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TYPE:	Article CC:CCG
JOURNAL TITLE:	Journal of the first-year experience & students in transition
USER JOURNAL TITLE:	Journal of the first-year experience & students in transition.
ARTICLE TITLE:	Investigation of the Effect of First-Year Seminars on Student Success
ARTICLE AUTHOR:	Qingmin Shi, John R. Crooker, Christina Drum, Bren
VOLUME:	33
ISSUE:	2
MONTH:	
YEAR:	fall 2021
PAGES:	65-95
ISSN:	1542-3077
OCLC #:	40245359

Processed by RapidX: 3/28/2023 11:41:06 AM

Investigation of the Effect of First-Year Seminars

e FYS is one of the most widely researched rst-year initiatives in higher education, and a large body of literature indicates that FYS participation bridges a student's successful transition from high school to college and promotes academic performance and the likelihood of persistence into the second year (e.g., Barton & Donahue, 2009; Fidler, 1991; Jenkins-Guarnieri, et al., 2014-2015; Pascarella & Terenzini, 2005). However, a signi cant portion of the literature on FYS programs calls into question their impact on retention and academic performance (Clark & Cundi , 2011; Permzadian & Crede, 2016). Some studies have identi ed large positive e ects on GPA and retention (e.g., Blacke , 2008; Swanson et al., 2017; Woolfork-Barnes, 2017), while others have reported very small e ects or even negative e ects of FYS on students' GPA and retention rate (e.g., Cavote & Kopera-Frye, 2004; Wolf-Wendel et al., 1999). Recently, a meta-analysis revealed a small average FYS e ect on both rst-year grades and the 1-year retention rate (Permzadian & Crede, 2016). However, it also suggested the impacts of FYS on 1-year retention and rst-year grades are substantially moderated by FYS characteristics, institutional and instructional characteristics, population studied, and study characteristics. e inconsistent ndings of the FYS impact call for a close examination of FYS using sophisticated methodologies.

However, methodologically, identifying and estimating average treatment e ects of an educational intervention, such as FYS courses, from nonexperimental data collected in

(b) What are the predictive powers of FYS participation and FYS grades on the likelihood of retaining to the second Fall and graduating within 6 years, and first-Fall term GPAs (without FYS performance) when controlling for other variables?

It is our hope to provide empirical evidence of FYS participation and its impacts on student success metrics at large public research universities, specifically, and higher education institutions in general, and contribute to a broad knowledge base by inspiring college leadership and policymakers to examine FYS and student outcomes at their home campuses more closely such that students may benefit more from FYS.

In this article, "FYS participants" are students who enrolled in at least one FYS course section (either in the first Fall or Spring term), regardless of whether they completed the course; otherwise, students are classified as FYS nonparticipants. FYS grade is a letter grade that a student earned from the FYS course(s). If the student took an FYS section in both Fall and Spring term, the Fall record was counted.

Theoretical Framework

Permzadian & Crede, 2016). e majority of the studies compared outcomes in 1-year retention and rst-year GPA between students who enrolled in or completed an FYS course and those who did not. Some studies extended 1-year retention to 2-year retention (e.g., Jamelske, 2009; Lang, 2007; Schnell & Doetko , 2002-2003) and other outcomes (e.g., Al-Sheeb et al., 2018; Zerr & Bjerke, 2016). Rarer still, some examined longitudinal outcomes of FYS beyond the second year (Fidler, 1991; Miller & Lesik, 2014-2015; Schnell et al., 2003; Shanley & Wi en 1990; Woolfork-Barnes, 2017). Studies also found that FYS grades are predictors of student outcomes measured by retention, cumulative GPA, and graduation (Hyers & Joslin, 1998; Starke et al., 2001; Zimmerman, 2000).

Method

FYS at This Institution

e institution in which this study took place is a 4-year public R1 university located in the Southwestern region of the United States (we use "this Institution" herea er). is Institution is a Hispanic-serving institution (HSI) anen-no--no-.35.8 (Peb2]e)-2.23 (.8 (i) .2 (e)25 a)-2

the participants in the total sample, the Fall 2010–Fall 2011 cohorts, and the Fall 2012–Fall 2014 cohorts.

Table 1
Characteristics of the Participants

Variable		**Fall 2010-2014 (*N* = 15,882)**		**Fall 2010-2011 (*N* = 5,620)**		**Fall 2012-2014 (*N* = 10,262)**	
		n	**%**	***n***	**%**	***n***	**%**
Sex	Female	9,024	56.8	3,121	55.5	5,903	57.5
	Male	6,858	43.2	2,499	44.5	4,359	42.5
Pell recipient status	Pell recipient	5,613	35.3	1,966	35.0	3,647	35.5
	Non-Pell recipient	10,269	64.7	3,654	65.0	6,615	65.5
Race and Ethnicity	American Indian or Alaska Native	39	0.25	17	0.3	22	0.2
	Asian	2,561	16.1	872	15.5	1,689	16.5
	Black or African American	1,281					

Variable	Fall 2010-2014

Fall 2010 and Fall 2011 data before FYS implementation with Fall 2012, Fall 2013, and Fall 2014 data to compare outcomes of FYS participants with FYS nonparticipants in terms of retention, performance, and completion, controlling for variables that have been found associated with student outcomes in the existing literature.

To address the first research question of this study, we compared FYS participants and nonparticipants regarding retention and graduation rates using descriptive statistics

Table 2
Descriptive Results of Student Outcomes by Fall FYS Enrollment

Student outcomes		**Not retained/ Not graduated (#/%)**	**Retained/ graduated (#/%)**	**Total**	χ^2	***p***
Retained to second fall	Not enrolled in FYS	2,359 (25.8)	6,785 (74.2)	9,144		
	Enrolled in FYS	1,437 (21.3)	5,301 (78.7)	6,738		
	Total	3,796	12,086	15,882	42.65	0.001**
Retained to third fall	Not enrolled in FYS	3,284 (35.9)	5,860 (64.1)	9,144		
	Enrolled in FYS	2,023 (30.0)	4,715 (70.0)	6,738		
	Total	5,307	10,575	15,882	60.50	0.001**
Retained to fourth fall	Not enrolled in FYS	3,965 (43.4)	5,179 (56.6)	9,144		
	Enrolled in FYS	2,399 (35.6)	4,339 (64.4)	6,738		
	Total	6,364	9,518	15,882	97.22	0.001**
Four-year graduation	Not enrolled **in** FYS	8,031 (87.8)	1,113 (12.2)	9,144		
	Enrolled in FYS	5,526 (82.0)	1,212 (18.0olled			

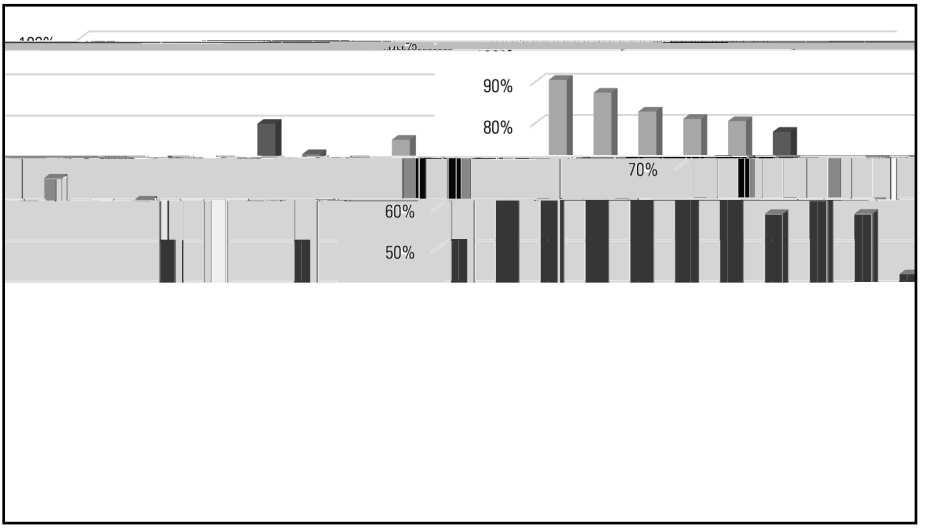

Figure 1. Retention rate by FYS grade.

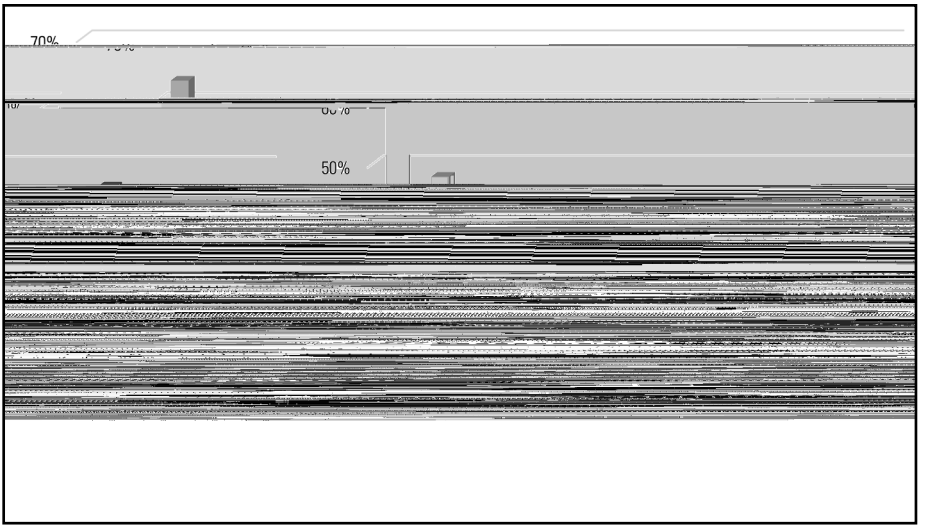

Figure 2. Six-year graduation rate by FYS grade.

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Table 3.1
Model Coefficients for Retention to the Second Fall (FYS Grade Effects)

	Estimate	**Std. error**	***z* value**	**Pr (>|z|)**
FYS final grade A	1.6595	0.2423	6.8495	0.0001**
FYS final grade A-	1.5950	0.2467	6.4646	0.0001**
FYS final grade B+	1.3950	0.2475	5.6367	0.0001**
FYS final grade B	1.3061	0.2453	5.3252	0.0001**
FYS final grade B-	1.3208	0.2511	5.2610	0.0001**
FYS final grade C+	1.1124	0.2559	4.3473	0.0001**
FYS final grade C	0.9659	0.2493	3.8751	0.0001**
FYS final grade C-	0.7346	0.2651	2.7706	0.0056**
FYS final grade D+	0.7647	0.2882	2.6531	0.0080**
FYS final grade D	0.6581	0.2611	2.5206	0.0117*
FYS final grade D-	0.3185	0.3043	1.0467	0.2952
FYS final grade F	-0.0897	0.2472	-0.3630	0.7166
FYS final grade AD	0.7318	0.6204	1.1796	0.2382
FYS final grade I	0.7992	0.3258	2.4535	0.0141*
FYS final grade S	1.0998	0.5631	1.9531	0.0508
FYS final grade W	0.0354	0.2557	0.1385	0.8899
Subject BUS	-0.0854	0.1001	-0.8531	

Retention to the second fall		First-fall GPA		Six-Year Graduation	
Variable	**Importance**	**Variable**	**Importance**	**Variable**	**Importance**
SAT combined score	302.71	SAT combined score	2216.45	SAT combined score	225.98
FYS grade	168.24	FYS grade	2048.50	First-fall career semester credits	87.80
First-fall career semester credits	113.20	First-fall career semester credits	756.39	FYS grade	52.10
Age	73.45	Age	506.09	Age	50.60
First generation status	46.66	Pell recipient status	299.65	First generation status	33.60
Pell recipient status	44.48	First generation status	293.81	Sex (Female)	33.02
Sex (Female)	43.98	Sex (Female)	293.38	Pell recipient status	32.47
Underrepresented minority (URM)	42.80	URM	287.89	URM	31.39
FYS no grade	26.99	FYS no grade	261.02	Fall FYS	14.55
Subject COLA	20.42	Fall FYS	212.35	Instructor GA	11.81
Fall FYS	20.10	Subject SCI	147.27	FYS no grade	11.64
Instructor GA	19.47	Spring FYS	126.49	Instructor ADM	10.74
Instructor temporary	17.33	Instructor GA	1Istruco 3ETEMC 31/P <</Lang (en-U16g (/27.3292		

Retention to the second fall		First-fall GPA		Six-Year Graduation	
Variable	**Importance**	**Variable**	**Importance**	**Variable**	**Importance**
Instructor LOA	15.57	Instructor temporary	85.52	Instructor permanent	8.39
Instructor permanent	15.41	Subject HON	85.22	Subject HSC	8.33
Subject HSC	14.30	Subject HSC	84.13	Subject TCA	7.37
Instructor ADMLOA					

Table 5
Retention Odds Ratios by FYS Enrollment

Description	Odds Ratio
Pr(RET 2nd Fall|Grade=F)/Pr(RET 2nd Fall|No FYS)	0.629
Pr(RET 2nd Fall|Grade=D-)/Pr(RET 2nd Fall|No FYS)	0.921
Pr(RET 2nd Fall|Grade=D)/Pr(RET 2nd Fall|No FYS)	1.166
Pr(RET 2nd Fall|Grade=D+)/Pr(RET 2nd Fall|No FYS)	1.238
Pr(RET 2nd Fall|Grade=C-)/Pr(RET 2nd Fall|No FYS)	1.218
Pr(RET 2nd Fall|Grade=C)/Pr(RET 2nd Fall|No FYS)	1.366
Pr(RET 2nd Fall|Grade=C+)/Pr(RET 2nd Fall|No FYS)	1.448
Pr(RET 2nd Fall|Grade=B-)/Pr(RET 2nd Fall|No FYS)	1.551
Pr(RET 2nd Fall|Grade=B)/Pr(RET 2nd Fall|No FYS)	1.544
Pr(RET 2nd Fall|Grade=B+)/Pr(RET 2nd Fall|No FYS)	1.582
Pr(RET 2nd Fall|Grade=A-)/Pr(RET 2nd Fall|No FYS)	1.656
Pr(RET 2nd Fall|Grade=A)/Pr(RET 2nd Fall|No FYS)	1.676

Table 6
Retention Odds Ratios by FYS Grade

Description	Odds Ratio
Pr(RET 2nd Fall|Grade=A)/Pr(RET 2nd Fall|Grade=F)	2.663
Pr(RET 2nd Fall|Grade=A)/Pr(RET 2nd Fall|Grade=D/3u2 T1834edaaaa693aa693aa01l(a4 (e)66)-63.|017261c823 (s	

retention to the second Fall, performance in the FYS is indicative of this retention. Again, intuitively, as student performance fell further below the "A" level, the likelihood of retention fell as well. Also, le er grades in the "A–" to "C" range may not imply signi cantly lower rates of retention; the model suggested systemic underperformance for non-"A" grade earners.

Figure 3 also illustrates the probability of retention to the second Fall for the composite

Table continued from page 83

	Estimate	Std. error	*t* value	Pr (>|z|)
Subject HSC	-0.1815	0.0658	-2.7593	0.0058**
Subject SCI	-0.4495	0.0593	-7.5783	0.0001**

Note. Subject prefix represents the FYS course offered by that college. BUS: College of Business; CFA: College of Fine Arts; COE: College of Education; COLA: College of Liberal Arts; EGG: College of Engineering; GSC: College of Urban Affairs; HON: Honors College; HSC: School of Integrated Health Sciences; SCI: College of Sciences. *$p < .05$. **$p < .01$.

Table 7.2
Model Coefficients for First-Fall GPA (Instructor Effects)

	Estimate	Std. error	*t* value	Pr (>|z|)
Administrative	-0.0201	0.0515	-0.3898	0.6967
Administrative LOA	0.0227	0.0623	0.3651	0.7151
Graduate assistant	0.0620	0.0478	1.2974	0.1945
LOA	-0.0196	0.0448	-0.4366	0.6624
Other	0.3137	0.2156	1.4548	0.1457
Permanent	0.0998	0.0430	2.3237	0.0202*

*$p < .05$.

Table 7.3
Model Coefficients for First-Fall GPA (Pre-College and Enrollment Effects)

	Estimate	Std. error	*t* value	Pr (>|z|)
Age	0.0532	0.0100	5.3247	0.0001**
Fall FYS	-0.7191	0.3692	-1.9475	0.0515
Spring FYS	0.5186	0.0370	14.0072	0.0001**
Last high school unweighted GPA	0.6842	0.0226	30.3250	0.0001**
First fall career semester credits	0.0279	0.0058	4.8376	0.0001**
SAT combined scores	0.0010	0.0001	16.3704	0.0001**
Application submission advanced day	0.0005	0.0001	3.8386	0.0001**
Sex male	-0.0832	0.0177	-4.7020	0.0001**
Pell recipient Y	0.0075	0.0183	0.4118	0.6805
Term code_Fall 2011	-0.5930	0.0294	-20.1662	0.0001**
Term code_Fall 2012	-0.4568	0.0409	-11.1679	0.0001**
Term code_Fall 2013	-0.5434	0.0400	-13.6015	0.0001**
Term code_Fall 2014	-0.5215	0.0395	-13.1974	0.0001**

*$p < .05$. **$p < .01$.

Table 7.4
Model Coefficients for First-Fall GPA (Race and Ethnicity and Parents' Edu Effects)

	Estimate	**Std. error**	***t* value**	**Pr (>|z|)**
Asian	0.2396	0.1718	1.3946	0.1632
Black or African America	0.0885	0.1730	0.5115	0.6090
Hispanic	0.1820	0.1712	1.0629	0.2878
Native Hawaii or Pacific Islanders	0.0132	0.1810	0.0731	0.9417
Nonresident alien	0.2085	0.1829	1.1400	0.2543
Two or more	0.1111	0.1726	0.6435	0.5199
Unknown race	0.2973	0.1899	1.5652	0.1176
White	0.1514	0.1711	0.8849	0.3762
Mother ed less than HS	-0.0194	0.0420	-0.4616	0.6444
Mother ed HS graduate	-0.0367	0.0240	-1.5298	0.1261
Mother ed some college	-0.0192	0.0225	-0.8504	0.3951
Mother ed not indicated	-0.0728	0.0443	-1.	en33US

Table 8.1
Model Coefficients for Six-Year Graduation (FYS Grade Effects)

	Estimate	Std. error	*z* value	Pr (>|z|)
FYS final grade A	0.2220	0.1352	1.6418	0.1006
FYS final grade A-	0.0831	0.1575	0.5279	0.5976
FYS final grade B+	-0.0774	0.1672	-0.4629	0.6434
FYS final grade B	-0.0656	0.1552	-0.4226	0.6726
FYS final grade B-	-0.3794	0.1928	-1.9676	0.0491*
FYS final grade C+	-0.2756	0.2074	-1.3286	0.1840
FYS final grade C	-0.5281	0.1952	-2.7056	0.0068**
FYS final grade C-	-1.2162	0.3466	-3.5085	0.0005**
FYS final grade D+	-0.7895	0.4531	-1.7426	0.0814
FYS final grade D	-0.7807	0.2543	-3.0703	0.0021**
FYS final grade D-	-0.7756	0.4401	-1.7624	0.0780
FYS final grade F	-1.2160	0.2163	-5.6224	0.0000**
FYS final grade I	-0.0653	0.3309	-0.1975	0.8435
FYS final grade S	-0.0323	0.9674	-0.0333	0.9734
FYS final grade W	-1.1149	0.2908	-3.8342	0.0001**
Subject BUS	-0.2037	0.1762	-1.1559	0.2477
Subject CFA	-0.0597	0.1590	-0.3755	0.7073
Subject COE	0.1879	0.2312	0.8129	0.4163
Subject COLA	-0.0515	0.1390	-0.3705	0.7110
Subject EGG	-0.3153	0.1508	-2.0907	0.0366*
Subject GSC	-0.1016	0.1760	-0.5773	0.5637
Subject HON	0.4882	0.9412	0.5187	0.6039
Subject HSC	-0.5108	0.1452	-3.5179	0.0004*
Subject SCI	-0.4553	0.1771	-2.5714	0.0101*

Note. Subject prefix represents the FYS course offered by that college. BUS: College of Business; CFA: College of Fine Arts; COE: College of Education; COLA: College of Liberal Arts; EGG: College of Engineering; GSC: College of Urban Affairs; HON: Honors College; HSC: School of Integrated Health Sciences; SCI: College of Sciences. *$p < .05$. **$p < .01$.

Table 8.2
Model Coefficients for Six-Year Graduation (Instructor Effects)

	Estimate	Std. error	*z* value

Table 8.4

Table 9
Six-Year Graduation Odds Ratios by FYS Enrollment

Description	Odds Ratio
Pr(Grad 6 Years|Grade=F)/Pr(Grad 6 Years|No FYS)	0.552
Pr(Grad 6 Years|Grade=D-)/Pr(Grad 6 Years|No FYS)	1.019
Pr(Grad 6 Years|Grade=D)/Pr(Grad 6 Years|No FYS)	1.013
Pr(Grad 6 Years|Grade=D+)/Pr(Grad 6 Years|No FYS)	1.002
Pr(Grad 6 Years|Grade=C-)/Pr(Grad 6 Years|No FYS)	0.551
Pr(Grad 6 Years|Grade=C)/Pr(Grad 6 Years|No FYS)	1.349
Pr(Grad 6 Years|Grade=C+)/Pr(Grad 6 Years|No FYS)	1.717
Pr(Grad 6 Years|Grade=B-)/Pr(Grad 6 Years|No FYS)	1.563
Pr(Grad 6 Years|Grade=B)/Pr(Grad 6 Years|No FYS)	2.033
Pr(Grad 6 Years|Grade=B+)/Pr(Grad 6 Years|No FYS)	2.015
Pr(Grad 6 Years|Grade=A-)/Pr(Grad 6 Years|No FYS)	2.253
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|No FYS)	2.452

Table 10
Six-Year Graduation and Odds Ratios for FYS Grade

Description	Odds Ratio
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=F)	4.445
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=D-)	2.406
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=D)	2.421
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=D+)	2.448
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=C-)	4.447
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=C)	1.818
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=C+)	1.428
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=B-)	1.568
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=B)	1.206
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=B+)	1.217
Pr(Grad 6 Years|Grade=A)/Pr(Grad 6 Years|Grade=A-)	1.088

Discussion, Conclusion, and Implication

e purpose of this study was to explore how the FYS and FYS grades relate to student retention, academic performance, and graduation, in addition to other variables that have been widely examined in the student success literature. It was not intended to establish a causal relationship between FYS and FYS grades and these desirable student outcomes. Although participants of this study were drawn from several FTFT cohorts before and a er FYS launched, the results of this study are limited to the FYS courses o ered at one R1 institution, which is not representative of all types of FYS courses at di erent colleges and

FYS, is positively correlated to student success (Pascarella & Terenzini, 2005). From the institutional perspective, actively engaging and supporting students upon their embarking in higher education would encourage students to strive for their educational goals (Schnell & Doetko , 2002-2003). We argue not only that FYS should operate as a GE course, but it could also be a vehicle of student engagement. erefore, it is essential for the institution to intentionally create curricula and other learning opportunities and provide resources and a variety of purposeful educational activities to engage students (Kuh, 2001, 2009).

Second, methodologically, we employed a probit model and a GLM to estimate the e ects of FYS participation and FYS grades on the likelihood of retention to the second Fall and 6-year graduation, and we calculated odds ratios of retention and graduation likelihood by FYS participation and FYS grades. e methods have not commonly been used in the studies of the FYS e ectiveness, and this may inspire researchers, IR professionals, and campus leaders to examine the FYS e ect at their home campuses in a more rigorous fashion. To examine the FYS e ect, future studies may use other robust analytic approaches, for example, di erence-in-di erences (e.g., Furquim et al., 2020), synthetic control methods (e.g., Crooker et al., 2021; Li, 2017), or propensity score matching (Clark & Cundi , 2011; Lang, 2007; Schnell & Doetko , 2002-2003; Herzog, 2014). Using instrumental variables would also account for the confounding of the self-selection bias (Pike et al., 2011).

We also included the credits enrolled in the rst F Tm[(W)34.9u2-2 l do -16.8 (-)83

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