



Assessing the Impact of High Impact Practices Using Propensity Score Matching

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IUPUI

What we plan to do...

- Background
- Methods
- Study Results
- Implications and Discussions



Sam H. Jones (SHJ) Community Service Scholarship Goals

- Recruit and retain students who demonstrate commitment to community service and civic involvement
- Support the personal development, academic achievement, and civic commitment of Service Scholars
- Involve Service Scholars to increase the participation of IUPUI students, faculty and staff in civic engagement
- Strengthen campus-community partnerships through the ongoing involvement of IUPUI students, faculty and staff in community organizations
- What is the impact of SHJ program on student success?

Sam H. Jones (SHJ) Community Service Scholarship Goals

- Provide funding for a student scholar to assist faculty/staff with the additional time and added effort that is required for developing and implementing community engaged teaching, research, and scholarship. This funding helps faculty/staff develop as community engaged scholars and teachers and helps build capacity for community engaged learning opportunities in the curricular and co-curricular setting.
- Provide student scholars with a mentoring and engaged learning opportunity to develop their knowledge, skills, and abilities as Civic-Minded Graduates.

2019-2020 SHJ Scholarship Programs

Scholarship Type	Description
Alternative Break Trip Leaders and Co-Coordinators	Scholars are fully engaged in the planning and implementation of a quality alternative spring break trip. The experience promotes continued learning for both the trip leader and the participants while broadening individual leadership skills and perspectives.
Bonner Leader Scholars (3 cohorts)	Using a cohort model, Scholars support a variety of community organizations and pursue their interest in social issues such as food insecurity, community development, education and sustainability. Scholars assist in implementing various campus-wide service events.
Community Service Leaders (CSLs)	CSLs are responsible for the planning of campus-wide service events and the mentoring of Bonner Scholars. The program is designed to identify leaders who are best suited for leading specific events and programs based on their knowledge, skills, expertise, and interests.
Family Schools and Neighborhood Scholars (FSNE)	Scholars works with FSNE staff to build and to strengthen community partnerships that address community-identified issues. The scholars engage in research, projects, and activities to assist in furthering the goals of neighborhood quality-of-life plans while also serving as student advocates for community engagement on the IUPUI campus.
Fugate Scholars	Fugate Scholars implement various college preparatory curricula to students in grades 5–12 at GWCHS and neighboring elementary schools.
Paws Scholars	Paw's Scholars assist the Office of Student Advocacy and Support to oversee the operations of the on-campus food pantry and clothing closet, which supports those experiencing basic needs insecurity.
Service Learning Assistant (SLA) Scholars	The SLA program is unique in that CSL makes the award directly to a faculty or staff member. The awardee identifies a student as a recipient of the scholarship. This support enables high quality student mentoring opportunities and improves SLA Scholars' civic learning, critical thinking, and time/project management skills. Faculty/staff outcomes include enhanced community-engaged scholarly practice and increased capacity for sustainable community-campus partnerships.



2018-19 SHJ Scholars Demographics Overview

SAM and SLA

SAM Scholars

- Total Number of Scholars in the SAM Programs*: 73
- Majority are Female: 77% (IUPUI overall = 58%)
- Majority are White: 66% (IUPUI overall = 72%)
- Over a third (34%) are persons of color (IUPUI overall = 28%)
- Overall Retention = 96%
- Overall GPA = 3.28

*Alt Breaks, Bonners Years 1 & 2, CSL Leaders, FSNE, Fugate, Paws, Service Corp

SLA Scholars

- Total Number of Scholars in the SLA Program: 70
- Majority are Female: 74% (IUPUI overall = 58%)
- Majority are White: 61% (IUPUI overall = 72%)
- Nearly 40% are persons of color (IUPUI overall = 28%)
- Retention = 96%
- GPA = 3.38



Image Credit: IUPUI Center for Service and Learning

Alternative Break Program Scholars plan and lead service trips within the United States.



Methodology

- Undergraduate students who participated in the SHJ program in Fall 2017 (n=113).
- Explored the effect of program participation on outcome measures, one-year retention and fall semester GPA.
- In order to assess the true impact of the SHJ program, the propensity score matching method was used to minimize confounding factors such as gender and academically preparedness, as well as selection-bias.



How do we minimize
Selection Bias?

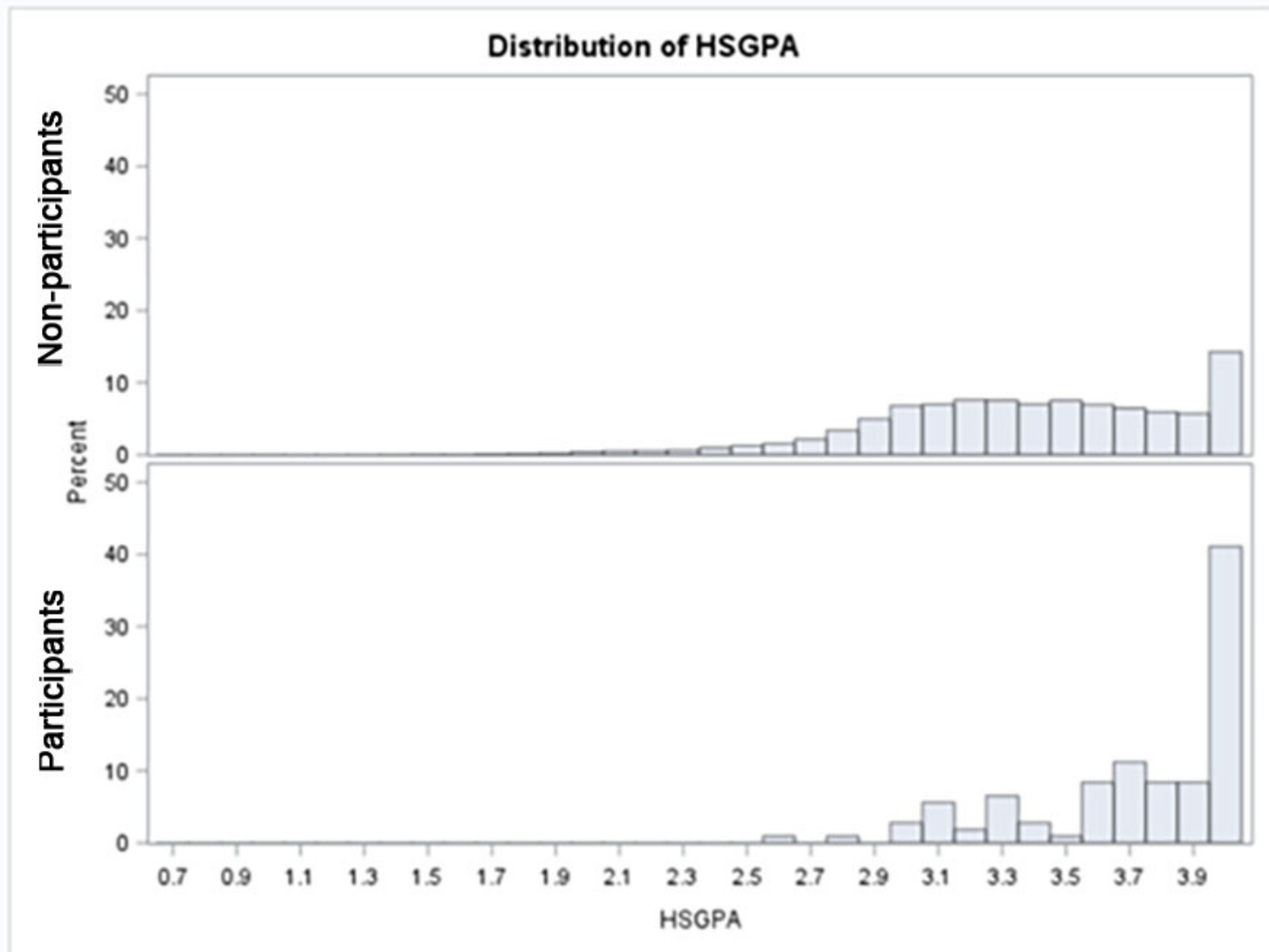
Why is Matching
Important?

Confounding Factors?



High School GPA

Fall 2017 SHJ participants and non-participants



Are SHJ Participants Different from Non-Participants?

Compared to Fall 2017 undergraduate degree-seeking students who were non-participants, students participating in the SHJ program were significantly ($\alpha < 0.01$):

- More likely to be **female** (72.6% vs 55.6%)
- More likely to be **attending full-time** (97.4% versus 84.5%)
- More likely to be **living in campus housing** (24.8% vs 12.6%)
- More likely to have **lower unmet financial need**
- More likely to be a **direct admit** (60.2% vs 42.7%)
- Be more academically prepared, with **higher high school GPA** (3.72 vs 3.37) and **higher SAT scores** (1200 vs 1116)



Implying Causal Inferences



“Three Identical Strangers” Documentary



Propensity Score Matching (PSM)

Process in PSM

- Specified a list of confounding variables that may be related to both the treatment assignment and the outcome.
- Fit a logistic regression model, which in turn, was used to estimate the probability that a student would have been a SHJ participant. This probability is called the propensity score.
- Students with exact or similar propensity scores were paired.
- Test assumptions
- After a treatment group and control group have been defined, t-tests and chi-square tests were performed to compare retention rates and GPA between the two groups.



Process in PSM

113 non-participants was matched 113 SHJ participants
based on the following characteristics:

- Gender
- Received Annual Pell award (Y/N)
- Annual unmet need amounts
- Direct admit (Y/N)
- Admit type
- Underrepresented ethnicity (Y/N)
- First Generation Status (Y/N)
- Course load (Full-time/Part-time)
- Living in campus housing (Y/N)
- School of major
- Student class level (i.e., Sophomore)
- Standardized high school GPA/transfer GPA



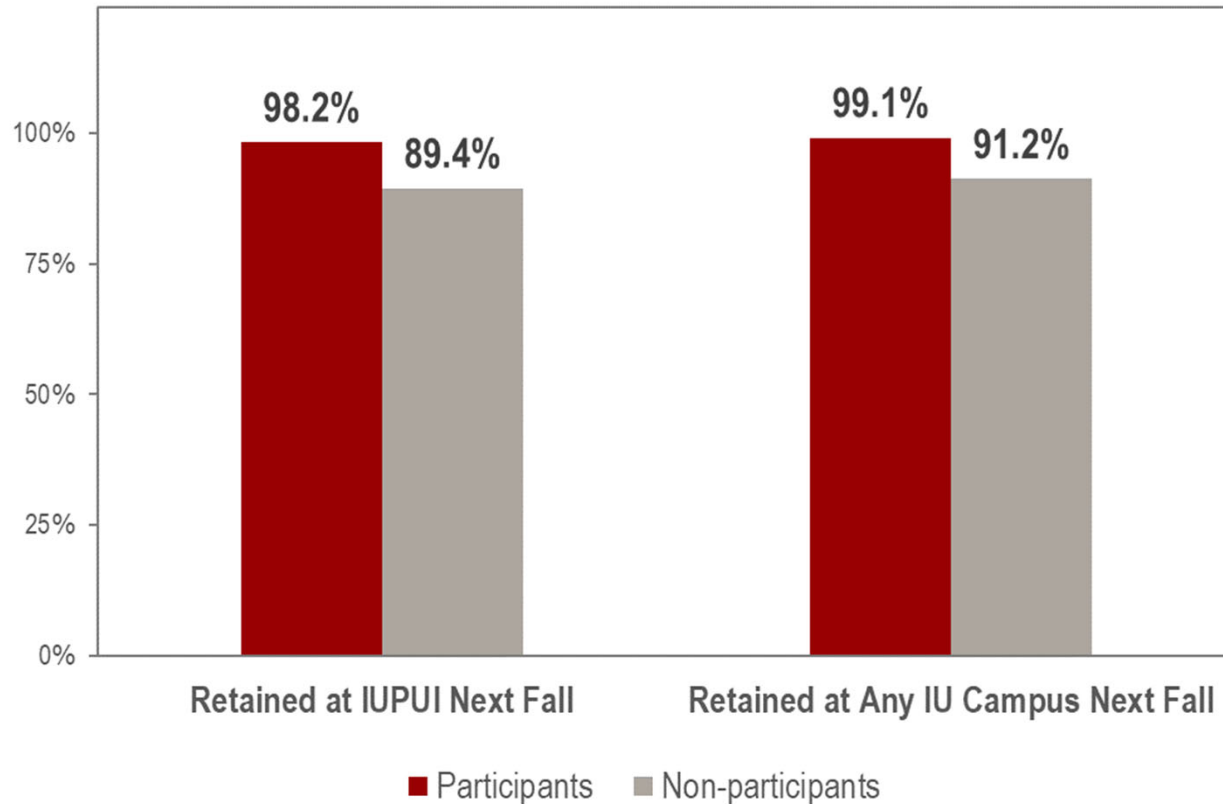
Propensity Score Matching (PSM) - Example

	SHJ Scholar	Not SHJ Scholar
	Student A	Student B
Gender	Female	Female
Ethnicity	White	White
Direct admit	No	No
Admit type	New First Time	New First Time
Class level	Junior	Junior
Course load	Full-time (16 credits)	Full-time (17 credits)
School	School of Nursing	School of Nursing
Living in campus housing	Yes	Yes
Unmet Need Amount	\$0	\$0
Pell Received	Yes	Yes
First Generation	Yes	Yes
HS GPA	4.0	4.0



One Year Retention

Fall 2017 SHJ Participants versus Non-participants

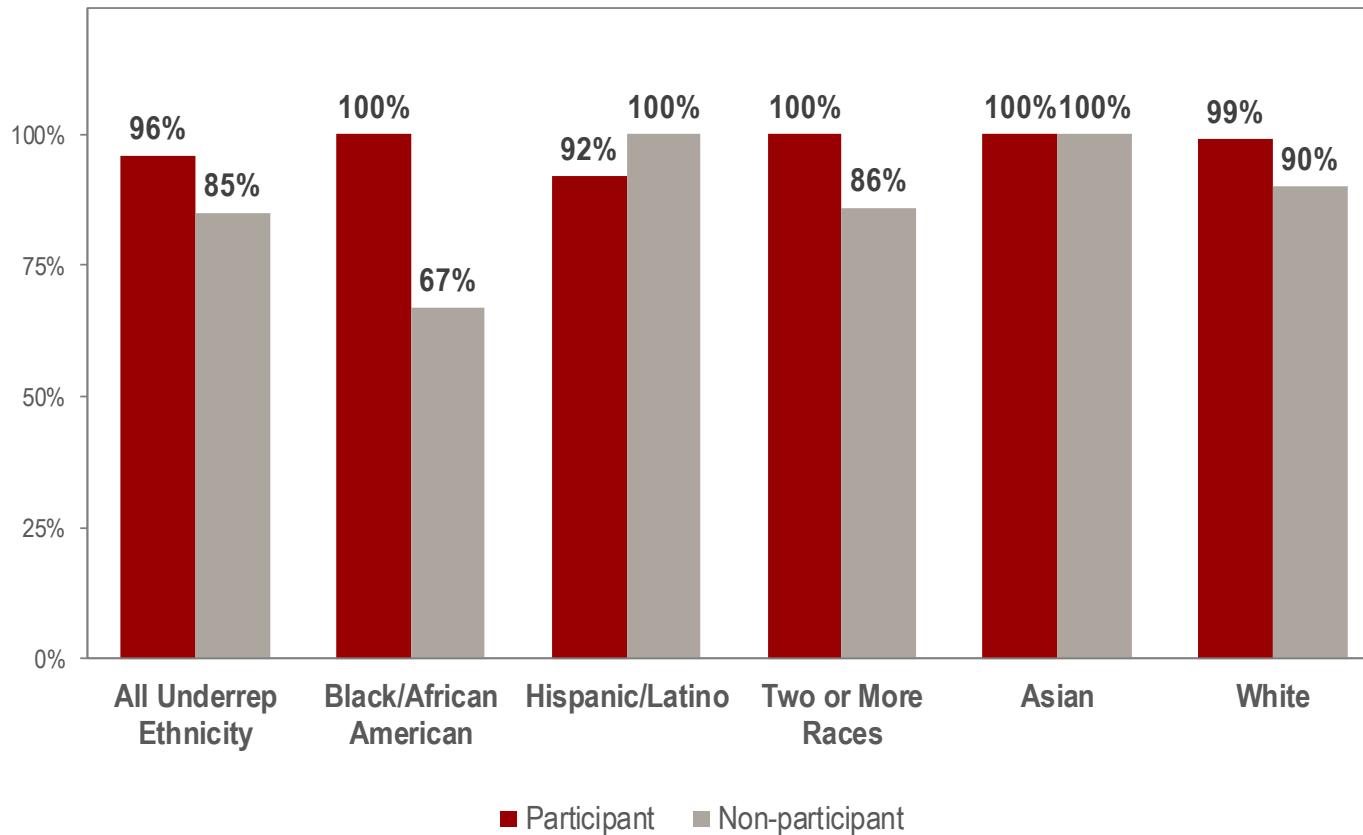


There was an 8.8 percentage point increase in fall-to-fall retention at IUPUI and 7.9 percentage point increase in fall-to-fall retention at any IU campus as a result of participating in the SHJ program.



One Year Retention

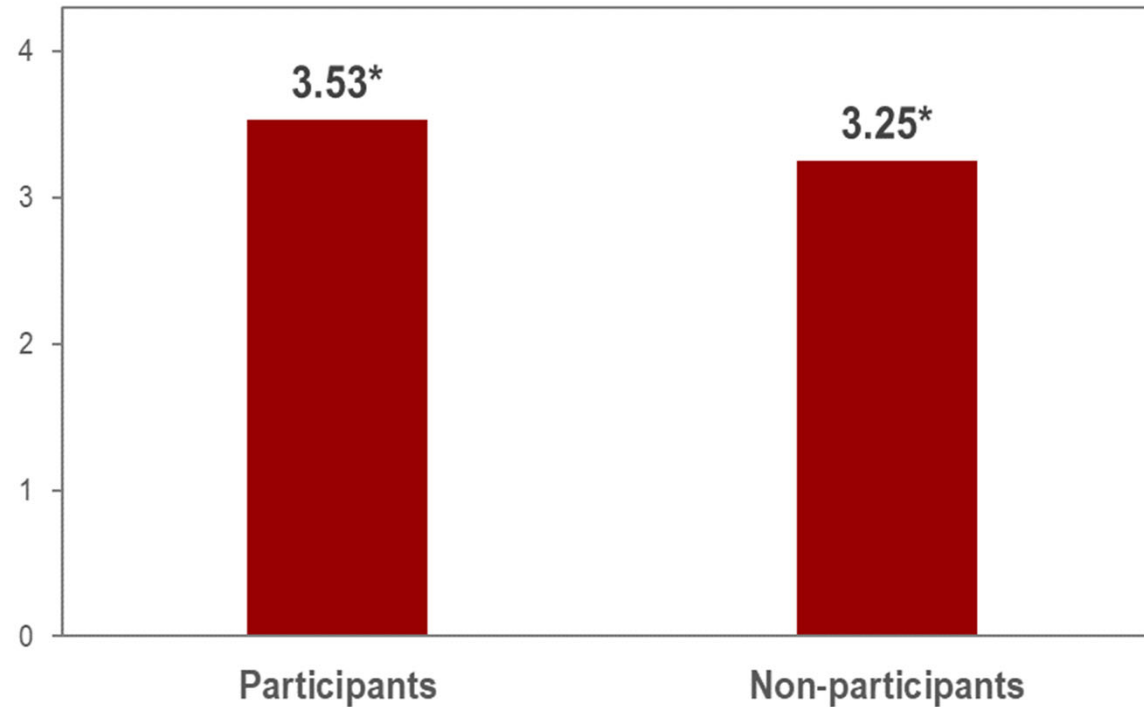
Fall 2017 SHJ Participants and Non-participants



The difference in retention rates was relatively high among Black students, as 100 percent of all Black students who participated in SHJ were retained at IUPUI, while only 67 percent of their peers were retained.



Fall 2017 Semester GPA for Fall 2017 SHJ Participants and Non-participants



There was also approximately **0.30** point increase in semester GPA as a result of participating in SHJ.



Validating Assumptions of PSM

- Sensitivity analysis tests the underlying assumption of PSM: the model accounts for all covariates that is associated with the outcome measure.
- Sensitivity analysis suggested that there exists some student characteristics that our current model did not account for.
- Students who engage in community service are likely different from their peers in terms of social psychological aspects, including personality, motivational and circumstantial characteristics (Snyder & Omoto, 2007). These are covariates that could be difficult to measure.
- A comprehensive study may be warranted in order to understand the impact of uncontrolled covariates on academic outcomes.



Satisfaction

SAM

- Over 95% of respondents agreed or strongly agreed that they were satisfied with their overall experience as a Scholar.
- Over 85% of the respondents agreed or strongly agreed that their experiences as a Scholar enhanced their academic learning
- 100% of respondents agreed or strongly agreed that their service benefitted the community.
- 98% would recommend the Scholarship Program to a friend.



Satisfaction

SLA

- 97% of respondents were satisfied with the mentoring they received during their SLA experience
- 99% of respondents agreed or strongly agreed that they were satisfied with their overall experience as a Scholar.
- 100% respondents agreed or strongly agreed that their experiences as a Scholar enhanced their academic learning
- 99% of respondents agreed or strongly agreed that their service benefitted the community.
- 100% of the respondents would recommend the Scholarship Program to a friend.



“

In short, the more students believe that they belong, the better they do academically. The reverse is also true...” (The College Dropout Crisis, p. 8)



Connection to IUPUI

95% of respondents reported that participating as a SAM Scholar helped them to form a connection to IUPUI.



Questions?



Image Credit: IUPUI Center for Service and Learning



IUPUI

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References

- Hahn, T. (2017). Sam H. Jones Service Scholarship Assessment Report (2017-18).
- Rosenbaum, P. R., and Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika* 70:41–55.
- Sanders, M., Van Oss, T., & McGeary, S. (2015). Analyzing Reflections in Service Learning to Promote Personal Growth and Community Self-Efficacy. *Journal of Experiential Education*, 39(1), 73-88.
- SAS Institute Inc. (2013). Sensitivity Analysis. Retrieved June 1, 2019, from https://documentation.sas.com/?docsetId=statug&docsetTarget=statug_psmatch_examples09.htm.
- Snyder, M., & Omoto, A. M. (2008). Who gets involved and why? The psychology of volunteerism. In E.S.C. Liu, M. J. Holosko, & T. Wing Lo (Eds.), *Youth empowerment and volunteerism: Principles, policies, and practices* (pp. 3-26). Hong Kong, China: City University.