

## Supplemental Materials

### New Evidence on Self-Affirmation Effects and Theorized Sources of Heterogeneity from Large-Scale Replications

by P. Hanselman et al., 2016, *Journal of Educational Psychology*

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## Appendix

Table A1. Source of Standardized Impact Estimates Displayed in Figure 1

Citation	Grade(s)	N	N Source	D	SE	Impact Source	Additional Notes
Cohen et al. (2006)	7	119	p. 1307	0.31	0.12	“African American students in the affirmation condition earned a higher grade point average (GPA) in these nontargeted courses than did those in the control condition [experiment 1: $B = 0.31$ , $t(40) = 2.63$ , $P < 0.02$ ; experiment 2: $B = 0.21$ , $t(58) = 1.70$ , $P < 0.10$ two-tailed test, $P < 0.05$ one-tailed test]. Pooling data from both experiments yielded a significant effect [ $B = 0.23$ , $t(108) = 2.51$ , $P = 0.02$ ].” (p. 1308)	SE calculated from reported t statistic and estimate. Effect size calculated assuming GPA standard deviation of 0.75.
Sherman et al. (2013) Study 1	6,7,8	81	p. 596	0.29	0.10	“Affirmed Latino American students ( $M = 2.62$ , $SE = 0.06$ ) had a higher GPA than unaffirmed Latino American students ( $M = 2.40$ , $SE = .06$ ), $F(1, 177) = 8.18$ , $p = .005$ , $d = 0.29$ .” (p. 600)	SE calculated from derived t statistic (square root of F statistic) and reported estimate.
Sherman et al. (2013) Study 2	7	55	p. 602	0.45	0.18	“Affirmed Latino American students ( $M = 2.84$ , $SE = 0.12$ ) had a higher GPA than unaffirmed Latino American students ( $M = 2.46$ , $SE = 0.11$ ), $F(1, 146) = 5.05$ , $p = .026$ , $d = 0.45$ .” (p. 605)	SE calculated from derived t statistic (square root of F statistic) and reported estimate.

Dee (2015): Black Students	7	994	Calculated from Table 2	0.02	0.06	Raw impact estimate reported in Table 5; SD of outcome reported in Table 3.	Overall GPA not reported. Estimate reflects targeted class only.
Dee (2015): Hispanic Students	7	495	Calculated from Table 2	0.05	0.10	Raw impact estimate reported in Table 5; SD of outcome reported in Table 3.	Overall GPA not reported. Estimate reflects targeted class only.
Borman et al. (2016)	7	374	Calculated from Table 1	0.09	0.04	“To illustrate, the estimated interaction term (0.082) and marginal effect (0.065) for the cumulative GPA outcome correspond to effect sizes of 0.11 and 0.09, respectively.” (35)	SE is calculated from CI for raw estimate reported in Table A5.
Current Study	7	449	Table 1	0.00	0.04	Table 2	

D = Standardized Treatment Effect, SE = Standard Error, CI = 95% Confidence Interval

Notes: All estimates reflect standardized impacts on grade point average (overall if reported) during the year of implementation. A spreadsheet with all calculations is available upon request.

Running head: EFFECTS OF SELF-AFFIRMATION IN TWO COHORTS

Table A2. Summary of the Madison Writing and Achievement Project Self-affirmation Randomized Control Trial in Two Cohorts

		Cohort 1	Cohort 2
<b>Overview</b>	7th Grade Year	2011-2012	2012-2013
	Treatment Implementation	Conducted by Language Arts or Homeroom Teachers 3-4 times during year	Conducted by Language Arts or Homeroom Teachers 3-4 times during year
	Experimental Groups	Treatment (50%), Control A (25%), and Control B (25%)	Treatment (50%), Control A (25%), and Control B (25%)
<b>Recruitment</b>	Parental Consent	Collected at school registration days (August) and follow-up via permission slips distributed in school (September)	Collected at school registration days (August) and follow-up via permission slips distributed in school (September)
	Student Assent	Conducted in classrooms at the beginning of the school year (September)	Collected at school registration days (August) and individual follow-up in school (September)
	Consent Rate	63.6%	72.8%
<b>Intervention Details</b>			
<b>Ex 1 (September or October)</b>	Treatment	Students select from a list and write about their important values	Students select from a list and write about their important values
	Control A	“Original” control: students select non-important values and write about their potential importance to someone else	“Original” control: students select non-important values and write about their potential importance to someone else

	Control B	“Original” control: students select non- important values and write about their potential importance to someone else	“Neutral” Control: Students respond to a writing prompt about their summer that does not explicitly mention values
<b>Ex 2 (November)</b>	Treatment	Students select from a list and write about their important values	Students select from a list and write about their important values
	Control A	“Original” control: students select non- important values and write about their potential importance to someone else	“Original” control: students select non- important values and write about their potential importance to someone else
	Control B	“Neutral” Control: students respond to a procedural writing prompt, such as explaining how to open a locker	“Neutral” Control: students respond to a procedural writing prompt, such as explaining how to open a locker
<b>Ex 3 (January or February)</b>	Treatment	Students write free-response about important values	Students write free-response about important values
	Control (A and B)	Students respond to a procedural writing prompt about their morning routine	Students respond to a procedural writing prompt about their morning routine
<b>Ex 4 (April or May)</b>	Treatment	Students write about how a previously selected value is important now	Students write about how a previously selected value is important now
	Control (A and B)	Students respond to a procedural writing prompt about their after- school routine	Students respond to a procedural writing prompt about their after- school routine

<b>Other In Class Activities</b>	In-class assent	Conducted by researchers in classrooms at the beginning of the school year (September) with no specific reference to self-affirmation activities	None
	In-class survey	None	Conducted by researchers at beginning (September) and end (May) of 7th grade with no specific reference to self-affirmation activities

Table A3. Regression Estimates from Pooled Multilevel Models of Treatment Impacts on each Outcome for Potentially Threatened Students (Black and Hispanic)

	(1)	(2)	(3)	(4)	(5)	(6)
	Grade 7 GPA	Grade 8 GPA	Grade 7 Math	Grade 8 Math	Grade 7 Read	Grade 8 Read
Treatment	0.044	0.124*	2.996	4.954+	-2.035	-1.336
	(0.041)	(0.054)	(2.573)	(2.905)	(3.432)	(3.445)
Cohort 2	0.185	0.535*	7.065	8.338	51.166+	11.904
	(0.179)	(0.235)	(23.358)	(26.375)	(28.740)	(28.860)
Treatment * Cohort	-0.046	-0.180*	-6.893*	-8.850*	1.589	0.872
	(0.054)	(0.071)	(3.386)	(3.823)	(4.512)	(4.530)
6th Grade Outcome Measure	0.935*	0.864*	0.722*	0.754*	0.811*	0.750*
	(0.037)	(0.049)	(0.032)	(0.036)	(0.042)	(0.042)
Female	0.089*	0.112*	2.395	-2.074	5.805+	9.925*
	(0.041)	(0.054)	(2.565)	(2.896)	(3.420)	(3.433)
Limited English Proficiency	0.063	0.163*	-2.262	-0.437	-6.495	2.262
	(0.048)	(0.063)	(3.060)	(3.455)	(4.212)	(4.227)
Special Education	-0.012	0.001	-7.653*	-16.141*	-11.394*	-17.482*
	(0.056)	(0.073)	(3.863)	(4.362)	(4.986)	(5.005)
Free/reduced Price Lunch	-0.207*	-0.187*	-6.935+	-10.572*	-18.284*	-17.924*
	(0.057)	(0.075)	(3.594)	(4.058)	(4.766)	(4.772)
Cohort 2 * 6th Grade Outcome Measure	-0.027	-0.086	0.014	-0.018	-0.107*	-0.044
	(0.049)	(0.064)	(0.042)	(0.048)	(0.053)	(0.053)
Cohort 2 * Female	-0.073	0.005	-3.337	1.132	-5.676	-9.961*
	(0.055)	(0.072)	(3.413)	(3.854)	(4.555)	(4.572)
Cohort 2 * Limited English Proficiency	0.008	-0.003	5.383	3.558	6.442	-2.177
	(0.063)	(0.082)	(3.947)	(4.456)	(5.409)	(5.423)
Cohort 2 * Special Education	0.128+	0.074	-7.312	1.176	-4.201	1.942
	(0.074)	(0.098)	(5.013)	(5.660)	(6.592)	(6.617)
Cohort 2 * Free/reduced Price Lunch	-0.019	-0.183+	-6.558	-2.920	2.487	2.110
	(0.078)	(0.103)	(4.891)	(5.523)	(6.479)	(6.503)
Constant	0.082	0.185	160.789*	159.516*	120.567*	159.464*
	(0.148)	(0.189)	(17.710)	(19.997)	(22.613)	(22.689)
Variance Component Estimates						
var(School)	0.036*	0.036*	0.000	0.000	10.671*	5.544

	(0.016)	(0.017)	(0.001)	(0.000)	(10.845)	(8.492)
var(Residual)	0.137*	0.236*	539.207*	687.458*	956.376*	964.651*
	(0.007)	(0.012)	(27.306)	(34.811)	(48.790)	(49.205)
N	780	780	780	780	780	780
Schools	11	11	11	11	11	11

Standard errors in parentheses

+ p<.1, \* p<.05

Table A4. Estimates for Treatment Impacts on Grade 8 GPA by Cohort and Teacher Type (both-cohort versus single-cohort) for Potentially Threatened Students (Black and Hispanic)

	(1)	(2)	(3)	(4)
	All Teachers	Both-cohort Teachers	Single-cohort Teachers	All Teachers
Treatment	0.122*	0.109+	0.158	0.168
	(0.055)	(0.061)	(0.120)	(0.114)
Cohort 2	0.149*	0.165*	0.098	0.110
	(0.052)	(0.062)	(0.108)	(0.099)
Treatment * Cohort 2	-0.188*	-0.196*	-0.188	-0.199
	(0.073)	(0.086)	(0.144)	(0.137)
Both-cohort Teacher				0.010
				(0.096)
Treatment * Both-cohort Teacher				-0.060
				(0.130)
Cohort 2 * Both-cohort Teacher				0.066
				(0.118)
Treatment * Cohort 2 * Both-cohort Teacher				0.003
				(0.163)
Grade 6 GPA	0.831*	0.806*	0.871*	0.832*
	(0.033)	(0.040)	(0.060)	(0.033)
Female	0.102*	0.077+	0.155*	0.103*
	(0.037)	(0.044)	(0.071)	(0.037)
Limited English Proficiency	0.152*	0.189*	0.090	0.151*
	(0.042)	(0.051)	(0.075)	(0.042)
Special Education	0.041	0.023	0.074	0.038
	(0.051)	(0.057)	(0.109)	(0.051)
Free/reduced Lunch	-0.272*	-0.259*	-0.293*	-0.272*
	(0.055)	(0.064)	(0.104)	(0.055)
Intercept	0.353*	0.465*	0.275	0.342*
	(0.137)	(0.160)	(0.248)	(0.155)
Variance Component Estimates				
var(School)	0.034*	0.030*	0.051*	0.034*
	(0.016)	(0.016)	(0.031)	(0.016)
var(Residual)	0.242*	0.229*	0.262*	0.242*
	(0.013)	(0.015)	(0.024)	(0.013)
N	744	501	243	744
Schools	11	9	9	11



Standard errors in parentheses

+  $p < .1$ ; \*  $p < .05$

Table A5. OLS Estimates of Implementation Measures for each Exercise by Treatment Group and Cohort for Black and Hispanic Students

Model	(1)	(2)	(3)	(4)	(5)
Outcome	Returned Assigned Exercise	Words Written	Words Written	Self-affirmation Writing	Self-affirmation Writing
Control Group	Both	Both	Original Only	Both	Original Only
<b>A. Exercise 1</b>					
Treatment (in Cohort 1)	-0.0004	10.94+	9.169	0.721*	0.724*
	(0.0346)	(5.929)	(6.474)	(0.0321)	(0.0367)
Cohort 2 (among control students)	0.0242	13.46*	-1.911	0.330*	0.0431
	(0.0276)	(4.186)	(4.800)	(0.0367)	(0.0543)
Treatment x Cohort 2	-0.0446	-16.38+	-0.630	-0.294*	-0.0105
	(0.0465)	(7.563)	(6.981)	(0.0433)	(0.0476)
N	780	741	586	780	619
Outcome mean	0.931	71.8	69.3	0.587	0.601
<b>B. Exercise 2</b>					
Treatment (in Cohort 1)	0.0354	7.304	15.47*	0.709*	0.669*
	(0.0258)	(5.383)	(6.202)	(0.0423)	(0.0473)
Cohort 2 (among control students)	0.0134	6.652	5.236	0.00792	-0.0436
	(0.0556)	(3.766)	(4.656)	(0.0229)	(0.0446)
Treatment x Cohort 2	0.00480	-4.941	-2.590	0.0796+	0.129*
	(0.0472)	(6.702)	(7.070)	(0.0413)	(0.0568)
N	780	705	561	780	619
Outcome mean	0.879	70.8	67.9	0.442	0.546
<b>C. Exercise 3</b>					
Treatment (in Cohort 1)	-0.0912	14.33	9.952	0.370*	0.334*
	(0.0555)	(9.707)	(11.40)	(0.125)	(0.140)
Cohort 2 (among control students)	0.0952	-1.364	-16.13	-0.0177	-0.0473
	(0.181)	(10.28)	(13.11)	(0.0121)	(0.0263)
Treatment x Cohort 2	0.0800	-6.801	8.553	0.273+	0.297+
	(0.0651)	(11.45)	(14.26)	(0.131)	(0.135)
N	780	464	356	780	619
Outcome mean	0.597(a)	77.6	77.6	0.282	0.354
<b>D. Exercise 4</b>					

Treatment (in Cohort 1)	0.00791	-5.118	-6.270	0.611*	0.601*
	(0.0506)	(6.927)	(7.650)	(0.0386)	(0.0403)
Cohort 2 (among control students)	0.0458	-10.48	-13.11	0.0215	0.0195
	(0.0384)	(8.462)	(11.45)	(0.0219)	(0.0359)
Treatment x Cohort 2	-0.0313	4.243	7.705	0.0795	0.0821
	(0.0725)	(6.838)	(8.874)	(0.0631)	(0.0693)
N	780	695	547	780	619
Outcome mean	0.868	82.4	82.1	0.362	0.451

+  $p < .1$ ; \*  $p < .05$

(a) Lower exercise completion rates in exercise 3 reflect the inclusion of students in several schools that opted out of this implementation.

Notes: Each panel presents selected results of one of 20 separate Ordinary Least Squares regression models, defined by the model specification listed in the column heading (1-5) for the exercise listed in the row (A-D). All models include indicators for randomization block (school) and intercept (not shown). Standards errors (adjusted for clustering within schools) reported in parentheses.

Table A6. Logistic Regression Estimates of Predictors of Membership in Cohort 1 among Black and Hispanic Students (N=780)

	Coef.	Std. Err.	P-value
Treatment	-0.071	0.152	0.639
Female	-0.327	0.156	0.036
Limited English Proficiency	0.121	0.182	0.507
Special Education	0.136	0.224	0.545
Free/Reduced Lunch	-0.301	0.234	0.198
Grade 6 GPA Quintiles			
2	0.076	0.249	0.761
3	0.233	0.266	0.380
4	0.352	0.290	0.225
5	0.399	0.348	0.252
Grade 6 Math Achievement Quintiles			
2	-0.556	0.262	0.034
3	-0.872	0.294	0.003
4	-0.662	0.313	0.034
5	-0.083	0.367	0.821
Grade 6 Reading Achievement Quintiles			
2	0.344	0.254	0.175
3	0.400	0.282	0.155
4	0.584	0.302	0.054
5	0.033	0.369	0.929
School Indicators			
2	0.508	0.300	0.091
3	0.158	0.339	0.641
4	-0.326	0.440	0.458
5	0.077	0.347	0.825
6	-0.006	0.373	0.987
7	0.669	0.351	0.057
8	-0.061	0.397	0.878
9	0.256	0.331	0.441
10	-0.750	0.385	0.051
11	-0.051	0.332	0.879
Intercept	-0.081	0.446	0.856

Table A7. Ordinary Least Squares Estimates of Self-affirmation Treatment Effects on Grade 8 GPA (4 point scale) for Black and Hispanic Students by Cohort, with and without Weights for Cohort Membership

	Cohort 1	Cohort 2
N	331	449
Unweighted	0.118	-0.056
	(0.055)	(0.046)
Weighted	0.117	-0.041
	(0.058)	(0.044)

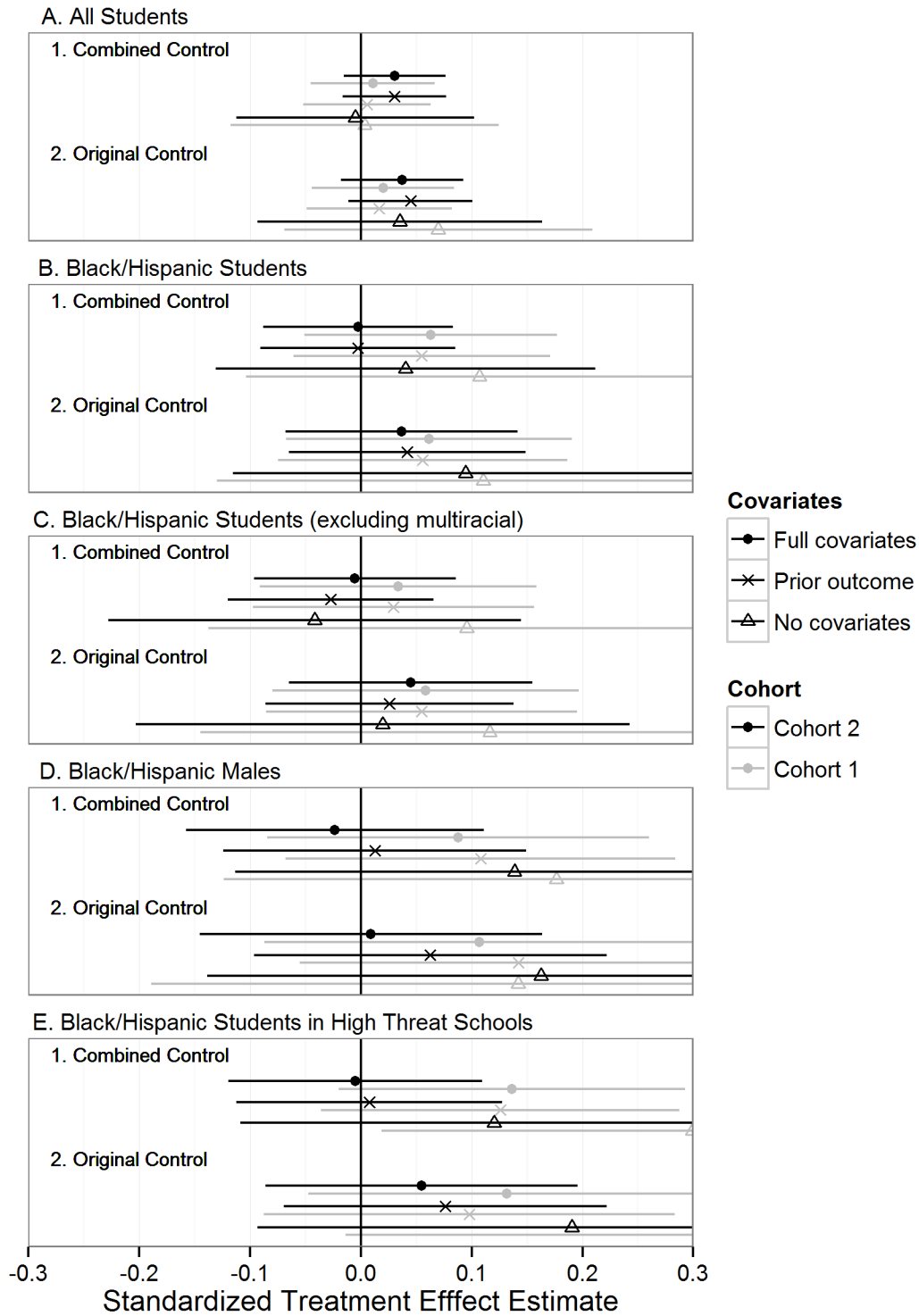
Standard errors in parentheses.

Note: All estimates are based on models including controls for randomization block (school), grade 6 GPA, and baseline student characteristics (gender, special education status, Limited English Proficiency designation, and eligibility for free or reduced price lunch). Weighted models are weighted by the inverse of the estimated probability of inclusion in the cohort. For example, the weights for cohort 2 members are defined as:

$$w_i = \frac{1}{\Pr(\text{Cohort}_i = 2)}$$

We estimated the probability of inclusion in a cohort with a logistic regression of group membership on student characteristics, estimates reported in Table A6.

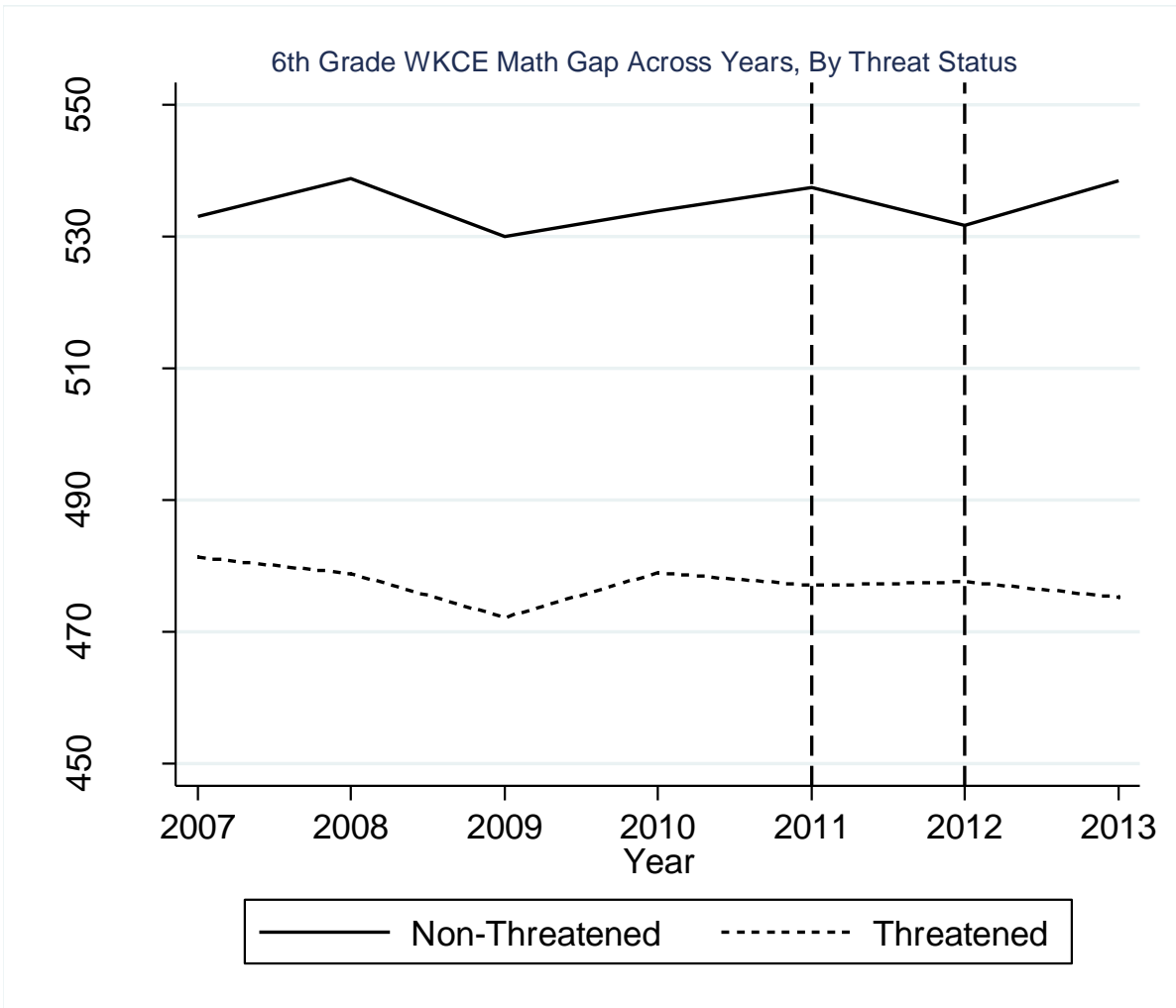
Figure A1. Estimated Self-Affirmation Treatment Effects on Grade 7 GPA by Cohort, Sample, Comparison Group, and Included Covariates



GPA = Overall Grade Point Average; CI = Confidence Interval  
 Note: Each estimate was calculated from a separate multilevel model (students nested within schools) of intention to treat effect of the self-affirmation writing activities. Full covariates

specifications include: grade 6 GPA, gender, special education status, Limited English Proficiency designation, and eligibility for free or reduced price lunch. Prior outcome is grade 6 GPA. In the “Original Control” condition, students wrote about a least important value in each of the first two interventions. The “Combined Control” group includes these students as well as those who were assigned at least one writing prompt that did not explicitly mention values. For readability, the displayed range is restricted to effect sizes of absolute value 0.3 or less. Asterisks indicate that the estimated effects are statistically significantly different between cohorts ( $p < 0.05$ ), based on a pooled model. The main result is the Black/Hispanic sample with combined control condition and full covariates (Panel B1 circles). Other results assess whether patterns were different for subpopulations and comparisons where self-affirmation benefits are hypothesized to be stronger and more consistent, as described in the text. Because the cohort difference persists across all specifications (although less precise in smaller subsamples), these tests provide no evidence that hypothesized moderators explain the difference.

Figure A2. Racial/ethnic Achievement Gap in 6th Grade Mathematics, 2007-2013

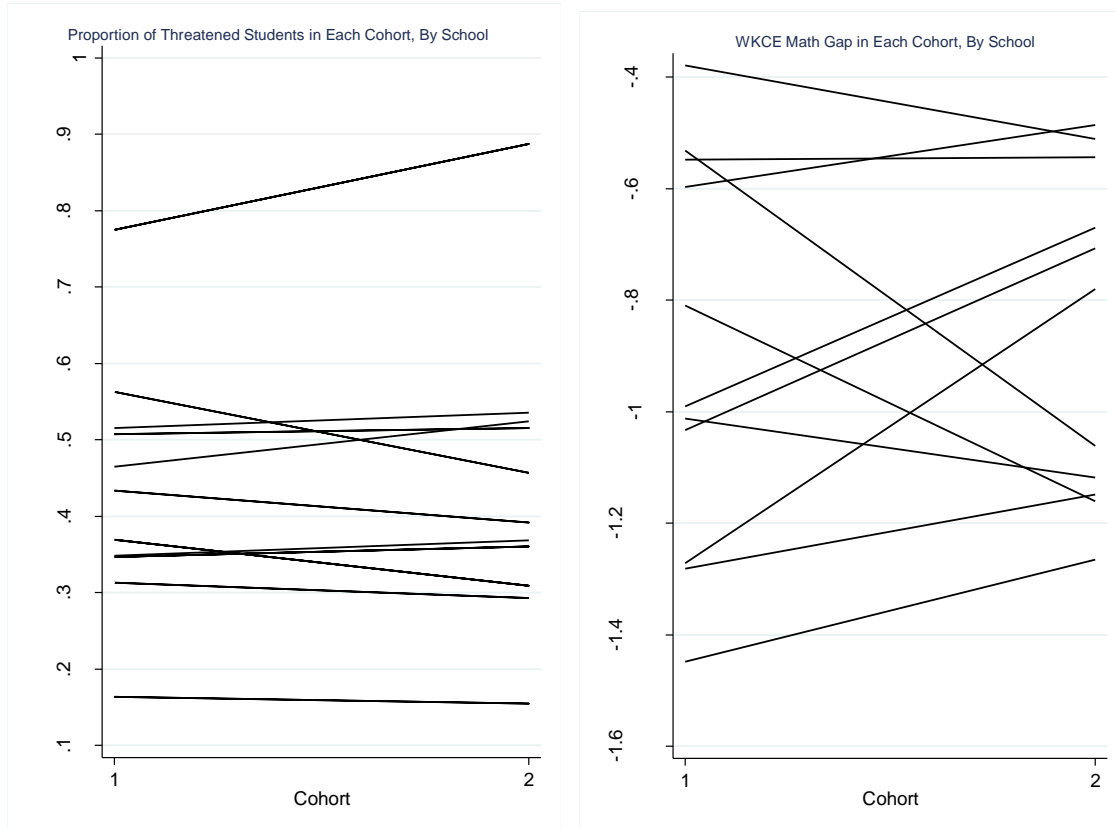


WKCE = Wisconsin Knowledge and Concepts Evaluation

Notes: Non-threatened students include White and Asian students. Threatened students are Black and Hispanic.

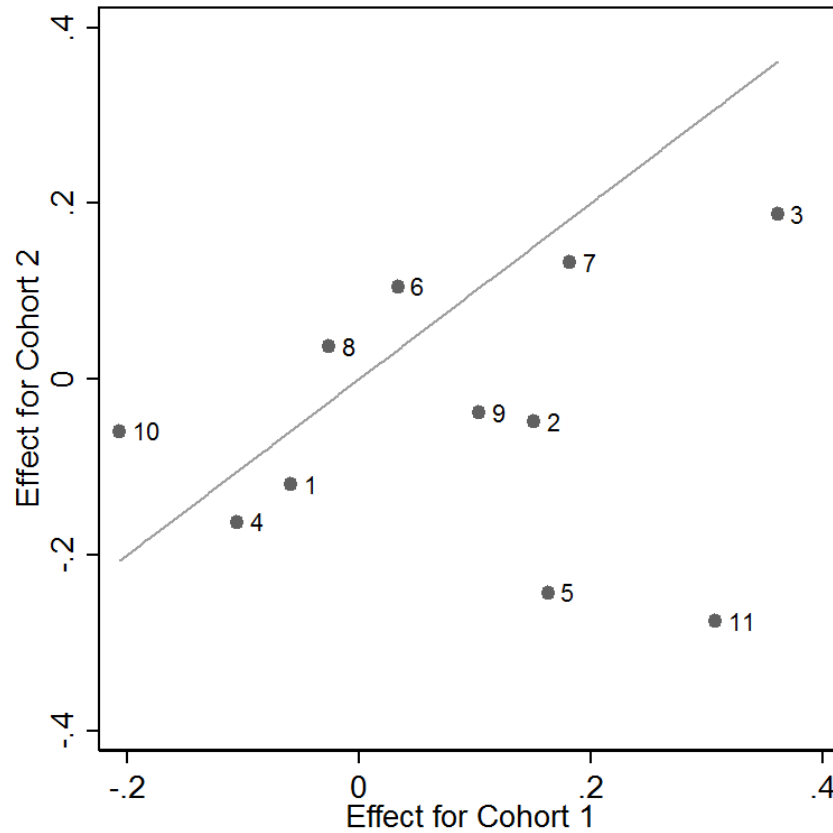


Figure A3. Demographic Consistency between the Two Cohorts: Racial Composition and Standardized Achievement Gaps Prior to the Intervention



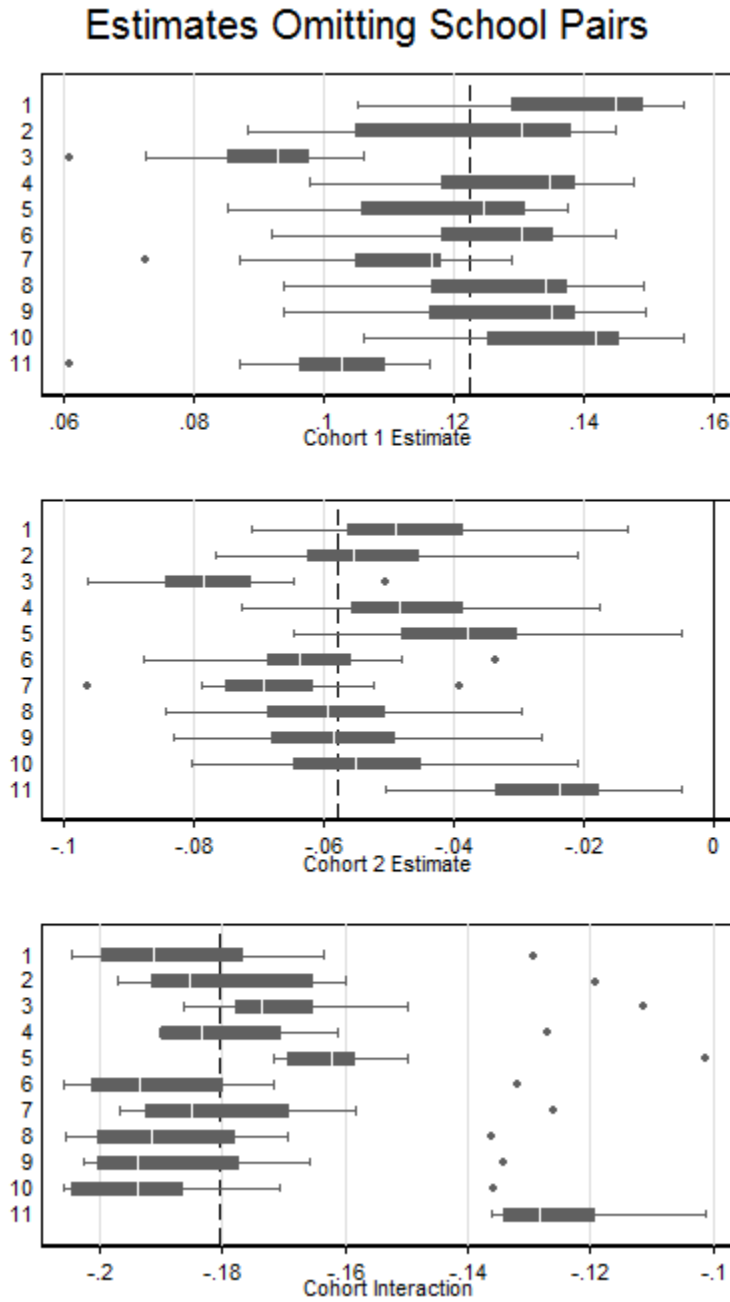
Notes: Each line represents one school. Horizontal slopes indicate no absolute change in the demographic characteristic between each cohort. Racial achievement gaps are calculated as the standardized difference in Wisconsin Knowledge and Concepts Examination (WKCE) mathematics scale scores in 6th grade for Black and Hispanic students compared to Whites and Asians.

Figure A4. Treatment Impact Estimates for Black/Hispanic Students in Cohort 1 and 2 by School



Notes: Each point represents the two cohort treatment effect estimates for grade 8 GPA for a each school (among Black and Hispanic students), including controls for grade 6 GPA, gender, special education status, Limited English Proficiency designation, and eligibility for free or reduced price lunch. The line  $y=x$  is plotted, representing equal estimates in both cohorts.

Figure A5. Distribution of Self-affirmation Treatment Estimates in each Cohort and Interaction, Omitting Pairs of Schools



Each boxplot represents the distribution of estimates omitting 10 school pairs, grouped by the 11 schools. The top boxplot in each panel reflects estimates from all pairs omitting school 1 (1 and 2, 1 and 3, ..., 1 and 11). The next reflects all estimates omitting school 2 (2 and 1, 2 and 3, ..., 2 and 11). Note that each pair of schools is therefore represented twice (the 1-2 pair is represented in the distribution for school 1 and for school 2, for instance). The dashed lines represent the overall estimate (omitting no schools).