Abstract Title Page

Title: Fidelity of Implementation in a Large-Scale, Randomized, Field Trial: Identifying the Critical Components of Values Affirmation

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Abstract Body

Background/Context:

Several studies suggest that values-affirmation can serve as a simple, yet powerful, tool for dramatically reducing achievement gaps. Cohen et al. (2006; 2009) find a 40 percent reduction in the black-white achievement gap among 7th grade students; Sherman et al. (2013) find a 20 to 30 percent reduction in the Latino-white achievement gap among 7th grade students; and Miyake et al. (2010) find a 60 percent reduction in the female-male achievement gap among college physics students. Yet, despite this demonstrated potential for values-affirmation to bring about powerful changes, salutary effects are not always obtained – even in randomized trials (Borman 2012; Kost-Smith et al. 2012).

Because subtle variations in implementation procedures may explain some of the variation in these findings, it is crucial for researchers to measure the fidelity with which interventions are implemented. Yet, this begs the question, fidelity to what? Fidelity analyses require explication of a 'gold-standard' intervention, a theoretical ideal that specifies the number and frequency of treatments, necessary participant responses and engagement, and important contextual conditions – in addition to defining a process of deployment against which the real-world intervention can be compared (Hulleman and Cordray 2009). Based on the intervention design of Cohen and colleagues (2006) and a broader assessment of the literature on values affirmation, we develop a rubric for assessing the fidelity of implementation and apply it to data from the MWAP research program.

Our aim is part of a growing focus in social sciences as researchers have become increasingly aware that translating promising research into successful policy requires careful attention to and measurement of fidelity of implementation (e.g. Hulleman and Cordray 2009). The more complicated the ideal intervention, the greater the opportunity for the intervention to fail and the more important it is that researchers both develop facilitation strategies (training, monitoring, support, feedback, differentiation etc.) to improve fidelity and enact a plan to assess adherence to those protocols (Carroll et al. 2007). While the values affirmation does not seem to be a complicated instrument, the salience of contextual factors, the fact that teachers must serve as administrators, and the many ways in which the effect of the treatment can be 'broken' present both a compelling case for the development of facilitation strategies and the necessity of a detailed fidelity evaluation.

Definition and evaluation of fidelity is key to successfully bringing interventions to scale in the field. Fidelity of implementation establishes internal validity and helps to distinguish between opportunities for innovation and adaptation and the critical components of an intervention, to which implementers must maintain fidelity to the original design (O'Donnell 2008). Further, fidelity of implementation is likely to be of particular import with regard to social psychological classroom interventions since there are many, subtle ways in which the values affirmation can – in theory – be undermined or altered (Yeager and Walton 2011).

Purpose / Objective / Research Question / Focus of Study:

Two purposes drive this work. Firstly, fidelity has not been an explicit consideration in most prior values-affirmation work; and so an ideal classroom-administered values-affirmation has not been fully specified. We employ a critical components approach to identify the most crucial elements of a classroom-administered values-affirmation intervention. Through careful study of prior work, we identify intervention design (the intervention is tailored to fit the students' capabilities and needs), teacher-centered delivery (teachers administer the intervention as

instructed), stealth (teachers and students view the intervention as normal and do not view it as an assessment or as research), timing (early in the year, and proximate to stressful events like exams), and student engagement (students follow instructions and affirm themselves) as the critical components of implementation fidelity that could serve to moderate the success of the intervention. It is our hope this framework will help measure fidelity in other studies. Secondly, our district-wide randomized trial of values-affirmation revealed important, but relatively modest, impacts compared to previous studies (Cohen et al. 2006, 2009; Miyake et al. 20010; Sherman et al, 2013). We utilize our metric to investigate fidelity of implementation, and its variability across schools and classrooms in our sample as one possible explanation for our comparatively modest effects.

Setting:
The MWAP intervention took place in an urban school district in the Midwest where National Assessment of Educational Progress (NAEP) scores show some of the largest achievement gaps between White and Black (Vanneman, Hamilton, Baldwin, Anderson and Rahman, 2009), and White and Hispanic students (Hemphill, Vanneman and Rahman, 2011). The intervention was implemented over two cohorts of 7th grade students across 11 schools with a total of 1,049 students participating in Cohort 1.

Population / Participants / Subjects:
All 7th grade students in the district were invited to participate in the trial, and 60% (*N*=1,049) consented to participate. The consent rate ranged from 55% to 75% across the 11 schools. There were 1048 total consented students by the administration of the second exercise in November. Consented students were randomized within schools to either the treatment or control condition for the duration of the study. Students who switched schools within the district throughout the year (2.2% of all consented) remained in their experimental group and are analyzed as members of the school in which they were initially observed. We also gathered qualitative data from 44 teachers involved in the exercise implementation, across all 11 schools. The majority of educators included in the study were language arts teachers.

Intervention / Program / Practice:
The experiment was conducted during the 2011-2012 academic year. The self-affirmation intervention procedure follows Cohen and his colleagues (Cohen et al. 2006; Cohen et al. 2009; Cook et al. 2012; Sherman et al. 2013). Seventh grade students completed a short (15-20 minute) writing prompt as part of their language arts or homeroom class activities three to four times during the school year: once early in the school year (September or October), once prior to state examinations in November, once in the winter (January or February; four schools opted out of this administration), and once in the Spring (April or May). Consented students were randomized within school to either the treatment or control condition and non-consented students received a third neutral written exercise in a similar format.

The first two treatment exercises were structured response questions in which students were asked to select two to three values that were important to them from a list. The third and fourth treatment exercises were open ended and prompted students to respond to a structured prompt about a specific value. In all exercise versions students were asked to reflect upon their choice of value or the value provided and free write a response for why that value is important to them. Non-consented and control condition students were assigned to one of two control

versions. In one version of the control condition exercise students were given a similar list of values and asked to select those values that were not important to them. They were then prompted to reflect on why the values they selected may not be important to them and may be important to someone else. Students in the second control condition (which will be referred to as the Neutral condition) were given a prompt such as describing how they open their locker or get ready for school. Students in the same classroom would typically be given all three prompts. Students were provided with Spanish language and low-literacy versions of each exercise as needed to ensure full participation and engagement from all students. The format of the exercises was changed slightly across implementations to minimize perceived repetition.

Regular classroom teachers administered the exercise materials and were asked not to refer to the exercises as research. Teachers were blinded both to the experimental condition of individual students and of the specific experimental hypotheses about marginalized students and social identity threat. This was accomplished by creating cover sheets for student exercises that appeared identical. Participating teachers received training from MWAP staffers before the first exercise implementation to ensure proper delivery of the exercises. For each exercise implementation teachers were asked to complete a classroom debrief form. These reports asked teachers to record any unusual events, questions, or disruptions, as well as other classroom activities the day of the intervention. At the end of the school year, after all exercises had been completed, teachers were then asked to fill out a survey to gauge the stealth of intervention delivery. Teachers were asked to reflect on how the exercises were delivered and what language they had used in describing the exercises to students (i.e. as a test, as a free-write, etc.).

Research Design:

We first review the literature on values-affirmations in and out of classrooms to generate an ideal model that identifies the most critical components of the intervention and distinguishes those critical components from acceptable adaptations and those that must be avoided. From this review we identify five critical processes described above—*intervention design* (fit), *low-stress*, *stealth*, *timing*, and *student engagement*. We map both our own and Cohen et al.'s (2006; 2009) protocols onto this model and identify indicators for each of these five processes. These include some traditional fidelity metrics: timing, dosage, and participant responsiveness, all demonstrated moderators of values affirmation (Critcher et al. 2010; Sherman et al. 2013). We then use these indicators to generate student- and teacher-centered fidelity indices.

Data Collection and Analysis:

For each critical component—intervention design (or fit), low-stress, stealth, timing, and student engagement – we use qualitative and quantitative data to assess fidelity. Intervention design (fit) is assessed by monitoring the match between the interventions received by the student and the student's particular linguistic needs and literacy levels. Characteristics of the students are measured by student and school-level administrative data, while use of adapted interventions (low-literacy, or Spanish-language) were noted by MWAP school liaisons. Data collected from classroom debrief reports, completed after each intervention, and end-of-year teacher surveys were used to assess adherence to the intended teacher-centered delivery protocols that may impact both the level of stress students feel and the "stealthiness" of the intervention delivery. We gathered descriptive data from the district about the timing of standardized tests to assess the adherence to the critical component of timing of the intervention. Finally, we conducted a content analysis of student responses to assess student participation and engagement in the

exercises. *Student Fidelity to Instruction* measures the extent to which student's followed the explicit instructions of the exercise (i.e. identify a value and explain why it is important to self). Because the written instructions do not tell the student to "affirm values," this measure acts as a reliability check on the exercises themselves. Fidelity to Treatment measures the extent to which student's engaged in self-affirmation, per the treatment intention, and is coded as a binary variable as to whether or not the student's exercise met the criteria for values-affirmation or attribute-affirmation. Teacher Fidelity to Delivery is generated by evaluating data gathered through classroom debrief forms filled out by teacher after each exercise.

Findings / Results:
Overall, our implementations across the school year appear close to the ideal. However, in this scaled up intervention we find substantial variation in fidelity across schools and classrooms, particularly in terms of the teacher-centered delivery of the intervention (see Table 1). Using the index of Fidelity to Treatment (Self-Affirmation), we find high levels of fidelity to the cognitive process of values affirmation among treated students (see Figure 1). Further, we find that variation in student engagement exists regardless of condition assignment. We find notable declines in both student and teacher engagement with the exercise by the fourth affirmation exercise. We believe that these results could indicate a dampening effect on the impact of the intervention in our sample. We also identify a tension between the critical components of the intervention; fidelity to the critical component of stealth can ultimately compromise the maintenance of a low-stress environment for students, which may jeopardize the investment on the part of students (see Table 2). This internal conflict may explain the variation in teacher delivery that took place, despite the detailed training provided.

Conclusions:
Our measurements are limited by the realities of scaling up a research project into the everyday classrooms of teachers. However, even in the face of these challenges, we believe that our results make a strong case for future implementations to take fidelity into account. Assessment of fidelity of implementation using a critical components framework will ensure better understanding of variation in the impacts of values-affirmations. We also believe our data support integrating teachers more fully into the process of delivery in order to resolve the conflict between teacher blindness on one hand and stealth and normalcy for students on the other-as this internal contradiction was implicated in the variation in teacher delivery. We strongly caution that the integration of these written interventions into regular curriculum must be handled carefully. Lastly, even with the threats to the fidelity of delivery and stealth we find significant impacts of the intervention on the intended audience (Borman & Grigg, 2014). These significant positive impacts despite low fidelity of *some* critical components suggests that there may be aspects of delivery and stealth that are less important as they are defined and understood in the original intervention protocol.

Appendices.

Appendix A. References

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Appendix B. Tables and Figures
Not included in page count.

Table 1: Exercise Fidelity Reports (Questions Relate to Stress and Stealth Components)

	Overall (%)	High Student Affirm (%)	Low Student Affirm (%)	High Student FTI-T (%)	Low Student FTI-T (%)
Classroom Disruption	**62**	**63**	**58**	**69**	**59**
Noticed Difference in Exercises	**20**	**24**	**39**	**20**	**25**
Student Asked about Research	**18**	**20**	**11**	**19**	**18**
Average Teacher Compliance	**72**	**83**	**71**	**64**	**75**
N= 275	**275 reports**	**7 schools**	**4 schools**	**8 schools**	**3 schools**

Table 2: End of Year Teacher Survey Responses (Questions Relate to Stress and Stealth Components)

	Overall (%)
Described as "Good for You"	**27**
Identified as Research	**33**
Presented as a Normal Activity	**58**
N= 26	

Figure 1: Fidelity to Treatment