SUPPLEMENT TO "FROM NATURAL VARIATION TO OPTIMAL POLICY? THE IMPORTANCE OF ENDOGENOUS PEER GROUP FORMATION"

(*Econometrica*, Vol. 81, No. 3, May 2013, 855–882)

BY SCOTT E. CARRELL, BRUCE I. SACERDOTE, AND JAMES E. WEST

TABLE A.I

PEER EFFECTS IN THE PRE-TREATMENT AND CONTROL GROUPS[a]

Variables	(1) GPA	(2) GPA
Pre-Treatment × Fraction High SAT-V Peers × High $\widehat{GPA}$	0.233	0.262[d]
	(0.154)	(0.147)
Pre-Treatment × Fraction High SAT-V Peers × Middle $\widehat{GPA}$	−0.137	−0.133
	(0.135)	(0.135)
Pre-Treatment × Fraction High SAT-V Peers × Low $\widehat{GPA}$	0.456[b]	0.460[b]
	(0.149)	(0.149)
Control Group × Fraction High SAT-V Peers × High $\widehat{GPA}$	0.222	0.318
	(0.333)	(0.287)
Control Group × Fraction High SAT-V Peers × Middle $\widehat{GPA}$	−0.143	−0.0372
	(0.439)	(0.328)
Control Group × Fraction High SAT-V Peers × Low $\widehat{GPA}$	0.855[d]	0.767[c]
	(0.438)	(0.376)
Pre-Treatment × Fraction Low SAT-V Peers × High $\widehat{GPA}$	0.0409	0.0414
	(0.142)	(0.145)
Pre-Treatment × Fraction Low SAT-V Peers × Middle $\widehat{GPA}$	−0.216	−0.238[d]
	(0.145)	(0.141)
Pre-Treatment × Fraction Low SAT-V Peers × Low $\widehat{GPA}$	0.0648	0.0552
	(0.141)	(0.138)
Control Group × Fraction Low SAT-V Peers × High $\widehat{GPA}$	0.0772	0.115
	(0.451)	(0.329)
Control Group × Fraction Low SAT-V Peers × Middle $\widehat{GPA}$	−0.487	−0.308
	(0.419)	(0.381)
Control Group × Fraction Low SAT-V Peers × Low $\widehat{GPA}$	−0.0835	3.48e−05
	(0.341)	(0.438)

(*Continues*)

 DOI: 10.3982/ECTA10168

TABLE A.I—*Continued*

Variables	(1) GPA	(2) GPA
Observations	16,447	16,447
R^2	0.345	0.343
F: Peer Effect for Low Group: Pre-Treatment v Control	0.747	0.642
p-value	0.388	0.424
F: Peer Effect for Middle Group: Pre-Treatment v Control	0.374	0.032
p-value	0.541	0.858

[a]We combine the pre-treatment data and control data and run our baseline peer effects specification as a single regression. The purpose is to test whether the peer effects coefficients differ between the pre-treatment group and control group. All specifications include year and semester fixed effects and individual-level controls for students who are black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Low, Middle, and High groups are based on the distribution of predicted GPA using own pre-treatment characteristics. Column 1 additionally controls for peer SAT Math and peer academic composite variables. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,
[c] $p < 0.05$,
[d] $p < 0.1$.

TABLE A.II

FULLY INTERACTED PEER MODEL[a]

Variables	(1) GPA
Fraction of High SAT-V Peers × High $\widehat{GPA}$	0.213
	(0.152)
Fraction of High SAT-V Peers × Middle $\widehat{GPA}$	−0.108
	(0.134)
Fraction of High SAT-V Peers × Low $\widehat{GPA}$	0.486[b]
	(0.157)
Fraction of High SAT-M Peers × High $\widehat{GPA}$	−0.015
	(0.126)
Fraction of High SAT-M Peers × Middle $\widehat{GPA}$	−0.063
	(0.138)
Fraction of High SAT-M Peers × Low $\widehat{GPA}$	0.042
	(0.143)
Fraction of High Ac Comp Peers × High $\widehat{GPA}$	−0.083
	(0.151)
Fraction of High Ac Comp Peers × Middle $\widehat{GPA}$	0.142
	(0.164)
Fraction of High Ac Comp Peers × Low $\widehat{GPA}$	0.021
	(0.158)
Fraction of Low SAT-V Peers × High $\widehat{GPA}$	0.010
	(0.145)

(*Continues*)

TABLE A.II—*Continued*

Variables	(1) GPA
Fraction of Low SAT-V Peers × Middle $\widehat{GPA}$	−0.214
	(0.148)
Fraction of Low SAT-V Peers × Low $\widehat{GPA}$	0.069
	(0.141)
Fraction of Low SAT-M Peers × High $\widehat{GPA}$	−0.142
	(0.149)
Fraction of Low SAT-M Peers × Middle $\widehat{GPA}$	−0.114
	(0.151)
Fraction of Low SAT-M Peers × Low $\widehat{GPA}$	0.001
	(0.168)
Fraction of Low Ac Comp Peers × High $\widehat{GPA}$	−0.101
	(0.149)
Fraction of Low Ac Comp Peers × Middle $\widehat{GPA}$	0.146
	(0.162)
Fraction of Low Ac Comp Peers × Low $\widehat{GPA}$	0.042
	(0.168)
Observations	14,024
R^2	0.346
F Peer SAT Verbal Variables	2.317
p-value	0.034

[a]We take the pre-treatment data from the classes of 2005–2010. We regress first and second semester GPA on ten peer variables interacted with three categories of own incoming ability (predicted GPA). We include year and semester fixed effects and individual-level controls for students who are black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Low, Middle, and High groups are based on the distribution of predicted GPA using own pre-treatment characteristics. Robust standard errors in parentheses are clustered by class by squadron.

[b]$p < 0.01$.

TABLE A.III

NONLINEAR PEER EFFECT WITH SAMPLE SPLIT BY YEARS[a]

Variables	(1) Classes 2005–2007 GPA	(2) Classes 2008–2010 GPA
Fraction of High SAT-V Peers × High $\widehat{GPA}$	0.427[c]	0.135
	(0.230)	(0.195)
Fraction of High SAT-V Peers × Middle $\widehat{GPA}$	−0.026	−0.182
	(0.261)	(0.151)
Fraction of High SAT-V Peers × Low $\widehat{GPA}$	0.558[b]	0.386[b]
	(0.260)	(0.172)
Fraction of Low SAT-V Peers × High $\widehat{GPA}$	−0.083	0.113
	(0.206)	(0.215)
Fraction of Low SAT-V Peers × Middle $\widehat{GPA}$	−0.309	−0.173
	(0.214)	(0.188)
Fraction of Low SAT-V Peers × Low $\widehat{GPA}$	−0.302	0.326[c]
	(0.229)	(0.172)
Observations	6674	7350
R^2	0.348	0.351
F: Peer Effect High − Peer Effect Middle	1.615	1.884
p-value	0.207	0.173
F: Peer Effect Low − Peer Effect Middle	0.000676	7.058
p-value	0.979	0.00905

[a]We take the pre-treatment data from the classes of 2005–2010. We regress own GPA on peer variables interacted with three categories of own ability (terciles of predicted GPA based on own characteristics). We split the sample into the earlier and later years of the data. All specifications include year and semester fixed effects and individual-level controls for students who are black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Low, Middle, and High groups are based on the distribution of predicted GPA using own pre-treatment characteristics. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.05$,

[c] $p < 0.1$.

TABLE A.IV

ENDOGENOUS PEER EFFECTS MODEL IN ALL THREE SAMPLES[a]

Variables	(1) Pre-Treatment	(2) Control	(3) Treatment	(4) Pre-Treatment	(5) Control	(6) Treatment
Peers' GPA	0.389[b]	0.293[b]	0.152			
	(0.038)	(0.093)	(0.109)			
Peers' GPA × High $\widehat{GPA}$				0.352[b]	0.326[d]	0.304[d]
				(0.056)	(0.172)	(0.151)
Peers' GPA × Middle $\widehat{GPA}$				0.343[b]	0.410[c]	0.188
				(0.060)	(0.153)	(0.195)
Peers' GPA × Low $\widehat{GPA}$				0.477[b]	0.136	−0.053
				(0.056)	(0.093)	(0.229)
Observations	14,024	2423	2411	14,024	2423	2411
R^2	0.352	0.342	0.385	0.352	0.343	0.386

[a]We run the endogenous peer effects specification showing own outcomes regressed on peer outcomes. The goal is to look for any indication that the process changed between the pre-treatment group and the control group. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

TABLE A.V

SQUADRON HETEROGENEITY IN PRE-TREATMENT INTERACTED WITH OWN STATUS[a]

Variables	(1) Low $\widehat{GPA}$	(2) Middle $\widehat{GPA}$	(3) High $\widehat{GPA}$
Fraction High SAT-V Peers	15.271[c]	7.084	5.341
	(8.552)	(6.764)	(9.444)
Peer Group SD($\widehat{GPA}$)	21.405[b]	6.112	6.285
	(10.246)	(10.271)	(13.958)
Peer Group VAR($\widehat{GPA}$)	−27.916[b]	−7.775	−7.867
	(13.939)	(15.039)	(19.134)
Peer Heterogeneity × Fraction of High SAT-V Peers	−79.018[c]	−36.924	−26.227
	(46.298)	(39.507)	(52.327)
Peer Heterogeneity^2 × Fraction of High SAT-V Peers	103.590[c]	47.237	33.547
	(62.425)	(57.005)	(72.205)
Observations	4638	4678	4708
R^2	0.099	0.063	0.133

[a]At the referees' request, we ran peer effects specifications while interacting the key peer measure (Fraction of High SAT-V Peers) with squadron level heterogeneity and squadron level heterogeneity squared. We measure heterogeneity as the standard deviation in the squadron's predicted GPA. Because these are interactions of continuous variables, the magnitudes on the coefficients are not necessarily easy to interpret, and we provide some attempts at interpretation in the letter to referees. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.05$.

TABLE A.VI

PEER EFFECTS COLUMNS USING FRACTION OF PEERS ABOVE 66TH PERCENTILE[a]

Variables	(1) GPA	(2) GPA	(3) GPA
Fraction of High Third SAT-V Peers × High $\widehat{GPA}$	0.259[b]	0.271[b]	0.258[b]
	(0.134)	(0.148)	(0.150)
Fraction of High Third SAT-V Peers × Middle $\widehat{GPA}$	0.072	0.013	0.004
	(0.112)	(0.113)	(0.118)
Fraction of High Third SAT-V Peers × Low $\widehat{GPA}$	0.239	0.240	0.142
	(0.147)	(0.159)	(0.159)
Fraction of Low Qtr SAT-V Peers × High $\widehat{GPA}$		0.039	
		(0.153)	
Fraction of Low Qtr SAT-V Peers × Middle $\widehat{GPA}$		−0.196	
		(0.147)	
Fraction of Low Qtr SAT-V Peers × Low $\widehat{GPA}$		0.003	
		(0.151)	
Fraction of Low Third SAT-V Peers × High $\widehat{GPA}$			0.001
			(0.137)
Fraction of Low Third SAT-V Peers × Middle $\widehat{GPA}$			−0.164
			(0.138)
Fraction of Low Third SAT-V Peers × Low $\widehat{GPA}$			−0.235
			(0.142)
Observations	14,024	14,024	14,024
R^2	0.345	0.345	0.345
F Peer Effect High v Middle	1.271	2.264	2.004
p-value	0.261	0.204	0.158
F Peer Effect Low v Middle	0.989	1.621	0.563
p-value	0.321	0.134	0.454

[a]This uses terciles of SAT Verbal Scores (rather than quartiles) to define higher ability peers. Each column varies the excluded group/definition of low ability peers. Robust standard errors in parentheses are clustered by class by squadron.

[b]$p < 0.1$.

TABLE A.VII

LINEAR IN PEER MEANS COLUMN[a]

Variables	(1) Full Sample	(2) Classes 2005–2007	(3) Classes 2008–2010
High $\widehat{GPA} \times$ Peer $\overline{\text{SAT-V}}$	0.169[c]	0.323[b]	0.001
	(0.096)	(0.128)	(0.153)
Middle $\widehat{GPA} \times$ Peer $\overline{\text{SAT-V}}$	0.159	0.247	0.057
	(0.107)	(0.173)	(0.127)
Low $\widehat{GPA} \times$ Peer $\overline{\text{SAT-V}}$	0.109	0.374[b]	0.060
	(0.096)	(0.142)	(0.141)
Observations	14,024	6674	7350
R^2	0.345	0.350	0.353
F Peer Effect High v Middle	0.007	0.149	0.102
p-value	0.934	0.700	0.750
F Peer Effect Low v Middle	0.158	0.383	0.000
p-value	0.691	0.537	0.989

[a]This is a basic peer effects regression in which students are affected by the mean SAT Verbal score of their peer group. Peer calculation excludes own SAT Verbal score. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.05$.

TABLE A.VIII

TREATMENT EFFECT ON DROPOUT RATE[a]

Variables	(1) Low $\widehat{GPA}$	(2) Middle $\widehat{GPA}$	(3) High $\widehat{GPA}$
Student in Treatment Group	0.021	−0.016	0.000
	(0.022)	(0.019)	(0.017)
SAT Verbal Score	−0.062[b]	−0.030	−0.023
	(0.020)	(0.019)	(0.016)
SAT Math Score	−0.050[c]	0.048	0.011
	(0.024)	(0.033)	(0.019)
HS Academic Composite	−0.015[c]	0.014	−0.019[c]
	(0.008)	(0.011)	(0.008)
HS Fitness Score	−0.043[b]	−0.010	−0.013
	(0.015)	(0.014)	(0.014)
HS Leadership Score	−0.013[d]	−0.010[d]	−0.010[d]
	(0.008)	(0.005)	(0.006)
Observations	880	884	883

[a]This calculates the treatment effect on whether a student attrits (drops out of USAFA) by the end of the first year. Each student is counted once as opposed to once per semester. Each column is for a different third of the sample as split by predicted GPA. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

TABLE A.IX

TREATMENT EFFECT IF ATTRITERS ASSIGNED 1.5 GPA[a]

Variables	(1) Low $\widehat{GPA}$	(2) Middle $\widehat{GPA}$	(3) High $\widehat{GPA}$
Student in Treatment Group	−0.066[d]	0.098[c]	−0.013
	(0.033)	(0.043)	(0.039)
SAT Verbal Score	0.156[b]	0.162[b]	0.134[b]
	(0.032)	(0.039)	(0.040)
SAT Math Score	0.258[b]	0.252[b]	0.208[b]
	(0.038)	(0.068)	(0.041)
HS Academic Composite	0.097[b]	0.086[b]	0.156[b]
	(0.011)	(0.023)	(0.020)
HS Fitness Score	0.077[b]	0.129[b]	0.115[b]
	(0.021)	(0.034)	(0.031)
HS Leadership Score	0.025[c]	−0.006	0.023
	(0.012)	(0.011)	(0.014)
Observations	1761	1768	1777
R^2	0.132	0.055	0.116

[a]We add the attriters (those who do not have a first or second semester GPA) back into the data set and we assign them a low GPA. The purpose is to ask whether differential attrition could be driving the estimated negative treatment effect. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

TABLE A.X

LOW ABILITY TREATMENT EFFECT BY RACE AND GENDER[a]

Variables	(1) All Students GPA	(2) Black Students GPA	(3) Hispanic Students GPA	(4) Male Students GPA	(5) White Male Students GPA	(6) Female Students GPA
Student in Treatment Group	−0.061[d]	−0.210[c]	−0.003	−0.094[c]	−0.091[c]	0.041
	(0.031)	(0.084)	(0.092)	(0.039)	(0.045)	(0.064)
SAT Verbal Score	0.102[b]	0.212[d]	−0.015	0.093[c]	0.110[c]	0.129[c]
	(0.038)	(0.124)	(0.070)	(0.044)	(0.054)	(0.063)
SAT Math Score	0.273[b]	0.013	0.358[b]	0.306[b]	0.353[b]	0.156[c]
	(0.036)	(0.087)	(0.103)	(0.039)	(0.054)	(0.076)
HS Academic Composite	0.102[b]	0.111[b]	0.094[b]	0.114[b]	0.118[b]	0.076[b]
	(0.010)	(0.020)	(0.019)	(0.012)	(0.019)	(0.018)
HS Fitness Score	0.055[c]	−0.070	0.077	0.052[c]	0.066[c]	0.024
	(0.023)	(0.063)	(0.056)	(0.024)	(0.028)	(0.042)
HS Leadership Score	0.012	0.060	0.033	0.007	0.006	0.025
	(0.012)	(0.040)	(0.044)	(0.015)	(0.016)	(0.022)
Observations	1571	201	180	1193	898	378
R^2	0.136	0.299	0.236	0.139	0.113	0.181

[a] We calculate treatment effects separately by race.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

TABLE A.XI

MIDDLE ABILITY TREATMENT EFFECT BY RACE AND GENDER[a]

Variables	(1) All Students GPA	(2) Black Students GPA	(3) Hispanic Students GPA	(4) Male Students GPA	(5) White Male Students GPA	(6) Female Students GPA
Student in Treatment Group	0.082[c]	0.217[d]	0.073	0.086[c]	0.083[d]	0.062
	(0.039)	(0.121)	(0.117)	(0.042)	(0.045)	(0.078)
SAT Verbal Score	0.128[b]	0.094	−0.023	0.100[b]	0.107[c]	0.222[b]
	(0.035)	(0.125)	(0.147)	(0.036)	(0.041)	(0.076)
SAT Math Score	0.314[b]	0.429[d]	0.269	0.246[b]	0.244[b]	0.625[b]
	(0.062)	(0.209)	(0.216)	(0.070)	(0.073)	(0.115)
HS Academic Composite	0.107[b]	0.223[c]	0.054	0.089[b]	0.090[b]	0.168[b]
	(0.023)	(0.082)	(0.066)	(0.025)	(0.026)	(0.045)
HS Fitness Score	0.128[b]	0.117[c]	0.086	0.112[b]	0.118[b]	0.208[b]
	(0.030)	(0.056)	(0.118)	(0.033)	(0.036)	(0.059)
HS Leadership Score	−0.016[d]	0.060[b]	−0.021	−0.012	−0.013	−0.032
	(0.009)	(0.019)	(0.045)	(0.011)	(0.012)	(0.021)
Observations	1626	50	123	1261	1115	365
R^2	0.067	0.577	0.076	0.056	0.054	0.155

[a] We calculate treatment effects separately by race.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

TABLE A.XII

PREDICTED TREATMENT EFFECT USING CONTROL GROUP PEER EFFECTS[a]

Variables	(1) All Students	(2) Bottom $\widehat{GPA}$	(3) Middle $\widehat{GPA}$	(4) Top $\widehat{GPA}$
Student in Treatment Group	2.805	2.448	2.774	3.203
	(0.026)	(0.026)	(0.027)	(0.027)
Student in Control Group	2.784	2.381	2.753	3.203
	(0.026)	(0.027)	(0.026)	(0.026)
Predicted Treatment Effect	0.021	0.067[b]	0.021	−0.001
	(0.037)	(0.037)	(0.037)	(0.037)
Observations	2653	881	884	888

[a] Using the magnitudes of peer effects estimated from the control group data (versus pre-treatment data as in Table V), we calculate individual predicted GPAs in the treatment and control groups and forecast standard errors. We test a null hypothesis that predicted grades in the treatment group are not greater than grades in the control group assuming independence of observations across squadrons.

[b] $p < 0.05$.

TABLE A.XIII

ADDITIONAL COLUMNS OF BEING IN A BIMODAL SQUADRON[a]

Variables	(1) GPA	(2) GPA	(3) GPA	(4) GPA	(5) GPA
Fewer than 6 Middle $\widehat{GPA}$ Students in Squadron	0.087[c]				
	(0.048)				
Fewer than 6 × High $\widehat{GPA}$	−0.067				
	(0.067)				
Fewer than 6 × Middle $\widehat{GPA}$	−0.038				
	(0.078)				
Fraction of Low $\widehat{GPA}$ Peers and High $\widehat{GPA}$ Peers > 0.40		0.025			
		(0.053)			
Fraction > 0.40 × High $\widehat{GPA}$		0.033			
		(0.073)			
Fraction > 0.40 × Middle $\widehat{GPA}$		0.151			
		(0.193)			
Fraction of High SAT-V Peers and Low SAT-V Peers > 0.35			0.006		
			(0.033)		
Fraction > 0.35 × High $\widehat{GPA}$			−0.183[b]		
			(0.070)		
Fraction > 0.35 × Middle $\widehat{GPA}$			−0.040		
			(0.061)		
Greater than 15 Low $\widehat{GPA}$ Students in Squadron				0.003	
				(0.032)	
Greater than 15 × High $\widehat{GPA}$				0.011	
				(0.040)	
Greater than 15 × Middle $\widehat{GPA}$				0.030	
				(0.031)	
Fraction of Low $\widehat{GPA}$ Peers and High SAT-V Peers in 4th Quartile					0.071
					(0.049)
Fraction in 4th Quartile × High $\widehat{GPA}$					−0.024
					(0.059)
Fraction in 4th Quartile × Middle $\widehat{GPA}$					−0.124[b]
					(0.039)
Observations	14,024	14,024	14,024	14,024	14,024
R^2	0.344	0.344	0.345	0.344	0.344
Number Observations Meeting This Definition of Bifurcation	545	229	573	1536	532

[a]This is an expanded version of Table VI. We include all students in the pre-treatment sample (not just low predicted GPA students). We look at effects from being in a bifurcated squadron and we allow that effect to vary by own ability. All regressions include baseline controls including year and semester fixed effects and individual-level controls for black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.1$.

TABLE A.XIV

EFFECTS FROM BEING IN A HOMOGENEOUS SQUADRON IN THE PRE-TREATMENT GROUP[a]

Variables	(1) Middle $\widehat{GPA}$ Students GPA	(2) Middle $\widehat{GPA}$ Students GPA
Squadrons with < 0.20 Low $\widehat{GPA}$ Students	0.003	
	(0.035)	
Squadrons with < 0.20 High $\widehat{GPA}$ Students		0.009
		(0.039)
Observations	4678	4678
R^2	0.062	0.062
Number Obs. Who Meet This Definition of Homogeneous	235	235

[a]Sample includes only students in middle third of predicted GPA. We regress own GPA on indicators for various measures of squadron homogeneity for students with middle predicted GPA in the pre-treatment group. All specifications include year and semester fixed effects and individual-level controls for students who are black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Robust standard errors in parentheses are clustered by class by squadron.

TABLE A.XV

QUADRATIC EFFECT IN FRACTION OF HIGH SAT-V PEERS[a]

Variables	(1) Observational Group GPA
Fraction of High SAT-V Peers	1.172
	(0.826)
Fraction of High SAT-V Peers^2	−1.364
	(1.410)
SAT Verbal Score	0.003
	(0.019)
SAT Math Score	0.214[b]
	(0.024)
HS Academic Composite	0.072[b]
	(0.007)
HS Fitness Score	0.047[b]
	(0.010)
HS Leadership Score	−0.009
	(0.007)
Observations	4638
R^2	0.098

[a]Sample is low predicted GPA students in the pre-treatment group. We include both Fraction of High SAT-V Peers and that fraction squared. The coefficients have the right signs to indicate that the relationship between own GPA and peer ability is concave. However, the magnitudes are such that the positive effects from the linear term dominate. (Note that the mean of the fraction term is 0.25 and the mean fraction squared term is roughly 0.06.) Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$.

TABLE A.XVI

SQUADRON HETEROGENEITY INTERACTED WITH OWN ABILITY[a]

Variables	(1) Control Group GPA
Fraction of High SAT-V Peers × High $\widehat{GPA}$	0.555
	(0.367)
Fraction of High SAT-V Peers × Middle $\widehat{GPA}$	−0.126
	(0.477)
Fraction of High SAT-V Peers × Low $\widehat{GPA}$	0.479
	(0.470)
Fraction of Low SAT-V Peers × High $\widehat{GPA}$	0.332
	(0.427)
Fraction of Low SAT-V Peers × Middle $\widehat{GPA}$	−0.388
	(0.466)
Fraction of Low SAT-V Peers × Low $\widehat{GPA}$	−0.142
	(0.352)
Peer Group SD($\widehat{GPA}$) × High $\widehat{GPA}$	−3.719
	(6.543)
Peer Group SD($\widehat{GPA}$) × High $\widehat{GPA}^2$	4.389
	(7.726)
Peer Group SD($\widehat{GPA}$) × Middle $\widehat{GPA}$	2.997
	(7.356)
Peer Group SD($\widehat{GPA}$) × Middle $\widehat{GPA}^2$	−3.610
	(9.085)
Peer Group SD($\widehat{GPA}$) × Low $\widehat{GPA}$	5.014
	(5.924)
Peer Group SD($\widehat{GPA}$) × Low $\widehat{GPA}^2$	−5.408
	(7.213)
Observations	2422
R^2	0.341

[a]Sample is the entire pre-treatment group (versus just the lower ability students, as in the previous table) and we interact status of low-middle-high with the peer measure and peer measure squared. Robust standard errors in parentheses are clustered by class by squadron.

TABLE A.XVII

MEDIUM PREDICTED GPA STUDENTS: TREATMENT EFFECTS ON STUDY PARTNER AND FRIEND CHOICES[a]

	(1)	(2)	(3)	(4)	(5)	(6)
	Study Partners			Friends		
Treatment Effect on …	Actual Peer Choices (sd)	If Peers Chosen Randomly (sd)	Actual Minus Random $P(A < R)$	Actual Peer Choices (sd)	If Peers Chosen Randomly (sd)	Actual Minus Random $P(A < R)$
Fraction Low $\widehat{GPA}$	−0.041	−0.083[b]	0.042[b]	−0.110[c]	−0.092[b]	−0.018
	(0.048)	(0.015)	0.002	(0.052)	(0.013)	0.901
Fraction Middle $\widehat{GPA}$	0.129[b]	0.071[b]	0.058[b]	0.104[c]	0.079[b]	0.065
	(0.049)	(0.019)	0.002	(0.043)	(0.018)	0.083
Fraction High $\widehat{GPA}$	−0.088[d]	0.012	−0.101[b]	0.006	0.013	−0.007
	(0.047)	(0.017)	1.000	(0.040)	(0.015)	0.681
Fraction High SAT-V	−0.119[c]	−0.068[b]	−0.051[b]	−0.040	−0.076[b]	0.036[c]
	(0.055)	(0.013)	1.000	(0.043)	(0.012)	0.036
Fraction Low $\widehat{GPA} > 0.50$	−0.027	−0.003	−0.024	−0.034	−0.003	−0.030
	(0.066)	(0.023)	0.848	(0.072)	(0.024)	0.902
Observations	498	10,000	10,000	543	10,000	10,000

[a]Data on study partners and friends come from a retrospective survey conducted at USAFA during the spring term of 2010. The survey asked each student to name up to five study partners and friends during their freshman year. Response rate was approximately 25 percent. For each study partner and friend dependent variable, estimated coefficients represent the difference between the treatment and control groups. Columns 1 and 4 report estimated coefficients using actual (endogenous) study partner choices. Columns 2 and 5 report estimated coefficients using 10,000 iterations of resampled study partner or friend assignments within each treatment and control squadron. These coefficients represent the purely compositional treatment effect on study partner availability. Standard errors are in parentheses under each estimated coefficient. Columns 3 and 6 report the difference between actual choices and random choices. Below these differences, we report empirical p-values, which are the proportion of random draws less than the actual choices observed. All specifications include year fixed effects and individual-level controls for students who are black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

TABLE A.XVIII

HIGH PREDICTED GPA STUDENTS: TREATMENT EFFECTS ON STUDY PARTNER AND FRIEND CHOICES[a]

	(1)	(2)	(3)	(4)	(5)	(6)
	Study Partners			Friends		
Treatment Effect on …	Actual Peer Choices (sd)	If Peers Chosen Randomly (sd)	Actual Minus Random $P(A < R)$	Actual Peer Choices (sd)	If Peers Chosen Randomly (sd)	Actual Minus Random $P(A < R)$
Fraction Low $\widehat{GPA}$	−0.033	0.002	−0.035[c]	−0.036	−0.001	−0.037[c]
	(0.044)	(0.016)	0.990	(0.038)	(0.015)	0.996
Fraction Middle $\widehat{GPA}$	0.015	0.007	0.009	0.037	0.010	0.028[d]
	(0.046)	(0.016)	0.326	(0.045)	(0.015)	0.034
Fraction High $\widehat{GPA}$	0.018	−0.010	0.028	−0.001	−0.011	0.009
	(0.052)	(0.020)	0.082	(0.037)	(0.019)	0.305
Fraction High SAT-V	0.009	−0.007	0.017	0.004	−0.009	0.013
	(0.050)	(0.015)	0.127	(0.040)	(0.013)	0.168
Fraction Low $\widehat{GPA} > 0.50$	−0.049	0.069[b]	−0.118[b]	−0.001	0.069[b]	−0.069[b]
	(0.056)	(0.025)	1.000	(0.057)	(0.026)	0.996
Observations	498	10,000	10,000	543	10,000	10,000

[a]Data on study partners and friends come from a retrospective survey conducted at USAFA during the spring term of 2010. The survey asked each student to name up to five study partners and friends during their freshman year. Response rate was approximately 25 percent. For each study partner and friend dependent variable, estimated coefficients represent the difference between the treatment and control groups. Columns 1 and 4 report estimated coefficients using actual (endogenous) study partner choices. Columns 2 and 5 report estimated coefficients using 10,000 iterations of resampled study partner or friend assignments within each treatment and control squadron. These coefficients represent the purely compositional treatment effect on study partner availability. Standard errors are in parentheses under each estimated coefficient. Columns 3 and 6 report the difference between actual choices and random choices. Below these differences, we report empirical p-values, which are the proportion of random draws less than the actual choices observed. All specifications include year fixed effects and individual-level controls for students who are black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Robust standard errors in parentheses are clustered by class by squadron.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

TABLE A.XIX

EVIDENCE OF HETEROGENEITY IN THE TREATMENT GROUP: ROOMMATE CHOICES[a]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Low $\widehat{GPA}$			Medium $\widehat{GPA}$			High $\widehat{GPA}$		
Treatment Effect on …	Actual Choices (sd)	Random Choices (sd)	Actual – Random $P(A < R)$	Actual Choices (sd)	Random Choices (sd)	Actual – Random $P(A < R)$	Actual Choices (sd)	Random Choices (sd)	Actual – Random $P(A < R)$
P(Low $\widehat{GPA}$ Roommate)	0.149[c]	0.151[b]	0.002	−0.027	−0.094[b]	0.067[c]	−0.008	0.008	−0.016
	(0.068)	(0.037)	0.519	(0.072)	(0.028)	0.007	(0.072)	(0.030)	0.703
P(Middle $\widehat{GPA}$ Roommate)	−0.055	−0.105[b]	0.051[c]	0.003	0.092[c]	−0.089[c]	0.038	0.028	0.010
	(0.044)	(0.028)	0.033	(0.078)	(0.036)	0.994	(0.081)	(0.031)	0.375
P(High $\widehat{GPA}$ Roommate)	−0.095[d]	−0.047	−0.048	0.024	0.003	0.021	−0.030	−0.036	0.006
	(0.055)	(0.030)	0.945	(0.059)	(0.031)	0.247	(0.053)	(0.039)	0.431
P(High SAT-V Roommate)	0.088[c]	0.100[b]	−0.012	−0.125[c]	−0.116[b]	−0.009	0.003	−0.035	0.037
	(0.036)	(0.028)	0.663	(0.052)	(0.024)	0.635	(0.047)	(0.027)	0.083
Roommate Mean $\widehat{GPA}$	−0.114[c]	−0.073[c]	−0.040	0.021	0.042[d]	−0.021	0.010	−0.001	0.019
	(0.054)	(0.029)	0.919	(0.047)	(0.022)	0.830	(0.047)	(0.029)	0.261
Observations	962	10,000	10,000	962	10,000	10,000	962	10,000	10,000

[a]Data on roommate assignments are only available for the graduating class of 2012. For each roommate dependent variable, estimated coefficients represent the difference between choices in the treatment group relative to control. Odd-numbered columns report estimated coefficients using actual (endogenous) roommate choices. Even-numbered columns report estimated coefficients using 10,000 randomly drawn roommate assignments within each treatment and control squadron. These randomly drawn (resampled) coefficients represent the purely compositional treatment effect on roommate availability. Standard errors are in parentheses under each estimated coefficient. Spanning the columns in square brackets, we report empirical p-values, giving the frequency with which the estimated coefficient using actual roommate choices exceeded the estimated coefficient using randomly drawn roommates. p-values close to either zero or 1 indicate that endogenous roommate selection processes differ between the treatment and control groups. All specifications include individual-level controls for students who are black, Hispanic, Asian, female, recruited athlete, and attended a preparatory school. Robust standard errors in parentheses are clustered at the peer group level.

[b] $p < 0.01$,

[c] $p < 0.05$,

[d] $p < 0.1$.

Dept. of Economics, UC Davis, One Shields Avenue, Davis, CA 95616, U.S.A.; secarrell@ucdavis.edu,

Dept. of Economics, Dartmouth College, 6106 Rockefeller Hall, Hanover, NH 03755, U.S.A.; Bruce.i.sacerdote@dartmouth.edu,

and

Dept. of Economics, Baylor University, One Bear Place #98003, Waco, TX 76798, U.S.A.; J_west@baylor.edu.

Manuscript received July, 2011; final revision received December, 2012.