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Assessing the Difference Between 1-, 2-, and 3-Credit First-Year Seminars on College Student Achievement

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Abstract. Research examining the differences between first-year seminars (FYS) of varying credit loads has been lacking. The purpose of this study was to investigate the effect of 1-, 2-, and 3-credit FYS on student achievement (N = 12,482). The results indicated that all students significantly benefited from participating in any of the three FYS types as compared to nonparticipants; however, at-risk subgroups (i.e., first-generation and male students, students of color, and conditionally admitted students) benefited more from participating in FYS with greater credit loads. On measures of first-term GPA and second-year fall credit load (i.e., reflecting persistence and progress toward degree completion), the achievement gap was nearly eliminated, and students exceeded their peers when participating in the 3-credit FYS. Overall, results support student participation in FYS with higher credit loads.

More students are entering higher education, and the student body is becoming increasingly diverse; at the same time, student attrition rates are alarmingly high (Boylan, Calderwood, & Bonham, 2017; Brock, 2010). First-year seminars are a research-based intervention (Permzadian & Credé, 2016; Swanson, Vaughan, & Wilkinson, 2017; Vaughan, Lalonde, & Jenkins-Guarnieri, 2014) that many academic institutions are using to improve student outcomes (Padgett, & Keup, 2011; Young & Hopp, 2014). These seminars have been researched and developed for more than 20 years and are now an accepted component of undergraduate education. However, first-year seminars are not all created equal (Permzadian & Credé, 2016). Although studies at multiple universities have found first-year seminars effective at increasing student retention rates (Jaijairam, 2016), the content, structure, and rigor of these courses vary across institutions. Research is needed to determine the type of first-year seminar that is both the most economical and the most beneficial for all students (Campbell, Saltonstall, & Buford, 2013; Permzadian & Credé, 2016). Due to variations in first-year seminars and the lack of empirical research to support specific types, the purpose of this study is to provide preliminary information about the varying impact of first-year seminars at the 1-, 2-, and 3-credit levels with college student achievement and persistence. A particular focus is students who are typically identified as at risk (i.e., conditional admits, first-generation and male students, and students of color).

Conditional admission programs have increased in popularity at many undergraduate institutions and involve being flexible with admission requirements and believing that even if students are academically underprepared, they can still be successful (Stewart & Heaney, 2013). Students with conditional admission must be provided the necessary support to close their preparedness gap, and first-year seminars are one way that universities are meeting their needs (Laskey & Heztel, 2011). In addition to students with conditional admission, first-generation students are typically labeled at risk for not matriculating successfully (Engle & Tinto, 2008). These students do not have an immediate family member who has completed college and frequently are classified as low socioeconomic status (Schademan & Thompson, 2016). First-generation students typically require mentoring and support to navigate complex collegiate systems. First-year seminars at many institutions are curricular programs put in place to support first-generation students in closing economic and academic gaps that prevent graduation (Mahan, Wilson, Petrosko, & Luthy, 2014; Vaughan, Parra, & Lalonde, 2014). Two other traditionally at-risk groups—male students and students of color—on average lag behind their not-at-risk peers in graduation rates and academic performance (Pike, Hanson, & Childress, 2014; Spruill, Hirt, & Mo, 2014). First-year seminars have demonstrated an ability to increase credit completion and retention rates for males and students of color (Swanson et al., 2017).

Given the importance of first-year seminars in meeting the needs of all students, including at-risk students, the study reported here fills a gap in the literature by taking advantage of a unique opportunity to evaluate the varying academic credit structures of a first-year seminar at a single institution. Over the course of five years, within the same midsized public university, the credits and rigor of a delivered first-year seminar increased each year. Outcome data were collected and examined to assess the effectiveness of the first-year seminar for all students in terms of persistence and grades. This inquiry contributes to the research on first-year seminars and can help institutions determine the best credit load and structure for their student bodies based on data and persistence for all student groups, especially at-risk student groups.

Literature Review

College students are struggling to stay in school. In the United States, only 73% of first-time first-year students continue to take college courses in their second year, and less than 60% of these students complete their degree within six years (Brock, 2010). For students who are typically at risk, retention and completion rates are even lower (Knapp, Kelly-Reid, Whitmore, & Miller, 2007; Pike et al., 2014). These fraught matriculation rates demonstrate the significance of the challenges many first-year students face when entering college. To meet this need and increase retention, graduation, and academic achievement, universities and colleges across the world have developed first-year seminar programs specifically designed to orient students to college and to help them adjust over the course of

the first semester and first year (Clark & Cundiff, 2011; Hansen & Schmidt, 2017). Moreover, first-year seminars have become the most common intervention used by colleges and universities to address the challenges faced by first-year students (Padgett & Keup, 2011; Young & Hopp, 2014).

These seminars are now a valued component of undergraduate education and are defined in a variety of ways, including as curricular innovations and as programmatic interventions designed to increase student retention rates and academic success (Keup & Barefoot, 2005). The seminal work by Barefoot (1992) classified first-year seminars into five different categories, including (a) extended orientation, (b) academic seminars with common themes across sections, (c) academic seminars with specific themes based on sections, (d) seminars linked to specific professions or disciplines, and (e) seminars focusing on basic study skills. First-year seminars, although successful overall, differ greatly in scope as well as in terms of curriculum topics and focus; the differences often depend on the university structure and financial resources. The National Resource Center for The First-Year Experience and Students in Transition (2006, 2013) conducts frequent national studies of first-year seminars; the results reveal that these courses range from no-credit required programs to optional 1-credit seminars to required courses for more than 5 credits. A review of the programs and the literature suggests that "no template of a successful retention program exists" (Braxton, Hirschy, & McClendon, 2004, p. vii). Furthermore, although the most common findings from the research on first-year seminars suggest their benefits, which include correlations with increased persistence, improved graduation rates, and success at improving student persistence (Jenkins-Guarnieri, Horne, Wallis, Rings, & Vaughan, 2015; Padgett, Keup, & Pascarella, 2013), program variety makes it difficult to establish the specific factors or structures that contribute to these outcomes (Campbell et al., 2013; Permzadian & Credé, 2016; Reason & Gansemer-Topf, 2013; Reid, Reynolds, & Perkins-Auman, 2014). Put another way, what does a first-year seminar need in terms of rigor or credit load to be the most successful?

As college campuses continue to diversify, it is particularly important to identify interventions that successfully support typically at-risk or underrepresented students. These students tend to require additional university support to thrive in higher education (Laskey & Hetzel, 2011) and may include students admitted conditionally, male students, first-generation students, and students of color. Many researchers (Elliott, 2014; Harper & Newman, 2016; Huerta & Fishman, 2014) have examined the lived experiences of these students to inform higher education on factors that may increase student success in the midst of potentially compounding factors, including minority stress (Wei, Ku, & Liao, 2011), poverty (Jensen, 2013), low academic skill (Connolly, Flynn, Jemmott, & Oestreicher, 2017), and first-year transition (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2011).

Two qualitative studies were conducted with two groups of minority students, Latino males (Huerta & Fishman, 2014) and Black males (Harper & Newman, 2016). The researchers

found, respectively, that the "importance of strong and purposeful support staff and systems to help students in their transitions to higher education should not be underestimated" (p. 96) and that "retaining and graduating Black undergraduate men at higher rates necessarily entails identifying what works in improving their classroom experiences and academic outcomes" (p. 20). These studies echo the quantitative work of Connelly and colleagues (2017), which concluded that each institution is responsible for providing quality interventions so that students gain the skills required for higher education attainment. Specifically, there is a call for first-year seminars that focus on high expectations and challenging students to complete college-level academic tasks.

Zilvinskis, Borden, and Severtis (2017) supported this theme with their research on conditionally admitted students, sharing that labeling a student as "conditional admission," especially without resources, may inhibit persistence. Concurrently, first-year seminars reflect a growing trend of pairing the distribution of effective resources with an increase in academic rigor to boost the achievement of traditionally at-risk students (Carter, Locks, & Winkle-Wagner, 2013; Jensen, 2013; Swanson et al., 2017; Vaughan et al., 2014). First-year seminars that include meaningful research-based academic instruction and a collegiate environment that provides both challenge and support have a positive impact on the student outcomes of persistence, grades, and matriculation (Longerbeam, 2016). A recent influx of studies share the recommendation that by increasing quality instruction, organization, and challenge and rigor, all students are more likely to develop higher level cognitive strategies and the tenacity to persist through college to graduation (Blaich, Wise, Pascarella, & Roksa, 2016; Campbell & Dortch, 2018; Olson, 2017; Padgett et al., 2013; Pascarella, Salisbury, & Blaich, 2011; Pascarella, Wang, Trolian, & Blaich, 2013; Wang, Pascarella, Nelson Laird, & Ribera, 2015).

One reason the midsized university in the present study shifted overtime from a 1-credit to a 3-credit academic first-year seminar was to meet course objectives that provided high-level cognitive meaning making and academic rigor. Although preparation for academic rigor may be helpful to students (Wang et al., 2015) and especially helpful for some student subgroups (Olson, 2017), it remains to be determined if an increase in the academic credit value in conjunction with more rigorous course objectives will lead to improvement in student persistence, grades, and matriculation (Swanson et al., 2017; Vaughan et al., 2014).

The present study addresses the need to conduct high-quality research on the potential impact of credit level on student outcomes in first-year seminars over time, and especially for at-risk student groups (Campbell et al., 2013; Permzadian & Credé, 2016). As nothing currently exists in the published research, this study was designed to contribute uniquely to the research on the effect of first-year seminars at the 1-, 2-, and 3-credit levels. Although there are limitations to conducting research with one institution, this strategy allows a direct comparison of the differing credit levels due to the similar

college environment, student population, and other contextual factors. The results of this study should help practitioners make informed decisions when providing varying levels of first-year seminars to all students and at-risk student subgroups.

Research Questions

The study addresses these specific research questions.

1. For all students, is participation (or nonparticipation) in a (1-, 2-, 3 credit) FYS related to student achievement (i.e., first-term GPA and one-year persistence)?
2. Does student achievement (i.e., first-term GPA and one-year persistence) for student subgroups (i.e., first-generation students, students of color, male students, and conditionally admitted students) very by the FYS credit level?

Method

Participants

Participants were full-time students (N = 12,482) enrolled at a medium-sized western four-year public research university. Six cohorts of first-time, first-year students were included (Fall 2009, 2010, 2011, 2012, 2013, and 2014). This student population was 63% female (n = 7,892 female, n = 4,590 male), 46% first-generation students (n = 5,763), 30% students of color (n = 3,769), and 23% students who were conditionally admitted (n = 2,852). Students of color were identified through student self-report when entering the university. Students could select from among the following ethnicities: African American, Asian, Pacific Islander, Native American, Hispanic, or White. If a student selected any ethnicity(ies) other than White, they were classified as "student of color" for the purposes of this study. Conditionally admitted students entered the university below the cutoff for high school GPAs and college entrance exam scores required for regular admittance.

First-Year Seminars (FYS)

Fall 2009 and 2010: 1-credit FYS. These were the last two years that the FYS was delivered as was an extended orientation where all entering first-year students were initially enrolled; however, students could drop the course prior to the semester beginning or during the add/drop period. This course was available only during students' first semester and was included as part of university-wide electives. The course schedule was similar across sections and included topics such as campus involvement, library resources, study strategies, and educational planning. Training for instructors consisted of a one-day orientation before the beginning of the semester. Instructor selection was based on availability and at least minimal knowledge of first-year student transition issues.

Fall 2011 and 2012: 2-credit FYS. This FYS applied to students' 40-credit liberal arts core graduation requirement and was only available during students' first semester. Students were not required to participate and self-selected into the seminar. Like other seminars, this course was small (i.e., 30 or fewer students), highly interactive, and discussion based, with emphases on student-centered instruction, recurrent application, and authentic learning opportunities. The curriculum combined research-based topics in the domain of educational psychology, such as goal and motivation theories, as well as more practical application topics such as time management and four-year educational planning. It was an academic course, rather than an extended-orientation model, that incorporated readings from peer-reviewed research, written assignment, research projects, and examinations.

Unlike many seminars offered, the curriculum was highly coordinated and each section had an identical schedule of topics and assignments. A competitive process was used to select instructors, and only instructors from specific domains (e.g., psychology, education) were eligible to apply. Each instructor then participated in a comprehensive week-long training prior to the semester followed by a concurrent, semester-long training to help ensure that each student received an equivalent course and experience.

Fall 2013 and 2014: 3-credit FYS. After delivering the 2-credit FYS for two years, the institution determined that two credits were not sufficient to meet the course objectives. As such, the course was increased to three credits. No other changes were made to the program other than to expand the current curriculum to incorporate more time for specific topics.

FYS Grade Distribution. The 1-credit FYS did not have a normal grade distribution. The distribution reflected several characteristics of the program. First, students had little to no graded academic work; they earned grades primarily based on attendance and participation. Students who did not attend the classes tended to earn a failing grade. Therefore, the distribution showed large numbers of "A" and "F" grades. Once the program transitioned to the 2- and 3-credit academic models, the distribution of FYS grades remained normal and paralleled most college-level academic courses.

Data Collection

Demographic and institutional data for each participant was recorded in the university's data management system. The Institutional Review Board granted approval to collect the following student information from existing institutional datasets: FYS participation, gender, ethnicity, first-generation status, index score, term GPA, and enrollment and credit loads. Index score was used as a control variable in the analyses to account for potential differences in students' entering academic preparedness. The score represents a combination of high school GPA and college entrance exams (e.g., ACT); it is calculated by the state and is used by institutions statewide to assess entering academic preparedness.

Data Analysis

The first analysis compared the population numbers in each group (i.e., 0- to 3-credit; where 0-credit refers to nonparticipation) to determine whether the groups were different in terms of percentage of first-generation students, students of color, and conditionally admitted students. This analysis also included average index score. For the percentage of first-generation students, students of color, and conditionally admitted students, a chi-square test of homogeneity with a pairwise comparison (z-test with a Bonferroni adjustment) was used to test for differences between the proportions in the four groups. A one-way between-subjects ANOVA was conducted, followed by a Tukey HSD post hoc test, to test for differences in average index score. These analyses were included to provide more information about participants and nonparticipants when interpreting the subsequent results. The results could potentially have different meaning if FYS participants were more academically prepared (i.e., higher index scores) or included fewer at-risk students.

The second analysis compared the relationship of first-term GPAs with participation in the three different first-year seminars (i.e., 1-, 2-, and 3-credit FYS) and nonparticipation (i.e., 0 credits). A one-way between-subjects ANOVA was conducted, followed by a Tukey HSD post hoc test (due to significant main effects). Subsequently, a regression analysis was conducted to determine any interactions between FYS credits on first-term GPA due to identification with a student subgroup (i.e., first-generation students, male students, students of color, or conditionally admitted students). Four regression models were included to represent each student subgroup because there were statistically significant correlations between some variables and multicollinearity was a concern (Huck, 2000). Additionally, the inclusion of separate models for each subgroup allowed for more clear interpretation of the effects within the model, and multicollinearity was no longer a concern.

For the third analysis, another one-way between-subjects ANOVA was conducted to compare the effect of FYS credits on second-year fall credit load. It was followed by a Tukey HSD post hoc test because the ANOVA showed significant main effects. The second-year fall credit load was used as a variable to represent both persistence and progress toward degree completion. Research supports the conclusion that students who take higher credit loads each semester are more likely to graduate (Radford & Horn, 2012). A regression analysis was then conducted to determine any interactions between FYS credits on second-year fall credit load due to identification with a student subgroup (i.e., first-generation students, male students, students of color, or conditionally admitted students). The rationale for using four models was the same as described previously.

Results

In the first analysis, the chi-square test of homogeneity showed significant differences ($p < .001$) in the proportion of first-generation students, students of color, and conditionally admitted students between the four groups. The z-test with Bonferroni correction showed

that the 3-credit FYS group had significantly higher proportions of first-generation students and students of color as compared to the other groups. Only the 2-credit FYS group had a significantly higher proportion of conditionally admitted students. See Table 1 for each of the proportions.

Analysis of differences in index score (i.e., entering academic preparedness) also showed a significant main effect for FYS credit, $F(3, 12431) = 24.49$, $p < .001$. Tukey HSD post hoc comparisons indicated that the index mean scores for all three FYS credits (i.e., 1, 2, and 3) was significantly lower ($p < .001$) than the mean score for 0 credits (i.e., nonparticipants). See Table 1 for average scores.

Table 1
Percentage of Students and Average Index Scores in Each FYS Credit Group

	FYS			
	0 credits	**1 credit**	**2 credits**	**3 credits**
First-generation students	$45.5\%_{a}$	$45.9\%_{a}$	$48.2\%_{a,b}$	$53.1\%_{b}$
Students of color	$28.8\%_{a}$	$27.4\%_{a}$	$37.8\%_{b}$	$47.3\%_{c}$
Conditionally admitted students	$21.7\%_{a}$	$24.9\%_{b}$	$30.9\%_{c}$	$23.3\%_{a,b}$
Average index scores	105.5	104.0	101.5	103.1

Note. 0 credits refer to students who did not participate in the first-year seminar. Each subscript letter denotes a subset of FYS categories whose column proportions do not differ significantly from each other at the .05 level.

Mean first-term GPA and second-year fall credit load for students at each FYS credit level are shown in Table 2. The analysis on first-term GPA showed a significant main effect for FYS credit, $F(3, 12478) = 36.30$, $p < .001$. Tukey HSD post hoc comparisons indicated that each of the mean scores for all three FYS credits (i.e., 1, 2, and 3) were significantly greater ($p < .001$) than the mean score for nonparticipants. There were no significant differences between the mean scores for participants in the 1, 2 or 3 FYS credits.

For the regression analysis, each of the assumptions was tested. Each regression model showed an independence of errors (i.e., Durbin-Watson values close to 2) and a linear relationship between the dependent and the independent variables (scatter plots of residuals). The analysis showed no multicollinearity: All independent variables had small correlations and tolerances were all greater than .1. The residuals were normally distributed (histograms and P-P plots), and there was homoscedasticity (plot of studentized residuals versus unstandardized predicted values).

Table 2
First-Term GPA Means and Second-Year Credit Loads for All FYS Credit Groups

	First-term GPA		Second-year fall credit loads		
	M	***SD***	***M***	***SD***	***n***
All	2.56	1.05	9.99	6.89	12,482
0 credits	2.50	1.12	9.60	7.03	8,980
1 credit	2.73	0.85	11.12	6.42	2,004
2 credits	2.72	0.78	10.76	6.39	679
3 credits	2.70	0.85	10.83	6.40	763

Note. 0 credits refer to students who did not participate in the first-year seminar.

There were significant interactions for first-generation students, gender, and conditionally admitted students with FYS credits ($p < .001$; see Table 3 and Figure 1) on first-term GPA and no significant interaction for students of color ($p = .353$; see Table 3). The average variance explained (R^2) for all four models ranged from 0.21 to 0.23.

The analysis for second-year fall credit load showed a significant main effect for FYS credit, $F(3, 12422) = 34.34$, $p < .001$. The Tukey HSD post hoc comparisons indicated that each of the 2nd year fall credit load mean scores for all three FYS credits (1, 2, and 3) was significantly greater ($p < .001$) than the mean score for 0 credits (i.e., nonparticipants). The analysis showed no significant differences between the second-year fall credit load mean scores for participants in the 1-, 2-, or 3-credit FYS. Some of the average second-year fall credit loads were less than full time because of the inclusion of zero credits for students who were no longer at the university.

The regression analysis showed significant interactions for all four subgroups with FYS credits ($p < .001$; see Table 4 and Figure 2) on second-year fall credit load. The variance explained (R^2) for all four models was 0.04.

Table 3
Regression Analysis Results of First-Term GPA With FYS Credit and Interaction Variables Controlling for Index Score

	B	***SE B***	***β***	***p***	**95% CI**
Model: First-generation students -					
FYS credit	0.10	0.01	.08	<.001	[0.08, 0.13]
First generation	-0.27	0.02	-.13	<.001	[-0.30. -0.23]
FYS credit (x) first generation	0.06	0.02	.04	.001	[0.03, 0.10]
Index score	0.03	0.00	.43	<.001	[0.03, 0.03]
F	873.90			<.001	
R^2	0.22				
Model: Gender					
FYS credit	0.18	0.02	.14	<.001	[0.14, 0.21]
Female	0.33	0.02	.15	<.001	[0.29, 0.37]
FYS credit (x) female	-0.08	0.02	-.05	<.001	[-0.12, -0.04]
Index score	0.03	0.00	.43	<.001	[0.03, 0.03]
F	902.53			<.001	
R^2	0.21				
Model: Conditionally admitted students					
FYS credit	0.11	0.01	.09	<.001	[0.09, 0.13]
Conditional admit	-0.11	0.03	-.04	<.001	[-0.17, -0.05]
FYS credit (x) conditional admit	0.09	0.02	.04	<.001	[0.04, 0.13]
Index score	0.03	0.00	.43	<.001	[0.03, 0.03]
F	814.60			<.001	
R^2	0.21				
Model: Students of color (SOC)					
FYS credit	0.13	0.01	.11	<.001	[0.11, 0.16]
SOC	-0.24	0.02	-.10	<.001	[-0.28, -0.19]
FYS credit (x) soc	0.02	0.02	.01	.353	[-0.02, 0.06]
Index score	0.03	0.00	.43	<.001	[0.03, 0.03]
F	855.327			<.001	
R^2	0.22				

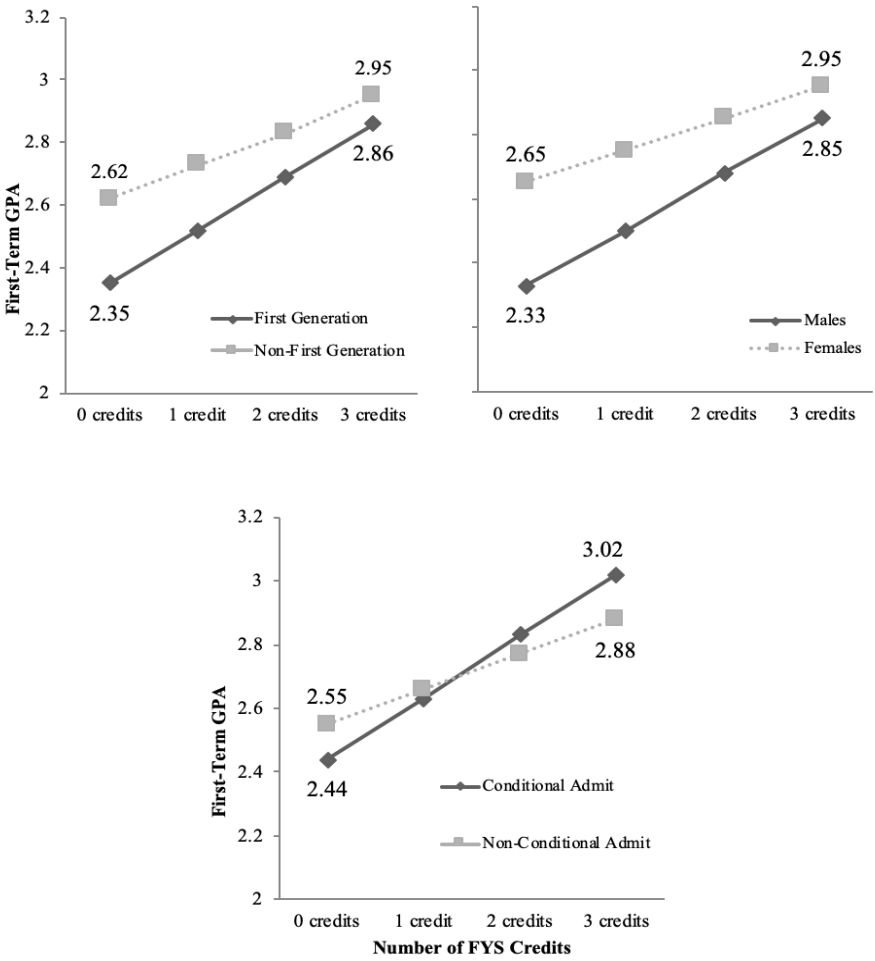

Figure 1. The significant interactions of first-generation status, gender, and conditional admittance with FYS credits on first-term GPA.

Table 4
Regression Analysis Results of Second Year Fall Credit Load With FYS Credit and Interaction Variables Controlling for Index Score

	B	***SE B***	***β***	***p***	***95% CI***
Model: First-generation students -					
FYS credit	0.52	0.10	.06	<.001	[0.32, 0.72]
First generation	-1.13	0.14	-.08	<.001	[-1.41, -0.86]
FYS credit (x) first generation	0.38	0.14	.04	.008	[0.10, 0.65]
Index score	0.09	0.00	.18	<.001	[0.08, 0.09]
F	144.69			<.001	
Model: Gender					
FYS credit	0.93	0.12	.12	<.001	[0.69, 1.17]
Female	0.73	0.14	.05	<.001	[0.45, 1.01]
FYS credit (x) female	-0.38	0.15	-.04	.013	[-0.67, -0.08]
Index score	0.09	0.00	.18	<.001	[0.08, 0.10]
F	133.67			<.001	
Model: Conditionally admitted students					
FYS credit	0.51	0.08	.06	<.001	[0.35, 0.68]
Conditional admit	-0.46	0.21	-.03	.026	[-0.87, -0.06]
FYS credit (x) conditional admit	0.72	0.17	.05	<.001	[0.02, 0.59]
Index score	0.09	0.01	.18	<.001	[0.08, 0.10]
F	814.60			<.001	
Model: Students of color (SOC)					
FYS credit	0.59	0.09	.07	<.001	[0.40, 0.77]
SOC	-0.53	0.15	-.04	.001	[-0.83, -0.23]
FYS credit (x) SOC	0.31	0.15	.03	.037	[0.02, 0.59]
Index score	0.09	0.00	.18	<.001	[0.08, 0.10]
F	130.15			<.001	

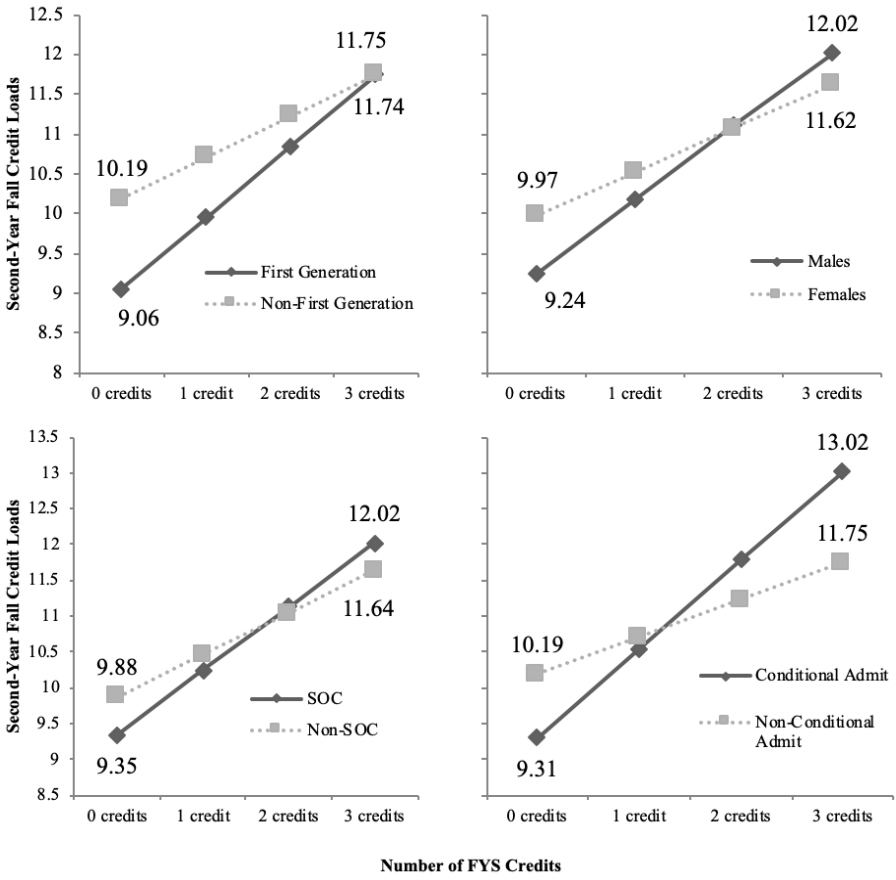

Figure 2. The significant interactions of first-generation status, gender, student of color identity, and conditional admittance with FYS credits on second-year fall credit load.

Discussion

Because of the challenges faced by students entering college for the first time, first-year seminar programs have developed as a major intervention to ease this transition and increase student persistence. This study highlights a first-year seminar program with a cross-sectional sample of students who completed the course during different years over a six-year period. Because the structure and content of this course was modified over this six-year period, the results from this study offer a unique perspective in understanding the potential impacts of different FYS types on student achievement. The analysis suggested that first-term GPA and second-year fall credit load were essentially equivalent for students in each of the FYS types (1-, 2-, and 3-credits); however, all were significantly greater than

the GPAs and credit loads for students who did not participate in any of the first-year seminars. These outcomes were clear even though the 3-credit FYS had a higher proportion of students who were first-generation and students of color and as a group had significantly lower average index scores.

Although this information is helpful when considering FYS types and their effectiveness, these outcomes reveal only a small part of the story. The additional analyses that assessed potential interactions offered more information about the relationship between at-risk student subgroups, their first-year achievement, and FYS credit levels. These findings suggest that first-generation students, male students, students of color, and conditionally admitted students benefit from participating in first-year seminars with greater credit loads. Both first-generation students and male students in the 3-credit FYS approached a mean first-term GPA of 2.9, essentially the same GPA as non-first-generation students and female students. Conditionally admitted students exceeded the GPA of their regularly admitted peers and on average earned a GPA over 3.0.

It is also important to note that the interaction and FYS credits variables were both significant above and beyond the variable index score in these models. Index score was used to represent entering academic preparedness. This finding suggests that regardless of previous academic readiness, participation in FYS has a significant impact on student achievement. This interpretation aligns with the recommendation of Permzadian and Credé (2016) that first-year seminars should not specifically target students with poorer incoming academic profiles. Instead, all students should be considered academically underprepared to some extent, and all can reap benefits of a first-year seminar course.

The results were more striking for second-year fall credit load as students in each at-risk subgroup who participated in the 3-credit FYS enrolled in more credits during their second fall term than their not-at-risk peers. Additionally, within their peer groups, students who participated in the 3-credit FYS enrolled in up to three and a half more credits than their at-risk peers who did not participate at all.

Finally, the interaction and FYS credits variables were both significant above and beyond the variable index score in all four models, similar to the findings from the analysis of first-term GPA. As such, these findings further support the argument that all students (no matter entering preparedness) can benefit and succeed in the first college year by participating in a first-year seminar. To summarize, for at-risk students, participating in the 3-credit FYS diminished or completely eliminated achievement gaps during the first year of college.

These results provide evidence that supports what many authors are endorsing: increasing the quality of instruction along with challenge and rigor for first-year seminars. This study included more rigorous academic content as the FYS transitioned from one to two to three credits (Blaich et al., 2016; Campbell & Dortch, 2018; Olson, 2017; Padgett et al., 2013; Pascarella et al., 2011; Pascarella et al., 2013; Wang et al., 2015).

Implications

Because these findings suggest similar outcomes for all students regardless of FYS credit loads, administrators in higher education who are contemplating instituting these types of programs for the first time or are considering changes to their current programs may be tempted to establish or maintain programs that require the least amount of resources. A one-credit extended-orientation FYS model that can be taught largely by staff members at a fraction of the cost of faculty-led courses may seem like an attractive option; however, these findings suggest that students who need the most support may not be best served by a 1- or 2-credit FYS.

This consideration is important as most institutions face intensified challenges because of rising enrollments of students who are at additional risk. Students of color and first-generation students are enrolling in institutions of higher education at an increasing rate (Bowen, Chingos, & McPherson, 2009; Hussar & Bailey, 2013; Reason, 2003); however, their success has been limited. Some studies suggest only 34% of students of color graduate within six years (Knapp et al., 2007); others show that only 24% of first-generation students earn their degrees within eight years (Chen & Carroll, 2005). The achievement gap for male students also continues to grow (Pike et al., 2014; National Center for Education Statistics, 2014). Male students are less likely than female students to enroll and less likely to graduate (Pike et al., 2014) Those who persist tend to take longer to complete their degrees (King, 2006). This trend began in the 1970s and is becoming more severe over time (Ewert, 2010).

Many institutions are also considering lowering their admission requirements (i.e., allowing more conditionally admitted students) as a potential strategy to increase enrollments. As students who are less prepared academically enter college at higher rates, it becomes critical to provide effective supports and interventions to maintain both university persistence and completion rates. The goal of intentionally bringing in students who have struggled significantly to stay in and complete college (Zilvinskis et al., 2017) deserves an institution's best efforts to support their needs.

The findings from this study strongly support a 3-credit academic first-year seminar to serve these at-risk student groups. Although not directly addressed in this study, placement of the FYS within general education requirements (in the 2- and 3-credit types) may have influenced the results. Because many students enter college less prepared (Chen & Carroll, 2005), it is essential that they receive the appropriate balance of challenge and support that will ultimately help them accomplish college-level work. Some of the risks for students entering college can be social or financial; however, if students cannot successfully complete college-level work, it is unlikely that they will be able to earn a degree. These seminars specifically focus on challenging tasks (e.g., research papers) that are scaffolded and partitioned into smaller divisions of work with extensive written and verbal feedback. Furthermore, it is likely that the comprehensive and ongoing instructor training helps provide the necessary tools and pedagogy to support these students effectively in a

student-centered and engaging learning environment. The research-based academic FYS has opportunities and time to include learning and motivation theories that likely have a direct impact on the behaviors of these students. For example, instructors promote help-seeking behaviors by having students examine their own self-efficacy beliefs and attributions in different educational contexts. For institutions seeking practices to support these students, particularly institutions where these students are the majority, this type of model may provide increased opportunities for success and persistence for their students.

Limitations and Future Research

The primary limitation of this study is its generalizability because it included only one institution. However, it is this limitation that made the study possible. It is unlikely that many institutions have the range of FYS types and credit loads available within a relatively short time. It also allowed a more direct comparison because the overarching educational context, university culture, and environment were essentially the same for each student. However, there are still limitations to designing a study with only one institution, as the "process of student retention differs in different institutional settings" (Tinto, 2006-2007, p. 4).

Another limitation is the information that can be generalized by doing a strict comparison based on number of credits (or no credits for nonparticipation). Although the curriculum at this institution changed as the seminar increased in credits, this quantitative study can provide evidence only that the increase in contact hours (i.e., number of credits) is related to differences in the achievement outcomes. Additional qualitative studies may provide more information about the "what" and the "how" of these seminars and how they affected students.

Finally, the effect size for some of the models was a limitation. In the models for first-term GPA, the interactions of first-generation students, gender, students of color, and conditionally admitted students with FYS credits had average effect sizes of 22% of the variance explained. This effect size is moderate considering the limitations within social science research; however, the effect sizes for the interactions with second-year fall credit load were low, at 4% of the variance explained. Nevertheless, the findings are still informative, especially as the model and each variable in the model were significant. More important, the findings have practical significance because each subgroup of

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