Expanding Student Success:
An Experimental Evaluation of a Comprehensive College Transition Program

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I. INTRODUCTION

Despite increases in the overall share of students attending college between 2000 and 2016 (National Center for Education Statistics, 2018), six-year graduation rates remain below 60 percent (Shapiro et al., 2018) and large gaps in graduation persist between students from different racial/ethnic backgrounds (National Center for Education Statistics, 2016; Museus, 2013), between students from high- and low-income families (National Center for Education Statistics, 2015), and between continuing- and first-generation students (Cataldi et al., 2018). Further, 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 (Ribera, Miller, Dumford, 2017; Ostrove & Long, 2007). As institutions of higher education face increasing pressure to recruit and retain students, these gaps are a growing area of concern for policymakers and administrators.

Institutions of higher education have explored a variety of strategies aimed at improving outcomes for students, including financial aid (Dynarski & Scott-Clayton, 2013), academic remediation (Valentine, Konstantpoulos & Goldrick-Rab, 2017), paired courses (Weiss et al, 2014), and learning communities (Visher et al., 2012), each with varying evidence of success. Perhaps because of increased evidence on the limits of the effectiveness of these types of interventions, universities are experimenting with comprehensive college transition programs (CCTPs) that combine financial, academic, and social support for students (e.g. Angrist et al., 2016; Scrivener et al., 2008). Importantly, while one goal of these comprehensive programs is to improve student persistence and degree completion, CCTPs are also concerned about 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. There is an emerging
body of literature evaluating the effectiveness of CCTPs for improving academic outcomes;
however, 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. 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, Autor, Hudson, & Pallais, 2016).
Scholarship recipients who attend one of the three University of Nebraska campuses must
participate in the CCTP.

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,
Kitchen, & Kezar (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, In addition, 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 of 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. 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, Stixrud, & Urzua, 2006; Kuh, Cruce, Shoup, Kinzie & Gonyea, 2008; Mayhew et al., 2016; Melguizo, 2010; Oyserman, 2015; Pascarella & Terenzini, 1991, 2005; Seldacek, 2004; Tinto, 1975; Wolf-Wendel, Ward, & Kinzie, 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, and our study examines whether TSLC was able to do so.

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). We surveyed a subset of 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 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 collect detailed information on students’ experiences 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 analyses leverage random assignment of scholarship applicants to estimate causal effects of the TSLC combined with a scholarship relative to receiving only the scholarship. We use this experimental variation to estimate the causal effect of TSLC among STBF 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, students drop out of college before the follow-up surveys were administered, or because of survey nonresponse. Fortunately, total attrition rates are very similar for the TSLC participants and non-participants among students who received the scholarship.\textsuperscript{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.

In addition to estimating the average treatment effect of participating in TSLC across all students, we estimate heterogeneous intent-to-treat 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.

\textsuperscript{1} The RCT included a third “control” arm of students who received neither the CCTP services nor the scholarship. Angrist et al. (2014; 2016) 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.
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 percent 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 across student groups.

II. DESCRIPTION OF THE TSLC INTERVENTION

The TSLC CCTP includes a variety of activities and services offered during the student’s first two years of college. These are designed to foster the academic and social wellbeing of program participants. 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 and group peer mentoring sessions in which students build personal and academic connections, and at community events, which may be purely social, academically-focused, service opportunities, or major and career exploration.
The support provided by TSLC in students’ second year is similar, but less intensive. For example, students may only take one shared academic course a semester rather than two, and students typically do not all live in the same dorm. 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.

Two other features of the TSLC make it distinctive compared to other related programs. First, it is funded by a private foundation but hosted at and administered by public, four-year universities. Second, the programs operate in the largely rural, western state of Nebraska. Most comparable programs can be found in urban settings (see Appendix Table B.1), while Nebraska has a much larger rural population than the rest of the country (average population density of 24 vs. 87 per square mile) with a higher percentage of white residents than the country as a whole (88 percent compared to 77 percent, United States Census Bureau, 2018a, b).

III. 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, Kezar, Perez, & Kitchen, 2019). 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 (Bloom & Sommo, 2005; Scrivener et al., 2008; Scrivener et al., 2015; Visher et al., 2012; Weiss et al., 2014; Evans et al., 2017; Bertrand et al., 2019).

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 (Scrivener et al., 2008; Weiss et al., 2014; Scrivener et al., 2015; Evans et al., 2017). 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; Scrivener et al., 2015; Weiss et al., 2012; Visher 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, Hemelt, and Ladd (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) find positive effects of the learning community 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 differentially benefit from participating in CCTPs at four-year institutions based on gender, race/ethnicity, parental education, and income, although the results are inconsistent across studies (Clotfelter, Hemelt, & Ladd, 2016; Evans et al., 2017; Page et al., 2017).

The Thompson Scholars Learning Community program is the only CCTP targeted at four-year institutions that has been evaluated experimentally. Angrist et al. (2016) 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. However, there was not a statistically significant difference between the TSLC group and the students who only received a scholarship on these measures (Angrist et al., 2016).

This paper 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 urbanicity. Second, 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.

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2 The 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.
Third, 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 the first experimental study to examine the impact of a CCTP operated exclusively at four-year campuses. Fourth, the majority of prior evaluations of CCTPs have focused exclusively on academic outcomes, potentially missing an important part of the student experience. By focusing on psychosocial outcomes, we provide additional nuance on the ways CCTPs affect college students.

**IV. 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 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, SACs, 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 intermediate psychosocial outcomes that the literature suggests are 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.
A. 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, 1996, p.21). In postsecondary 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). A number of empirical studies have tested the association between sense of belonging and traditional academic outcomes for first-generation and students of color (Hausman, Schofield, & Woods, 2007; Spanierman et al., 2013; Hoffman, Richmond, Morrow, & Salomone, 2002; Strayhorn, 2012).

Many of the main 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.

B. Mattering

Mattering 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 mattering 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. Mattering 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.

C. 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). He argues that self-efficacy is specific to a behavior or an outcome, and as such can be applied to, and measured in relation to, different activities. We measure both academic and social self-efficacy, two constructs that are linked theoretically and empirically to college persistence and attainment (Chemers, Hu, & Garcia, 2001; Gore, 2006; Inkelas & Associates, 2008; Krumrei, Newton, Kim, & Wilcox, 2013; Zajacova, Lynch, & Espenshade, 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, Cole, Rivera, & Hallett, 2017), and shared academic courses (Perez, Acuna, & Reason, 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.

With this conceptual understanding of our psychosocial outcomes of interest, we turn now to the specific data and methods utilized in this study.

V. DATA AND METHODS

We leverage data from a broader, mixed methods evaluation of the Thompson Scholars Learning Community (TSLC) program (Angrist et al., 2016; Cole, Kitchen & Kezar, 2019). The larger evaluation includes two cohorts of students who entered college in the 2015-16 and 2016-17 academic years. We pool data across both cohorts in all analyses presented here. We begin by describing our data sources, then discuss our analytic strategy for each research question.

A. 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.
B. 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 not been rigorously evaluated. Qualitative work conducted as part of the larger mixed methods study from which data for this study were drawn helped to inform decisions around scale development and selection (Cole, Kitchen, & Kezar, 2019). Table 2 summarizes the items included in each psychosocial construct.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Sample Item</th>
<th>Response Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belonging to Campus</td>
<td>8</td>
<td>I feel I am a member of the {INSTITUTION} community</td>
<td>1 (Strongly Disagree) – 7 (Strongly Agree)</td>
</tr>
<tr>
<td>Mattering to Campus</td>
<td>8</td>
<td>There are people at {INSTITUTION} who are generally supportive of my individual needs</td>
<td>1 (Strongly Disagree) – 7 (Strongly Agree)</td>
</tr>
<tr>
<td>Academic Self-Efficacy</td>
<td>14</td>
<td>Meet the academic demands of college</td>
<td>1 (Cannot do this at all) – 7 (Absolutely can do this)</td>
</tr>
<tr>
<td>Social Self-Efficacy</td>
<td>8</td>
<td>Make friends you can talk about your very personal problems with</td>
<td>1 (Cannot do this at all) – 7 (Absolutely can do this)</td>
</tr>
</tbody>
</table>

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 time, we calculate Rasch scores for each construct, and examine several psychometric properties of these scales. 

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3 In 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”).
scores to assess whether the scales are a good fit for our data (Andrich, 1978; Wright & Masters, 1982). Although the definition of “good fit” varies, 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 respondents (on that construct) 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

4 Rasch score construction and testing was conducted by AIR team members Samantha Nieman and Mark Masterton using WINSTEPS. The full psychometric report is available upon request.
5 Rasch reliabilities convey similar information as Cronbach’s alpha, and also range from 0 to 1, with higher values indicating greater reliability.
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 percent for the sense of belonging scale to 58.6 percent for the social self-efficacy scale, which is more than 20 percent 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 7 (strongly disagree) as more difficult to endorse than 6, a response category of 5 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 1 (strongly agree) as more difficult to endorse than 2, 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 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).

C. 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 selection bias that might affect our analysis: (a) differential enrollment, (b) survey non-response and differential response rates, and (c) differential persistence.

Table 3 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 remains 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 (Appendix Table A.1 reports the detailed breakdown of the sources of attrition). In contrast, only 30 percent 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), 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 percent vs. 57 percent). 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.

Table 3. Study samples from original funding group assignment to initial through second follow-up surveys, combined

<table>
<thead>
<tr>
<th></th>
<th># in RCT</th>
<th>% in RCT</th>
<th># Initial Survey Sampling Frame</th>
<th>% of RCT</th>
<th># Respondents, FFU</th>
<th>% of RCT</th>
<th># Respondents, SFU</th>
<th>% of RCT</th>
<th># Respondents, FFU &amp; SFU</th>
<th>% of RCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSLC</td>
<td>712</td>
<td>87%</td>
<td>622</td>
<td>68%</td>
<td>481</td>
<td>57%</td>
<td>403</td>
<td>57%</td>
<td>359</td>
<td>50.42%</td>
</tr>
<tr>
<td>COS</td>
<td>444</td>
<td>86%</td>
<td>383</td>
<td>66%</td>
<td>293</td>
<td>55%</td>
<td>245</td>
<td>55%</td>
<td>219</td>
<td>49.32%</td>
</tr>
<tr>
<td>Control</td>
<td>1680</td>
<td>70%</td>
<td>1177</td>
<td>44%</td>
<td>734</td>
<td>38%</td>
<td>638</td>
<td>38%</td>
<td>511</td>
<td>30.42%</td>
</tr>
<tr>
<td>Total</td>
<td>2836</td>
<td>77%</td>
<td>2182</td>
<td>53%</td>
<td>1508</td>
<td>45%</td>
<td>1286</td>
<td>45%</td>
<td>1089</td>
<td>38.40%</td>
</tr>
</tbody>
</table>

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.

To further investigate possible bias from differential attrition, we examined means of baseline covariates across the TSLC and COS groups. Table 4 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, the selection into the final sample does not appear to be generating systematic differences which could bias our estimates.

---

6 We 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.
Table 4: comparison of baseline characteristics by treatment status, combined cohorts

<table>
<thead>
<tr>
<th></th>
<th>Initial Survey Sample Frame</th>
<th>Respondents to First and Second Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>COS</td>
<td>TSLC</td>
</tr>
<tr>
<td></td>
<td>M or %</td>
<td>n</td>
</tr>
<tr>
<td>Female</td>
<td>62.0%</td>
<td>382</td>
</tr>
<tr>
<td>Latino/Hispanic, Any Race</td>
<td>24.9%</td>
<td>382</td>
</tr>
<tr>
<td>Black/African American Only, Non-Latino</td>
<td>5.8%</td>
<td>382</td>
</tr>
<tr>
<td>White Only, Non-Latino</td>
<td>58.4%</td>
<td>382</td>
</tr>
<tr>
<td>Other/Multiple Races, Non-Latino</td>
<td>4.7%</td>
<td>382</td>
</tr>
<tr>
<td>Unknown Race</td>
<td>2.1%</td>
<td>382</td>
</tr>
<tr>
<td>At Least One Guardian Attended College</td>
<td>23.3%</td>
<td>382</td>
</tr>
<tr>
<td>At Least One Guardian Earned a Bachelor's</td>
<td>68.1%</td>
<td>382</td>
</tr>
<tr>
<td>Took ACT</td>
<td>97.1%</td>
<td>382</td>
</tr>
<tr>
<td>ACT Composite</td>
<td>21.2</td>
<td>382</td>
</tr>
<tr>
<td>High School GPA</td>
<td>3.42</td>
<td>382</td>
</tr>
<tr>
<td>Expected Family Contribution ($)</td>
<td>2761.7</td>
<td>382</td>
</tr>
<tr>
<td>Parent's Adjusted Gross Income</td>
<td>45101.3</td>
<td>382</td>
</tr>
</tbody>
</table>

*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. P-values for funding group significance are from composite Wald tests that assignment to TSLC has no association with the variable in a regression model with targeted campus (randomization strata) by cohort fixed effects estimated using ordinary least squares.
C.1 Estimating Average 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; Shadish, Cook, & Campbell, 2002; Murnane & Willett, 2011). 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). Imputation was not used to fill in missing background information (such as race/ethnicity). Our preferred specification is given by Equation (1):

\[
Y_{it} = \beta_0 + \alpha X_i + \beta_1 TSLC_i + \tau Strata_i + \epsilon_i
\]

where \(Y_{it}\) represents the psychosocial outcome of interest in year \(t\), \(\beta_0\) 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 \(\epsilon_i\) is a stochastic error term. The coefficient of interest is \(\beta_1\), which estimates the impact of participating in TSLC on the psychosocial outcome.

---

7Students 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. Our results are not sensitive to including observations with imputed values. Results from models excluding observations with any imputed items are available upon request.
of interest.

C.2 Estimating Heterogeneous Effects

We estimate heterogeneous program effects using a model similar to Equation (1) but that includes interactions between the treatment indicator and an indicator of students’ inclusion in the subgroup if interest. 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 percent significance level and use the Benjamini-Hochberg procedure to control the false discovery rate. In this test, we rank all of the p-values of the individual coefficients in each model, sorting them from least to greatest. Each p-value is then multiplied by the number of tests (e.g. covariates) and divided by its rank. All adjusted p-values less than 0.05 are considered statistically significant.

For our analysis of heterogenous effects, we limit the analytic sample used to estimate the overall effects of the program to students with complete demographic information. This restricts our sample to 568 students, 67 percent of whom are female, 40 percent are students of color, and

---

8 We exclude 7 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 ($\beta_1$). 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.
66 percent are first-generation students. Average adjusted gross income is $46,130, with an average expected family contribution of $2,872. Among students who took the ACT, the average composite score is 23. We focus on heterogeneous effects of TSLC participation on students’ mattering to campus; results for additional psychosocial outcomes are available upon request.

VI. RESULTS

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

A. Average Program Effects

Table 5 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. We estimate TSLC students’ reported psychosocial outcomes relative to COS students’ outcomes across survey waves. Column (1) presents the first-year impact, measured at the end of the student’s freshmen year, 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.
Table 5: Impact of participating in a comprehensive college transition program on psychosocial outcomes, first and second years

<table>
<thead>
<tr>
<th>Sense of Belonging, Campus</th>
<th>End of First Year (1)</th>
<th>End of Second Year (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSLC vs. COS</td>
<td>0.165* (0.082)</td>
<td>0.170* (0.082)</td>
</tr>
<tr>
<td></td>
<td>0.189* (0.088)</td>
<td>0.179* (0.088)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mattering</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TSLC vs. COS</td>
<td>0.280*** (0.078)</td>
<td>0.280*** (0.077)</td>
</tr>
<tr>
<td></td>
<td>0.295*** (0.088)</td>
<td>0.289** (0.088)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic Self-Efficacy</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TSLC vs. COS</td>
<td>-0.088 (0.082)</td>
<td>-0.075 (0.082)</td>
</tr>
<tr>
<td></td>
<td>0.003 (0.085)</td>
<td>0.021 (0.086)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Self-Efficacy</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TSLC vs. COS</td>
<td>0.090 (0.083)</td>
<td>0.097 (0.082)</td>
</tr>
<tr>
<td></td>
<td>0.132 (0.083)</td>
<td>0.136 (0.083)</td>
</tr>
</tbody>
</table>

| N                         | 578                    | 578                    |
| Student Background        | Yes                    | No                     |
| Characteristics           |                        |                        |
| Randomization Strata     | 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.

The first panel presents the results for sense of belonging to campus. 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. The estimates for TSLC students compared to COS are large (0.165 standard deviations at the end of students’ first year and growing to 0.189 standard deviations at the end of students’ second year), even after controlling for student characteristics, and are statistically significant at the 5 percent level.

Our results also suggest that participating in TSLC increased students’ feelings of mattering to campus. Again, the magnitude of this effect is quite large, 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 percent 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.

As a robustness check, we estimated the effect of TSLC participation using doubly robust inverse propensity score weighting (Robins, Rotnizky, & Zhao, 1995; Rosenbaum & Rubin, 1993). While causal identification in this approach also relies on the fundamental assumption that we have properly accounted for selection into treatment (Bang & Robins, 2005), this approach allows us to relax some of the functional form assumptions embedded in the OLS specification. The results of the inverse propensity score weighting analysis closely mirror our findings from our preferred OLS estimation. Specifically, we find the program led to an increase in students’ sense of belonging to campus by 0.175 (0.197) standard deviations at the end of student’s first (second) year on campus, feelings of mattering to campus by 0.292 (0.307) standard deviations in their first (second) year, and had no significant impact on either academic or social self-efficacy. Full results from propensity score analyses are available upon request.
B. Heterogeneous Program Effects

Table 6 presents the impact of the program on students’ sense of mattering for each subgroup examined. We find suggestive evidence that the program was more effective for traditionally underserved student populations.

Table 6: Effect of assignment to TSLC on sense of mattering to campus across subgroups

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>End of First Year</th>
<th>End of Second Year</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students of Color</td>
<td>0.585***</td>
<td>0.332*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.125)</td>
<td>(0.143)</td>
<td></td>
</tr>
<tr>
<td>White Students</td>
<td>0.111</td>
<td>0.281*</td>
<td>568</td>
</tr>
<tr>
<td></td>
<td>(0.099)</td>
<td>(0.113)</td>
<td></td>
</tr>
<tr>
<td>P-value, subgroup difference</td>
<td>0.003</td>
<td>0.776</td>
<td></td>
</tr>
<tr>
<td>First Generation</td>
<td>0.318**</td>
<td>0.298**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td>(0.111)</td>
<td></td>
</tr>
<tr>
<td>Continuing Generation</td>
<td>0.250</td>
<td>0.305*</td>
<td>568</td>
</tr>
<tr>
<td></td>
<td>(0.132)</td>
<td>(0.150)</td>
<td></td>
</tr>
<tr>
<td>P-value, subgroup difference</td>
<td>0.681</td>
<td>0.969</td>
<td></td>
</tr>
<tr>
<td>Female Students</td>
<td>0.311**</td>
<td>0.384***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.096)</td>
<td>(0.109)</td>
<td></td>
</tr>
<tr>
<td>Male Students</td>
<td>0.260</td>
<td>0.139</td>
<td>568</td>
</tr>
<tr>
<td></td>
<td>(0.134)</td>
<td>(0.151)</td>
<td></td>
</tr>
<tr>
<td>P-value, subgroup difference</td>
<td>0.757</td>
<td>0.190</td>
<td></td>
</tr>
<tr>
<td>Below-Median ACT</td>
<td>0.329**</td>
<td>0.425***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.109)</td>
<td>(0.123)</td>
<td></td>
</tr>
<tr>
<td>Above-Median ACT</td>
<td>0.247*</td>
<td>0.159</td>
<td>568</td>
</tr>
<tr>
<td></td>
<td>(0.113)</td>
<td>(0.128)</td>
<td></td>
</tr>
<tr>
<td>P-value, subgroup difference</td>
<td>0.599</td>
<td>0.134</td>
<td></td>
</tr>
<tr>
<td>Zero EFC</td>
<td>0.528***</td>
<td>0.371*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.144)</td>
<td>(0.164)</td>
<td></td>
</tr>
<tr>
<td>Below-Median EFC</td>
<td>0.159</td>
<td>0.154</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.134)</td>
<td>(0.152)</td>
<td>568</td>
</tr>
<tr>
<td>Above-Median EFC</td>
<td>0.233</td>
<td>0.382**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.127)</td>
<td>(0.144)</td>
<td></td>
</tr>
<tr>
<td>P-value, subgroup differences</td>
<td>0.144</td>
<td>0.489</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05, **p<.01, ***p<.001

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 fixed effects included in all analyses. Standard errors in parentheses.

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 (σ=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 ($\sigma=0.371; p=0.024$).

The consistently positive and significant program effects for students of color, first-generation students, female students, students with below-median ACT scores, and students with zero EFC at the end of students’ first and second years on campus indicate that the program was particularly effective at helping traditionally underserved populations feel that they mattered to campus. This pattern of results is consistent with Walton and Cohen (2011), who found an intervention aimed at increasing students’ sense of belonging had a larger effect on black students than white students. Our findings are also consistent Evans et al. (2017) who found larger effects of a CCTP at a two-year college on low-income students and students of color than their higher-income and white peers, respectively.

We also test the robustness of our results 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.
We conduct post-hoc tests to examine whether the effect estimates across groups are significantly different from each other. For example, at the end of students’ first year on campus, we find a 0.585 standard deviation increase in mattering for students of color and an insignificant 0.111 standard deviation increase in mattering for white students. The difference between these point estimates is statistically significant at the 1 percent significance level (p=0.003). However, this difference fades by the end of students’ second year on campus. We estimate that participating in the TSLC program increased students of color’s sense of mattering to campus by 0.332 standard deviations at the end of their second year on campus, and white students’ sense of mattering to campus by 0.281 standard deviations at the end of their second year on campus. Post-hoc tests indicate that these point estimates are not distinguishable from each other. Simply put, at the end of the second year, the benefits of the TSLC program experienced by students of color and white students are not distinguishable from each other. In general, the point estimates between subgroups are not statistically different from each other at conventional levels of significance. While our results suggest that historically minoritized student populations experience the largest increase in mattering as a result of the TSLC program, future studies should be designed to ensure researchers have enough statistical power to precisely estimate subgroup effects.

VII. DISCUSSION AND CONCLUSION

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. 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.

It is instructive to compare our findings to those in Angrist et al. (2014; 2016). 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.

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) examine different cohorts, beginning with students entering college in 2012, and their completion results are 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 four 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.

Finally, different psychosocial outcomes may be more closely tied to the academic outcomes examined in Angrist et al. (2014; 2016). 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.

However, while many policymakers focus 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. 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.

Our findings that the program had larger effects on students of color and students from low-income backgrounds are consistent with evaluations of other CCTPs (e.g. Evans et al., 2017; Weiss et al., 2014), although the literature as a whole is unsettled regarding the question of differential effects of CCTPs. We add to this conversation by demonstrating that TSLC had larger impacts on female students, first-generation students, and students with lower prior achievement as well as students of color and students from low-income backgrounds. Our findings suggest that comprehensive college transition programs implemented at predominately white institutions can fulfill two important policy goals simultaneously: first, to improve student
outcomes and experiences overall, and, second, to increase equity in how students from historically privileged and underserved populations experience the campus environment.

Ongoing multi-method evaluations of TSLC suggest that our findings may be driven by students’ engagement with specific program elements as well as the manner in which program staff and faculty interacted with students through the program. In particular, case study evidence suggests that shared living or office space, regular meetings with TSLC staff and peer mentors, and opportunities to reflect on and receive guidance about academic and personal development, as well as some of the small shared courses with program peers taught by carefully selected faculty contributed to the increases we observe in students’ sense of belonging and feelings of mattering. The large impact on mattering is also consistent with preliminary results from the longitudinal case study that documents an ethic of care and validation embedded throughout the multiple activities that the students were exposed to throughout the duration of the program (Rendón, 1994; Hallett, Reason, Toccoli, Kitchen, & Perez, 2019).

Given the unique design of TSLC and 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 our findings 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.
REFERENCES


National Center for Education Statistics (2016). Table 326.10: Graduation rate from first institution attended for first-time, full-time bachelor’s degree-seeking students at 4-year postsecondary institutions, by race/ethnicity, time to completion, sex, control of institution, and acceptance race: Selected cohort entry years, 1996 through 2010. *Digest*


https://buffettscholarships.org/

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research.

*Review of Educational Research, 45*(1), 89-125.


United States Census Bureau (2018a). *Quick Facts: Nebraska.* Retrieved from

https://www.census.gov/quickfacts/NE


https://www.census.gov/quickfacts/fact/table/US/PST045218


**APPENDIX A**

**Table A.1: Decomposition of survey non-response by rates of attrition versus dropout**

<table>
<thead>
<tr>
<th>Reason for dropping</th>
<th>TSLC (N=712)</th>
<th>COS (N= 444)</th>
<th>Control (N= 1680)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Cumulative Attrition</td>
<td>N</td>
</tr>
<tr>
<td>Not in original sample frame (not enroll at NU)</td>
<td>90</td>
<td>12.64%</td>
<td>61</td>
</tr>
<tr>
<td>Not in NU at time of FFU (exited by FFU)</td>
<td>21</td>
<td>15.59%</td>
<td>19</td>
</tr>
<tr>
<td>In NU at FFU, did not respond to FFU</td>
<td>120</td>
<td>32.44%</td>
<td>71</td>
</tr>
<tr>
<td>Not in NU at time of SFU (exited after FFU)</td>
<td>38</td>
<td>37.78%</td>
<td>47</td>
</tr>
<tr>
<td>In NU at SFU, did not respond to SFU (responded to FFU)</td>
<td>84</td>
<td>49.58%</td>
<td>27</td>
</tr>
</tbody>
</table>

*Note*: TSLC: Thompson Scholars Learning Community. COS: College opportunity scholarship (students randomized to scholarship-only condition). Sample sizes reflect original randomization (Angrist et al., 2016). 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.
## APPENDIX B

### Table B.1: Description of comprehensive college transition programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Location</th>
<th>Program Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Doors Learning Communities</td>
<td>Kingsborough Community College, Brooklyn, NY</td>
<td>One-semester program targeted towards students majoring in Liberal Arts and late applicants; offers clustered courses, a first-year seminar, increased faculty engagement, academic counseling, tutoring, book vouchers, and social events.</td>
</tr>
<tr>
<td>Carolina Covenant</td>
<td>University of North Carolina-Chapel Hill</td>
<td>Need-based program offering a loan-free aid package for up to 8 semesters; provides faculty mentoring, career advising, social events, peer mentoring, summer academic support, professional clothes, and connections to on-campus resources.</td>
</tr>
<tr>
<td>Dell Scholars program</td>
<td>National (all students selected as Dell Scholars)</td>
<td>Need-based scholarship of up to $20,000; provides a laptop, funds for textbooks, academic monitoring/advising, and targeted support based on student need.</td>
</tr>
<tr>
<td>Accelerated Study in Associate Programs (ASAP)</td>
<td>9 City University of New York campuses</td>
<td>Three-year program that requires students to enroll full-time and provides financial assistance (last dollar funding up to cost of attendance), academic advising, tutoring, shared courses in the first year, and a one-semester course focused on soft skills.</td>
</tr>
<tr>
<td>EASE STEM learning community</td>
<td>University of California-Irvine</td>
<td>Targeted intervention aimed at all first-year students with a 600 or lower SAT score; requires students to take a shared developmental chemistry class, provides shared discussion sections for introductory biology and chemistry, and provides peer academic counseling.</td>
</tr>
<tr>
<td>Stay the Course</td>
<td>Trinity River Campus of Tarrant County, Fort Worth, TX</td>
<td>Case management program that assigns each students a 'navigator'/mentor with whom they work throughout their time on campus to develop goals and action plans; navigators also connect students with tutors, financial aid, external resources; students may also apply for emergency financial aid.</td>
</tr>
<tr>
<td>Thompson Scholars Learning Communities</td>
<td>University of Nebraska system (Omaha, Kearney, and Lincoln)</td>
<td>Need-based intervention offering a college scholarship (up to $5,550 a semester depending on credits); provides shared courses, academic monitoring/advising, peer mentoring, shared living and/or resource spaces, social events, career advising, volunteering, and a first-year seminar.</td>
</tr>
<tr>
<td>One Million Degrees</td>
<td>Chicago, IL (10 community colleges)</td>
<td>Provides a last-dollar scholarship, weekly tutoring, first-year seminar, academic advising, coaching from a local volunteer, career exploration, career-focused workshops, and wraparound personal support from individual Program Coordinators.</td>
</tr>
</tbody>
</table>