



IJRSLCE

International Journal  
of Research on  
Service-Learning &  
Community Engagement

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Volume 12 | Issue 1

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# Service-Learning in the First Year

*Enhanced Retention and Graduation Rates for First Year and Transfer Students from Underrepresented Groups*

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## Recommended Citation

Martinez, M. V., & Wyels, C. (2024). Service-Learning in the First Year: Enhanced Retention and Graduation Rates for First Year and Transfer Students from Underrepresented Groups. *International Journal of Research on Service-Learning and Community Engagement*, 12(1). <https://doi.org/10.37333/001c.127556>

**Service-Learning in the First Year**  
*Enhanced Retention and Graduation  
Rates for First Year and Transfer Students  
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**Abstract**

This study constitutes an assessment of the service-learning program at a minority-serving institution, using data spanning nine years. It focuses on two student populations: those who enrolled as first-time students and the larger population of students who transferred from other institutions, primarily two-year colleges. Within these groups, we examine the effects of service-learning in the first year on Latinx/Hispanic students, low-income students, and other underrepresented student subpopulations on first-year retention and on graduation rates. Using propensity score analysis with full matching techniques means this study may be considered a quasi-experimental design in the cases for which strong balance is obtained. Results indicate that service-learning increases first-year retention rates and increases two types of graduation rates in each case demonstrating strong balance and significance. Results for Hispanic students are particularly notable.

**Keywords:** *service-learning, college students, first-generation, Latino/Hispanic, low-income, minoritized students, transfer students*

**Aprendizaje-Servicio en el Primer Año**  
*Incremento en las Tasas de Retención y  
Graduación de Estudiantes de Primer  
Año y Transferencia de Grupos  
Subrepresentados*

Marco V. Martínez y Cynthia Wyels

**Resumen**

Este estudio constituye una evaluación del programa de aprendizaje-servicio en una institución que sirve a minorías, utilizando datos que abarcan nueve años. Se centra en dos poblaciones estudiantiles: aquellos que se inscribieron como estudiantes por primera vez, y la población más grande de estudiantes que se transfirieron de otras instituciones, principalmente entidades educativas de dos años. Dentro de estos grupos, examinamos los efectos del programa de aprendizaje-servicio en el primer año en estudiantes Latinx/Hispanos, estudiantes de bajos ingresos y otras minorías estudiantiles con respecto a la retención en el primer año y en las tasas de graduación. Se usó el análisis de puntuación de propensión con técnicas de emparejamiento completo, para los casos en los que se encontró un equilibrio fuerte este estudio se puede considerar como un diseño cuasi-experimental. Los resultados indican que el programa de aprendizaje-servicio aumenta las tasas de retención en el primer año y aumenta dos tipos de tasas de graduación en cada caso, presentado un fuerte equilibrio y resultados significativos. Los efectos en los estudiantes hispanos son particularmente notables.

**Palabras clave:** *Aprendizaje-servicio, estudiantes universitarios, primera generación, Latino/Hispano, bajos ingresos, estudiantes minorías, estudiantes de transferencia*

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“Progress in the national college completion rate has stalled.” Thus begins the most recent *Completing College* report, publicizing a 62.3% six-year completion rate for the student cohort that enrolled in fall 2016 (Lee & Shapiro, 2023). Meanwhile, students of color, low-income students, and first-generation students are less likely to graduate from colleges and universities than their peers. The National Center

for Education Statistics' data on students who enrolled as first-time full-time students at four-year institutions in fall 2014 (latest available) indicate that six-year graduation rates were 62% for White students, 58% for Hispanic/Latinx students, and 41% for Black/African American students. Among students receiving a Pell Grant—an indicator of low socioeconomic status—the six-year graduation rate was 52%; it was 74% for those not receiving a Pell Grant (National Center for Education Statistics, 2021a). First-generation students had a six-year graduation rate of 49%, compared to 66% for non-first-generation students (*ibid.*). The subpopulations of racially/ethnically minoritized students, low-income students, and first-generation students have significant overlaps, as pervasive disparities in higher education achievement mirror disparities in socioeconomic status and current and historical access to higher education for those from racially/ethnically minoritized groups (American Psychological Association, 2012; Redford & Hoyer, 2017). These figures demonstrate a need to improve college completion rates across the board as well as to address the persistent gaps in graduation rates of groups historically marginalized in higher education.

While underrepresented (racially/ethnically minoritized, low-income, and first-generation students) students are present in virtually all institutions of higher education (IHEs) in the United States, specific types of institutions enroll such students in numbers far beyond their proportion within higher education. Historically Black colleges and universities (HBCUs) comprise less than 3% of all U.S. IHEs yet enrolled 9% of Black students in 2021 (National Center for Education Statistics, 2021b, p. 2). As of the academic year 2021–22, Hispanic-serving institutions (HSIs) comprise 19% of U.S. IHEs yet enrolled 62% of all Latino undergraduates in the United States (*Excelencia in Education*, 2022). Tribal colleges and universities enrolled 8.7% of all American Indian and Alaska Native college students in the United States in 2020, despite comprising only 0.8% of the IHEs in the United States (U.S. Department of Education, 2020). The overlap between racially/ethnically minoritized and low-income status applies. In 2012, African American students, American Indian students, and Latino students comprised the three racial/ethnic groups receiving the largest percentages of Pell Grants, at 62%, 54%, and 50% respectively (National Center for Education Statistics, 2015).

Two-year institutions enroll far more than their share of underrepresented students. In fall 2019, 57% of all students enrolled in public two-year colleges were non-White, compared to 44% in public four-year institutions and 32% in private nonprofit four-year institutions (National Center for Education Statistics, 2021a). Similarly, 43% of all students enrolled in public two-year colleges came from families with an income of less than \$40,000, compared to 28% in public four-year institutions and 23% in private nonprofit four-year institutions (*ibid.*). Additionally, 44% of all students enrolled in public two-year colleges were first-generation students, compared to 33% in public four-year institutions and 21% in private nonprofit four-year institutions (*ibid.*). These statistics suggest that including the data for degree completion for students who transfer from two-year colleges to four-year institutions are an important equity consideration.

### **Service-Learning, Retention and Graduation, Underrepresented Students**

High-impact practices are associated with enhanced student outcomes (Kuh et al., 2005). A meta-analysis of 62 studies on service-learning in both K-12 and higher education provides evidence that student participation in service-learning is associated with positive outcomes in five areas: attitudes toward self, school and learning, civic engagement, social skills, and academic achievement (Celio et al., 2011). Astin et al. (2000) examine longitudinal data on a national sample and find significant positive effects on grade point average (GPA), writing skills, and critical thinking skills. Warren (2012) cites several studies demonstrating positive effects in thinking and personal or civic development and finds “positive effects on many aspects of students’ lives including cultural awareness, social responsibility, and student cognitive learning outcomes.” Yorio and Ye (2012) also report a medium effect of service-learning on students’ cognitive development and a small effect on students’ understanding of social issues and personal insights. A 2019 review of the literature indicated that service-learning enhanced students’

academic achievement, cognitive development, communication and interpersonal skills, and civic learning (Salam et al., 2019).

Quantitative studies examining the impact of service-learning guide additional research in this direction. One study assessed first-year retention for 685 students across 11 Indiana Campus Compact institutions, finding that service-learning increased first-year retention, although the effect disappeared when controlling for students' self-reported intentions to graduate from the same institution (Bringle et al., 2010). A study of 2,727 students in two entering cohorts at an urban, public R1 institution in the Midwest found that students taking the service-learning option of two general education courses exhibited a significant positive effect on student retention, GPA, and graduation (Mungo, 2017), with self-selection bias unlikely to have been a factor. This result was consistent when the student population was disaggregated across four racial categories. Another study on approximately 4,500 students indicated higher rates of successful course completion and next-semester reenrollment rates for the roughly 900 students who participated in service-learning over three semesters (Hill et al., 2014). A study of 2,295 full-time students who entered a large, urban public university in the mid-Atlantic region of the United States in 2005 and persisted to at least their third year found that the students engaged in service-learning in years three through six earned more credits, had a higher average GPA, and graduated at higher rates (Lockeman & Pelco, 2013). A report from institutional researchers at a large, public R2 university in the Western United States examined five enrollment cohorts of first-year students as well as seniors, with mixed results (some positive, some negative, some inconclusive) between those taking service-learning and those not taking service-learning on four- and five-year graduation rates and one-year retention rates for those enrolling as first-year students. They also found higher one-year graduation rates or one-year retention rates for service-learning-taking seniors (Leimer et al., 2009). For first-year-enrolling (FYE) students, taking at least one service-learning course in the first year has been shown to be positively correlated with first-year retention (Reed et al., 2015; Song et al., 2018). Song et al. (2018) also show positive effects for FYE students on four-, five-, and six-year graduation rates, in line with previous studies (Lockeman & Pelco, 2013; Yue & Hart, 2017).

Several researchers have also assessed the effect of service-learning on students from underrepresented populations. Song et al. (2017) hypothesized that service-learning can be effective in closing attainment gaps between such students and their peers. Their study followed one first-year cohort of 5,368 students at a large Midwestern research university across five years, examining the effect of service-learning on GPA, units earned, retention, and graduation. The results indicated some positive relationships overall and included some negative relationships when considered by college (i.e., related majors) and by underrepresented status. In Song et al. (2018), the authors assessed the potential effect of service-learning in the first year on GPAs, credits earned, retention, and four-to-six-year graduation rates on two cohorts. Positive and significant effects associated with service-learning were found for four-year graduation for underrepresented students from both cohorts. Mungo (2017) asked whether "race moderated the effect of service-learning on graduation," and concluded that service-learning did not reduce racial disparities in graduation but did increase the chances of graduation for all students.

## Theoretical Framework

We consider Tinto's (1993) integration model with Astin's (1993) input-environment-output theory. Tinto's work suggests that students' initial commitment to their goals and their academic and social integration in alignment with the cultural values of their institutions shape their likelihood of success. A robust service-learning program that incorporates community partners in the students' home communities may hasten students' social integration with their institution and their understanding of shared cultural values. Astin's model hypothesizes that students' background characteristics (input) together with the nature of the students' involvement in the college environment are important factors in determining student outcomes. It posits that students achieve social integration—a sense of belonging—to the institution through the activities in which they engage. Prior research makes a strong case for service-learning benefiting students' sense of belonging and social integration (Reason, 2009; York & Fernandez, 2018).

Additional thinking on the impact of service-learning on minoritized populations influences this study. First, Song et al. (2017) hypothesize that service-learning can be effective in closing attainment gaps between underrepresented students and their peers. Second, service-learning experiences in students' first-year enrollment can enhance retention and graduation by providing opportunities for early social integration (Bringle et al., 2010). Finally, Soria et al. (2019) argue that service-learning opportunities that view students' home communities through an asset lens may enhance students' sense of belonging. Indeed, service-learning courses that are culturally relevant and focus on service to students' home communities could strengthen students' commitment to their educational goals through demonstrating how their goals can benefit their home communities.

Researchers who have examined service-learning vis-à-vis underrepresented groups have called for further study. For example, Song et al. (2018) argue that "further research on the role of early-years participation in service-learning among students from underrepresented groups is warranted." A similar recommendation for further research as to whether service-learning has differential impacts on low-income students may be found in Soria et al. (2019). This study assesses the effect of students taking service-learning courses during their first year enrolled on first-year retention and on graduation using institutional data from a public regional HSI in the Western United States. It considers both transfer students and those enrolling as first-year students (FYE students). Considering transfer outcomes is important for multiple reasons. The student population at some institutions—especially at regional public universities—consists of large percentages of transfer students. For example, 38% of the roughly 45,000 new students enrolling in the California State University (CSU) in fall 2022 were transferred from two-year colleges; total transfer enrollment in the CSU is typically around 60% of all undergraduates (The California State University, 2022). Examining outcomes for transfer students is also important in terms of capturing possible differences in outcomes for underrepresented students; as noted earlier, students underrepresented across one or multiple categories tend to enroll first at two-year colleges at higher rates than their non-minoritized peers.

## **This Study**

This study investigates whether there is an influence on multiple student success measures for students taking service-learning courses during their first year enrolled at a midsize, regional public university. (The institution is described further in "Institutional Context," below.) We are particularly interested in any impact of service-learning on retention and graduation for students from marginalized or underrepresented/underserved populations. We explore this potential influence for both FYE students and for transfer students. Our research questions are as follows:

1. Does taking at least one service-learning course during the first year enrolled correlate with increased first-year retention, four-year graduation rates or 6-year graduation rates for (a) all FYE students or (b) for FYE students from multiple underrepresented groups?
2. Does taking at least one service-learning course during the first year enrolled correlate with increased first-year retention, two-year graduation rates or four-year graduation rates for (a) all students who enrolled as transfers or (b) for transfer students from multiple underrepresented groups?

Within each of the FYE and transfer student populations, we consider four subpopulations:

1. Latino/Hispanic students
2. Low-income students
3. Underrepresented students, that is, all students belonging to categories deemed underrepresented by the U.S. Department of Education: racial/ethnic minorities, low-income, and first-generation college students
4. Non-Hispanic underrepresented: students deemed underrepresented as in (3) yet excluding all Hispanic students.

The first two subpopulations are particular targets of the U.S. Federal Government's Title III and Title V HSI grants. The third is generally of interest in efforts to overcome historical and systemic disadvantages leading to lower levels of achievement in higher education. Finally, given that Hispanic students comprise

a majority of the underrepresented subpopulation in our dataset, we also examine the subset of underrepresented students obtained by omitting Hispanic students.

We incorporate propensity score analysis (PSA), a technique with great utility for studying the outcomes of interventions in higher education, where equitable access rules out randomized control trials. PSA allows researchers to make causal inferences from observational studies under certain preconditions (Shiba & Kawahara, 2021).

This study contributes to the literature due to the following factors:

- It employs techniques that constitute a quasi-experimental design, achieving strongly balanced treatment and control groups without omitting data.
- It assesses an entire service-learning program at an institutional level, using only readily available institutional data, thus replicable at midsize and larger institutions.
- The institution is a public regional HSI.
- The study examines a large population of roughly 7,000 transfer students.

Students from racially/ethnically minoritized populations form a majority of both the FYE and the transfer populations in the sample, as do low-income students. The FYE population includes 38.1% first-generation students while the transfer population includes 33.5% first-generation students. (“First-generation” here means those who report no parent attended college, a more restrictive definition than that of the National Center for Education Statistics, which defines first-generation students as those with no parent who completed a four-year college degree.)

## Methods

To assess this institution’s service-learning program for student success outcomes, we consider the national literature on variables associated with student success, the context of the institution, and the variables available via the institutional research office. In accordance with the national literature on factors known to correlate to student success (e.g., D’Amico & Dika, 2013), we include gender, race and ethnicity, socioeconomic status, first-generation student, status, and academic preparation. Students’ self-identification as Hispanic and any low-income status is important to any HSI. The local context also influences the graduation metrics chosen. For FYE students, six-year graduation is of greater interest than four-year graduation at many public regional universities. We include both, as well as two-year and four-year graduation rates for transfers among our outcome measures.

### **Institutional Context for Service-Learning**

The institution featured in this study is a midsize, regional public university in the Western region of the United States. It is a federally recognized HSI. The student body is majority non-White, majority Hispanic, majority low-income, and majority first-generation (no parent completed college). The university distinguishes between service-learning, volunteerism, and community engagement. It structures its service-learning program in alignment with the tenets of critical service-learning. Critical service-learning embraces the political nature of service, “examining systems of power, privilege, and oppression, questioning biases and assumptions, and working to dismantle the tools that perpetuate social and economic oppression and entrenched racial hierarchies” (Center for Community Engagement, n.d.). Critical service-learning encourages students to critique and respond to systems of inequity and injustice in communities while encouraging students to see themselves as agents of change (Mitchell, 2008). The university’s policy document codifying its practice in service-learning defines service-learning as “a high-impact teaching and learning strategy in which meaningful service addresses a critical societal and/or social justice issue and is a critical component of course curriculum and assessment of student learning. It is characterized by critical reflection and a collaborative partnership among the instructor, students, and community, with a focus on both student learning and community impact” (California State University Channel Islands, 2022).

Analysis of the university's community partners across a four-year period coinciding with the data collection for this study found that all partner sites were located in the university's county or an adjacent county. 87% of the partners were nonprofit organizations (including public educational institutions); 5% were government related (public libraries and health clinics); 5% were faith-based organizations targeting people experiencing homelessness or material poverty; 3% focused on arts, culture, or humanities. This study examines differential outcomes for students taking service-learning courses during their first year enrolled. For FYE students, these are typically general education courses, while some also serve as introductory courses for particular majors. Even when a service-learning course is an introductory major course, the majority of the students enrolled are likely to be taking it for general education credit. Accordingly, most FYE students may be assumed to have chosen the course, although anecdotal information suggests they frequently do not know they are choosing service-learning. Transfer students enrolling in service-learning courses are more likely to be enrolling in courses in their major, some of which may be required. Transfers also have an upper-division general education component that may be satisfied by nonmajor service-learning courses. Availability of service-learning courses at all levels is high: most courses fill after registration closes, if at all.

## Data and Samples

Institutional data regarding demographic information and participation in service-learning courses were provided for all students enrolling between spring 2012 and spring 2021 (inclusive). Data cleaning removed observations such as those representing students not enrolled long enough to assess first-year retention or the graduation rate in question or reflecting student characteristics outside our research questions (e.g., admission type other than FYE or transfer). Information regarding Pell Grant eligibility is used as a marker for low-income status; incoming GPA reflects academic preparation.

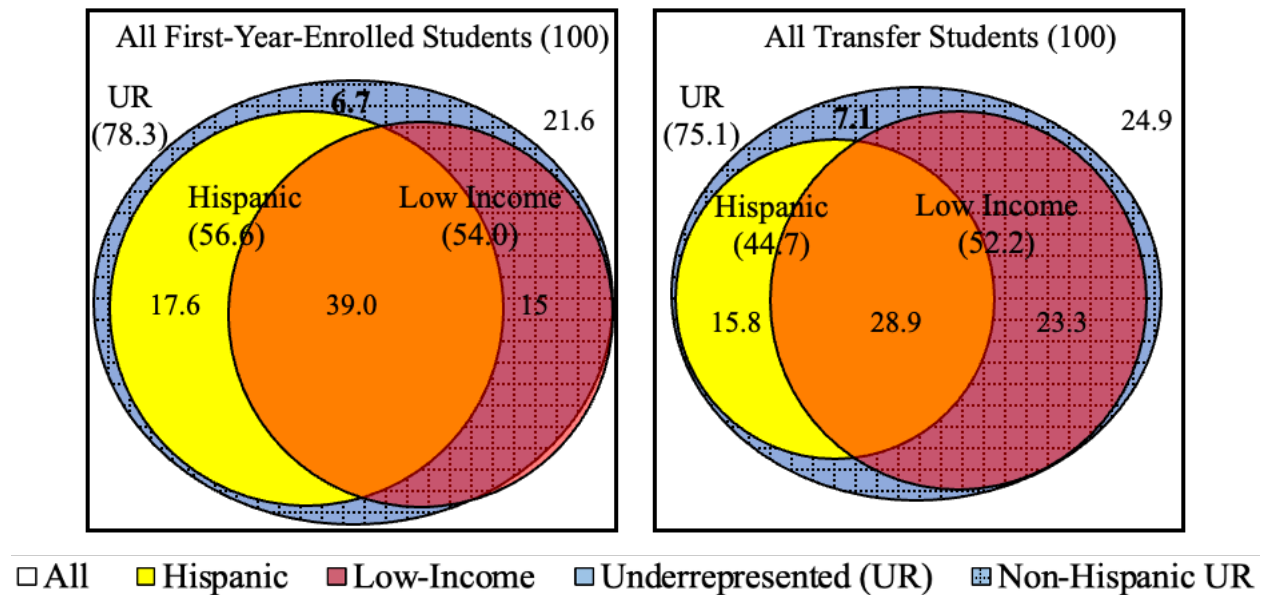
There are 6,900 students in the data categorized as FYE students. Of these 45.4% took at least one service-learning course in their first year, 68.9% were female, 54.0% were low-income, 38.1% were first-generation students, 56.6% were Hispanic, 23.7% were White, 5.7% were Asian, and 8.8% belonged to other non-White racial/ethnic categories. The mean incoming GPA of these students was 3.23.

The data contain 7,897 transfer students. Of these, 20.9% took at least one service-learning course in their first year, 60.1% were female, 52.2% were low-income, 33.5% were first-generation students, 44.7% were Hispanic, 34.7% were White, 5.3% were Asian, and 7.4% belonged to other non-White racial/ethnic categories. Their mean incoming GPA was 3.04.

The Venn diagrams in Figure 1 indicate the percentages of each student group belonging to the four subpopulations associated with our research questions and their intersections: Hispanic (yellow), low-income (red), underrepresented ("UR," blue), and non-Hispanic underrepresented (grid background). The Hispanic (yellow) and low-income (red) subpopulations comprise part of the underrepresented (blue) subpopulation. Areas in the diagrams are roughly proportional to the percentages associated with the areas. Values in parentheses are total percentages for that subpopulation; numbers without parentheses represent the percentage of students who belong only to that subpopulation. For example, for transfer students (Figure 1 on the right), the underrepresented (UR) subpopulation is 75.1% of the total transfer population, 15.8% are transfer students who are Hispanic but not low-income, 23.3% are transfer students who are low-income but not Hispanic, 28.9% are transfer students who are Hispanic and low-income, and 7.1% are underrepresented transfer students who are neither Hispanic nor low-income.

**Figure 1.**

*Percentages for Each Subpopulation for FYE and Transfer Students.*



### Data Analysis via PSA

We use PSA to account for potentially confounding variables and selection bias. Indeed, as explained below, PSA can overcome selection bias and pre-existing differences in student characteristics among the treatment and control groups when some technical conditions are satisfied. Finally, PSA allows researchers to make causal inferences from observational studies under certain preconditions (Lanza et al., 2013; Pan & Bai, 2015, 2018; Stuart, 2010).

PSA has gained a wide following in medical and epidemiological contexts among researchers seeking to make causal inferences from observational studies (Shiba & Kawahara, 2021). In education, where withholding interventions from a control group poses ethical questions or where students self-select to participate in an intervention, PSA methods on observational studies allow researchers to mimic the characteristics of a randomized controlled trial (RCT). In RCTs, randomized assignment seeks to ensure that the analysis of outcomes will not be marred by baseline characteristics that are distributed differently among the intervention and control groups. Researchers using PSA adjust intervention and control groups to balance those same baseline characteristics before performing outcome analysis. This results in the effects of confounding variables and self-selection being minimized or even eliminated. PSA incorporates design separation: Estimation of treatment effects is not performed until the variables are sufficiently balanced between the intervention and control groups. Choices made by researchers while carrying out PSA are thus not influenced by the outcomes. Additionally, when the balance between groups is sufficiently strong and other necessary assumptions are met, we may infer causality due to the intervention (Lanza et al., 2013; Pan & Bai, 2015, 2018; Stuart, 2010). Indeed, in Rosenbaum and Rubin's seminal paper proposing the method (1983), the authors write "Both large and small sample theory show that adjustment for the scalar propensity score is sufficient to remove bias due to all observed covariates." While PSA techniques assume that there are no unmeasured confounding variables, the same assumptions hold for RCTs and multivariable output regression.

Researchers must assess the balance of their post-matching intervention and control groups via a predetermined criterion. The standardized mean difference (SMD) is the standard numerical tool used to assess the balance of covariates between groups (Austin, 2011; Zhao et al., 2021). SMDs are not influenced



by sample size and allow the comparison of variables measured using different units. The What Works Clearinghouse (U.S. Department of Education, Version 5.0, 2022) requires SMDs less than 0.25 for a study to earn the label quasi-experimental design; this threshold is advocated elsewhere (Rubin, 2001; Stuart, 2010). The most conservative practitioner found recommends using a threshold of 0.1 (Austin, 2011).

The simplest method in propensity score matching is nearest neighbor matching, in which each unit in the treatment group is matched with a corresponding unit in the control group (Pan & Bai, 2015; Rosenbaum & Rubin, 1983). A major problem with this methodology is that it will discard observations when any are not matched (Stuart, 2010). We employ full matching methods thus incorporating the entire set of individuals. Full matching is considered an optimal matching method as it minimizes the average distances between intervention and control individuals within each matched set (Austin & Stuart, 2015; Hansen, 2004; Rosenbaum, 1991; Stuart, 2010).

When using full matching techniques, the researchers may calculate the average effect of treatment for those who receive treatment (Greifer & Stuart, 2021; Stuart et al., 2011). G-computation, which uses a maximum likelihood substitution estimator (Robins, 1986), is used to calculate an unbiased estimation of causal effects (Hernan, 2004; Snowden et al., 2011). Like other techniques in causal inference, the G-computation approach separates the estimation of effects related to the research question of interest from the estimation of parameters that are not directly relevant (such as the effects of confounding variables) (Snowden et al., 2011; Stuart et al., 2011).

## Results

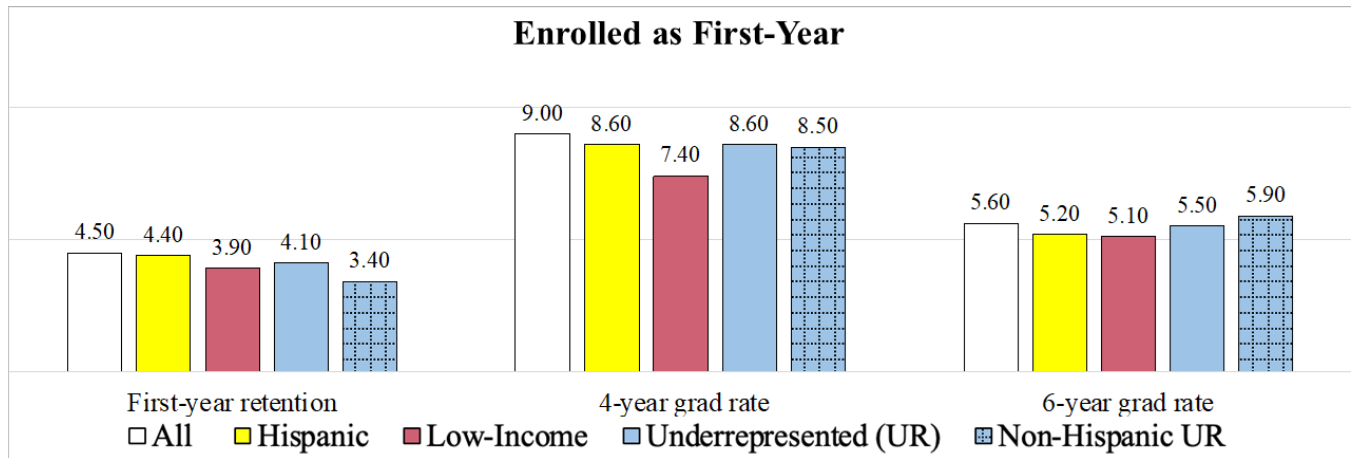
Comparisons of outcomes prior to applying analytical techniques, an outline of how we analyzed one subpopulation, and full results along with notes on limitations of this study follow in this section.

### Raw Differences in Outcome Measures

Our initial calculations provide the raw differences in student success outcome measures for our main populations (FYE students and transfer students) and for subpopulations of each (Hispanic, low-income, underrepresented, and non-Hispanic underrepresented). For FYE students, the outcome measures are first-year retention, four-year graduation, and six-year graduation. For transfer students, we examine first-year retention, two-year graduation, and four-year graduation. Figures 2 (FYE students) and 3 (transfer students) give the raw difference in each outcome between students who took service-learning in their first year enrolled and those who did not. In every case, percentages are positive, indicating that students who took service-learning courses in their first year had higher success rates than those who took no service-learning in their first year. However, this naïve approach does not account for selection bias or any variables other than taking or not taking service-learning in the first year enrolled.

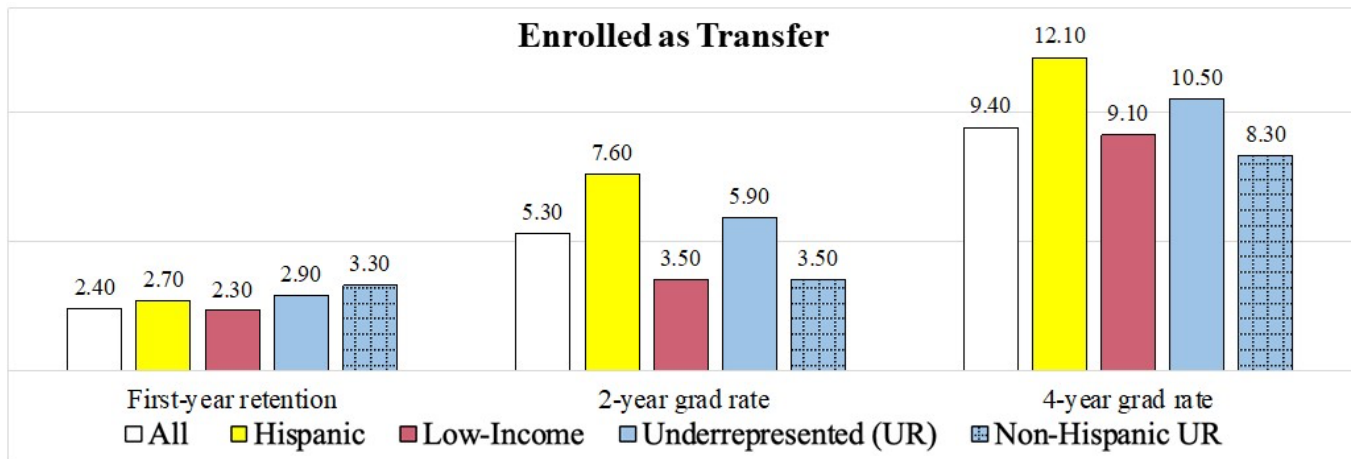
**Figure 2.**

*Raw Percentage Increase in Success Outcomes Corresponding to Service-Learning for FYE Students.*



**Figure 3.**

*Raw Percentage Increase in Success Outcomes Corresponding to Service-Learning for Transfer Students.*



**Matching and Balance of Matched Groups**

We turn to PSA on each subpopulation. For each analysis, we used full matching with a propensity score estimated using a probit regression of the treatment on the covariates. No observations were discarded by the matching. Recall that a standard criterion for assessing balance is to require that all SMDs for the covariates do not exceed 0.25, while more conservative researchers advocate that balance be accepted only for SMDs not exceeding 0.1. Assessing balance on paired and square interaction terms of the covariates provides another assessment of balance, one that typically produces higher SMDs than does simply examining the covariates. Consider the SMDs for all matched groups—across three outcome measures each for FYE and for transfer students and for the four subpopulations of each. In every case, the maximum SMD for individual covariates was below 0.1. When we included SMDs for paired and square interaction terms, the maximum SMD was below 0.25 in all instances. For FYE students, the maximum SMD was

below the conservative 0.1 threshold 90% of the instances; the same was true for transfers 87% of the instances. In short, the matched groups exhibited excellent balance.

**Example: Estimating the Treatment Effects—First-Year Retention of All FYE Students**

We illustrate the analytical process using the first-year retention of FYE students. To estimate the treatment effect and its standard error, we fit a linear regression model to the balanced groups with first-year retention as the outcome, and the treatment of “took a service-learning course in the first year enrolled,” the covariates, and their interactions as predictors. We included the full matching weights in the estimation. We then performed G-computation on the matched sample to estimate the average treatment effect of the treated. A cluster-robust variance was used to estimate its standard error with matching stratum membership as the clustering variable.

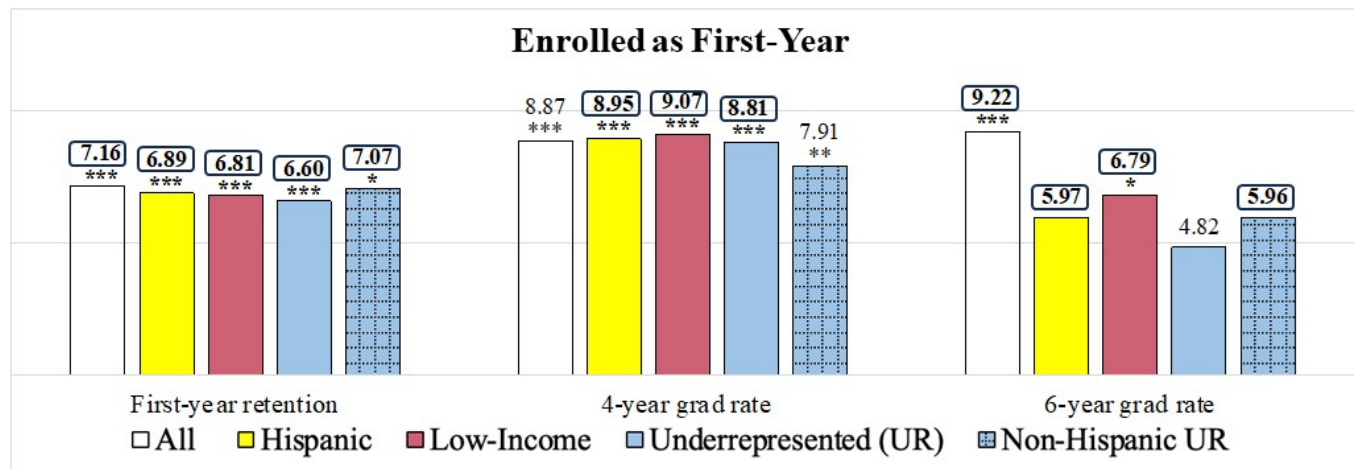
For the first-year retention of FYE students, the estimated effect was 7.16 (with a standard error of 0.0132, and  $p < 0.001$ ), indicating that the average effect of the treatment for those who received it was to be retained at a rate that is 7.16 percentage points (pp) higher than they otherwise would have been. In fact, the raw percentage difference for all FYE first-year retention of 4.50% is exceeded here by 2.7 pp, suggesting that selection bias and confounding masked a higher increase in first-year retention due to FYE students taking service-learning in their first year.

**Full Results**

The method outlined above was used to assess all outcome measures pertaining to our research questions. Figures 4 and 5 give the full results, which we summarize below each figure. Notably, the effect of taking service-learning in the first year is positive for each outcome measure and each subpopulation. That is, taking service-learning in the first year enrolled produced higher rates for every outcome measure, for every group examined. Furthermore, several of the increases exceeded the raw percentage point increases resulting from comparisons between the groups (shown previously in Figures 2 and 3). These larger increases are boldfaced and boxed in Figures 4 and 5.

**Figure 4.**

*Percentage Increases in Success Outcomes due to Service-Learning for FYE Students.*



\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , no stars:  $p \geq 0.05$ .

Boldfaced values indicate greater percentage increases due to service-learning than observed in the raw data (Figure 2).

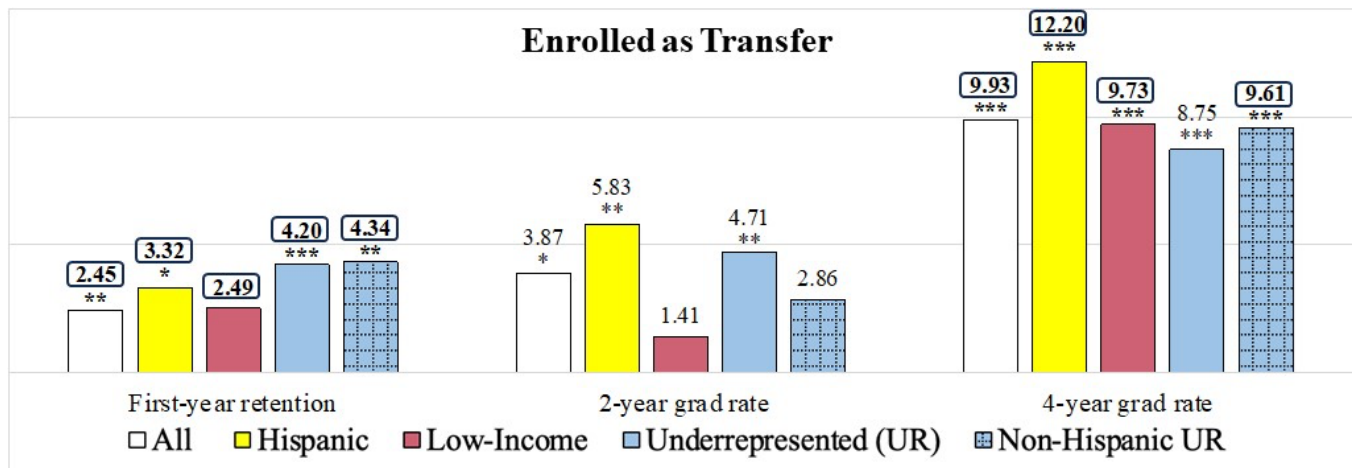
Some highlights observable in Figure 4 pertaining to FYE students are noted below.

- Service-learning in the first year enrolled accounted for increases in FYE student first-year retention of between 6.60 pp and 7.16 pp for all subpopulations studied. In each case, the increase was greater than that observed in the pre-analysis raw comparison. The significance was good ( $p < 0.05$ ) in all cases and excellent ( $p < 0.001$ ) in four of five cases.
- Service-learning in the first year enrolled accounted for increases in FYE student four-year graduation of between 7.91 pp and 9.07 pp for all subpopulations studied. In three cases (Hispanic, low-income, and underrepresented students), the increase was greater than that observed in the pre-analysis raw comparison. The significance was high ( $p < 0.01$ ) in one case and excellent ( $p < 0.001$ ) in the remaining four cases. Here we see increases for three of the four subpopulations that exceed the increase for all students—notable both for those wishing to close attainment gaps, and in that this excess was not observable in the raw comparisons.
- Service-learning in the first year enrolled accounted for increases in FYE student six-year graduation of between 4.82 pp and 9.22 pp for all subpopulations studied. Only two cases (all FYE and low-income FYE students) are significant ( $p < 0.001$  and  $p < 0.05$  respectively); both cases show increases greater than the raw comparisons.
- Three six-year graduation differences had higher p-values: 0.050 for Hispanic, 0.074 for UR, and 0.169 for non-Hispanic UR. They are included merely to share that in all cases, the rates associated with service-learning exceed those associated with no service-learning.

We now turn to the results for transfer students.

**Figure 5.**

*Percentage Increases in Success Outcomes due to Service-Learning for Transfer Students.*



\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , no stars:  $p \geq 0.05$ .

Boldfaced and boxed values indicate greater percentage increases due to service-learning than observed in the raw data (Figure 3).

These results include the following observations pertaining to transfer students.

- Service-learning in the first year enrolled accounted for increases in transfer first-year retention of between 2.45 pp and 4.34 pp. In four cases, the increase was greater than that observed in the pre-analysis raw comparison. The significance was good ( $p < 0.05$ ) for Hispanic students, high ( $p < 0.01$ ) for all students and for non-Hispanic underrepresented students, and excellent ( $p < 0.001$ ) for underrepresented students. The corresponding p-value for low-income students was 0.052, making

this increase worth reporting. It is notable that the increases are larger for all four underrepresented subpopulations than for all students.

- Service-learning in the first year enrolled accounted for increases in transfer two-year graduation of 3.87 pp for all transfer students, 5.83 pp for Hispanic transfers, and 4.71 pp for underrepresented transfers. The significance was high ( $p < 0.01$ ) in two cases (Hispanic and underrepresented transfers) and good ( $p < 0.05$ ) in the other reportable case (all transfers). While the data indicated increases of 1.41 pp and 2.86 pp for the other two subpopulations, the p-values were too high to consider these significant.
- Service-learning in the first year enrolled accounted for increases in transfer four-year graduation of between 8.75 pp and 12.02 pp for all subpopulations studied. In all but one case (underrepresented students), the increase was greater than that observed in the pre-analysis raw comparison. The significance was excellent ( $p < 0.001$ ) in all five cases. Particularly notable is the 12.20 pp increase for Hispanic students, exceeding the 9.93 pp increase for all transfers: This is truly an indicator of potential for closing attainment gaps.
- The lowest increases found—low-income first-year retention, low-income and non-Hispanic two-year graduation—did not have reportable significance levels; they are included merely to share that all differences between service-learning and non-service-learning groups are positive.

### **Limitations**

The large number of students in the dataset enabled the use of analytical techniques that account for confounding variables and self-selection. However, the study aggregated students across several years, potentially masking trends that could change over time. Another limitation is due to the potential inconsistency of individual service-learning courses' adherence to the definition used by the institution. Indeed, knowledgeable campus personnel report some "drift" from service-learning standards in some courses over the years: They note that some courses tagged as service-learning are now better-considered community engagement courses. This drift could strengthen the results found, if one assumes that true service-learning courses provide higher benefits to students than do the alternatives. Our understanding of when students chose to take a service-learning course in their first year enrolled is murky; we do not know when students made a choice among many options, when students were unaware that their course choice was a service-learning course, or when they were taking courses required for the majors. Finally, the study did not incorporate students' majors, as disaggregating by major would have resulted in groups too small for our analysis methods. Yet not accounting for majors, knowing that some majors directly engage in critical assessment of societal inequities and systems of powers and that these majors also offer service-learning electives or requirements, is a limitation of the study.

### **Discussion**

Graduation rates—and an intermediate measure, retention rates—are used to assess institutional performance by governmental and accreditation agencies and funding sources. A focus on these metrics is also motivated by recognizing the potential of higher education to break cycles of social and economic inequity, an ongoing debate regarding the balance between public and private investment in higher education, and the burdens imposed upon students and families who incur educational debt without realizing their educational goals. Lower graduation rates observed for students from underrepresented subpopulations are a cause for concern and intervention, particularly as the demographics of the potential U.S. college-going population indicate increases in the ratios of the subpopulations that have generally experienced lower graduation rates.

This study indicates that taking service-learning courses in the first year enrolled can increase graduation and retention rates for both FYE students and for transfer students. It finds positive correlations between service-learning and these student outcomes for all students and for students from Hispanic, low-income, underrepresented, and non-Hispanic underrepresented subpopulations. Significant effect sizes for

some important metrics are large (e.g., just below 7 pp to over 9 pp for FYE six-year graduation and from just under 8 pp to over 12 pp for transfer four-year graduation). The significance of the results is outstanding ( $p < 0.001$ ) in half the analyses and is good ( $p < .05$ ) in 80% of the analyses. Due to the use of PSA techniques, service-learning may be inferred to be causal in these outcomes. In several cases, the gain in success rates outpaces the corresponding gains for all students, indicating that service-learning has the potential to close attainment gaps for underrepresented students. For example, Hispanic transfer students' four-year graduation rate increases by 12.20 pp, compared to the 9.93 pp increase for all transfers. Similar outpacing of the gains seen for all students is also observable for several underrepresented subpopulations that historically have lower graduation and retention rates.

The nature of the student body at the institution studied allowed for a focus on some important subpopulations. Other studies combine racial/ethnic minorities, first-generation students, and Pell-eligible students into one all-encompassing “underrepresented student” status. The dataset allowed for the separation of three or four confounding markers of underrepresentation to examine populations for which these markers intersect. The study also makes novel contributions through its detailed results on transfer students and on students who are underrepresented across several axes. Regional and national initiatives to make college more affordable typically focus on access to two-year colleges followed by transfer to four-year institutions. Transfer students have long comprised the majority of the student body in the nation's largest four-year university system (The California State University, 2022). In this same system, nearly half of the undergraduates are low-income, half are from underrepresented racial/ethnic minoritized groups, and nearly one-third are the first in their families to attend college<sup>1</sup>—a profile similar to that of the institution in this study. For institutions with similar demographics, the results of this study are encouraging indeed: Service-learning not only generally increases first-year retention and graduation, but it does so in greater measure for several subpopulations of students for which these measures have lagged. In *Closing the Gap*, Mungo (2017) found a tide that lifts all boats; this study finds that service-learning reduces attainment gaps for some subpopulations.

We suspect that the positive effects due to service-learning interventions for students from underrepresented populations in our study may be partly attributable to three factors: (1) the nature of the service-learning opportunities paired with the characteristics of the student body; (2) a cultural match between students' backgrounds, the institution, and the service-learning opportunities; and (3) the contribution of service-learning to developing a sense of belonging. Bringle et al. (2010), Lockeman and Pelco (2013), Mungo (2017), and Song et al. (2017, 2018) all conducted studies at predominantly White institutions (PWIs). In Song et al. (2017), service-learning experiences are described as being “largely defined by White faculty [to serve] White students” (p. 31); the authors note that underrepresented students are likely to benefit less from associated boundary-crossing experiences than their non-minoritized peers, thus possibly explaining the lower effect for underrepresented students in the PWIs in these studies. The institution in our study, by contrast, enrolls a student body that is majority non-White and majority Hispanic as well as majority low-income; it is also majority first-generation (no parent completed college). Almost all students come from the surrounding region. The service-learning opportunities are embedded in communities that are also majority non-White and Hispanic; the community partners serve predominantly low-income populations. While boundary-crossing is presumably reduced, the institution's focus on critical service-learning—when the goal of encouraging students to see themselves as change agents is achieved—may strengthen the commitment of students from these communities to complete their degrees.

Stephens et al. (2012) outline a cultural mismatch theory, contrasting the independent norms of typical middle-class context such as “a focus on individual development, personal choice, and self-expression” with the interdependent norms of typical working-class contexts such as “adjusting to and responding to others' needs and connecting to others.” These authors argue that first-generation students tend to come from primarily working-class backgrounds. Their findings indicate that American colleges and universities “reflect the pervasive middle-class norms of independence that are foundational to American society.” Additional findings show that a cultural mismatch (an alignment with interdependent norms) was associated

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<sup>1</sup> Using the more restrictive “no parent attended college” definition.

with lower grades, with construing academic tasks as more difficult, and with performance gaps on those tasks. Other work aligns Latino culture with interdependent norms (Arevalo et al., 2015; Niemann et al., 2000) and indicates that, more generally, students of color face cultural mismatch challenges at PWIs (Guiffrida et al., 2012).

HSIs, in contrast with PWIs, are expected to foster a culturally affirming campus climate through practices and policies. Pelco et al. (2014) suggest that students whose cultural backgrounds embrace interdependent norms may—if they view service-learning as aligned with these norms—benefit more from service-learning than other students. Other research supports the hypothesis that “service-learning works best when it is culturally relevant, when students’ unique identities and experiences are validated, and when students see their [service-learning experience] ... [as] useful for solving problems in their communities” (Soria et al., 2019). A qualitative study of Hispanic, first-generation low-income students exploring such students’ use of cultural wealth to succeed in college examined their aspirational capital, an aspect of which is the desire to better one’s family and community. Seven of eight study participants spoke about their commitment to using education to better their communities (Hasendonckx, 2019). The students in this quantitative study who share similar characteristics may benefit from their early service-learning experiences by making early connections between their academic experiences and their communities.

Students’ participation in service-learning is likely to enhance their sense of belonging at the institution. A vast literature connects a sense of belonging with academic achievement, including retention and graduation (e.g., Strayhorn (2018) surveys this research). Service-learning can benefit lower-income students by enhancing their sense of belonging, as service-learning allows such students to “establish deeper connections to their peers, faculty, institution and greater community” (Soria et al., 2019, p. 10). York and Fernandez (2018) found a quantitative correlation between the sense of belonging and service-learning for transfer students across multiple institutions. Soria et al. (2019) discuss how service-learning that employs a deficit lens may further alienate students and diminish the likelihood of their developing a sense of belonging. By contrast, critical service-learning views students and their home communities through an asset lens. Finally, Museus et al. (2017) identify *cultural community service*—the description of which encompasses service-learning—as an aspect of *culturally engaging campus environments*, which positively influence sense of belonging.

HSIs have an important role in the national higher education picture. Between 1996 and 2016, overall enrollment in IHEs in the United States increased by 5%, while Hispanic enrollment increased 18%, and Latino enrollment at HSIs increased 284% (The Postsecondary National Policy Institute, 2021). Six-year graduation rates at HSIs lag national rates; increases similar to those found in our study will make a difference.

We recommend that institutions enrolling large numbers of transfer students, low-income students, and students from other underrepresented categories make service-learning a part of students’ expected course load early in their studies. Our recommendation extends that of York (2016), who states that institutions seeking to increase the success of low-income first-generation students should ensure these students are provided critical service-learning experiences. Infusing service-learning into the curriculum early can alleviate the issue of differential access to high-impact practices being dependent on time and financial resources. We further recommend that institutions consider the climate of their service-learning program, ensuring that students and minoritized communities are viewed through an asset lens, and that community partners are considered knowledge holders and equal partners in educating students during their service-learning experiences.

## Concluding Comments

We model methods appropriate for analyzing service-learning at institutions that collect student-level data on service-learning courses. Examining outcomes for transfer students incorporates a population critical to improving student outcomes nationally, particularly at regional public institutions. The results presented show positive relationships between taking service-learning courses in the first year and retention and graduation for both transfer and FYE students, across several demographic groups of interest. Using

propensity score matching techniques and meeting a strict matching criterion suggest that the influence of taking service-learning courses in the first year has a causal positive influence on student outcomes. In particular, the exceptionally strong matching results for Hispanic students together with the positive and significant increases in all six outcome measures suggest that the culturally affirming environment of an HSI amplifies the positive impact of service-learning for such students. While service-learning appears to benefit all students, the positive outcomes seen for Hispanic students, together with trends in enrollment and enhanced Hispanic student degree completion has potential to move national college completion rates beyond the plateau on which they are currently “stalled” (Lee & Shapiro, 2023).

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### Acknowledgments

We are indebted to Pilar Pacheco, director of the Center for Community Engagement at California State University Channel Islands, for her work building an exemplary critical service-learning program, for sharing her insights into service-learning, and for motivating this study. Robert Trujillo, Jennifer Mota, and Juan Rosete, Summer 2021 Undergraduate Research Fellows, carried out the initial data cleaning, munging, and exploration. Indeed, it was Robert's careful regression analysis of the data on many important subpopulations that first revealed the high efficacy of service-learning for students from minoritized populations in our data. We thank Alejandra Castillo for guiding Robert and the authors toward sound statistical reasoning while engaged in regression-based analysis of the data. Robert's results motivated us to apply PSA techniques and—on again finding excellent results—to share the findings with a wider audience of service-learning researchers and practitioners. Finally, we are very grateful to Dr. Dennis

Downey and two anonymous reviewers for providing invaluable feedback and suggestions to improve the manuscript.

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