

## **First-Generation College Student Achievement and the First-Year Seminar: A Quasi-Experimental Design**

**Angela Vaughan, Janessa Parra, and Trent Lalonde**

University of Northern Colorado

*Abstract.* Research has shown consistently that first-generation college students are less prepared academically for college, have a higher risk for dropping out, and are less likely to obtain a degree. This study investigated the effect of first-generation students' participation in a first-year seminar (FYS) on academic achievement and persistence to the second semester compared to nonparticipants. The authors collected data from 266 first-generation students in an FYS and used a quasi-experimental design incorporating hierarchical propensity score matching techniques to form quasi-control groups. The results show the seminar had a significant positive effect on achievement (an overall GPA difference of 0.71 points) and persistence (an overall 17% difference).

Over the past decade, access to higher education has become increasingly available. Enrollment rose 46% from 1996 to 2010 (Hussar & Bailey, 2013), and during the past 20 years in particular, research has shown that undergraduate college students in the United States have steadily become more diverse (Pascarella, Bohr, Nora, & Terenzini, 1996; Reason, 2003; Woodard, Love, & Komives, 2000). According to Reason (2003), higher education needs to be prepared to serve this growing population, including students from multiple racial or ethnic backgrounds and socioeconomic statuses.

Presently, many students identified as first-generation, meaning neither parent has more than a high school education, are seeking degrees for career advancement. In its profile of undergraduate students in the 2007-2008 academic year, the National Center for Education Statistics reported that approximately 38% of undergraduates at four-year institutions had parents with a high school diploma or less (Staklis, 2010). Moreover, the percentage of first-generation students at two-year institutions is even greater—approximately 50%. Unfortunately, research has consistently shown that first-generation college students are less prepared academically for college than their peers with college-educated parents (Chen & Carroll, 2005). As a result, these students are at higher risk for dropping out and are less likely to obtain a bachelor's degree (Chen & Carroll, 2005). With increasing numbers of first-generation students entering college—and the known barriers they face upon entry—it is imperative for universities to create programs to support them. As such, this study investigated how participation

in a first-year seminar (FYS) affected academic achievement and persistence to the second semester of first-generation students who took the course compared to first-generation students who did not. Another purpose was to illustrate a more rigorous research methodology that potentially could lead to more valid and useful findings. A quasi-experimental design was employed, incorporating hierarchical propensity score matching techniques to form quasi-control groups (Vaughan, Lalonde, & Jenkins-Guarnieri, 2014) to address the limitation of student self-selection into the course where randomization was not possible.

## Literature Review

Most researchers, administrators, and faculty have recognized first-generation students are pursuing postsecondary education in greater numbers than ever before. However, many might not be aware of the unique and sometimes overwhelming challenges these students face. Dennis, Phinney, and Chuateco (2005) found first-generation students more often came from low socioeconomic families and communities as well as ethnically diverse cultures, typically underrepresented in higher education. These students frequently had weaker cognitive skills in reading, math, and critical thinking and tended to be less involved with peers and teachers in high school (Dennis et al., 2005; Zalaquett, 1999). Furthermore, first-generation students received less encouragement from their parents to attend college (Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996) and often applied to less competitive universities (Pascarella, Pierson, Wolniak, & Terenzini, 2004). These students were at greater risk for intellectual poverty, including access to college role models, information about necessary college processes, and limited knowledge about college activities (Saenz, Hurtado, Barrera, Wolf, & Yeung, 2007; York-Anderson & Bowman, 1991). These specific backgrounds have put first-generation students at a particular disadvantage, making cultural, social, and academic transitions from high school to college more difficult for them compared to their traditional peers (Terenzini et al., 1996).

Research has shown that first-generation students more likely live and work off campus, are less involved in extracurricular activities, and complete fewer credit hours in three years compared to their peers (Pascarella et al., 2004; Pike & Kuh, 2005; Terenzini et al., 1996). These students also reported feeling less support from the university and were less likely to experience many situations that research has shown relate positively to learning, performance, and persistence (Pascarella et al., 2004; Terenzini et al., 1996). Pike and Kuh (2005) found first-generation students less engaged overall in college and less likely to integrate diverse cocurricular activities into their college experiences.

They further speculated that first-generation students might be less engaged with the university and in their classes because they knew less about the importance of engagement and how to become engaged.

For all students, research has found attrition rates are highest after the first year of college (Barefoot, 2004). Factors affecting attrition included individual student characteristics, social integration with other students and faculty, and the overall college environment (Braxton, Milem, & Shaw Sullivan, 2000; Tinto, 1987). First-generation students have faced the same demands as other entering first-year students along with unique challenges. Together, all of these issues consistently have translated to significant differences in persistence and graduation rates for first-generation students (Chen & Carroll, 2005). Specifically, Chen and Carroll (2005) found that only 24% of first-generation students earned bachelor's degrees within eight years compared to 46% of students overall. More troubling, Ishitani (2003) reported that attrition rates were 71% higher for first-generation students even after controlling for key variables (e.g., income). Clearly, as the literature has shown, these students require support from the university to increase their persistence and graduation rates.

Previous research has provided evidence that education programs designed to improve first-generation students' learning and success can reduce the outcomes and experiences gap between them and their peers (Pike & Kuh, 2005; Richardson & Skinner, 1992). This research has suggested that first-generation students could benefit from specific university programming that "enables students to feel accepted and promotes academic performance" (Woosley & Shepler, 2011, p. 711). In a study by Byrd and MacDonald (2005), researchers asked first-generation students to identify their needs while in college. They identified these skills required for college readiness: (a) time management, (b) a goal focus, and (c) the ability to advocate for themselves. Additionally, Pascarella et al. (1996) found first-generation students who were more involved in their classes and extracurricular activities had greater academic outcomes than students who were not. This involvement was related to strong, positive effects on students' critical thinking, degree plans, and sense of control over their academic success.

Because studies have suggested that student experiences in the first year are the most significant in persistence decisions (Bai & Pan, 2010), institutions increasingly have focused on improving the beginning college experience (Barefoot, 2000). Many colleges and universities, for example, have developed programs specifically designed to orient first-year students to college and help them adjust over the first semester and year. Research has suggested that FYs, one type of intervention that provides critical opportunities for first-generation students, can increase persistence into the second year, satisfaction, and overall GPA (Sidle & McReynolds, 2009).

FYSs have contributed to these outcomes by teaching practical skills that encourage (a) college scholarship, (b) campus involvement, (c) engagement with the academic community and university faculty, and (d) social connections to peers (Clark & Cundiff, 2011; Miller, Janz, & Chen, 2007). The FYS can take many forms—from study skills courses to interdisciplinary, topical seminars—that might have differential effects on students' experiences and perceptions and, consequently, shape decisions to re-enroll (Clark & Cundiff, 2011). Persistence theories have suggested that first-year students need to integrate with the academic and social climate of the university (e.g., Tinto, 1975)—exactly the support that many seminars offer. Further, these theories often have involved noncognitive and psychosocial factors, such as motivation to earn a degree or social comfort in the new college environment, and the current college student outcomes literature has supported these factors' roles in student success and persistence decisions (Brown et al., 2008).

In assessing these programs, much of the research has examined first-year persistence and compared retention rates of students who participated in an FYS to those who did not. This same body of research has suggested seminars benefit all types of students (Pascarella & Terenzini, 1998). For example, FYSs have impacted persistence positively for women and men, as well as ethnic minority students (Boudreau & Kromrey, 1994). This positive effect has produced practical benefits, with studies having shown that students who participated in an FYS were 5% to 15% more likely to graduate within four years (Pascarella & Terenzini, 1998). Ishler and Upcraft (2005) identified FYSs as “one of the most powerful predictors of first-year student persistence into the sophomore year” (p. 41), even after accounting for student background characteristics.

The body of literature, which has been growing since the 1980s, has consistently supported FYSs (Schnell & Doetkott, 2003), highlighting the “positive and statistically significant advantages to students who take” them (Pascarella & Terenzini, 2005, p. 400). Previous research has identified that first-generation students face unique challenges (Pike & Kuh, 2005; Terenzini et al., 1996) and suggested that programming development encompass broader thinking and greater collaboration across structural boundaries when learning experiences and policies are being developed (Pascarella et al., 1996; Pike & Kuh, 2005). Despite these findings and recommendations, very little research has focused on the effectiveness of the actual support programming offered to first-generation students and whether it directly addresses their needs.

Although research consistently has demonstrated the positive effects of FYSs, many universities continue to debate their necessity and the requisite funding to maintain them (Cuseo, 2011). With recent fiscal challenges, many universities have begun to

examine budget priorities closely based on assessment, which has become “more critical than it had been previously, both to determine where funding should go as well as to justify programs and services to others” (Romano, Hanish, Phillips, & Waggoner, 2010, p. 65). Institutions might also be hesitant to continue offering or to adopt FYSs specifically because using analyses limited to description (e.g., percent of participating students retained compared to nonparticipants) or regression techniques incorporating covariates to account for possible differences between students (e.g., Keup, 2006; Miller et al., 2007) has weakened much of the evidence that supports them. Because many FYSs are voluntary and randomized study designs present ethical challenges, the statistical rigor of investigations of program effectiveness is often limited (Clark & Cundiff, 2011; Pascarella & Terenzini, 2005). Most studies have focused on the FYS population as a whole and not compared students in the course with similar non-participants. While current research has shown significantly positive outcomes related to FYS participation (Hendel, 2007; Jamelske, 2009; Sidle & McReynolds, 2009), more sophisticated methodologies are needed to maintain ongoing support for these programs and contribute to the “maturity in the field” (Kinzie, 2013, p. 47) of educational research. Therefore, the purpose of this study was to help fill this gap by using a more rigorous research methodology to explore the outcomes for first-generation students participating in an FYS. More broadly, the study was designed to influence practice, promote higher confidence in the results, and allow administrators to make policy decisions based on potentially more valid findings. The following question directed the research: What is the effect on academic achievement and persistence for first-generation students’ participating in an FYS?

## **Methods**

### ***Participants***

Participants were first-year, first-time students ( $N = 2,185$ ) enrolled at a medium-sized, four-year, public, research university in the West during the fall semester. All participants were full-time, degree-seeking students. This population was 62.5% female, 44.5% first-generation, and 29.4% non-White. Students came from high schools with an average enrollment of 355, and 45 university majors were represented in the sample.

### ***First-Year Seminar***

Available only during students’ first semester, this university’s FYS is an optional course offered within the general education requirements and is organized within sections by major, program, or college. Similar to other seminars, this course is small

(i.e., 30 or fewer students), highly interactive, and discussion-based. The curriculum combines research-based topics, such as goal and motivation theories, with practical application topics, such as time management and four-year educational planning. An academic course rather than an extended-orientation model, the seminar incorporates readings from peer-reviewed research, written assignments, and examinations. The curriculum is highly coordinated, and each instructor participates in a concurrent, comprehensive, semester-long training program to ensure that each student receives an equivalent course and experience.

### ***Data Collection***

Each participant had his or her demographic and institutional data recorded in the university's data management system at the fall and spring census dates. With approval from the Institutional Review Board, reports were generated from this existing institutional dataset to collect student information that included (a) college of enrollment, (b) major, (c) fall term GPA, (d) number of fall credits attempted, (e) number of spring credits attempted, (f) participation in an FYS, (g) FYS grade, and (h) high school index score.

### ***Data Analysis***

A primary obstacle to conducting research in educational contexts is the necessity of randomization and experimental designs to show causal relationships (Fisher, 1935; Montgomery, 2005). Quasi-experimental designs provide the second strongest evidence compared to experimental designs (U.S. Department of Education, n.d.). In these designs, researchers use some type of matching to account for nonrandomization; however, this strategy often fails to account for the likely dependence between subjects because of common nesting that occurs in educational settings. Or the opposite is true: researchers use hierarchical modeling to account for the dependence between subjects but are able to show only relationships between variables because of the lack of control groups available for comparison. For this particular study, the research methodology, a quasi-experimental design, covered both concerns by using a hierarchical propensity score to form a quasi-control group that accounted for information at both the student and college levels.

While a hierarchical matching scheme would not allow researchers to make cause-and-effect conclusions, there are benefits to constructing control groups by matching

techniques. A primary concern of quasi-experimental studies is bias in estimation of treatment effects (Leow, Marcus, Zanutto, & Boruch, 2004). In particular, it is safe to assume that naturally formed groups contain individuals who differ, with respect to certain characteristics, independent of any treatment application. These inherent differences between groups can magnify the differences observed in dependent variables, causing group differences to appear more significant than they truly are and inflating the probability of committing a Type I error by declaring significance where none exists (Leow et al., 2004; Shadish, Cook, & Campbell, 2001). Using a hierarchical matching technique accounts for variables from multiple levels of observation when selecting control subjects, allowing subjects in experiment and control pools to be compared with greater scrutiny. This technique allows selection of a control group that has greater similarity to the experimental group than with other methods. Thus, this approach reduces the bias in estimating the treatment effect and, consequently, the probability of committing a Type I error in inferential analysis.

To explore the FYS's impact on the academic success of first-generation college students, 342 students who completed the course were matched to 342 of the 1,843 students who did not, pairing students according to the nearest propensity score. Propensity scores were obtained as predicted probabilities from a hierarchical logistic regression model that included both student- and college-level variables and a normal random error term at the college level. At the first level of the matching model, student-level variables included (a) first-year status, (b) first-generation status, (c) gender, (d) race (binary as White/non-White with Hispanic), (e) high school index score, and (f) fall credit hours attempted. The second level of the matching model included the college-level variables productivity (number of graduates) and student-faculty ratio. To evaluate the matching, each variable was compared between the experimental and quasi-control groups, and no evidence indicated a significant difference for each variable (see Table 1). All comparisons for classification variables were made using a chi-square test of independence. Also, Rubin's (2001) matching criteria were used to evaluate the hierarchical matching. Comparing experimental and quasi-control groups, the propensity score means were within 0.0001 standard deviations; the propensity score variances had a ratio of 1.001; and the residual error variances were within the acceptable range of 0.50 to 2.00, with the exception of fall credit hours, which showed a ratio of 0.495. Being close to the criteria of 0.50, the matching was determined to be acceptable (see Table 1). From this pool of experimental and quasi-control groups, first-generation students were selected for further analysis (see Table 2).

Table 1

*Matching Results of Experimental and Quasi-Control Groups on Student- and College-Level Variables*

<b>Variable</b>	<b>Experimental (<i>n</i> = 342)</b>	<b>Quasi-control (<i>n</i> = 342)</b>	<b><i>p</i></b>	<b>College-level residual error variance ratio</b>
Student-level				
High school index ( <i>M</i> )	101.6	101.6	.9750	1.031
Fall credit hours ( <i>M</i> )	14.4	14.5	.8338	0.495
First-year status	98%	99%	.5602	1.905
Gender ( <i>M</i> )	32%	28%	.2766	1.026
First-generation status	39%	39%	.8754	0.986
Race (non-White)	29%	31%	.5575	0.969
College-level				
Productivity ( <i>M</i> )	329.0	318.2	.6713	0.948
Student-faculty ratio ( <i>M</i> )	91.6	91.7	.9909	1.005
Rubin's Criteria				
Difference in propensity means				0.001
Ratio of propensity variances				1.001

Table 2

*Demographic Profile of First-Generation Student Sample (N = 266)*

<b>Characteristic</b>	<b>Experimental (<i>n</i> = 132)</b>		<b>Quasi-control (<i>n</i> = 134)</b>	
	<b><i>n</i></b>	<b>%</b>	<b><i>n</i></b>	<b>%</b>
Sex				
Female	98	74.2	105	78.4
Male	34	25.8	29	21.6
Race				
White	75	56.8	66	49.6
Non-White	57	43.2	67	50.4

## Results

Fall GPA was compared between the experimental and quasi-control groups using a two-sample *t*-test. Persistence and good academic standing were compared between the two groups using chi-square tests of independence. As a post hoc analysis, similar comparisons were made for each college to further examine the differences in the variables of interest. In cases of small college sample sizes, Fisher's Exact Test was applied in place of the chi-square test of independence.

Table 3 presents the overall group comparisons for each variable. The tests showed evidence of differences at any chosen significance level. Compared to their peers who did not take the seminar, first-generation students enrolled in an FYS had higher GPAs and were more likely to persist and complete the fall semester in good academic standing.

Table 3

*Overall Performance Comparisons of Experimental and Quasi-control Groups*

<b>Achievement indicator</b>	<b>Experimental (<i>n</i> = 132)</b>	<b>Quasi-control (<i>n</i> = 134)</b>	<b><i>p</i> (<math>\chi^2</math>)</b>	<b><i>p</i> (Satterthwaite)</b>
Fall 2011 GPA	2.67	1.96		<.0001
Persistence (%)	95	78	<.0001	
Good academic standing	83	60	<.0001	

Results by college for fall GPA are presented in Table 4. Health sciences, interdisciplinary, and undeclared majors enrolled in an FYS had significantly ( $p < .05$ ) higher GPAs compared to students not enrolled in the course. All tests were conservative in that they applied Satterthwaite's (1946) weighted variance estimates instead of pooled estimates, which saved degrees of freedom but imposed the assumption of equal variance. The business and social sciences participants also had higher GPAs than their peers; however, the difference between participants and nonparticipants was not significant.

Students' majors affected their persistence and good academic standing. Health sciences majors showed a significant difference for persistence (Table 5), with those students enrolled in an FYS more likely to return in the spring than students not enrolled ( $p < .05$ ). Although not significant, nonhealth sciences majors enrolled in an FYS had higher rates of persistence than those not enrolled; small sample size might explain the lack of significance. Concerning good academic standing (Table 6), business, interdisciplinary, and undeclared majors who participated in an FYS had higher academic standings than those not enrolled ( $p < .05$ ).

Table 4  
*Fall Term GPA Comparisons of Experimental and Quasi-Control Groups*

Program	Experimental		Quasi-control		<i>p</i> ( <i>Satterhwaite</i> )
	GPA	<i>n</i>	GPA	<i>n</i>	
Business	2.83	19	2.32	17	.0614
Health sciences	2.63	44	1.98	48	.0006
Social sciences	2.43	13	1.83	13	.1972
Interdisciplinary	2.77	33	1.83	30	.0004
Undeclared	2.59	23	1.90	26	.0141

Table 5  
*Fall to Spring Persistence Comparisons of Experimental and Quasi-Control Groups*

Program	Experimental		Quasi-control		<i>p</i> ( $\chi^2$ )	<i>p</i> ( <i>Fisher</i> )
	% retained	<i>n</i>	% retained	<i>n</i>		
Business	100	19	82	17	.0614	.0952
Health sciences	91	44	75	48	.0006	
Social sciences	100	13	92	13	.1972	1.00
Interdisciplinary	91	33	80	30	.0004	.2888
Undeclared	100	23	73	26	.0141	0.105

Table 6  
*Good Academic Standing (GPA > 2.0) Comparisons of Experimental and Quasi-Control Groups*

Program	Experimental		Quasi-control		<i>p</i> ( $\chi^2$ )	<i>p</i> ( <i>Fisher</i> )
	% in good academic standing	<i>n</i>	% in good academic standing	<i>n</i>		
Business	100	19	76	17		.0404
Health sciences	80	44	63	48	.0729	
Social sciences	54	13	54	13		1.00
Interdisciplinary	91	33	53	30	.0008	
Undeclared	83	23	54	26	.0321	

## **Discussion**

Consistent with previous research, the results of this study show that participation in an FYS increased student achievement and persistence. Through the hierarchical propensity score matching scheme, first-generation students who participated in an FYS were matched at multiple levels with students of similar characteristics who did not participate. Previous research primarily has created matched control groups using only student-level variables; however, by matching on seven variables across two levels (student and college level), the model in this study results in a quasi-control group that is more similar to the experimental group. Overall,

the extension of propensity score matching using hierarchical propensity scores is intended to reduce selection bias, account for subject dependencies at multiple levels, and reduce bias in treatment effect estimates and Type I error rates; therefore, providing a rigorous and theoretically sound inferential quantitative approach to educational research situations. (Vaughan et al., 2014, p. 578).

The results clearly indicate positive results for first-generation students who participated in this course, including significant differences in GPA, persistence, and number of students in good academic standing. Additionally, this study provides evidence that an academic FYS model can be effective for students who enter college potentially less prepared than their peers. The current program provides a challenging but supportive setting in which students accomplish college-level tasks, similar to their other courses, in a highly scaffolded environment. Moreover, the seminar focuses directly on development (i.e., intellectual, personal, and professional) rather than campus resources, policies, or engagement. Yet, the seminar's structure (e.g., small class size) and the intentional teaching strategies instructors incorporate (e.g., promoting student-teacher and student-student interactions) allow students to obtain pertinent campus information. In general, topics are introduced with their theoretical framework, which then leads to discussions of how students can apply these concepts to their daily lives and ultimately in their fields as professionals. For example, when students discuss goals, they first are introduced to goal theory (e.g., achievement goals) and its corresponding research and literature (e.g., Ormrod, 2012). With this understanding, students begin to see how goals relate and can be applied to influence their motivation, behaviors, and even time management. The seminar quickly helps these beginning scholars at a research university understand how research supports their learning and is vital for their education.

The course also features unique elements not necessarily shared by other FYs. With an interdisciplinary focus, the course is included in the university's general education requirements. Furthermore, based on a coordinated curriculum and comprehensive semester-long instructor training, the program ensures that each student receives the same course and experience. Because specific sections are based on major, program, or school, some of the curriculum can be targeted particularly to the students' disciplines, including educational planning and career research in those fields, while helping them build peer networks. Grouping the classes by disciplines allows professional advisors to provide direct, specific instruction related to each field's requirements. With these characteristics, the program provides a meaningful balance between challenge and support, helping students transition successfully to the university.

Other institutions can benefit from the implications from this study, especially schools with students for whom financial considerations are important. Because this university is the least expensive and most diverse compared to other public institutions in the state, it attracts many low-income, first-generation students. Typically, at least a third of entering students identify as first-generation; approximately 20% meet federal guidelines for low-income status; and 25% identify as an ethnic minority. These numbers translate to a student population that needs more support. Although designing a study with only one institution creates limitations, examining a particular university is helpful because the "process of student retention differs in different institutional settings" (Tinto, 2006-2007, p. 4). However, other institutions with higher rates of minority, low-income, and first-generation students also could benefit from this research.

Therefore, from a course design and delivery perspective, these findings suggest the key elements of this program could be effective in promoting first-generation student academic success at similar institutions. Factors that could be considered when developing or contemplating changes to a program include (a) focusing on student development, (b) incorporating relevant research and literature, (c) scaffolding complex academic tasks, (d) providing an interdisciplinary context, and (e) grouping students by discipline. Furthermore, the coordinated curriculum across sections likely provides more opportunity for a university-wide impact that potentially could be reflected in the overall retention rates.

With the current economic situation of higher education, helping students persist and graduate also has significant financial implications for institutions and the students they serve. For many universities, federal funds have become unavailable, and significant funding shortfalls have occurred. One option to address these shortfalls is increasing tuition; alternatively, universities could invest more in the students currently enrolled. Retaining students versus recruiting them produces a cost benefit, as Astin (1975) noted:

In four-year institutions, any change that deters students from dropping out can affect three classes of students at once, whereas any change in recruiting practices can affect only one class in a given year. From this viewpoint, investing resources to prevent dropping out might be more cost effective than applying the same resources to more vigorous recruitment. (p. 2)

This same philosophy holds true in today's financial climate. With these current financial issues and the challenges ahead, any efforts to retain students successfully until graduation could indirectly benefit student access in terms of costs to attend the university. A sustainable FYS that directly targets students' needs is critical to these retention efforts. This study's findings provide strong, valid evidence that an FYS can positively affect some of the university's most at-risk, first-generation college students.

## **Future Research**

Several opportunities exist to extend this research. First, conducting a mixed-methods study incorporating some qualitative components could provide valuable information that might help explain how and why some program elements were effective. Focus groups and interviews also could provide information on which elements had the greatest impact, especially in supporting first-generation students and their specific challenges. Also, longitudinal studies are needed to assess these students' ongoing persistence, achievement, and ultimately, graduation. Researchers might study the long-term effects of this particular program design. This research methodology could also examine the benefits of this course design with other at-risk groups (e.g., undeclared students). Subsequently, researchers might ask, Are there differences in the effectiveness for different student populations? The answer could be helpful for administrators who, because of budget or instructional constraints, want to create and implement more targeted programs.

Finally, from a methodological perspective, opportunities exist for institutions to assess (or reassess) their programs using hierarchical propensity score matching. By minimizing the self-selection bias and nonrandomization concerns, program researchers could provide information that is potentially more valid and reliable, resulting in increased confidence in the findings, which is essential to making important program decisions.

## **Conclusion**

Using hierarchical propensity scores, the present study assessed the effect of first-generation students' participation in an FYS on their academic achievement and

persistence. The authors established matched control groups on two levels, creating a more sophisticated, rigorous methodology. This quasi-experimental design addressed concerns of self-selection and nonrandomization, which exist in many studies of FYs. Introducing this methodology, this study provides strong evidence that first-generation students can benefit from an academic seminar. Future research might assess which elements of the seminar are directly related to student success as well as the impacts on different student populations.

## References

- Astin, A. W. (1975). *Preventing students from dropping out*. San Francisco, CA: Jossey-Bass.
- Bai, H., & Pan, W. (2010). A multilevel approach to assessing the interaction effects on college student retention. *Journal of College Student Retention: Research, Theory & Practice, 11*, 287-301.
- Barefoot, B. O. (2000). The first-year experience. *About Campus, 4*(6), 12-18.
- Barefoot, B. O. (2004). Higher education's revolving door: Confronting the problem of student drop out in US colleges and universities. *Open Learning: The Journal of Open and Distance Learning, 19*, 9-18. doi:10.1080/0268051042000177818
- Boudreau, C. A., & Kromrey, J. D. (1994). A longitudinal study of the retention and academic performance of participants in freshmen orientation course. *Journal of College Student Development, 35*(6), 444-449.
- Braxton, J. M., Milem, J. F., & Shaw Sullivan, A. (2000). The influence of active learning on the college student departure process: Toward a revision of Tinto's theory. *The Journal of Higher Education, 71*(5), 569-590.
- Brown, S. D., Tramayne, S., Hoxha, D., Telander, K., Fan, X., & Lent, R. W. (2008). Social cognitive predictors of college students' academic performance and persistence: A meta-analytic path analysis. *Journal of Vocational Behavior, 72*, 298-308.
- Byrd, K. L., & MacDonald, G. (2005). Defining college readiness from the inside out: First-generation college student perspectives. *Community College Review, 33*(1), 22-37.
- Chen, X., & Carroll, C. (2005). *First-generation students in postsecondary education: A look at their college transcripts* (NCES 2005-171). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Printing Office.
- Clark, M. H., & Cundiff, N. L. (2011). Assessing the effectiveness of a college freshman seminar using propensity score adjustments. *Research in Higher Education, 52*, 616-639.

- Cuseo, J. (2011, January 11). Re: Research on first year experience courses. Message posted to the National Resource Center First-Year Experience and Students in Transition FYE electronic mailing list, archived at [http://www.sc.edu/fye/list\\_serve/archives.html](http://www.sc.edu/fye/list_serve/archives.html)
- Dennis, J., Phinney, J. S., & Chuateco, L. I. (2005). The role of motivation, parental support, and peer support in the academic success of ethnic minority first-generation college students. *Journal of College Student Development*, 46(3), 223-236.
- Fisher, R. A. (1935). *The design of experiments*. Edinburgh, Scotland: Oliver & Boyd.
- Hendel, D. D. (2007). Efficacy of participating in a first-year seminar on student satisfaction and retention. *Journal of College Student Retention: Research, Theory & Practice*, 8, 413-423.
- Hussar, W. J., & Bailey, T. M. (2013). *Projections of education statistics to 2021* (NCES 2013-008). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Printing Office.
- Ishitani, T. (2003). A longitudinal approach to assessing attrition behavior among first-generation students: Time-varying effects of pre-college characteristics. *Research in Higher Education*, 44(4), 433-449.
- Ishler, J. L., & Upcraft, M. L. (2005). The keys to first-year student persistence. In M. L. Upcraft, J. N. Gardner, & B. O. Barefoot (Eds.), *Challenging and supporting the first-year student* (pp. 27-46). San Francisco, CA: Jossey-Bass.
- Jamelske, E. (2009). Measuring the impact of a university first-year experience program on student GPA and retention. *Higher Education*, 57, 373-391. doi:10.1007/s10734-008-9161-1
- Keup, J. R. (2006). The impact of curricular interventions on intended second year re-enrollment. *Journal of College Student Retention: Research, Theory & Practice*, 7, 61-89.
- Kinzie, J. (2013). Advancing the study of a movement: The status of methods and measures in first-year experience and student transition research. *Journal of The First-Year Experience & Students in Transition*, 25(2), 39-52.
- Leow, C., Marcus, S., Zanutto, E., & Boruch, R. (2004). Effects of advanced course-taking on math and science achievement: Addressing selection bias using propensity scores. *American Journal of Evaluation*, 25, 461-478. doi:10.1016/j.ameval.2004.09.003
- Miller, J. W., Janz, J. C., & Chen, C. (2007). The retention impact of a first-year seminar on students with varying pre-college academic performance. *Journal of The First-Year Experience & Students in Transition*, 19(1), 47-62.

- Montgomery, D. C. (2005). *Design and analysis of experiments*. Hoboken, NJ: John Wiley & Sons.
- Ormrod, J. E. (2012). *Human learning* (6th ed.). Boston, MA: Pearson.
- Pascarella, E. T., Bohr, L., Nora, A., & Terenzini, P. T. (1996). Is differential exposure to college linked to the development of critical thinking? *Research in Higher Education*, *37*(2), 159-174.
- Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-generation college students: Additional evidence on college experiences and outcomes. *The Journal of Higher Education*, *75*(3), 249-284.
- Pascarella, E. T., & Terenzini, P. T. (1998). Studying college students in the 21st century: Meeting new challenges. *Review of Higher Education*, *21*, 151-165.
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research* (Volume 2). San Francisco, CA: Jossey-Bass.
- Pike, G. R., & Kuh, G. D. (2005). First- and second-generation college students: A comparison of their engagement and intellectual development. *The Journal of Higher Education*, *76*(3), 276-300.
- Reason, R. D. (2003). Student variables that predict retention: Recent research and new developments. *NASPA Journal*, *40*(4), 172-191.
- Richardson, R. C., & Skinner, E. F. (1992). Helping first-generation minority students achieve degrees. *New Directions for Community Colleges*, *80*, 29-43.
- Romano, C. R., Hanish, J., Phillips, C., & Waggoner, M. D. (2010). The new normal: Senior student affairs officers speak out about budget cutting. *New Directions for Student Services*, *129*, 59-70.
- Rubin, D. B. (2001). Using propensity scores to help design observational studies: Application to the tobacco litigation. *Health Services & Outcomes Research Methodology*, *2*, 169-188.
- Saenz, V. B., Hurtado, S., Barrera, D., Wolf, D., & Yeung, F. (2007). *First in my family: A profile of first-generation college students at four-year institutions since 1971*. Los Angeles, CA: Higher Education Research Institute, UCLA.
- Satterthwaite, F. E. (1946). An approximate distribution of estimates of variance components. *Biometrics Bulletin*, *2*(6), 110-114.
- Schnell, C. A., & Doetkott, C. D. (2003). First year seminars produce long-term impact. *Journal of College Student Retention*, *4*, 377-391.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2001). *Experimental and quasi-experimental designs for generalized causal inference* (2nd ed.). Belmont, CA: Wadsworth Publishing.

- Sidle, M. W., & McReynolds, J. (2009). The freshman year experience: Student retention and student success. *NASPA Journal*, 46, 434-446.
- Staklis, S. (2010). *Profile of undergraduate students 2007-08* [Web tables, NCES 2010-2015]. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Printing Office.
- Terenzini, P. T., Springer, L., Yaeger, P. M., Pascarella, E. T., & Nora, A. (1996). First-generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, 37, 1-22.
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125.
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago, IL: University of Chicago Press.
- Tinto, V. (2006-2007). Research and practice of student retention: What next? *Journal of College Student Retention*, 8(1), 1-19.
- U.S. Department of Education, Institute of Education Sciences. (n.d.). *What works clearinghouse*. Retrieved from <http://ies.ed.gov/ncee/wwc>
- Vaughan, A. L., Lalonde, T., & Jenkins-Guarnieri, M. A. (2014). Assessing student achievement in large-scale educational programs using hierarchical propensity scores. *Research in Higher Education*, 55(6), 564-580. doi:10.1007/s11162-014-9329-8
- Woodard, D. B., Love, P., & Komives, S. R. (2000). Students of the new millennium. In D. B. Woodard, P. Love, & S. R. Komives (Eds.), *Leadership and management issues for a new century* (New Directions for Student Services, No. 92, pp. 35-47). San Francisco, CA: Jossey-Bass.
- Woosley, S. A., & Shepler, D. K. (2011). Understanding the early integration experiences of first-generation college students. *College Student Journal*, 45(4), 700-714.
- York-Anderson, D. C., & Bowman, S. L. (1991). Assessing the college knowledge of first-generation and second-generation college students. *Journal of College Student Development*, 32(2), 116-122.
- Zalaquett, C. P. (1999). Do students of noncollege-educated parents achieve less academically than students of college educated parents? *Psychological Reports*, 85, 417-421.

### **Reader May Respond:**

Angela Vaughan

Director, First Year Curriculum and Instruction

University of Northern Colorado

E-mail: [angela.vaughan@unco.edu](mailto:angela.vaughan@unco.edu)

Phone: (970) 351-1175