Abstract Title Page
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Title: The Behavioral Outcomes of a Self-Affirmation Intervention for Middle School Students

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Abstract Body

Limit 4 pages single-spaced.

Background / Context:

Description of prior research and its intellectual context.

Social psychological interventions in schools have gained popularity in education research for their ability to often dramatically increase student academic performance through simple exercises. Many of these interventions are designed to address stereotype threat, which is defined as "being at risk of confirming, as self-characteristic, a negative stereotype about one's group" (Steele & Aronson, 1995, p. 797). One of the social psychological interventions with the most drastic impact on the performance of students potentially affected by stereotype threat (i.e., African American students) was a set of self-affirmation exercises administered in racially diverse middle schools by Cohen and his colleagues (Cohen, Garcia, Apfel, & Master, 2006; Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009). The intervention, a brief writing exercise about why a value the student selected (e.g., friendship) is important to him or her, resulted in a 40 percent decrease in the racial grade point average gap in the year of administration (Cohen, Garcia, Apfel, & Master, 2006), as well as long-term increases in the grade point averages of African American students (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009).

While Cohen and his colleagues' (2006; 2009) self-affirmation intervention focused on academic achievement outcomes, there is evidence suggesting the intervention may also be able to elicit positive behavioral responses in students by supplementing their levels of self-control. Past research has shown that self-control is a resource possessed in limited quantities (Muraven & Baumeister, 2000). One of the ways self-control has been shown to be depleted is through the management of stigma. For instance, Inzlicht, McKay, and Aronson (2006) show that African American college students exposed to a stereotype threat inducing condition (i.e., a diagnostic verbal test) displayed lower levels of attention self-regulation, while female college students exposed to a stereotype threat inducing condition (i.e., a diagnostic math test) exhibited lower levels of physical self-control. Research also suggests that self-affirmation exercises can replenish self-control in individuals whose supply has been drained. Schmeichel and Vohs (2009), for instance, conduct a set of experiments showing that "high-level" self-affirmation (i.e., writing about ***why*** one thinks a value is important) increases the self-control of undergraduates whose self-control reserves had previously been experimentally reduced. The exercises had no effect on students whose self-control reserves were previously untapped.

Purpose / Objective / Research Question / Focus of Study:

Description of the focus of the research.

Based on these findings, we seek to determine if a self-affirmation intervention can influence the behavior of middle school students over the course of three years, focusing on a measure of behavior that is both common in middle/high school settings and potentially related to students' ability to self-regulate: the number of office discipline referrals (ODRs) students receive over the course of a school year. Since past research has shown that stereotype threat can deplete self-control reserves in stigmatized groups (Inzlicht, McKay, & Aronson, 2006), we hypothesize that effects will be stronger for members of the minority groups that face the highest levels of stigma

in a school context (or as we will refer to them, threatened groups). In addition, we consider the possibility that the intervention may be more beneficial to 1) male students (who have a greater propensity for misbehavior in school) and 2) students with a history of behavioral problems.

Setting:
Description of the research location.

The intervention was conducted in eleven middle schools in the Madison (Wisconsin) Metropolitan School District during the 2011-2012 school year, at which point the students were in the seventh grade. Data from students' seventh-, eighth- and ninth-grade years are used.

Population / Participants / Subjects:
Description of the participants in the study: who, how many, key features, or characteristics.

The school district enrolled around 1,700 seventh-grade students in the 2011-2012 school year, while our consented sample contains 1,055 students. The sample is approximately equally divided between genders, with a majority of students (52.1 percent) being white. The next largest racial group is Hispanic (17.2 percent), followed by African American (13.3 percent) and Asian (9.3 percent). Around 15 percent of the sample is of limited English proficiency, while 14 percent are designated for special education. Family poverty is another significant variable within the sample, with a large proportion of students (40.0 percent) receiving free or reduced price lunches at the time of the intervention.

Intervention / Program / Practice:
Description of the intervention, program, or practice, including details of administration and duration.

The intervention is a self-affirmation exercise created by Cohen and his colleagues (2006; 2009). It involves up to four, 15-20 minute writing assignments administered by teachers in homeroom or Language Arts over the course of the school year (three in the fall semester and one in the spring semester). The exercise packet students were given presents them with a list of values (e.g., being with friends or family; being religious). Students randomized into the treatment group were asked to select the two or three values that are most important to them, while the comparison group students were asked to select the two or three that are ***least*** important to them. The treatment group students were then asked to write a short essay explaining why the selected values are important to them. In contrast, the comparison group wrote essays explaining why the values they selected may be important to ***someone else***. For the second administration of the exercise, school performance was added to the list of values. For the third administration, students were simply prompted to write about something that is important to them. Finally, for the last administration, students were provided with a value they selected earlier in the year and asked to write a reflection.

Research Design:
Description of the research design.

We consented students before the start of the 2011-2012 school year and randomized them into comparison and treatment groups. Teachers, blind to students' group randomization,

administered the intervention exercises over the course of the school year (as discussed above), while the students who did not consent were given separate writing exercises to complete.

Data Collection and Analysis:
Description of the methods for collecting and analyzing data.

After each intervention exercise was administered, the teachers collected and returned the packets. The school district continues to provide additional demographic and academic information (e.g., test scores) from consented students at the end of each school year. After collecting the data, we coded and analyzed it using Stata, as documented below.

Measures

The dependent variable of interest is *Office Discipline Referrals (ODRs)*, which is a count of the number of behavioral referrals a student received each school year (as recorded by a school's office staff). In order to correct for the presence of extreme values, we created a cut-off point at two standard deviations from the mean for those students who received one or more ODRs. Values that exceeded this cutoff were recoded to the largest whole number of ODRs under the cutoff (e.g., values exceeding a cutoff of 25.5 were recoded to 25).

The independent variables of interest are:

1) *Treatment group membership*
2) *Interactions between treatment group membership and:*
   a. *Threatened-Status* (i.e., Hispanic or African American ethnicity, including multiracial students who identify as either Hispanic or African American)
   b. *Gender*
   c. *Sixth-grade office discipline referrals* (recoded to address extreme values, as described above, and centered at a value of two for all analyses)

Models

Due to the shape of the distribution of office discipline referrals, we used mixed negative binomial models for the analysis:

$$\log\left(\frac{y_{ij}}{t_{ij}}\right) = \alpha + \beta\left(Treatment_{ij}\right) + \gamma\left(Treatment\ Interactions_{ij}\right) + \sum \delta x_{ij} + u_j + \varepsilon_{ij},$$

where $\frac{y_{ij}}{t_{ij}}$ represents the rate of office discipline referral receipt, x_{ij} represents a set of covariates (i.e., English proficiency, free and reduced price lunch status, gender, special education designation, and sixth-grade GPA). The u_j term represents the error-term for schools, while ε_{ij} represents errors for students within schools.

Analytic sample

We chose an analytic sample that consists of students who are not missing data for key academic and demographic variables. The final sample of 908 students decreases in eighth and ninth grade to 889 and 863, respectively, due to students leaving the district. Two sample t-tests reveals that no significant differences exist between the treatment and control group on sixth-grade demographic, academic and behavioral variables in this sample ($p>0.10$ for all variables in two-sided tests, with the exception of gender for which $p>0.09$).

Findings / Results:
Description of the main findings with specific details.

The effects of the intervention on office discipline referrals (ODRs) can be seen in Tables 1, 2 and 3. While the models reveal no effects in seventh grade (see Table 1), effects emerge beginning in eighth grade. In that year, male students in the treatment group received office discipline referrals at a rate that was about three fourths that of untreated male students ($p<0.10$; see Model 3 in Table 2). In the ninth grade, we find a main treatment effect, but no significant interactions with race, gender, or sixth-grade ODRs. On average, treated students in this year received office discipline referrals at a rate that was three fifths that of untreated students, holding other factors constant ($p<0.05$; see Model 1).

While statistically significant differences between groups are reported above, evidence suggests these differences are of little practical significance. Figure 2 shows the predicted number of office discipline referrals received by treated and untreated male and female students in the eighth grade. Although treated male students are predicted to receive ODRs at a lower rate, the predicted difference of 0.2 ODRs between treated and untreated male students is small. Similarly, Figure 3 shows the predicted number of ODRs received by treated and untreated ninth-grade students. Again, the predicted difference in rate of ODR receipt is close to zero (0.05 ODRs).

To determine if treatment impacts may appear more meaningful over longer periods of time, we reanalyzed the data by pooling eighth- and ninth-grade ODR receipts (the two years in which statistically significant impacts were found). The results, shown in Table 4, reveal a statistically significant impact on treated males ($p<0.01$; see Model 3), who over the eighth and ninth grades received around 0.66 times as many office discipline referrals as untreated males. Figure 4 displays the predicted number of ODR receipts over these two years by treatment status and gender. Treated male students are predicted to receive 0.65 ODRs over this period, while untreated males are predicted to receive 0.99, yielding a difference of 0.34 ODR receipts.

Conclusions:
Description of conclusions, recommendations, and limitations based on findings.

Although our results show statistically significant impacts of the intervention on male students in eighth grade and on all students in ninth grade, the practical importance of these effects appears to be minimal. In both the eighth and ninth grades, the baseline rates of ODR receipt is low, making it difficult for self-affirmation exercises to yield meaningfully large differences between groups. It is possible that the treatment would produce more practically significant impacts in schools with higher ODR receipt rates, but we can make no claims about how well these findings will generalize to other schools, especially those with different behavioral policies in place. For now, therefore, we find no strong evidence that suggests self-affirmation exercises should be adopted as a strategy to address office discipline referral receipt in schools.

Appendices

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Appendix A. References

References are to be in APA version 6 format.

Cohen, G. L., Garcia, J., Apfel, N., & Master, A. (2006). Reducing the racial achievement gap: A social-psychological intervention. Science, 313(5791), 1307-1310.

Cohen, G. L., Garcia, J., Purdie-Vaughns, V., Apfel, N., & Brzustoski, P. (2009). Recursive processes in self-affirmation: Intervening to close the minority achievement gap. Science, 324(5925), 400-403.

Inzlicht, M., McKay, L., & Aronson, J. (2006). Stigma as ego depletion how being the target of prejudice affects self-control. Psychological Science, 17(3), 262-269.

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? Psychological bulletin, 126(2), 247.

Schmeichel, B. J., & Vohs, K. (2009). Self-affirmation and self-control: affirming core values counteracts ego depletion. Journal of personality and social psychology, 96(4), 770.

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. Journal of personality and social psychology, 69(5), 797.

Appendix B. Tables and Figures

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Table 1: Mixed negative binomial model of office discipline referral receipt in the seventh grade

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Treatment	-0.0778	-0.143	-0.0622	-0.0772	-0.214	-0.406	-0.0146	-0.326
	(0.158)	(0.192)	(0.207)	(0.156)	(0.226)	(0.279)	(0.194)	(0.568)
Treatment*Threatened		0.142			0.416	0.403		0.597
		(0.370)			(0.345)	(0.397)		(0.574)
Treatment*Female			-0.0342		0.123		-0.0293	0.0355
			(0.250)		(0.638)		(0.261)	(0.951)
Treatment*6th Grade ODRs				0.00124		-0.228	0.00215	-0.117
				(0.0707)		(0.143)	(0.0393)	(0.274)
Treatment*Threatened*Female					-0.442			-0.441
					(0.801)			(1.058)
Treatment*Threatened*6th Grade ODRs						0.255		0.113
						(0.164)		(0.312)
Treatment*Female*6th Grade ODRs							0.0719	-0.157
							(0.145)	(0.368)
Treatment*Threatened*Female*6th Grade ODRs								0.306
								(0.371)
Observations	908	908	908	908	908	908	908	908
Number of groups	11	11	11	11	11	11	11	11
BIC	2122.84	2122.575	2122.825	2122.84	2114.702	2107.251	2111.785	2086.521

Robust standard errors in parentheses. Control variables included (as described above) but not displayed. *** p<0.01, ** p<0.05, * p<0.1

***Figure 1**: Predicted office discipline referrals in the seventh grade, setting other variables at mean values*

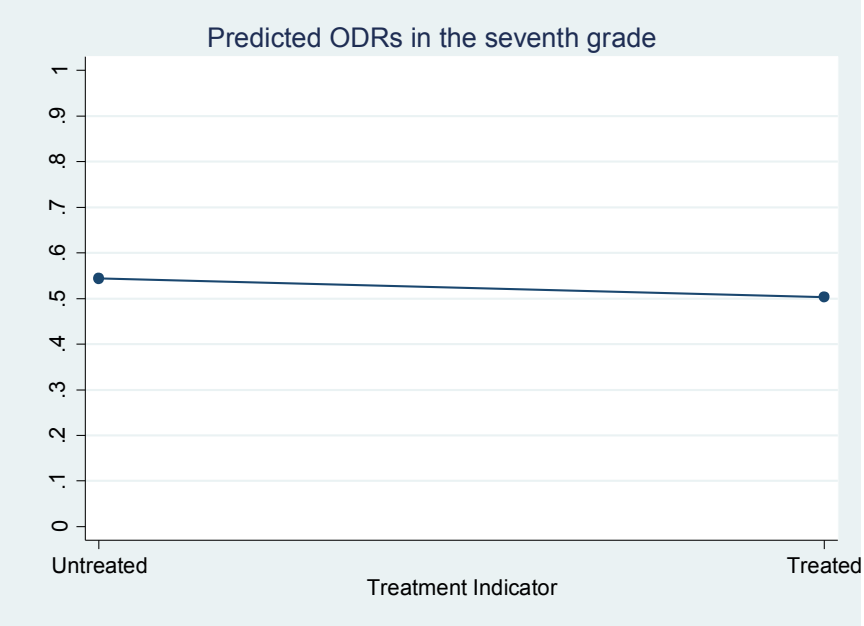

Table 2: Mixed negative binomial model of office discipline referral receipt in the eighth grade

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Treatment	-0.102	-0.0788	-0.327*	-0.0771	-0.343	-0.111	-0.216	-0.176
	(0.205)	(0.324)	(0.186)	(0.192)	(0.217)	(0.284)	(0.157)	(0.160)
Treatment*Threatened		-0.0538			0.0777	-0.0414		-0.00404
		(0.453)			(0.214)	(0.461)		(0.210)
Treatment*Female			0.504*		0.650		0.457	0.328
			(0.299)		(0.559)		(0.355)	(0.641)
Treatment*6th Grade ODRs				0.0379		-0.0129	0.0552	0.0879
				(0.0630)		(0.142)	(0.0355)	(0.108)
Treatment*Threatened*Female					-0.350			-0.174
					(0.972)			(1.050)
Treatment*Threatened*6th Grade ODRs						0.0439		-0.0429
						(0.156)		(0.133)
Treatment*Female*6th Grade ODRs							0.0158	-0.203
							(0.172)	(0.217)
Treatment*Threatened*Female*6th Grade ODRs								0.270
								(0.224)
Observations	889	889	889	889	889	889	889	889
Number of groups	11	11	11	11	11	11	11	11
BIC	1903.525	1903.493	1900.716	1903.136	1896.103	1898.692	1887.27	1878.762

Robust standard errors in parentheses. Control variables included (as described above) but not displayed. *** p<0.01, ** p<0.05, * p<0.1

***Figure 2**: Predicted office discipline referrals in the eighth grade, setting other variables at mean values*

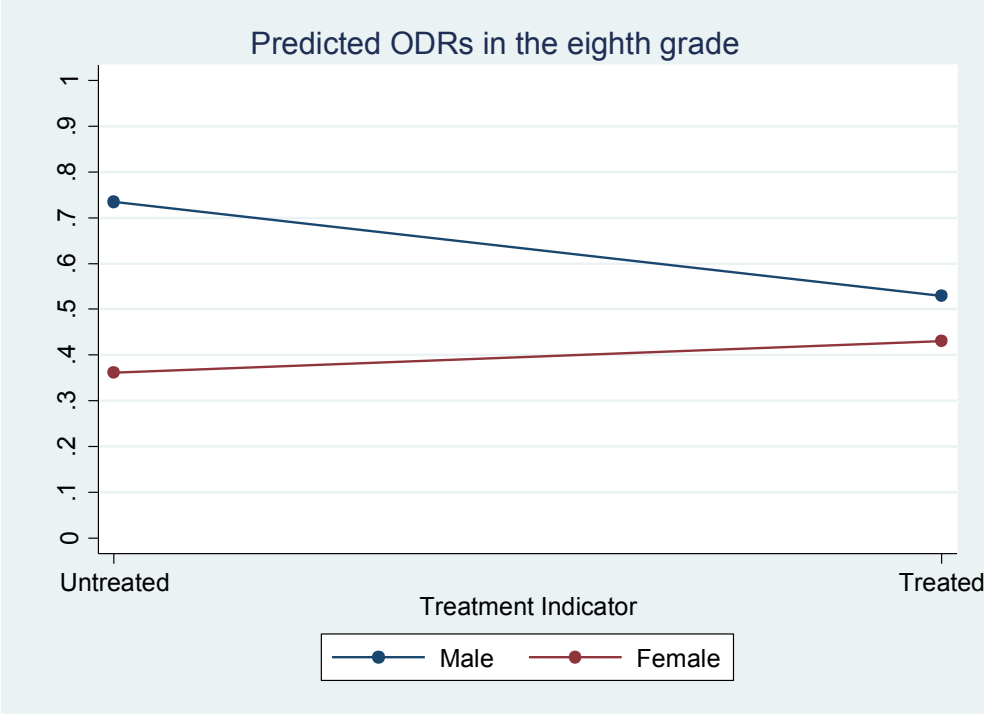

Table 3: Mixed negative binomial model of office discipline referral receipt in the ninth grade

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Treatment	-0.510**	-0.569**	-0.697***	-0.510**	-0.738**	-0.699***
	(0.205)	(0.246)	(0.224)	(0.203)	(0.288)	(0.257)
Treatment*Threatened		0.101			0.134	0.234
		(0.403)			(0.344)	(0.344)
Treatment*Female			0.456		0.417	
			(0.393)		(0.789)	
Treatment*6th Grade ODRs				-0.0252		-0.157
				(0.0618)		(0.140)
Treatment*Threatened*Female					-0.0786	
					(0.906)	
Treatment*Threatened*6th Grade ODRs						0.158
						(0.177)
Observations	863	863	863	863	863	863
Number of groups	11	11	11	11	11	11
BIC	972.9342	972.8763	971.7892	972.7889	967.8583	970.7798

Robust standard errors in parentheses. Control variables included (as described above) but not displayed. Models 7 and 8 did not converge for the ninth-grade data. *** p<0.01, ** p<0.05, * p<0.1

***Figure 3**: Predicted office discipline referrals in the ninth grade, setting other variables at mean values*

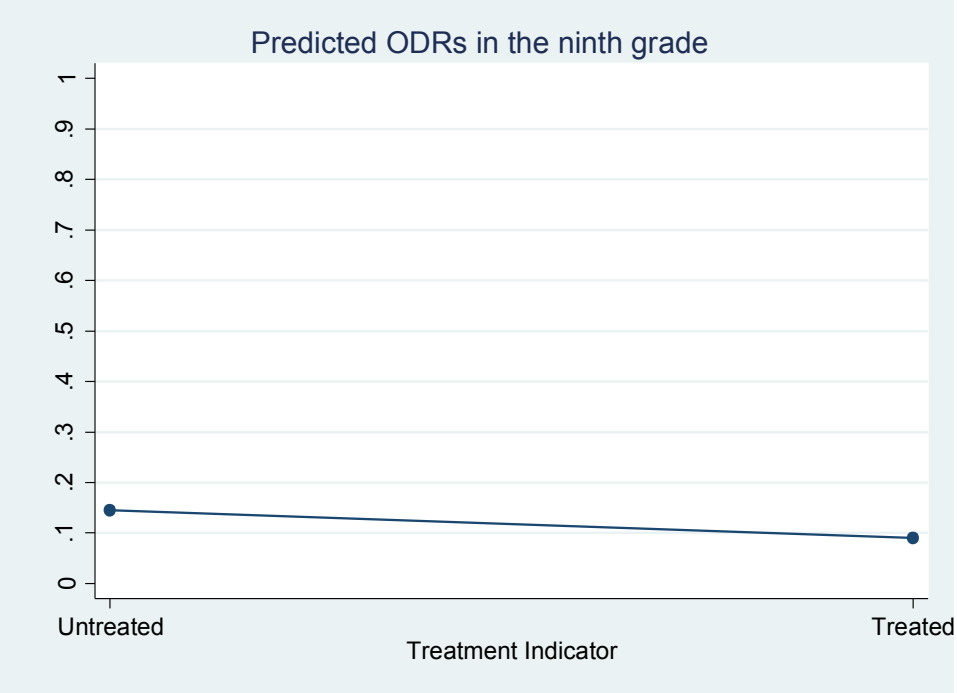

Table 4: Mixed negative binomial model of office discipline referral receipt over the eighth and ninth grades

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Treatment	-0.138	-0.135	-0.414***	-0.151	-0.410**	-0.376	-0.319***
	(0.221)	(0.324)	(0.145)	(0.220)	(0.177)	(0.242)	(0.123)
Treatment*Threatened		-0.00764			0.0416	0.228	
		(0.468)			(0.213)	(0.407)	
Treatment*Female			0.628		0.680		0.546
			(0.407)		(0.617)		(0.401)
Treatment*6th Grade ODRs				-0.0167		-0.170	0.0622
				(0.0627)		(0.108)	(0.0411)
Treatment*Threatened*Female					-0.173		
					(0.987)		
Treatment*Threatened*6th Grade ODRs						0.197	
						(0.129)	
Treatment*Female*6th Grade ODRs							-0.0938
							(0.158)
Observations	859	859	859	859	859	859	859
Number of groups	11	11	11	11	11	11	11
BIC	2077.889	2077.888	2073.266	2077.813	2066.227	2075.084	2066.991

Robust standard errors in parentheses. Control variables included (as described above) but not displayed. Model 8 did not converge for the ninth-grade data. *** p<0.01, ** p<0.05, * p<0.1

***Figure 4**: Predicted office discipline referrals over eighth and ninth grade setting other variables at mean values*