(1)	(2)	(3)	(4)
Sense of Belonging to Campus	0.165* (0.082)	0.170* (0.082)	0.189* (0.088)	0.179* (0.088)
Mattering to Campus	0.280*** (0.078)	0.280*** (0.077)	0.295*** (0.088)	0.289** (0.088)
Academic Self-Efficacy	-0.088 (0.082)	-0.075 (0.082)	0.003 (0.085)	0.021 (0.086)
Social Self-Efficacy	0.090 (0.083)	0.097 (0.082)	0.132 (0.083)	0.136 (0.083)
<i>N</i>	578	578	578	578
Student Background Characteristics	Yes	No	Yes	No
Randomization Strata	Yes	Yes	Yes	Yes

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

Note. TSLC: Thompson Scholars Learning Community Scholars; COS: College Opportunity Scholarship Scholars. Standard errors are in parentheses. The following covariates are included: Female, student of color, at least one guardian earned a bachelor’s, took ACT, ACT composite, high school GPA, expected family contribution, and an indicator for zero EFC. Randomization strata defined by intended campus of enrollment, as indicated on student applications to the STBF, and cohort. The sample excludes students who did not target a University of Nebraska campus in the scholarship application. Constructs calculated using Rasch rating scale models. Each estimate is from a separate regression.

Program Effects for the Full Sample

Table 4 reports the results for four psychosocial outcomes of interest at both the first and second follow-ups, pooling data from both the 2015 and 2016 cohorts. Figure D.1 in Supplemental Appendix D shows these estimates visually. We estimate TSLC students’ reported psychosocial outcomes relative to COS students’ outcomes across survey waves. Column (1) presents the first-year impact and Column (3) presents the overall impact for the two-year TSLC program, both from our preferred model specification. Columns (2) and (4) presents estimates of the program’s first- and second-year impacts, respectively, without controls for student characteristics.

Our results indicate that after engaging in the program for one and two academic years, respectively, students in TSLC compared to COS reported stronger feelings of belonging to the institution. Among students in TSLC, reported feelings of belonging to the institution were 0.165 standard deviations higher than those reported by COS students at the end of their first year; this difference grew to 0.189 standard deviations at the end of students’ second year. Effects are significant after controlling for student characteristics, and are statistically significant at the 5% level. It is difficult to gauge the relative magnitude of these effects given the limited literature evaluating the impact of programmatic interventions on postsecondary students’ psychosocial outcomes. However, the literature that does exist is in line with our estimates. For example, Solanki et al. (2019) find that participating in a STEM-focused learning community increases students’ sense of belonging by about 21 percent of a standard deviation. Recent reviews of studies in higher education classify effect sizes between .12 and .20 as medium (Mayhew et al., 2016); however, more work is needed to understand the typical range of effects on psychosocial outcomes.

Our results also suggest that participating in TSLC increased students’ feelings of mattering to campus. The magnitude of this effect is large by common standards in higher education research (Mayhew et al., 2016), almost 30 percent of a standard deviation after students’ first and second years, after accounting for student background

characteristics. The program effects on students' sense of mattering at both the first and second follow-up are statistically significant at the .001 significance level.

We find no differences in either academic or social self-efficacy between TSLC and COS students. At both the end of students' first and second years in the program, we estimate small, noisy effects for academic self-efficacy in our preferred model. Similarly, while we estimate slightly larger point estimates for the impact of TSLC on students' social self-efficacy (0.090 standard deviations at the end of year one and 0.132 standard deviations at the end of year two), neither estimate is statistically significant at the 5% level. While the direction of our results aligns with findings from parallel qualitative analyses that found students create a strong social bond with peers in their first year as a result of the intense participation in the social and programmatic activities embedded in the program, we cannot conclude that there is a quantitatively distinguishable effect of the program on students' social self-efficacy.

Heterogeneous Program Effects

Table 5 presents the impact of the program on students' psychosocial outcomes for each subgroup examined. Figures D.2–D.5 in Supplemental Appendix D offer a visual representation of the subgroup estimates. We find suggestive evidence that the program was

Table 5. Effect of TSLC on psychosocial outcomes across subgroups.

Subgroup	Mattering to campus		Belonging to campus		Academic self-efficacy		Social self-efficacy		N
	Year 1 (1)	Year 2 (2)	Year 1 (1)	Year 2 (2)	Year 1 (3)	Year 2 (4)	Year 1 (5)	Year 2 (6)	
Students of Color	0.585*** (0.125)	0.332* (0.143)	0.269* (0.133)	0.150 (0.141)	-0.137 (0.134)	-0.024 (0.138)	0.126 (0.135)	0.077 (0.134)	568
White Students	0.111 (0.099)	0.281* (0.113)	0.119 (0.105)	0.222* (0.112)	-0.063 (0.106)	0.008 (0.109)	0.073 (0.107)	0.170 (0.106)	568
<i>p</i> -Value, subgroup difference	0.003	0.776	0.375	0.693	0.663	0.856	0.756	0.584	
First Generation	0.318** (0.098)	0.298** (0.111)	0.168 (0.103)	0.079 (0.109)	-0.077 (0.104)	-0.043 (0.107)	0.106 (0.105)	0.051 (0.104)	568
Continuing Generation	0.250 (0.132)	0.305* (0.150)	0.192 (0.139)	0.404** (0.148)	-0.118 (0.140)	0.064 (0.145)	0.069 (0.141)	0.285* (0.141)	568
<i>p</i> -Value, subgroup difference	0.681	0.969	0.889	0.078	0.811	0.553	0.833	0.183	
Female Students	0.311** (0.096)	0.384*** (0.109)	0.193 (0.102)	0.176 (0.108)	-0.038 (0.102)	0.099 (0.105)	0.091 (0.103)	0.204* (0.103)	568
Male Students	0.260 (0.134)	0.139 (0.151)	0.144 (0.141)	0.228 (0.150)	-0.194 (0.142)	-0.204 (0.146)	0.097 (0.143)	-0.000 (0.143)	568
<i>p</i> -Value, subgroup difference	0.757	0.190	0.778	0.779	0.373	0.093	0.973	0.246	
Below-Median ACT	0.329** (0.109)	0.425*** (0.123)	0.159 (0.115)	0.124 (0.122)	-0.090 (0.115)	0.031 (0.119)	0.017 (0.116)	0.167 (0.116)	568
Above-Median ACT	0.247* (0.113)	0.159 (0.128)	0.181 (0.119)	0.254* (0.126)	-0.107 (0.120)	-0.055 (0.123)	0.163 (0.120)	0.088 (0.120)	568
<i>p</i> -Value, subgroup difference	0.599	0.134	0.895	0.460	0.916	0.612	0.384	0.634	
Zero EFC	0.528*** (0.144)	0.371* (0.164)	0.204 (0.153)	0.067 (0.162)	-0.201 (0.154)	-0.251 (0.158)	0.004 (0.155)	0.018 (0.154)	568
Below-Median EFC	0.159 (0.134)	0.154 (0.152)	0.137 (0.142)	0.155 (0.150)	-0.118 (0.142)	-0.004 (0.147)	0.057 (0.143)	0.053 (0.143)	568
Above-Median EFC	0.233 (0.127)	0.382** (0.144)	0.191 (0.134)	0.333* (0.142)	0.017 (0.135)	0.185 (0.139)	0.198 (0.136)	0.298* (0.135)	568
<i>p</i> -Value, subgroup differences	0.144	0.489	0.941	0.435	0.551	0.115	0.604	0.304	

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

Note. Each panel represents a separate regression. Covariates include indicators for race and gender, as well as high school GPA, ACT score, expected family contribution, and an indicator for zero EFC. Students with missing information excluded. Randomization strata, defined by cohort of enrollment and intended campus of enrollment as indicated on students' initial application to the STBF, fixed effects included in all analyses. Standard errors in parentheses.

more effective at developing students' feelings of mattering among traditionally underserved populations. However, we find no clear patterns of heterogeneity in program effects for sense of belonging, academic self-efficacy, or social self-efficacy. Additionally, the point estimates between subgroups are not statistically different from each other at conventional levels of significance.

At the end of students' first year on campus, participating in TSLC had statistically significant and positive effects on feelings of mattering for students of color ($\sigma = 0.585$; $p = 0.000$), first-generation students ($\sigma = 0.318$; $p = 0.001$), female students ($\sigma = 0.311$; $p = 0.001$), students with below-median ACT scores ($\sigma = 0.329$; $p = 0.003$), students with above-median ACT scores ($\sigma = 0.247$; $p = .029$), and students with zero EFC ($\sigma = 0.528$; $p = 0.000$). At the end of students' second year on campus, we find that TSLC significantly increased feelings of mattering to campus among students of color ($\sigma = 0.332$; $p = 0.020$), white students ($\sigma = 0.281$; $p = 0.013$), first-generation students ($\sigma = 0.298$; $p = 0.007$), female students ($\sigma = 0.384$; $p = 0.000$), students with below-median ACT scores ($\sigma = 0.425$; $p = 0.001$), and students with zero EFC ($\sigma = 0.371$; $p = 0.024$).

We test the robustness of our results for mattering to campus using the Benjamini-Hochberg procedure for multiple comparisons. When we do this, we find that, at the end of the first year, the program had a significant effect on mattering for students of color, first-generation students, first-generation students, female students, students with below-median ACT scores, and students with zero EFC. At the end of the second year, we find that the program had a significant effect on mattering for female students and students with below-median ACT scores. Overall, our findings across the four psychosocial outcomes indicate little heterogeneity in program effects. However, our sample sizes are limited when examining subgroups. Future studies should be designed to ensure researchers have enough statistical power to precisely estimate subgroup effects.

Discussion and Conclusion

We find that participating in TSLC leads to practically and statistically significant increases in students' sense of belonging to campus and feelings of mattering to campus. Put simply, participating in TSLC helps students feel a sense of affiliation to their college and helps students feel like others on campus care about and value them as individuals. These are critical indicators of students' wellbeing and offer an important reflection on the extent to which students are encountering environments that allow them to thrive as people. As institutions of higher education work to promote student success, it is critical that they focus not just on traditional measures of success like degree attainment, but also environmental indicators of success, such as students' psychosocial development. Our results suggest that building comprehensive college transition programs may be one strategy for pursuing this goal.

Our results suggest that TSLC effectively supported the transition of low-income students to college and fostered some psychosocial factors that are linked to college persistence and attainment (Swanson et al., 2020). Specifically, participation in TSLC, as compared to receiving a substantial college scholarship without additional supports, is related to large increases in both mattering and sense of belonging to campus after students' first and second years on campus. We did not find evidence of effects on

academic self-efficacy or social self-efficacy, nor did we find consistent evidence of heterogeneous effects across subgroups.

Importantly, the treatment-control contrast in our analysis is between students in TSLC and COS; students in both groups receive a generous financial scholarship that requires students meet certain academic benchmarks to maintain eligibility each year. The receipt of the scholarship alone may affect student outcomes, including psychosocial outcomes such as those studied in this article. For example, if scholarship receipt reduces students' need to work, they may be more able to participate in activities on campus, thereby increasing their feelings of belonging. Similarly, the scholarship could help counter students' feelings of imposter syndrome, as they know they were deemed academically worthy to receive a large scholarship, again increasing their sense of belonging or academic self-efficacy. Thus, our results may be smaller in magnitude than an evaluation focused on the impact of a comprehensive college transition program relative to no support. Future work should explore the impact of scholarship receipt not just on academic outcomes but on students' psychosocial outcomes as well.

It is instructive to compare our findings to those in Angrist et al. (2014, 2016, 2020). Their analysis found large impacts of receiving a scholarship from the STBF on students' postsecondary enrollment, persistence, and degree completion within six years. However, they found no significant differences between students in TSLC and students who only received the scholarship, which is the primary contrast in our analysis. There are a few reasons why we could observe large, positive impacts of TSLC relative to the COS in terms of psychosocial outcomes without yet seeing impacts of TSLC participation on completion outcomes.

First, Angrist et al. (2014, 2016, 2020) examine different cohorts as they are focusing on 6-year graduation rates of students entering college in 2012 through 2016, and their completion results are currently driven by students exposed to a relatively new program. As TSLC matured, program impacts could also grow, and we may observe significant differences in outcomes between TSLC and COS students for the cohorts examined in this study, who entered college in 2015 and 2016.

Second, we evaluate the impact of TSLC participation on students' psychosocial outcomes in their first two years, when they receive intensive support. Degree completion is not observed until two to five years later. As Yeager and Walton (2011) discuss, while interventions targeting improved psychosocial outcomes can have lasting effects, they are not a panacea that addresses all the complex, overlapping barriers students may face to success. Thus, the large gains we see in immediate psychosocial outcomes may be related to more modest changes in degree completion. There may also be fadeout of the impacts we find here after students exit the structured TSLC program, although the scholarship support extends through 5 years and students can continue to interact with TSLC staff after their second year.

Finally, different psychosocial outcomes may be more closely tied to the academic outcomes examined in Angrist et al. (2014, 2016, 2020). For instance, we do not find any effects on academic self-efficacy, which may be consistent with the lack of effects of the TSLC on college persistence. It may be that interventions, such as TSLC, that affect outcomes like mattering and sense of belonging might have limited effects on traditional indicators of college success. Continued research into the overall and differential effects

of comprehensive college transition program on students' psychosocial, academic, and long-term outcomes, and the relationships between these three types of outcomes, is needed.

While many policymakers focus solely on student outcomes as measured by retention and graduation rates, *how* students experience their campus environments is also an important outcome. Students who feel a greater sense of mattering to their campus community may be more likely to seek out enriching experiences, such as undergraduate research, study abroad, or just to ask a professor for a letter of recommendation. Students with limited prior exposure to the unspoken social mores of college in particular may be hesitant to seek out assistance from professors or other institutional agents when working to build their professional networks (Jack, 2019); by increasing students' feelings of mattering, the TSLC program may help to reduce these types of disparities and close gaps in terms of perceived collegiate experience. The psychosocial outcomes we examine should not be valued only as stepping stones to other academic outcomes, but rather as important measures of students' thriving (Schreiner, 2010, 2013) and representative of opportunities for flourishing (Brighouse et al., 2018). We argue these outcomes should be of interest to program administrators, institutional leaders, and policymakers in and of themselves in order to holistically support students and foster their success.

Given the unique design of TSLC and the setting in which the program was implemented, it is unclear whether our results generalize to other CCTPs implemented in other settings. Future research should continue to evaluate CCTPs operating in different states, at various types of institutions, and with differing program elements to replicate and extend our findings to help policymakers and program staff determine which program components are necessary for student success and which contextual features help CCTPs achieve their mission.

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