

Can the Impacts of a Brief Middle-School Self-Affirmation Intervention be Sustained Into High School?

Background/Context

Prior research suggests that social identity threats, such as stereotypes (Steele & Aronson, 1995), explain significant portions of school-based achievement gaps. By prompting students to write about values relevant to their success and well-being, researchers may shore up students' overall self-concept through "self-affirmation" (Steele & Lui, 1983). Interventions that buffer against identity threats demonstrate significant potential in educational settings because they subtly target specific psychological processes to promote lasting cycles of positive change (Yeager & Walton, 2011). Immediate impacts of these self-affirmation interventions on achievement (GPA) have been demonstrated in field settings (Borman et al., 2016; Cohen et al., 2006; Sherman et al., 2013). Similar evidence shows that self-affirming diminishes recursive impacts of identity threats, thus reducing declines in GPA over time (Cohen et al., 2009; Sherman et al., 2013).

Purpose/Objective/Research Question/Focus of Study

Given prior research, it is critical to further understand how these interventions impact students at-scale across major transitions in schooling when students may face difficult academic and social adjustments. In the current study of a district-wide "scale-up," we examine whether the immediate intervention impacts from seventh grade reported by Borman et al. (2016) were sustained through twelfth grade.

Setting

This self-affirmation intervention was implemented during the 2011-2012 academic year in all eleven of the Madison Metropolitan School District (MMSD) middle schools. The current analyses use data through the 2016-2017 academic year.

Population/Participants/Subjects:

Approximately 1,700 seventh-grade students were enrolled in the district at the time of the intervention. Consent and assent were obtained for 61% of the sample ($n=1,048$). The current analytic sample includes 804 students with complete longitudinal GPA data. Commensurate with previous studies, we label African American and Latino students as "potentially threatened," as they are more likely to be at-risk for stereotype threat in academics. We label White and Asian students as "potentially non-threatened."

Student-level randomization, blocked within schools, produced balanced treatment and control samples, both for the full sample and potentially threatened subsample (Table 1). Student attrition rates for the full sample and potentially threatened sample were 23% and 33%, respectively. Treatment and control groups experienced statistically equivalent rates of attrition both in the full sample and the subsample of potentially threatened students¹.

¹ The differential attrition rate is 1% in the full sample ($\chi^2(1, N = 804) = .055, p = .815$) and 2% in the subsample of potentially threatened student ($\chi^2(1, N = 261) = .105, p = .746$).

Intervention/Program/Practice:

The intervention replicated the self-affirmation writing activities fielded by Cohen and colleagues (2006). To maintain randomization, researchers delivered personalized copies of the intervention materials while both students and teachers were blind to treatment assignment. Students were assigned to complete four exercises during the 2011-2012 school year, which were administered prior to high-stakes assessments, which may induce stereotype threat (see Figure 1 timeline). Teachers administered the 15-20 minute exercises to students in homeroom or Language Arts. The exercises presented students with a list of things that may be important to them or others (e.g., family and friends, religion, music). Treatment students were asked to select and write a short passage about two or three of the *most* important items. Control students were asked to select and write about the two or three *least* valued items. The content of the second through fourth exercises was somewhat different, to promote continued student engagement, but included similar directions.

Research Design/Data Collection and Analysis:

We hypothesized that the impact of the intervention would persist through twelfth grade and mitigate the decline in GPA over time for potentially threatened students. As such, we used the following growth curve model, which allowed us to assess the effect of the intervention on both the twelfth grade time-point and the longitudinal trajectory of GPA:

$$GPA_{it} = \beta_{00} + \beta_{01}Affirmed_i + \beta_{02}Threatened_i + \beta_{03}Affirmed_i \times Threatened_i \\ + \beta_{10}Year_t + \beta_{11}Affirmed_i \times Year_t + \beta_{12}Threatened_i \times Year_t \\ + \beta_{13}Affirmed_i \times Threatened_i \times Year_t + \beta X_i + \eta_i + \varepsilon_{it}$$

The outcome GPA_{it} represents the GPA of student i at time t ($t=0$, end term of twelfth grade in spring 2017). Each student GPA was averaged in a given term (four GPA terms in middle school, two in high school) using a four-point scale. Table 2 displays the student outcomes from each year. βX_i includes student covariates and indicator variables for eleven schools. The coefficients, β_{03} and β_{13} , respectively represent the effects of the intervention on twelfth grade GPA and on the trend in student GPA over time for potentially threatened students. We expected that both estimates would be positive based on our hypotheses.

Findings/Results:

The results showed that student GPA declined for all students from seventh through twelfth grade, though potentially threatened students showed a statistically greater decline as shown in Figure 2. As predicted, we found that the impact of the intervention persisted through twelfth grade (see Table 2). Additionally, the intervention mitigated the dramatic decline in GPA for potentially threatened students. In addition to the analyses of changes in GPA over time, we report yearly, cross-sectional impacts on GPA from seventh through twelfth grades in Table 4.² These results revealed statistically significant impacts of the intervention at each grade level, except for tenth grade. The treatment effect sizes for potentially threatened students from seventh through twelfth grade were: $d = 0.11, 0.17, 0.17, 0.14, 0.22,$ and 0.21 .

² We used the following cross-sectional model of students nested within the eleven schools:

$$GPA_{ij} = \alpha + \beta(Affirmed_{ij}) + \gamma(Affirmed_{ij} \times Threatened_{ij}) + \sum \delta X_{ij} + u_j + \varepsilon_{ij}$$

Conclusion:

These results indicate that the self-affirmation intervention replicated at-scale can produce long-term, increasing impacts on the academic outcomes of potentially-threatened students. This is consistent with the theory underlying recursive processes presented by Cohen et al. (2009), whereby these interventions enact affirming psychological processes that buffer students against stereotype threat, improving achievement over time as the identity threats are mitigated. These results are promising for both policy and practice, as they suggest these brief, easily implemented interventions can be utilized at-scale to promote lasting positive change for threatened students.

Appendices

Appendix A. References

- Borman, G.D., Grigg, J., Hanselman, P. (2016). An effort to close achievement gaps at scale through self-affirmation. *Educational Evaluation and Policy Analysis*, 38(1), 21-42.
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Appendix B. Tables and Figures

Table 1: Sample Characteristics and Experimental Balance

<i>All Students</i>				
	Overall	Compare	Treatment	p-value
<i>Potentially Threatened</i>	0.32	0.33	0.32	0.94
<i>African-American</i>	0.16	0.14	0.18	0.14
<i>Hispanic</i>	0.16	0.18	0.15	0.29
<i>Asian</i>	0.11	0.10	0.13	0.17
<i>American Indian</i>	0.04	0.04	0.04	0.43
<i>White</i>	0.76	0.78	0.74	0.26
<i>Female</i>	0.51	0.53	0.49	0.29
<i>Limited English Proficiency</i>	0.15	0.16	0.14	0.28
<i>Free/Reduced Lunch Eligible</i>	0.35	0.34	0.36	0.51
<i>Special Education Services</i>	0.11	0.10	0.12	0.25
<i>Prior GPA</i>	3.35	3.37	3.32	0.24
	(0.59)	(0.57)	(.60)	
<i>N</i>	804	399	405	
<i>Potentially Threatened Students</i>				
	Overall	Compare	Treatment	p-value
<i>African-American</i>	0.48	0.42	0.54	0.06
<i>Hispanic</i>	0.50	0.54	0.46	0.19
<i>Asian</i>	0.00	0.00	0.01	0.32
<i>American Indian</i>	0.11	0.13	0.10	0.43
<i>White</i>	0.56	0.59	0.53	0.29
<i>Female</i>	0.48	0.51	0.45	0.35
<i>Limited English Proficiency</i>	0.31	0.36	0.27	0.10
<i>Free/Reduced Lunch Eligible</i>	0.75	0.75	0.75	0.97
<i>Special Education Services</i>	0.16	0.15	0.18	0.52
<i>Prior GPA</i>	2.92	2.95	2.88	0.36
	(0.62)	(0.64)	(0.61)	
<i>N</i>	261	130	131	

Notes: Standard deviations in parentheses; Race/Ethnicity indicators are not mutually exclusive and sum to greater than 1; Binary variables tested with two-sample proportion test and scale variables tested with two-sample t-test ($H_0: T - C = 0$)

Table 2: 7th, 8th, 9th, 10th, 11th, and 12th Grade Academic Outcome Variables

	Mean	SD	Min	Max
Grade 7 GPA	3.25	0.68	0.46	4
Grade 8 GPA	3.24	0.66	0.85	4
Grade 9 GPA	3.10	0.86	0	4
Grade 10 GPA	3.04	0.88	0.05	4
Grade 11 GPA	3.01	0.90	0	4
Grade 12 GPA	3.01	0.86	0	4

N=804

Table 3: Estimates from Growth Models of GPA Grades 7-12 using Term

	Main	Main: full covariates	Simple Effects: All	Simple: Threatened
<i>Intercept (End of Grade 12)</i>	3.394* (0.055)	0.051 (0.112)	-0.020 (0.112)	-0.219 (0.212)
<i>Potentially Threatened Group</i>	-0.962* (0.067)	-0.428* (0.049)	-0.194* (0.035)	
<i>Self-Affirmation * Threatened</i>	0.134 (0.092)	0.174* (0.062)		
<i>Years (slope)</i>	-0.039* (0.004)	-0.039* (0.004)	-0.058* (0.003)	-0.098* (0.007)
<i>Years * Threatened</i>	-0.059* (0.007)	-0.059* (0.007)		
<i>Years * Treatment</i>	-0.008 (0.005)	-0.008 (0.005)	0.001 (0.004)	0.020* (0.010)
<i>Years * Self-Affirmation * Threatened</i>	0.028* (0.009)	0.028* (0.009)		
<i>Self-Affirmation</i>	-0.063 (0.052)	-0.031 (0.035)	0.026 (0.029)	0.141* (0.064)
<i>Grade 6 GPA</i>		0.898* (0.029)	0.896* (0.029)	0.856* (0.050)
<i>Female</i>		0.112* (0.025)	0.112* (0.025)	0.177* (0.055)
<i>Limited English Proficiency</i>		0.100* (0.040)	0.096* (0.040)	0.105+ (0.063)
<i>Special Education</i>		0.104* (0.043)	0.104* (0.043)	-0.018 (0.078)
<i>Free/reduced Lunch</i>		-0.118* (0.037)	-0.118* (0.037)	-0.260* (0.072)
<i>Var(Student)</i>	0.315* (0.016)	0.112* (0.006)	0.112* (0.006)	0.169* (0.017)
<i>Var(Within)</i>	0.199* (0.003)	0.199* (0.003)	0.201* (0.003)	0.321* (0.007)
<i>Observations</i>	12798	12798	12798	4147
<i>Students</i>	804	804	804	261

Notes: Students N=804; all models include school fixed effects (not shown); standard errors in parentheses; + p < 0.10, * p < 0.05

Table 4: Estimates from the Cross-Sectional Model of GPA through 12th Grade

	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
<i>Self-Affirmation</i>	-0.0189 (0.0269)	0.0170 (0.0336)	0.0280 (0.0529)	-0.000784 (0.0551)	-0.0241 (0.0594)	-0.0591 (0.0597)
<i>Threatened</i>	-0.118* (0.0367)	-0.187* (0.0460)	-0.298* (0.0728)	-0.341* (0.0766)	-0.511* (0.0830)	-0.354* (0.0850)
<i>Self-Affirmation * Threatened</i>	0.0803+ (0.0444)	0.126* (0.0562)	0.172+ (0.0890)	0.141 (0.0930)	0.215* (0.100)	0.192+ (0.103)
<i>Grade 6 GPA</i>	0.944* (0.0231)	0.869* (0.0292)	1.150* (0.0463)	1.047* (0.0498)	0.942* (0.0544)	0.706* (0.0547)
<i>Female</i>	0.0780* (0.0217)	0.127* (0.0273)	0.0609 (0.0433)	0.112* (0.0452)	0.0676 (0.0486)	0.200* (0.0491)
<i>Limited English Proficiency</i>	0.0767* (0.0325)	0.162* (0.0419)	0.176* (0.0661)	0.250* (0.0695)	0.234* (0.0750)	0.125 (0.0767)
<i>Special Education</i>	0.0160 (0.0345)	0.0122 (0.0433)	0.360* (0.0695)	0.213* (0.0727)	0.149+ (0.0801)	0.0652 (0.0828)
<i>Free/reduced Lunch</i>	-0.122* (0.0302)	-0.108* (0.0380)	-0.162* (0.0600)	-0.198* (0.0633)	-0.165* (0.0683)	-0.238* (0.0696)
<i>Intercept</i>	0.119 (0.0951)	0.290* (0.115)	-0.845* (0.183)	-0.529* (0.191)	-0.0944 (0.208)	0.692* (0.204)
<i>Var(Schools)</i>	0.0178* (0.00819)	0.0143* (0.00712)	0.0429* (0.0208)	0.0242* (0.0126)	0.0230* (0.0126)	0.00514* (0.00525)
<i>Var(Students)</i>	0.115* (0.00515)	0.174* (0.00796)	0.415* (0.0194)	0.438* (0.0208)	0.490* (0.0238)	0.492* (0.0242)
<i>N</i>	1012	967	926	896	861	840
<i>Schools</i>	11	11	11	11	11	11

Notes: multilevel-models; standard errors in parentheses; + p < 0.10, * p < 0.05

Figure 1: Timing of Interventions during the Seventh Grade Year

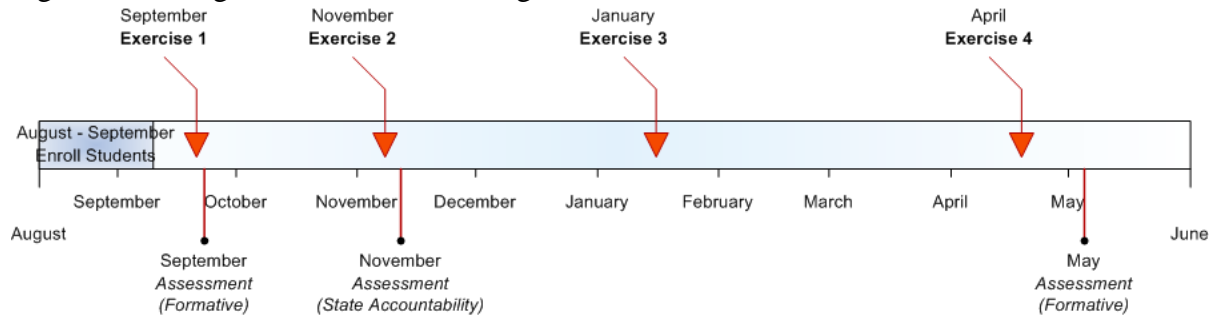
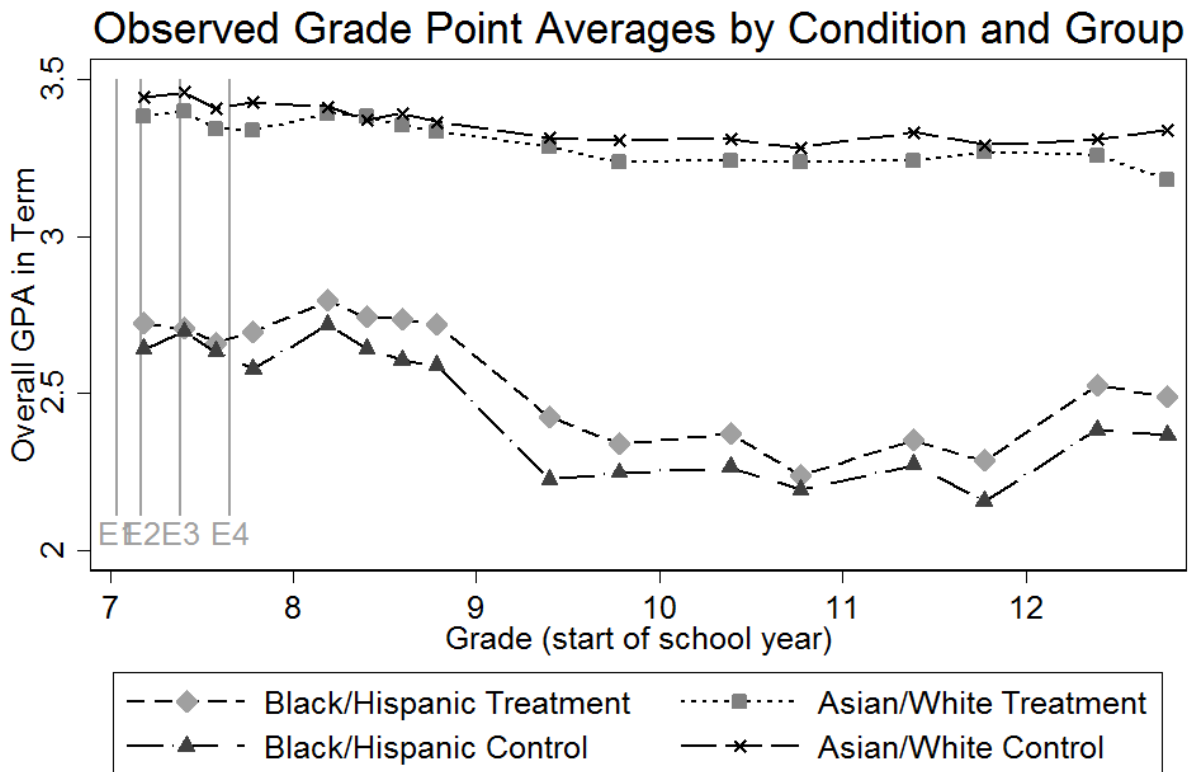


Figure 2: GPA Trends in 7-12 Grades by Treatment Condition and Students Group



Points represent end of marking period.
 E1-E4 represent median implementation time of each of the four exercises.