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Reducing Stereotype Threat in Academically At-Risk African-Americans Students: A Self-Affirmation Intervention

By

Crystal Marie Simmons

A dissertation submitted in partial satisfaction of the
requirements for the degree of
Doctor of Philosophy
in
Education
in the
Graduate Division
of the
University of California, Berkeley

Committee in charge:
Professor Frank C. Worrell, Chair
Professor Susan Holloway
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Abstract

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Doctor of Philosophy in Education

University of California, Berkeley

Professor Frank C. Worrell, Chair

In this study, I examined the effectiveness of a self-affirmation intervention (Cohen et al., 2006) with a sample of African American high school students who were at risk for academic failure. Participants consisted of 47 African-American students from 3 different high schools. Unlike previous research, results indicated that students who received the self-affirmation did not earn higher GPAs at the end of the first semester. Students who received the self-affirmation intervention also did not feel more psychologically engaged within the academic environment. Reasons for these disparate findings in comparison to previous research are discussed. Implications for stereotype threat theory and what type of students can benefit from this intervention are also discussed.

Keywords: self-affirmation intervention, stereotype threat, African-American high school students

Dedication

This dissertation is dedicated to my Grampy, Charles Bonaparte, and my parents, Isaiah Simmons, Sr. and Hazel B. Simmons. You are the reason that I have come this far in my life and why I am still going strong. You have been a consistent support for me, always believing that I can do anything and encouraging me to do my best. The completion of this dissertation and my doctoral studies is your accomplishment as well.

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Reducing Stereotype Threat in Academically At-Risk African-Americans Students: A Self-Affirmation Intervention

The reason why African-American students underachieve relative to other racial/ethnic groups is probably one of the most studied topics in psychology and education. Since the Coleman Report (1960) revealed significant differences in achievement outcomes between the races, a large body of empirical research has focused on discussing the causes of the achievement gap and ways in which to close it. Everything from familial, societal, psychological, school-related, and neighborhood characteristics have been correlated or used as predictors of academic achievement. This research led to numerous interventions and educational policies, including, but not limited to, eliminating the effects of racial discrimination in the classroom, changing the school environment to fit children's learning styles (Irvine, 1991), introducing culturally relevant curricula (Ladson-Billings, 1995), compensatory education, increasing academic engagement among African-Americans and other minority groups (Fordham & Ogbu, 1986; Steele & Aronson, 1997), class size reduction, and improvement of teacher credentialing and quality (Herrnstein & Murray, 1994).

Despite the many interventions and policies that were developed, the efforts to close the achievement gap have had limited success over the past 30 years. In his literature review and analysis of the National Assessment of Educational Progress (NAEP; 1971-1999) and Scholastic Aptitude Test (SAT; 1977-2000) scores, Lee (2002) found that the achievement gap between African-Americans and European-Americans fell between 0.5 and 1 standard deviation units over this 30 year period. However, the achievement gap was only reduced significantly between the 1970s and 1980s, and widened again in the 1990s. Other data yield similar results. A meta-analytic review utilizing large sample sizes (N s ranging from 0.4 million to 2.4 million) by Roth, Bevier, Bobko, Switzer, and Tyler (2001) indicated that a 1.1 standard deviation difference exists between African-American and European-American students' scores on the SAT and Graduate Record Examination (GRE), job application tests in corporate settings, and tests in the military.

More recent data from *The Nation's Report Card: Findings in Brief Reading and Mathematics 2011* indicated that African-Americans have lower average scores in math and reading than their European-American counterparts as well as other racial ethnic groups (U.S. Department of Education, National Center for Education Statistics, 2011). Additionally, the report showed that the Black-White achievement gap in reading has narrowed since 1992, but has remained constant since 2009. Although these results seem promising, African-Americans scores on average 26 points lower than their European-American counterparts in the 4th grade and 25 points in the 8th grade. Furthermore, although the Black-White achievement gap narrowed since 1992 for 4th graders in math, there has been no significant change from 1992-2009 for 8th grade students, suggesting that as African-American students matriculate through the educational system, they do not make significant progress in this content area.

The continued existence of the achievement gap is concerning. Researchers often argue that the gap has enduring lifetime consequences for minority students, in that it limits their access to employment, earnings, and higher education (Ogbu, 1994). Given the consequences of the achievement gap, researchers have continued to seek out novel explanations for racial inequity in achievement outcomes. Over the past two decades, researchers from the field of

social psychology have built a body of empirical research demonstrating that African-American students may be affected by a pervasive psychological threat—termed *stereotype threat*—that they experience within the academic setting (Steele & Aronson, 1995). These researchers argue that African-Americans may not do as well as their European-American counterparts because of a fear of confirming a negative stereotype of their group, the stereotype that African-Americans are not as smart as European-Americans. Therefore, the academic achievement of African-American students is affected because they experience anxiety in situations that are diagnostic of their intellectual and academic abilities (Steele, 1997; Steele & Aronson, 1995).

Using this theoretical framework, researchers have created various interventions aimed at reducing the achievement gap by alleviating psychological threat in academic settings for minority students (Cohen, Garcia, Apfel, & Master, 2006; Good, Aronson, & Inzlicht, 2003; Wilson & Linville, 1982, 1985). There is also a growing body of research indicating that these kinds of interventions, albeit brief, can have a significant impact on raising the achievement of high and low achieving African-American students (Yeager & Walton, 2011). Most of these interventions are simple, require a small amount of time to complete, and have been found to be effective in reducing the achievement gap between African-American and European-American students (e.g. Cohen et al., 2006, 2009). Although these interventions demonstrate positive results for African-American students, researchers have also expressed the need for replication, particularly to determine under what conditions and with what population of students these interventions may be useful (Cohen & Garcia, 2008). Therefore, the purpose of this study is to replicate an intervention designed by Cohen and his colleagues (2006) to reduce stereotype threat.

In order to provide a context for this study, I present a critical analysis of the effect of stereotype threat on academic achievement outcomes for minority students, with an emphasis on African-American students. Following this critical analysis is a discussion on how stereotype threat affects academic achievement outcomes for African-American students. Next, is a brief review of self-affirmation theory and interventions designed to combat the effects of stereotype threat. Finally, I conclude with the purpose of the present study as well as the research questions and hypotheses.

Stereotype Threat: A Brief Critical Analysis

In an interview, Claude Steele (2004) reflected on how he noticed a peculiar trend among African-American college students in the course of conducting his research. He discovered that high-achieving African-American students who had similar levels of prior academic achievement (i.e. SAT scores) as their European-American counterparts did not do as well as the latter group in the college setting (Steele, 2004, 2011). To investigate the nature and cause of this trend, Steele and his colleague, Joshua Aronson, carried out four separate experiments in the landmark study entitled, “Stereotype Threat and the Intellectual Test Performance of African Americans” (Steele & Aronson, 1995). In this study, Steele and Aronson hypothesized that African-American students’ performance on tests that measure intellectual ability is compromised, because the simple act of taking a test that is diagnostic of their intellectual abilities induces the possibility of confirming a *stigmatized-ability stereotype*. The stigmatized-ability stereotype is the belief that certain minority groups, including African-Americans, are not intelligent or not as intelligent as other racial groups. When this stereotype is made salient within an academic

setting (e.g., in a testing situation), performance suffers, especially for students who perceive the test to be frustrating and who care about performing well academically.

Across the four studies, Steele and Aronson (1995) found support for stereotype threat effects on African-American student performance. In the first study (Study 1), European-American and African-American students were placed in either a diagnostic condition, nondiagnostic condition, or a nondiagnostic challenge condition. In the diagnostic condition, students were explicitly told that the study assessed (“various personal factors involved in performance on problems requiring reading and verbal reasoning abilities” (Steele & Aronson, 1995, p. 799). In the nondiagnostic and nondiagnostic challenge conditions, students were told that the study assessed “psychological factors involved in solving verbal problems” (p. 799). Additionally, the students in the nondiagnostic challenge were told that the researchers wanted to present “even highly verbal people with a mental challenge” (p. 799). In this first study, they found that after controlling for previous SAT scores, African-American students in the diagnostic condition had significantly lower scores on a sample of items from the Graduate Record Exam (GRE) than their European-American counterparts. Also, African-American students performed just as well as their European-American counterparts in the nondiagnostic condition. However, African-American students in the diagnostic condition did not score significantly lower than the African-American students in the nondiagnostic or nondiagnostic challenge conditions. Therefore, there was no clear indication from this study that stereotype threat had significant negative effects on the overall performance of African-American students.

In Study 2, Steele and Aronson (1995) replicated the aforementioned study, omitting the nondiagnostic-challenge condition, and exploring whether anxiety mediated the performance decrements of African-Americans. They found the intended stereotype threat effect, in that African-Americans in the diagnostic condition performed significantly lower than European-Americans in both conditions as well as African-American students in the nondiagnostic condition. However, they did not find evidence for anxiety mediating the academic performance of the African-American students in the diagnostic condition.

In Studies 3 and 4, Steele and Aronson (1995) examined whether the stigmatized ability stereotype was activated when in the threatening condition (i.e., diagnostic condition) and how easily it could be activated. In Study 3, the researchers demonstrated that when African-American students were told that a test was diagnostic of their ability, they had more self-doubts, more racial stereotypes were activated in their thinking, and they were less likely to indicate their race on the test than African-American students in the nondiagnostic condition. In Study 4, African-American students were asked to indicate their race before taking the test as a subtle prime of stereotype threat. They found that African-American students who indicated their race before the test experienced a decrease in their performance. This decrease was also found to be mediated by anxiety (Study 4) and inefficiency in processing—that is, “stereotype-threatened participants spent more time doing fewer items more inaccurately” (Steele & Aronson, 1995, p. 809). Therefore, there was evidence that stereotype threat was easily activated for students who were in threatening environments.

From this series of studies, the authors concluded that stereotype threat can depress the performance of African-Americans when they know that the test is diagnostic of their academic abilities (Studies 1 and 2; Steele & Aronson, 1995). When students know that a test is diagnostic of their ability, the stigmatized-ability stereotype is activated in their thinking (Study 3; Steele &

Aronson). Furthermore, when race is primed for in subtle ways, Blacks experienced impairment in their performance. This impairment was found to be mediated by anxiety and inefficiency in processing (Study 4; Steele & Aronson).

Support. Since the conception of this theory, there has been a proliferation of studies reporting similar stereotype threat effects on academic outcomes for minority students using the Steele and Aronson's (1995) methodology (see Steele, Spencer, & Aronson, 2002, for a review). The studies investigating stereotype threat effects on the African-American students have indicated that stereotype threat is an important factor influencing academic performance on standardized tests, classroom achievement, and intelligence testing in laboratory studies (Davis & Simmons, 2008). Two recent meta-analyses have found an overall small effect size for the effects of stereotype threat on minority (i.e., ethnic minorities and female math students) student achievement. In the exploratory analyses of a study by Walton and Cohen (2003), they found a mean d of $|.29|$ across 43 studies for minority students in general. Nguyen and Ryan (2008) found a mean d of $|.26|$ across 116 published and unpublished studies for stereotype effects on all minority students and a mean d of $|.32|$ for ethnic minority students. To date, the majority of the studies examining ethnic minority students specifically address stereotype threat effects on African-Americans. Therefore, Nguyen and Ryan's results suggest that the stereotype threat effects can lead to performance decrements African-American students. However, these effects are small.

Criticisms. Although stereotype threat's effects on achievement outcomes are well-documented, there are several criticisms of this literature, including the heavy reliance on college samples, the statistical analysis and interpretation of the results, and the generalizability of these effects to real-world settings. These criticisms are discussed below.

Reliance on college samples. The vast majority of research investigating the existence of stereotype threat for African-American students using Steele and Aronson's (1995) design is on college-aged populations. If stereotype threat contributes to the achievement gap, as theorists in this area suggest (e.g., Steele, 1997) then, it would have to affect African-American students at all age and grade levels. There are a few studies in the literature that have examined stereotype threat effects with the K-12 population (Ambady, Shih, Kim, & Pittinsky, 2001; Keller, 2002; Keller & Dauenheimer, 2003; Kellow & Jones, 2005, 2008; McKown & Weinstein, 2003). Using Steele and Aronson's (1995) experimental design, Ambady and her colleagues (2001) found that females in the lower elementary grades (K-2) and middle school (6-8) performed better on a math test when their Asian identity was activated than when their female identity or no identity was activated. In contrast, Asian females in the upper elementary grades (3-5) did better when their female identity was activated. The researchers indicated that this trend was developmentally appropriate because at this age, children are reported to believe that they are superior at performing many tasks. However, as they grow older, they begin to endorse the gender stereotypes that adults hold about math achievement, as indicated by the decreased performance of students in middle school (Ambady et al., 2001).

Similarly, in their study examining stereotype threat effects in stigmatized ethnic minority students (i.e., Latino, African-American, and Native American) ages six to ten, McKown and Weinstein (2003) found that stigmatized ethnic minority students who were aware

of stereotypes that other's may hold about their ethnicity (i.e., stereotype consciousness) were adversely affected by stereotype threat. More specifically, minority students who had stereotype consciousness and were told that a test was diagnostic of their abilities performed significantly lower on a measure of cognitive ability than those who were told that a test was used to help the researchers understand how they learn. Furthermore, in their sample of 202 students, they found that some stigmatized ethnic minority students developed stereotype consciousness as early as six years old, with the majority of these students (65%) reaching stereotype consciousness by the age of nine. Therefore, these research findings further indicate that African-American students are susceptible to stereotype threat as early as first grade, and more likely by the third grade (McKown & Weinstein, 2003).

Several studies have examined stereotype threat effects in high school students. Keller (2002) examined stereotype threat on math achievement for female high school students. He found that the females who were explicitly told about the gender stereotype did more poorly on the math tests than female students who were not told about the stereotype. However, Keller (2002) also suggested that stereotype threat may not be easily cued, given that female students who were not told anything prior to the test did as well as their male counterparts. Additionally, in two separate studies using the same methodology, Kellow and Jones (2005, 2008) found contrasting results. In the 2005 study, the researchers found that African-American students who were told that the test was evaluative of their abilities (i.e., evaluative condition) did worse than European-American students in the same condition. African-American and European-American students who were told that no differences existed (i.e., nonevaluative condition) performed similarly. In their 2008 study, however, the researchers found no significant differences in achievement between African-American students in the evaluative condition and nonevaluative conditions. Therefore, research has yet to clarify the effects of stereotype threat on high school students, especially for African-Americans.

Other researchers have suggested the presence of stereotype threat in middle school students by the results of interventions designed to reduce stereotype threat. There are several intervention studies that demonstrate positive effects on achievement when stereotype threat is alleviated (e.g., Aronson, Fried, & Good, 2002; Good et al., 2003). In many of these studies, middle school students who were administered the stereotype threat intervention performed better on an academic task or had better grade point averages than students who were not given the intervention (Yeager & Walton, 2011).

In conclusion, the research so far demonstrates that K-12 students may experience stereotype threat effects on achievement. However, in comparison to the research literature using college samples, the number of studies for K-12 populations is still significantly lower (Ambady et al., 2003; Keller, 2002, 2007; Keller & Dauenheimer, 2003; Kellow & Jones, 2005, 2008; McKown & Weinstein, 2003). Also, the results for stereotype threat effects on high school students are at best mixed. Further research is needed to make definitive conclusions about stereotype threat effects in this population.

Statistical analyses. Critics have also argued that the statistical analyses used to measure stereotype threat effects are misleading (Sackett, Hardison, & Cullen, 2004; Sackett, Schmitt, Ellingson, & Kabin, 2001). In their initial study, Steele and Aronson controlled for SAT scores, thereby eliminating the variation in prior performance between the African-American and European-American students. Therefore, the observed differences between European-Americans

and African-Americans in the non-diagnostic condition actually demonstrates that “absent stereotype threat, the Black-White difference is just what one would expect based on the Black-White difference in SAT scores, whereas in the presence of stereotype threat, the difference is larger than would be expected based on the difference in SAT scores” (Sackett et al., 2004, p. 297). Research has yet to demonstrate that stereotype threat truly *underpredicts* the performance of African-American students (Sackett et al.).

In their study on stereotype threat effects in African-American students, Brown and Day (2006) used a statistical method to address the concerns of Sackett and his colleagues (2001, 2004). Instead of statistically controlling for group differences on previous standardized test scores between African-American and European-American students, the researchers controlled for these differences within each racial group. After exposing the students to one of three threat conditions (i.e., low, standard, and high), Brown and Day found that African-Americans in the low threat condition scored three fourths of a standard deviation higher on the Raven’s Progressive Matrices (APM) test than African-Americans in the high and standard conditions. They also performed as well as European-Americans in both the standard and high threat condition on the APM. Despite having, on average, lower ACT scores, African-Americans were just as capable of performing as well as European-Americans on the APM when it was framed as a problem-solving task (Brown & Day).

Research by Walton and Spencer (2009) also addresses the critics’ concerns over the statistical analyses used to demonstrate stereotype threat effects (Sackett et al., 2001, 2004). The researchers argued that this study has implications for the criticisms because they explicitly examined whether minority students’ prior level of performance underestimated their intellectual ability in environments where stereotype threat was reduced. They conducted a meta-analysis on 39 studies ($N = 3,180$) using Steele and Aronson’s experimental design. Participants were diverse in age (K-12) and minority status (e.g., African Americans, Hispanic-American, Turkish Germans, and women in the mathematic fields).

Walton and Spencer (2009) performed two statistical tests, using non-stereotyped students in the nondiagnostic condition. In the first statistical test, not controlling for measures of prior academic performance, they compared stereotyped students (i.e., female and ethnic minority students) in the diagnostic condition to non-stereotyped students (i.e., males and European-Americans) in the non-diagnostic condition. The results of this analysis would determine if stereotyped students *under-performed* because of stereotype threat. Second, they compared stereotyped and non-stereotyped students in the non-diagnostic condition. The results of this analysis would determine if minority students’ prior performance underestimated their true ability when stereotype threat is removed (Walton & Spencer, 2009).

It is important to note that the non-stereotyped students in the non-diagnostic situation were used in all comparisons because research has shown that non-stereotyped students can experience *stereotype lift*, which is an increase in academic performance when a negative comparison is made between their group and an outgroup (Walton & Cohen, 2003). The scores of the non-stereotyped students in the non-diagnostic condition, then, are theoretically more appropriate for comparison with the scores of stereotyped students.

In the first analysis, Walton and Spencer (2009) researchers found that the stereotyped students in the diagnostic condition did *worse* than the non-stereotyped students at every level of prior performance ($d = 0.32$). These results indicate stereotype threat *does not* lead to a greater

difference in achievement scores between minority and non-minority students than expected based on previous SAT scores. Instead, it shows that in the presence of stereotype threat, stereotyped students perform less well than non-stereotyped students at the same level of achievement. In the second analysis, the researchers found that the stereotyped students did *better* than the non-stereotyped students at the low, mean, and high levels of prior performance ($d = 0.18$). Therefore, in a situation where stereotype threat is removed, the achievement gap disappeared and was in fact reversed. This effect was found at all age levels, did not vary by minority status (ethnic minority vs. women), and was found on all measures of achievement (i.e., class grades, IQ scores, standardized testing, etc.; Walton & Spencer, 2009).

From the research presented, it seems that researchers have provided evidence to address the statistical criticisms. The research indicates that stereotype threat does have an effect on achievement and it does not simply exaggerate the achievement gap that is already present between African-American and European-Americans as critics claims (Walton & Spencer, 2009). When stereotype threat is reduced, African-American achievement does not simply return to levels consistent with the achievement gap. Instead, in the absence of stereotype threat, African-American and other minority students do as well as (Brown & Day, 2006) or outperform (Walton & Spencer, 2009) their European-American counterparts on achievement measures. These effects, however, were small.

Generalizability. Although it is safe to conclude that when African-American students are threatened with the stigmatized ability stereotype, it affects their achievement, based on the aforementioned research (i.e., Brown & Day, 2006; Walton & Spencer, 2009), these findings can only be applied to achievement outcomes in the laboratory setting. There is currently mixed evidence on its effect in the real-world setting. For example, Stricker and Ward (2004) sought to determine if indicating one's race and gender before completing the Advanced Placement Calculus and community college entrance exams would produce performance differences. They found that African-American students in the diagnostic condition (i.e. race indicated before exam) and the non-diagnostic condition (i.e. race indicated after the exam) performed the same on all measures. This result is in contrast to the race prime effect found by Steele & Aronson (1995, Study 3).

In another study, Cullen et al. (2004) used data from college freshmen in thirteen universities to model different correlational relationships that are predicted by stereotype threat. In one set of their analyses, they tested whether SAT Math and Verbal scores predicted overall GPA for African-American and European-American students in the same way. The researchers tested for the presence of two nonlinear relationships between SAT scores and overall GPA that were consistent with the assumptions of stereotype threat. First, they predicted that because stereotype threat affects students who are most identified with the academic domain, African-American students and European-American students with low SAT scores would have parallel regression lines, but as test scores increase, the regression lines for the racial groups would separate. A separation in regression lines would indicate that the SAT scores predict overall GPA differently for more highly-identified African-Americans than for highly-identified European-Americans. Second, because students have to experience some level of frustration in order to be affected by stereotype threat, Cullen et al. (2004) predicted that stereotype threat would affect only African-American students who are identified with the domain, but who may

also find the test challenging. Therefore, African-American students' scores in the middle range of the test distribution should underestimate their overall GPA.

Results showed that there was a slight change in slopes between the African-American and European-American students in the upper half of the distribution when the SAT Math-GPA relationship was examined. Further analyses, however, revealed that the slopes were practically identical and SAT math scores only accounted for 0.003% of the variance in overall GPA. The relationship between SAT Verbal scores and overall GPA was linear throughout the score range, for both groups. Therefore, none of the predicted nonlinear relationships was supported, indicating that stereotype threat does not have an effect on achievement outcomes for African-American students.

Although Stricker and Ward (2004) and Cullen et al. (2004) did not find support in real-world data, they both acknowledged a limitation to their findings. In a real testing situation, it is obvious to students that their abilities are being assessed. It is very likely, then, that stereotype threat was activated for all African-American students in their study. If this is true, the similar performance of African-American students across experimental conditions in the Stricker and Ward study may be because all of the African-American students were threatened. Similarly, one cannot rule out the fact that stereotype threat affected the SAT scores that were used to predict the students' GPA. Therefore, if stereotype threat effects cannot be ruled out in influencing test score data, it will be very difficult to establish with certainty whether or not it exists using test score data in real-world settings.

Other researchers, Walton and Spencer (2009), used an alternative analysis of examining the existence of stereotype threat effects using real-world. In their meta-analysis, the researchers found support for stereotype threat effects using data from interventions designed to reduce stereotype threat. Three studies ($N = 15,796$), which focused on creating a sense of belonging to the school environment and affirming values that were important to African-American students, were included in the analyses. The researchers found that in the absence of the intervention, African-American students performed worse than European-American students at the low, mean, and high levels of prior performance ($d = 0.31$, $d = 0.27$, $d = 0.23$, respectively). Conversely, when African-American students participated in an intervention, they performed better than European-American students at the low, mean, and high levels of prior performance ($d = 0.12$, $d = 0.17$, $d = 0.22$, respectively). Furthermore, in one of the intervention studies (Cohen et al., 2006) students who received the intervention had fewer negative stereotype cognitions than those who did not experience it, suggesting that stereotype threat was reduced for them in the academic setting (Steele & Aronson, 1995, Study 3).

Although the study by Walton and Spencer (2009) provides support for stereotype threat effects, the findings have limited generalizability and strength. First, the interventions used in these studies only focused on college and middle school students. The vast majority of research findings have also confirmed stereotype threat effects in these populations (Steele et al., 2002), so consequently, the results of these interventions are consistent with theory. However, it is hard to generalize these findings to African-Americans of all ages because the study was limited to, albeit not by choice, college and middle school students. Last, according to the effect size estimates, the effect of the interventions on academic achievement were small, suggesting that although removing stereotype threat from the environment is beneficial, it also does not have robust effects on achievement.

General conclusions. Although there is a large body of evidence that indicates the presence of stereotype threat effects, most of these studies are confined to the laboratory setting and rely heavily on college samples. Studies examining real-world data for stereotype threat effects (Cullen et al., 2004; Stricker & Ward, 2004; Walton & Spencer, 2009) have found mixed evidence that it contributes significantly to decreased academic performance for African-American students as a group. On the one hand, intervention studies demonstrate that stereotype threat effects may be present for students in real-world settings because reducing its presence produced positive academic outcomes for African-Americans (Davis & Simmons, 2008; Walton & Spencer, 2009). On the other hand, these effects are small (Walton & Spencer) and the intervention research to date has only focused on middle and college aged students. Furthermore, stereotype threat may not be easily triggered within African-Americans, given that it did not affect achievement when subtly primed in high school students (Stricker & Ward, 2004)

It may be argued, however, that the lack of a stereotype threat effect in real-world settings is because the test score data used to predict academic outcomes are already influenced by stereotype threat. It is hard to control for previous stereotype threat effects in the real world so the results of Stricker and Ward (2004) and Cullen et al. (2004) do not necessarily negate stereotype threat effects in African-American students. Conversely, the test score data hinders the conclusion that stereotype threat affects African-American students of all ages in the real-world setting. As mentioned earlier, evidence for stereotype threat is more tentative in the high school population (Keller, 2002; Kellow & Jones, 2005, 2008). Therefore, the absence of a stereotype threat effect in the real-world data of Stricker and Ward (2004) may be reflective of the limited evidence for its effects in the high school population.

In conclusion, it is clear that stereotype threat has an effect on the achievement of African-Americans. However, given the limited evidence for its generalizability to all age groups in real-world settings, more research needs to be done to determine if it contributes significantly to the overall achievement gap between African-American and European-American students.

How Stereotype Threat Affects African-American Achievement

Since the conceptualization of stereotype threat, researchers have struggled with determining how it affects the performance of minority students. To address the “how” question, researchers have examined specific mediating and moderating variables on stereotype threat in lab settings (see Davis & Simmons, 2008, or Smith, 2004, for a list of variables). Other researchers have developed and examined theoretical models that relate stereotype threat to other psychological constructs (e.g., performance goals; Smith, 2004, 2006) and biological processes (e.g., executive functioning; Schmader, Johns, & Forbes 2008). In Steele’s (1997) earlier work on stereotype threat, he outlined a process, the *disidentification process*, that explained how stereotype threat can contribute to overall minority underachievement. More recently, Cohen and Garcia (2008) developed the *identity engagement model* to illustrate how stereotype threat interacts with the academic environment to lower achievement and possibly engender disidentification. In this section, I will discuss Steele’s (1997) conceptualization of the disidentification process and Cohen and Garcia’s (2008) identity engagement model by to explain how stereotype threat affects the achievement of African-Americans. I also present a

discussion of the evidence for the disidentification process. These theories are used in order to understand how the intervention in this study may be beneficial to alleviating stereotype threat in African-American students.

The disidentification process. Steele (1997) argued that it is important for students to develop a strong identification with the academic domain in order to do well in school. When students are identified with the academic domain, they value it as an important part of their self-concept, or self-esteem. Steele argued and other theorists have found (Crocker, Karpinski, Quinn, & Chase, 2003; Crocker, Sommers, & Luhtanen, 2002) that as a result of valuing the academic domain, performance in it, has significant consequences for their self-esteem. Positive performance leads to a self-esteem boost and negative performance decreases self-esteem (Osborne, 1995, 1997; Steele, 1997). Assuming that students desire to feel good about themselves, doing well in school, then, will increase their identification with academic domain, and poor performance will decrease their identification. If a student continues to experience negative outcomes in the academic domain, they will experience a drop in their self-esteem and therefore need to employ a defense mechanism in order to protect their self-esteem (Steele, 1997).

Steele (1997) hypothesized that minority students, including African-Americans, may use a defense mechanism called *disidentification* in order to preserve a positive view of the self. Disidentification is the process of psychologically disengaging from and eventually removing the centrality of a domain that is being threatened as an important part of an individual's self-esteem. Minority students may psychologically disengage by either discounting or devaluing their academic performance in school (Crocker & Major, 1989; Major, Spencer, Schmader, Wolfe, & Crocker, 1998). Discounting refers to assuming that performance on academic tests is biased, whereas devaluing means not investing the sense of self into academics in general (Major et al., 1998). Either type of disengagement is hypothesized to lead minority students to disidentification (Major, 1995; Major et al., 1998; Steele, 1997).

Because there are multiple opportunities to be threatened by the stigmatized-ability stereotype in the school setting, Steele (1997) claimed that African-American students are at an increased risk of disidentifying with the academic domain. For example, at school, minority students are placed in situations where they often have to demonstrate their abilities on classroom tests and assignments as well as state standardized testing. Or African-American students, especially on large predominantly White college campuses, may not feel a sense of belonging in the academic environment, leaving them to question their abilities and whether they fit in the academic setting (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Steele, 2011; Walton & Cohen, 2007). If African-American students are constantly subjected to threatening academic environments and they do not have coping mechanisms to handle them, they may choose to psychologically disengage or disidentify with the academic domain in order to preserve their self-esteem. Once they are disengaged or disidentified, their self-esteem is no longer affected by their academic performance, causing a decrease in the motivation to achieve. Consequently, these students have low academic performance, but are able to maintain high levels of self-esteem (Osborne, 1995, 1997; Steele, 1997).

The identity engagement model. In their conceptualization of the identity engagement model, Cohen and Garcia (2008) outlined how the experiences that minorities face in their social environments interacts with their social-identity status to cause disidentification or positive academic outcomes. The researchers argued that when minority students enter into an academic setting, they make a general assessment on whether or not they are in a situation where their identity as a minority can be connected to a negative outcome. If the answer is yes, their minority status will be psychologically engaged and they will begin to actively search for cues in the environment that will either confirm or disconfirm the presence of threat based on their identification as a minority. Positive academic outcomes can occur if minorities discover cues in the environment that they are being fairly treated.

On the other hand, if minority students perceive cues in the environment that confirm the presence of threat, they will have to make an appraisal of whether or not they can and want to handle the situation. If minority students feel that they cannot handle the threat, their performance decreases. Performance decrements can then interact with other factors in the academic environment in a repeating, or *recursive*, cycle until either low performance stabilizes or an *adaptation* occurs. Cohen and Garcia argue that such adaptations can be disengagement, disidentification, or an event that can alter the course of the negative recursive cycle.

To illustrate the aforementioned process, Cohen and Garcia gave this example. In a study by Cohen and Steele (2002) the researchers found that African-American students who received critical feedback on an essay from their professor were less motivated than European-American students to revise it. In reality, if this student does not revise this paper, they may receive a lower grade, which may lead the teacher to have low expectations towards her or him. Or the lower grade may indicate to the student that they do not belong in the academic environment (Walton & Cohen, 2007; Steele, 2011). Both of these consequences in the academic environment can lead to further decrements in achievement and in turn increase psychological threat (Cohen & Garcia, 2008).

However, in that same study (Cohen & Steele, 2002), when students were told that the professor gave the critical feedback because he had high expectations for them and believed that they could reach them, the African-American students were just as likely as their European-American counterparts to respond positively and they were more willing to revise their essays, which in turn improved their grade. In the same way that low performance can lead to a downward spiral in achievement, performance improvements can reverse the spiral. Revising the paper can lead to a better grade. A better grade may lead to a more positive teacher-student relationship and improve feelings of belongingness in the academic environment. Both of these factors can lead to increases in achievement and a reduction of psychological threat.

Conclusions. Based on Steele (1997) and Cohen and Garcia's (2008) theoretical models, African-American student achievement is affected because they are likely to experience threat in the academic environment based on their social-identity status. When they experience threat, they may interpret situations in a way that lead to behaviors that are not conducive to positive academic outcomes. Not experiencing positive outcomes can also lead to drops in self-esteem. Over time, if the student is not able to cope in a way to improve their academic performance, they may begin to disengage or eventually disidentify with the academic domain in order to preserve their self-esteem. Disengagement or disidentification can lead to consistent low achievement or possibly total academic failure for African-American students. Consequently, as

Steele (1997) argued, if stereotype threat is pervasive, the effect it has on African-American students' academic achievement is pervasive as well and would contribute to the achievement gap between African-Americans and European-Americans.

Research on the disidentification process. Research pertaining to the processes outlined in Cohen and Garcia's (2008) identity engagement model is based on intervention studies for stereotype threat and is discussed later in the paper. Research on the disidentification process as conceptualized by Steele (1997) has focused on whether African-Americans use psychological disengagement as a coping mechanism more so than European-Americans, disidentify with the academic domain, and whether stereotype threat leads to disidentification. Most of the studies are correlational in nature, but use data from laboratory and real-world settings. The research pertaining to Steele's conceptualization is discussed below.

Psychological disengagement. Several correlational studies were conducted by Major and her colleagues to examine whether African-American students disengaged from academics more than European-American students. In one study, Major (1995, as cited in Major et al., 1998) used an instrument assessing intellectual disengagement to determine whether African-American students had higher scores than European-Americans and if these scores were related to academic achievement and global self-esteem in the same way as European-Americans. Consistent with Steele's (1997) conceptualization of disidentification, Major found that African-Americans scored higher than European-Americans on intellectual disengagement items (e.g., How I do intellectually has little relation to who I really am). Furthermore, higher intellectual disengagement scores were related to lower achievement and higher global self-esteem more so for African-Americans than for European-Americans. The correlations indicate that although African-Americans have low achievement, they maintain high levels of self-esteem, presumably because they have disengaged their self-esteem from the academic domain.

To investigate whether psychological disengagement is used as a defense mechanism, Major and colleagues (1998) examined if African-Americans maintained a high level of self-esteem in response to experiencing a threatening environment. The researchers conducted two experiments to determine whether African-American students psychologically disengaged more than European-Americans after being primed for race and receiving either success or failure feedback on a test. They also investigated whether the responses to feedback for African-Americans were chronic or situational. In each experiment, the researchers determined evidence for psychological disengagement by looking at the extent to which African-American students' global and performance self-esteem (e.g., "I feel confident in my abilities) correlated with achievement outcomes.

In their first experiment, Major and her colleagues (1998) assigned 77 college-aged students to either a racially biased (i.e., students were told that the test was biased against certain racial groups) or the unbiased condition (i.e., students were told that the test was "culturally unbiased"). In each condition, students either received an easy or a difficult intelligence test, which represented two types of performance feedback, success and failure, respectively. The researchers hypothesized that there would be no difference in performance and global self-esteem across performance feedback levels of African-American students who were in the racially biased condition. The results confirmed the hypotheses only for performance self-esteem. The performance self-esteem of African-American students who received failure

feedback from the test in the racially primed condition was not significantly different from the African-American students who received success feedback. Moreover, European-Americans who received success feedback in the racial bias primed condition had higher levels of self-esteem than the European-American students that received failure feedback.

On the contrary, the performance self-esteem of African-American students who received failure feedback from the test in the racially primed condition was not significantly different from the African-Americans in the unbiased condition. The authors noted that this finding may have occurred because all African-American students completed a survey on perceptions of racial disadvantage, which may have inadvertently primed students in both conditions for racial biases. Nevertheless, these results suggest that African-American students may disengage from negative evaluations in the academic domain in order to preserve their self-esteem, when they are primed to believe that the test is biased. Furthermore, this process was unique to African-American students because European-American students in the racial bias primed condition did not exhibit the same pattern of results as the African-American students.

In their second study, Major and colleagues (1998) were interested in extending their findings by determining if African-American students disengaged their self-esteem when a more subtle racial prime was used and if African-Americans use psychological disengagement as a chronic response to threatening situations. The researchers assigned 67 college students to either the race-biased or unbiased condition in which they all received failure feedback. The researchers tested several hypotheses. They hypothesized that self-esteem levels for African-American students who received failure feedback and who were primed to believe that the test was racially biased would be higher than European-Americans in this condition and higher than African-American students in the race-unbiased condition. For chronic disengagement, the researchers hypothesized that all students who scored high on a measure of chronic disengagement would have higher self-esteem scores after receiving the failure feedback than those who did not. Furthermore, African-American students reporting high levels of chronic disengagement were expected to have higher self-esteem scores than European-Americans with similar disengagement scores. Finally, to determine if disengagement is a chronic response for African-American students in general, the researchers hypothesized that self-esteem levels would be similar for African-American students in both the race biased and unbiased conditions, regardless of their chronic disengagement scores.

The results of the study confirmed some of these hypotheses, specifically with regard to global self-esteem. First, African-American students had higher levels of global self-esteem in the race-biased condition than European-Americans in this condition as well as African-American students in the race-unbiased condition. Second, the African-American students who had high scores on the measure of the disengagement scale had significantly higher global self-esteem scores than chronically disengaged European-Americans. There was no significant effect found across chronic disengagement status for European-American students (Major et al., 1998). Contrary to what was hypothesized, students who scored high on the chronic disengagement measure had performance and global self-esteem scores that were marginally significantly higher than those who did not. Additionally, African-American students who had high scores on the chronic disengagement measure had significantly higher levels of self-esteem after receiving failure feedback than low chronically disengaged African-American students.

Similar to the first experiment, the results of this study indicate that African-Americans psychologically disengage when primed to believe that the test is biased (i.e., when in a threatening environment) and that this disengagement was unique to this group (Major et al., 1998). However, there was no evidence of psychological disengagement being a chronic response to threat. In fact, African-American students who were in the race-unbiased condition had lower self-esteem scores than European-American students in this condition, confirming that African-American students disengaged from the academic domain only when they felt threatened (Major et al., 1998).

From these studies, it seems that in the face of negative feedback, African-Americans tend to cope by psychologically disengaging. Also, in general, a positive correlation exists for African-Americans, but not European-Americans, between disengagement scores and self-esteem as well as a negative correlation between disengagement and low academic achievement (Major, 1995). African-American students were able to maintain high levels of self-esteem regardless of the type of feedback they received and when race was explicitly or subtly primed.

Criticisms and conclusions. Despite the evidence for disengagement among African-American students, there are two main issues that arise from this research. First, the inconsistent findings for performance and global self-esteem seem to be inconsistent with the conceptualization of the theory (Steele, 1997). In the first study by Major et al. (1998), performance self-esteem levels remained high across the race prime conditions for African-Americans. However, in the second study, only global self-esteem levels remained high. Theoretically, if students are psychologically disengaging, it should be evident in the part of the self-concept that is directly related to that domain (Morgan & Mehta, 2004; Osborne, 1997), which, in this case, would be performance self-esteem, and their overall sense of self.

The researchers did not address why there would be differences between the results of the studies. Perhaps when the stereotype is not explicitly primed (Major et al., 1998, Study 2) there was no need to disengage the self-esteem that is directly related to the academic domain (i.e., performance self-esteem). This would mean that African-Americans do not find a subtle reference to race threatening, which contradicts an existing finding in the literature (e.g., Stricker & Ward, 2004). However, it is not clear from the theoretical framework why the students' global self-esteem was disengaged in Study 2, but not in Study 1.

Second, psychological disengagement may not always lead to performance decrements. Other researchers have found that psychological disengagement can be a productive way to cope with stereotype threat and maintain the motivation to achieve. In their study, Nussbaum and Steele (2005) found that although African-American students in both a diagnostic and nondiagnostic condition had similar scores on a measure of disengagement, the disengagement scores of African-American students who were primed to believe that a test was diagnostic of their ability (i.e. diagnostic) mediated their response to persist on a difficult task on which they received negative feedback. This was not the case for European-American students in the diagnostic condition or for any of the students in the nondiagnostic condition. From their findings, it seems that African-Americans choose to psychologically disengage in threatening environments and coping in this way can be beneficial to academic achievement. Furthermore, their finding implies that psychologically disengaging may not necessarily lead to disidentification with the academic domain.

In conclusion, although African-American students, in general, may psychologically disengage more than European-American students in response to experiencing threat in the academic setting, what part of their self-esteem they are disengaging is unclear (Major et al., 1998). Furthermore, African-American students may disengage in order to persist in the face of difficulty (Nussbaum & Steele, 2005). As Nussbaum and Steele concluded, African-American students may use psychological disengagement as a coping strategy that allows them to detach negative feedback from their self-concept, but also allows them to remain committed to the academic domain. Therefore, there is some evidence that African-Americans psychologically disengage in response to threat, albeit in the laboratory. Whether psychological disengagement necessarily leads to disidentification is debatable (Nussbaum & Steele, 2005).

Disidentification. Studies examining whether African-American students disidentify with the academic domain have focused on investigating the relationship between self-esteem and academic achievement over time using large data sets from real-world settings. Using data from the National Education Longitudinal Study (NELS), Osborne (1995, 1997) provided evidence to suggest that African-American students disidentify with academics more than other racial groups in order to protect their self-esteem. In his first study, Osborne (1995) investigated two assumptions related to the disidentification hypothesis. First, he tested whether African-American students had lower achievement scores than European-Americans from eighth to tenth grade. Second, he tested whether the relationship between global self-esteem and academic achievement gradually decreased from over the same time span for African-American students. Support for the disidentification hypothesis is shown if African-American students exhibit a significant decrease in academic achievement over time and if this decrease was present for them and not European-American students.

Osborne found limited evidence for both hypotheses. African-American students scored significantly lower than European-American students on a measure of self-reported GPA and academic achievement tests by the 10th grade. Additionally, the correlation between global self-esteem and academic achievement decreased significantly with age for African-American males, but not for European-American students. The correlations ranged from $r = 0.21$ to $r = 0.08$ for self-reported GPA and from $r = 0.24$ to $r = 0.19$ for achievement tests. African-American females also experienced a decrease for self-reported GPA, but it was not statistically significant. The correlation between academic achievement and global self-esteem was small for both African-American and European-American students, with correlations ranging from 0.14 to 0.28. For African-American males, these correlations went from small to no relationship at all. Correlations for the European-American students and African-American females remained small.

In his second study, Osborne (1997) was interested in extending the findings of the 1995 study. In particular, he investigated whether females disidentified at a later grade, if other racial minority groups disidentified with academics (i.e., Hispanic-Americans and Native Americans), and if disidentification was uniform across all academic content areas (i.e., math, English, and history). In keeping with the assumptions of the disidentification hypothesis, Osborne found that African-American students had higher levels of self-esteem from eighth to twelfth grade than European-American and Hispanic-American students, but both African-American and Hispanic-American students' achievement decreased over this time span.

Similar to his previous findings (Osborne, 1995), the correlation between global self-esteem and academic achievement (i.e., self-reported GPA and academic achievement tests)

decreased significantly, from small to no relationship, for African-American and Hispanic-American males between the tenth and twelfth grades in all academic content areas. The correlation between global self-esteem and academic achievement was also small for African-American females and decreased slightly between tenth and twelfth grade for history and science, but increased for math. There was no change in the correlation between global self-esteem and academic achievement for European-American males and Hispanic-American females in all academic content areas. European-American females experienced a significant increase in all content areas. Osborne (1995, 1997) interpreted the findings from both studies as evidence that minority students, especially African-American males, disidentified with academics over time in order to maintain their self-esteem.

Although Osborne's studies seemingly provide support for Steele's (1997) conceptualization of the disidentification hypothesis, Osborne (1997) admitted that a more accurate way to measure disidentification is to examine the relationship between academic achievement and academic self-esteem. Academic self-esteem would be more appropriate because the disidentification process entails removing the academic domain of the self as important to the global sense of self (Steele, 1997). Furthermore, academic self-concept has a stronger relationship to academic achievement outcomes than global self-esteem for all racial groups (Marsh & Martin, 2011).

In light of the aforementioned critique by Osborne (1997), Morgan and Mehta (2004) reexamined the NELS data set using academic self-concept as a measure for self-esteem. Morgan and Mehta assessed three claims. First, in order for disidentification to be an explanation for racial differences in achievement, stigmatized minorities have to show that they discount the relevance of academic evaluations more so than their European-American counterparts. Therefore, African-American students should exhibit a weaker correlation between academic self-concept and academic achievement as compared to European-Americans. Second, they argued that a more adequate test of disidentification would be to assess how much of the variance of students' perceptions of their academic competence, or their academic self-concept, contributes to their global self-esteem. As Steele (1997) indicated, evidence of disidentification with an academic domain means that performing well in school no longer contributes to an individual's self-esteem. Last, disidentification is shown when a student's self-esteem is no longer related to their performance in the academic domain. Thus, the correlation between global self-esteem and achievement for African-Americans should be weaker as compared to European-Americans and they should derive a positive sense of self-esteem from other sources such as peers and family (Steele, 1997).

Morgan and Mehta (2004) only found support for the first question. Based on Morgan and Mehta's regression analysis, there was a significant interaction effect between race and the correlation of academic achievement (i.e., self-reported GPA and academic achievement tests) to academic self-concept. Specific correlations between measures of academic achievement and academic self-concept were not reported, but African-Americans demonstrated approximately a 30% to 40% weaker relationship between academic self-concept and academic achievement when compared to European-Americans. This finding suggests that either African-Americans who perform well may not see themselves as more competent than their peers or that African-Americans who perform poorly do not view themselves as less competent than their peers. In either case, Morgan and Mehta interpreted this finding as evidence that African-American

students do discount the relevance of academic evaluations more than European-American students. On the other hand, the lack of support for the other two claims indicate that African-American students do not psychologically disengage their academic self-concept from their global self-esteem or have a weaker correlation between their academic achievement and overall self-esteem more so than their European-American counterparts.

Criticisms and conclusions. Taken together, the studies examining the relationship between academic achievement and self-esteem seem to provide equivocal evidence for disidentification. There are two main findings that challenge the evidence for disidentification among African-Americans. First, the correlations between academic achievement and self-esteem for all racial groups were small. The correlations between global self-esteem and academic achievement for all ethnic groups typically range from small to moderate (Hansford & Hattie, 1982), with European-American students having higher correlations than African-Americans, $r = 0.33$ and $r = 0.19$, respectively. Taken together, these findings pose an interesting question for the disidentification process: If the correlation between academic achievement and global self-esteem is small for African-Americans, is there truly a need for African-American students to disengage? Arguably, if there is not a strong correlation between academic achievement and self-esteem in the first place, the need for African-American students to psychologically disengage their self-esteem from the academic domain is unwarranted.

On the other hand, low correlations between academic achievement and global self-esteem are usually used as evidence for the disidentification process (Griffin, 2002; Osborne, 1999; Osborne & Walker, 2006; Steele, 1997). Researchers have claimed that because African-Americans typically have higher levels of self-esteem than other racial groups, but also have low correlations between academic achievement and global self-esteem, they disidentify as a group from the academic domain (Osborne, 1999; Steele, 1997). Given that correlations do not imply causation, it is hard, then, to determine from this kind of research whether academic achievement is a significant contributor to African-American students' sense of self, or if African American students have disengaged from this domain because they are threatened. Nevertheless, Osborne's studies provide weak support for the latter interpretation because global self-esteem and academic achievement, although small to begin with, did decrease to no relationship at all over time. This finding, however, was only true for African-American and Hispanic-American males. There is currently no support for African-American and Hispanic-American females.

In conclusion, there is some limited evidence suggesting that African-American students psychologically disengage academically more than European-Americans (Major, 1995; Major et al., 1998; Morgan & Mehta, 2004), but only African-American males tend to disidentify with the academic domain over time (Osborne, 1995, 1997). Given that most studies use correlations, it is also hard to determine if the low correlation between academic achievement and global self-esteem is indicative of disidentification or of academics not being a significant contributor to African-American students' overall sense of self. Therefore, the results from the disidentification studies show that more research is needed to definitively conclude that the low academic achievement of African-American students is a result of disidentification and that disidentification contributes significantly to the achievement gap between African-American and European-American students.

Stereotype threat and disidentification. So far, there is evidence that psychological disengagement can lead to disidentification. A remaining question for the disidentification

hypothesis is whether stereotype threat can lead to disidentification. Two studies have examined how stereotype threat can play a role in minority students dropping out of high school, which is a concrete way of disidentifying with the academic domain. In the first study, Griffin (2002) tested whether the relationship between school persistence and academic achievement was greater for European-American and Asian-American than for African-American and Hispanic-American high school students in 14 school districts ($N = 132, 903$). He used logistic regression to examine the relationship between GPA and drop out status, hypothesizing that if stereotype threat led African-American and Hispanic-American students to drop out, the odds of staying in school based on GPA would be higher in European-American and Asian-American students than for African-Americans and Hispanic-Americans. Griffin found that for every 1 point increase in GPA, the odds of staying in school for European-Americans and Asian-American increased by a factor of 3.74 and 4.17, respectively. The odds increased by a factor of 2.94 and 2.36 for African-Americans and Hispanic-Americans, respectively. Therefore, the odds for staying in school as GPA increased were weaker for African-Americans and Hispanic-Americans than for European-Americans and Asian-Americans. Griffin interpreted his findings to mean that African-Americans and Hispanic-Americans were more likely to disidentify with the academic domain, and this disidentification led to students dropping out of school.

In a second study, Osborne and Walker (2006) examined the link among identification with the academic domain, stereotype threat, and withdrawal from school. They hypothesized that withdrawal from school would be more likely for minority students who were more identified with academics in their 9th grade year because stereotype threat affects students who are identified with the academic domain. This trajectory would not be seen in European-American students. Osborne and Walker found that for African-American and Hispanic-American students, the odds of withdrawing increased as academic identification with the domain increased. Additionally, after controlling for GPA, the researchers found that the African-American, Hispanic-American, and Native American students who did not withdraw had significantly lower mean z scores (0.02, -0.02, and -0.02, respectively) on the school identification measures than students who did (0.57, 0.33, and 0.73, respectively). Furthermore, European-American students who withdrew from school had lower scores on the identification with academics measures at 9th grade than minority students.

Criticisms and conclusions. Collectively, these studies suggest some interesting paradoxes for African-American students that provide mixed support for the disidentification hypothesis. First, Griffin (2002) concluded that minority student (African-Americans and Hispanic-Americans) achievement in school matters to a lesser degree than their European-American and Asian-American counterparts when deciding to withdraw from school, presumably because they have already disidentified with the importance of achieving in school. On the other hand, Griffin's (2002) analysis can be interpreted as evidence in support of a large body of research indicating a relationship between school achievement and dropping out (Finn, 1989). The odds for the minority students, although statistically weaker, were still relatively high, suggesting that relative to their European-American and Asian-American peers, GPA was not a strong predictor of drop out, but in general, it was still considerably predictive. Therefore, Griffin's results do not support Steele's conceptualization of the disidentification hypothesis. Minority students may place a lesser emphasis on school achievement than their European-American and Asian-American counterparts when considering dropping out, but it may not

significantly decrease the emphasis that African-American and Hispanic-American students place on academic achievement when dropping out.

Secondly, it is also counterintuitive that identification with academics is associated with withdrawal for minority students, as Osborne and Walker's (2006) research suggest. On the one hand, Steele and Aronson (1995) hypothesized that stereotype threat would affect African-American students that are highly identified with the academic domain because academics is an important part of their self-concept. Theoretically, then, these students would also be at the greatest risk for withdrawal/disidentification, and this hypothesis is supported by the data from Osborne and Walker's study. On the other hand, theorists have suggested that students, regardless of race, who are more identified with academics are at a greater risk for underperformance because it can increase the amount of pressure to perform well (Crocker, Brook, Niiya, & Villacorta, 2006; Crocker & Park, 2004). This pressure can reduce intrinsic motivation, increase anxiety, and possibly impair self-regulation processes necessary for being successful. Therefore, it is surprising that the same results did not occur for the European-American students in Osborne and Walker's (2006) study. However, Osborne and Walker's results may also show that stereotype threat is a unique pressure that African-American students face and it increases the likelihood of them withdrawing from school more so than their European-American counterparts.

General conclusions. Taken together, the studies investigating psychological disengagement and disidentification with the academic domain demonstrate that there is evidence that African-American students are more likely than European-Americans to disengage their self-esteem from performance feedback in intellectual testing situations, but only for African-American and Hispanic-American males (Osborne, 1995, 1997). Furthermore, psychological disengagement is more likely to occur in situations where racial stereotypes about academics are made salient (Major et al., 1998). Methodological issues, such as how self-esteem is measured and the reliance on correlational studies, however, limit making definitive conclusions on whether or not stereotype threat necessarily leads to disidentification (Morgan & Mehta, 2004; Nussbaum & Steele, 2005). Therefore, whether or not stereotype threat contributes significantly to the achievement gap via the disidentification process is a question that needs further examination.

Stereotype Threat Interventions

Although there are some outstanding questions in the research literature regarding the strength of stereotype threat effects on African-American achievement, it is clear that stereotype threat can lead African-American students to use psychological disengagement as a defensive mechanism, which can have a negative impact on academic achievement. Therefore, it is important, to find ways to help minority students effectively cope when in a threatening academic environment, so as to buffer the potential negative effects of stereotype threat.

There are now several interventions in the research literature designed to reduce psychological threats in the academic environment for minority students. These studies have focused on addressing the situations or beliefs that can either theoretically lead to the stigmatized ability stereotype coming to awareness for minority students or combat its presence when made conscious at school. Interventions in the research literature include helping minority students

make more constructive attributions about academic set-backs (Good, Aronson, & Inzlicht, 2003; Wilson & Linville, 1982, 1985), attribute anxiety around belonging in the college environment to the difficulties associated with the transition to college (Walton & Cohen, 2007, 2011), identify and affirm important values about themselves (Cohen, Garcia, Apfel, & Master, 2006; Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Mikaye, Kost-Smoth, Finkelstein, Pollock, Cohen, & Ito, 2010), make academic courses personally relevant to students (Hulleman & Hackiewicz, 2009), understand that intelligence is malleable (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, & Dweck, 2007), and see the consistency between their racial identity and positive future academic outcomes (Oyserman, Bybee, & Terry, 2006). All of the studies reported positive results in boosting academic achievement for minority students (i.e., ethnic minority or women in math environments) immediately following the intervention and some reported long-term effects on achievement outcomes (Cohen et al., 2009, Oyserman et al., 2006, Walton & Cohen, 2011). Two of the aforementioned intervention studies (Cohen et al., 2006; Mikaye et al., 2010) were designed to specifically alleviate the effects of stereotype threat through self-affirmations. These interventions and their theoretical relationship to psychological disengagement are discussed below.

Self-affirmation interventions. The rationale for using self-affirmations as an intervention comes from self-affirmation theory (Sherman & Cohen, 2006; Steele, 1988). Self-affirmation theory is based on the following tenets. First, individuals are motivated to maintain a perceived sense of self-integrity and self-worth. This perceived sense of self-worth and integrity is dependent on multiple domains or contingencies, including the individuals' roles (e.g., mother, student), values (e.g., being artistic or athletic), group identities (e.g., race, religion), central beliefs (e.g., political ideologies), goals (e.g., academic success, wealth), and relationships (e.g., family and friends; Sherman & Cohen, 2006). These domains make up the individual's self-system. Second, if their self-integrity is threatened—that is, when any part of the self-system is threatened—individuals will engage in behaviors to restore their sense of self-worth and integrity. They may automatically or unconsciously use defensive responses such as dismissing, avoiding, or denying the existence of the threatening event. Third, when individuals experience failure in one domain of the self-system, they can respond by emphasizing success or affirming the self in another domain. And fourth, because individuals tend to affirm themselves in other domains when threatened, they can engage in self-affirming activities, thereby reducing the need to utilize defense mechanisms. Their cognitive resources will then be freed to engage in learning from the threatening event (Sherman & Cohen, 2006).

An in-depth review on the evidence for self-affirmation theory is beyond the scope of this literature review (see Sherman & Cohen, 2006). However, there is evidence in support of this theory from a variety of psychological disciplines. For example, there are many studies that demonstrate that when an individual is given information that contradicts their political ideology, those individuals who had the chance to affirm their self of sense were more open to accepting the contradictory political viewpoint than those individuals who did not have the opportunity to self-affirm (Sherman & Cohen). Based on self-affirmation theory, then, if African-American students have the opportunity to self-affirm when experiencing stereotype threat in an academic situation, this opportunity should reduce the chance of them using a defense mechanism, like psychological disengagement and disidentification, to cope with the threatening situation

(Sherman & Cohen, 2006).

In the first study that examined the effects of a self-affirmation intervention on African-American students, Cohen and his colleagues (2006) randomly assigned students to either the self-affirmation or the other-affirmation condition. In the self-affirmation condition, students were given a worksheet instructing them to choose their most important value(s), write about why they were important to them, and answer four questions about how they were important to them. In the other affirmation condition, students were given a worksheet instructing them to choose their least important value(s), write about why they would be important to someone else, and answer four questions about how they were important to other people. The researchers found that the African Americans in the self-affirmation group achieved significantly higher grades than those in the control group, decreasing the achievement gap in the school by 40%. Interestingly, lower performing students tended to benefit from the intervention more than higher performing students and these gains were sustained through their 8th grade year. Additionally, Cohen and his colleagues (2006) found that students in the affirmation condition completed fewer stereotype word fragments than those in the control group, suggesting that the intervention reduced the activation of stereotype threat. A follow-up study by Cohen et al. (2009) indicated that the academic gains made by the African-American student continued two years post treatment.

Mikaye and her colleagues (2010) found similar results to Cohen and his colleagues (2006) when they replicated the study in a college sample of women in a college-level introductory physics class who were from more advantaged backgrounds and in an environment with instructional supports. The researchers found that women in the self-affirmation group had significantly higher grades than women in the control group. The gender gap was also significantly reduced between women and men and by the end of the physics course women moved from the average range (C) to the above average range (B; Mikaye et al., 2010).

The self-affirmation studies are noteworthy, given their simplicity and significant consequent impact on grades for low achievers in school-aged populations. Critics have wondered how such small intervention cause great effects on academic achievement (Yeager & Walton, 2011). It is even logical to suggest that other factors in the environment outside of the intervention were the driving force for the changes in academic achievement. After all, Cohen et al. (2006) did mention that the intervention was done in a school that had other academic supports. On the other hand, the study by Mikaye and colleagues (2010) demonstrated that in environments with solid academic supports, the self-affirmation intervention had powerful effects on achievement.

One speculation about how the self-affirmation intervention led to such positive results was that the affirmations interrupted a negative recursive cycle that occurs in school (Cohen & Garcia, 2008; Yeager & Walton). Recall that the *identity engagement model* (Cohen & Garcia) indicates that when a person is not prepared to deal with the psychological threat to their sense of self, they will perform negatively. The consequent negative performance interacts with other psychological processes in the academic environment to cause an increasing downward spiral in academic performance. If this cycle is not broken, low levels of performance can stabilize. The person then adapts to their environment through disengaging or disidentifying with the academic domain. However, by providing a way to fortify the self in times of psychological threat, which is the function of the self-affirmation, threat is reduced and academic performance can be

preserved or increased (Cohen & Garcia). The self-affirmations, then, can interrupt a negative recursive cycle and provide an alternative defense mechanism for African-American students to maintain academic achievement as an important part of the self-concept (Cohen & Garcia, 2008), reducing the likelihood of disengagement or disidentification.

Summary and Current Study

Overall, there is a large body of evidence suggesting that stereotype threat significantly and moderately affects the academic achievement of African-Americans (Nguyen & Ryan, 2008; Walton & Spencer, 2009). Previous research has also shown that African-American students psychologically disengage (Major, 1995; Major et al., 1998) and African-American males tend to disidentify in order to cope with academic failure when they experience stereotype threat (Osborne 1995, 1997). Interventions designed to remove stereotype threat have shown positive and long-term results in improving academic achievement (e.g., Good et al., 2003; Walton & Cohen, 2007) and have reduced the achievement gap within a school (Cohen et al. 2006). Although these interventions show great promise, research on their effectiveness is limited and there are many unanswered questions. For example, at what developmental stage is it appropriate to intervene? What types of populations of students can benefit from this intervention (Cohen & Garcia, 2008)?

The current study was designed to broadly address the aforementioned questions by partially replicating the Cohen et al. (2006) study with a group of high school students who are at-risk of academic failure. Given the promising results of the Cohen et al. (2006) study for low achievers in school-aged populations, the researcher was interested in investigating whether this intervention, which was designed to reduce stereotype threat, could enhance the academic achievement and reduce the level of psychological disengagement in a sample of at-risk high school students. This study will also extend the research done by Cohen and his colleagues in two ways. First, previous research has focused mainly on intervening at the middle school and college level (Walton & Spencer, 2009; Yeager & Walton, 2011). This study focuses exclusively on high school students, who have been identified as being at-risk for academic failure. Research has yet to show that stereotype threat is a significant contributor to academic achievement in high school students. Therefore, the results of this study will also have implications for the presence of stereotype threat in this population.

Second, because self-affirmations are hypothesized to change recursive processes for African-American students, (Yeager & Walton, 2011), this study examines if self-affirmations engender changes in psychological processes known to promote positive recursive processes in the academic environment. The Student Engagement Inventory (SEI; Appelson, Dongjin, & Reschly, 2006), which assesses different domains of student cognitive and psychological engagement that are positively correlated with academic outcomes, is used as a measure of psychological engagement. These domains include attitudes on the value of education, perceptions of student-teacher relationships, and future goal orientation, to name a few. Two specific research questions were addressed:

1. Does a self-affirmation intervention, theoretically designed to reduce stereotype threat effects, lead to increased academic achievement for African-American high school students?

2. Does a self-affirmation intervention facilitate engagement with psychological processes known to increase academic achievement for African-American high school students?

Hypotheses for the research questions were as follows:

1. Given the increase in achievement, especially for low-achieving middle school students in the original intervention study by Cohen et al. (2006), it was hypothesized that the academic achievement of high school students receiving the self-affirmation intervention would increase significantly. Based on the results of the Cohen et al. (2006), no increase in academic achievement is expected for students in the other affirmation group.
2. Because the self-affirmation intervention should theoretically alter recursive processes in the academic environment, it was hypothesized that high school students who received the self-affirmation intervention would report greater levels of psychological engagement with the academic domain (Yeager & Walton, 2011). Specifically, these students should engage in behaviors and experience cognitions that promote learning and better teacher-student relationships in the classroom and increase future aspirations and goals.

Method

School Selection and Profiles

The high schools selected for the study were based on access of the researcher and the achievement profiles of the schools. There were three high school sites, one in Richmond, VA and two sites in Vallejo, CA. Because this study focused on the effectiveness of this intervention with low-achieving students, low performing schools in their school district and/or state were selected as research sites. Also low performing students from the school were selected to participate in the study.

Virginia School (VAS). According to the 2009-2010 school year report card from the Virginia Department of Education (VDOE) website, VAS has grade levels 9 through 12 and a predominantly African-American student population. It is also a low performing school in the school district. During the 2009-2010, this school did not meet annual benchmark academic goals (Adequate Yearly Progress) as outlined in the No Child Left Behind legislation (U.S. Department of Education, 2002) and based on standardized testing results from the previous academic year (i.e., 2008-2009). Only 30 of 984 students (i.e., $\approx 3\%$ of the student population) were enrolled in Advanced Placement courses. The school safety record indicated that offenses against students and teachers/staff decreased over the previous three years, with the exception of disorderly/disruptive behaviors. The drop-out rate for African-American students for the previous school year was only 5.83%; however, the graduation rate was only 58% percent for the whole school and 56% for African-American students.

California School #1 (CAL 1). According to CAL 1 school's 2009-2010 Accountability Report Card, CAL 1 has grade levels ninth through twelfth and a predominantly African-American student population (64%). It is also a continuation high school and considered to be a low performing school in the district. This school typically enrolls students who are failing in the comprehensive high schools, who are in need of a few credits to graduate, or who are far behind in their school work for medical reasons. The majority of the student population is in either 11th or 12th grade (61%) and a little over half of the population is classified as socioeconomically disadvantaged (57%). During the 2008-2009 school year, this school did not meet annual benchmark academic goals (Adequate Yearly Progress) as outlined in the No Child Left Behind legislation. There are no Advanced Placement classes offered. According to the 2008-2009 school year, the drop-out rate from this school (those students who leave school before the school year ends) was 61% and the graduation rate after four years is 23%.

California School #2 (CAL 2). According to the 2009-2010 Accountability Report Card (VCUSD website), the CAL 2 is a predominately African-American (35%) and Hispanic-American (30%) school that has 9th through 12th grades. The majority of the student population is in the 9th grade (33%) and a little over half of the population is considered socioeconomically disadvantaged (54%). This school did not meet annual benchmark academic goals (Adequate Yearly Progress) as outlined in the No Child Left Behind legislation based on standardized testing results from the previous academic year (i.e., 2008-2009). In the 2008-2009 school year, the drop-out rate from this school was 11% and the graduation rate after four years is 58%.

Participants

Participants for this study were recruited at the three high schools mentioned in the previous section. The students from VAS were drawn from an afterschool program that targeted students who had behavior problems and academic difficulties at school. The afterschool program selected students for participation in their program based on the student's academic and behavioral discipline record and in consultation with the school's administration. All students from CAL 1 had an opportunity to participate in this study. From the CAL 2 school, only 9th grade students in the English and Math support classes had the opportunity to participate. These students were placed into support classes because they scored in the below basic range on the California State Standards Test two years in a row. All students that participated turned in signed consent forms from their parents or themselves (for students 18 years of age or older) indicating that they could participate in this study.

The total number of students who participated in the study was 64 (47 African-Americans, 11 Hispanic-Americans, 2 European-American, and 2 Other Minority). Because this study focused particularly on African-American students, only data from these students ($n = 47$) were analyzed. The following demographic statistics reflect only the African-American students in the sample. This sample included 23 males and 24 females aged 14-19. Thirty-seven students reported their age $M = 16.16$, $SD = 1.46$. Participants included 10 freshmen, 6 sophomores, 7 juniors, and 13 seniors. Most students described their socioeconomic status as either working class (38.9%) or middle class (41.7%). No students indicated that they were wealthy and 11 students did not respond to this question. The majority of the students reported living in urban communities (38.2%) and being raised in mixed (51.4%) or mostly African-American (48.6%) neighborhoods. Thirteen students did not report the type community that they lived in and 12 students did not report the racial composition of their community. Most students reported that they were currently in good to very good physical (77.8%) and mental (94.5%) health. The average Fall quarter GPA was 2.44 ($SD = 0.91$). Table 1 lists the gender and age representation for each school.

Procedure

Study design. The study was conducted as a randomized double-blind experiment. Students were recruited with the help of the staff members of each school. Class presentations about the study were made and a letter was sent home to participants' parents describing the study. Briefly, students were told that they were going to participate in an activity about their values. All students who were interested in participating in the study were required to give assent for participation.

Data were collected over two school years. Data for VAS were collected during the 2009-2010 school year and data for CAL 1 and CAL 2 were collected during the 2010-2011 school year. At the beginning of the second quarter of each of the school years, students were assembled in the cafeteria or another classroom on campus. Each student was randomly assigned to either the control or the treatment conditions. They were given a packet of materials that contained the Student Engagement Instrument (SEI; Appelson et al., 2006), the demographic questionnaire from the Cross Racial Identity Scale (CRIS; Vandiver et al., 2001; Worrell, Vandiver, & Cross, 2004), and one of two intervention conditions. Students completed the materials within approximately 30 minutes.

At the end of the third semester, students were assembled into a room and given the SEI (Appelton et al., 2006) to complete. Students had approximately 30 minutes to complete the measure. Upon completion of the pre- and post-test materials, students had the option of either being entered into a drawing for one of ten iPod shuffles, or being paid \$10 for their participation.

Intervention conditions. The self-affirmation and other-affirmation intervention conditions of the Cohen et al. (2006) were used in this study. In the self-affirmation condition (treatment), students were asked to select 1-3 values (e.g., sense of humor, religion, and sports) that were most important to them and then write about why they were important. In the other-affirmation condition (control), students were asked to select 1-3 values that were least important to them from a list of values and then write about how they might be important to other people.

Measures

The measures used in the study included GPA, the SEI (Appelton et al., 2006), and a brief demographic questionnaire. GPA was used as a measure of academic achievement, and the SEI as a measure of psychological engagement. The demographic questionnaire was used to gather background information of the participants. A description of each measure follows.

Academic achievement. Academic achievement was measured by school reported overall GPA from both the Fall and Winter Quarters. GPA was calculated using the student's grade in their core classes (e.g., English, Math, etc.). The Fall Quarter GPA represented the pre-intervention measure of academic achievement and the Winter Quarter GPA represented the post-intervention measure of academic achievement.

SEI. The SEI (Appelton et al., 2006) is a 35-item instrument designed to measure the cognitive and psychological factors involved in student engagement with the school. Each item is rated on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Two items on the Intrinsic Motivation Scale are reversed scored. Reliability of the scales' scores were examined with middle and high school students (Appelton et al., 2006; Betts, Appelton, Reschly, Christenson, & Huebner, 2010). Both exploratory and factor analytic procedures were used to determine the underlying structure of the instrument's scores. Six factors were found, including Teacher-Student Relationships (TSR), Control and Relevance of School Work (CRSW), Peer Support for Learning (PSL), Future Aspirations and Goals (FG), Family Support for Learning (FSL), and Intrinsic Motivation (IM). The subscales were also positively correlated with positive school outcomes (e.g., GPA, and standardized math and reading tests), and negatively correlated with school suspensions. Scores were also consistent across gender and school level (i.e., Grades 6 - 12; Betts et al., 2010). Reliability estimates (Cronbach's α) for the SEI factors' scores were adequate, ranging from 0.72 to 0.88 in the study by Appelton et al. (2006), and from 0.70 to 0.80 in the study by Betts et al. (2010).

For the purposes of this study, the TSR, CRSW, and FG are used as measures of psychological engagement. These scales are most relevant to the academic domain and assess the hypothesized recursive psychological processes that may be altered as a result of the intervention. The TSR subscale assesses the attitudes and beliefs students hold about the quality

of their teacher-student relationships. The CRSW subscale measures students' perceptions about the value of learning and strategies used to promote success. Finally, the FG subscale assesses the value students place on school as an important part of reaching future goals. According to the studies by Appelon et al. (2006) and Betts et al. (2010), the reliability estimates (Cronbach's α) for the subscales were as follows, respectively: $TSR_{\alpha} = 0.88$ and 0.74 ; $CRSW_{\alpha} = 0.80$ and 0.80 ; $FG_{\alpha} = 0.78$ and 0.70 . Sample items for each of the subscales used in this study are found in Table 2. Student responses on the SEI before the intervention are referred to as pre-SEI and responses after the intervention are referred to as post-SEI.

Demographic questionnaire. The demographic questionnaire from the Cross Racial Identity Scale (CRIS; Vandiver et al., 2001; Worrell, Vandiver, & Cross, 2004) was used. The questionnaire included items asking students to indicate information such as their age, grade, school, religious affiliation, the type of community they were raised in, socioeconomic status, physical and mental health, and extracurricular activities. The question asking students to identify their race was removed in order not to directly trigger stereotype threat using a subtle cue (Steele & Aronson, 1995).

Results

Preliminary Analyses

Missing data. The Fall and Winter GPA for all participants were obtained. An inspection of the pre- and post-intervention responses on the SEI was done to determine if there were any missing items. Of the 47 African-American participants, 10 students did not complete the SEI after the intervention. Students who did not complete both the pre-SEI and post-SEI measure were excluded from the analysis addressing the change in psychological engagement for students in self-affirmation intervention group (i.e., Research Question #2). Of those participants who completed the pre-SEI and post-SEI, there were a total of 23 missing data points across 19 variables (7 pre-SEI variables and 12 post-SEI variables). The greatest number of responses missing on any SEI item was two. The mean substitution method was used to handle missing data. Using this method, all missing items in a variable was replaced with the mean of the scores on that variable. A disadvantage to using this procedure is that it decreases the standard deviation of that variable, thereby decreasing the variability in a set of scores (Hair, Anderson, Tatham, & Black, 1998). However, replacing the missing data resulted in standard deviation decreases less than or equal to 0.02.

Reliability. Reliability estimates (Cronbach's α) were computed for the three subscales used in this study from the SEI. Estimates were computed for both the pre-SEI and the post-SEI subscales. The estimates in this sample were lower than those found in research. For the pre-SEI subscales, reliability estimates were as follows: TSR $\alpha = 0.77$, CRSW $\alpha = 0.68$, and FG $\alpha = 0.66$. For the post-SEI subscales, reliability estimates were as follows: TSR $\alpha = 0.80$, CRSW $\alpha = 0.60$, and FG $\alpha = 0.69$. The estimates indicate that the scales were fairly reliable in measuring psychological engagement for this sample of students (Hair et al., 1998).

Descriptive statistics and analysis of group differences. For the total sample, the Fall GPAs ranged from 0.66 to 4.0 ($M = 2.44$, $SD = .91$). The means and standard deviations of the Fall GPA by school were as follows: VAS ($M = 1.89$, $SD = 0.69$); CAL 1 ($M = 3.12$, $SD = 0.72$); CAL 2 ($M = 2.39$, $SD = 0.90$). A one-way Analysis of Variance (ANOVA) was run to determine if there were significant differences among the Fall GPAs for the three schools. The ANOVA revealed that there was a significant difference among the mean Fall GPAs of the schools, $F(2, 44) = 11.06$, $p < 0.05$.

The Fall GPAs for the self-affirmation condition ranged from 0.66 - 4.00 ($M_{sa} = 2.42$, $SD_{sa} = 1.00$, $n_{sa} = 24$) and the other-affirmation group ranged from 0.80 - 4.00 ($M_{oa} = 2.46$, $SD_{oa} = 0.84$, $n_{oa} = 23$). An ANOVA was run to determine if there was a significant difference between the mean Fall GPAs of the conditions. No significant difference was found, $F(1, 45) = 0.03$, $p = 0.86$.

The pre- and post-SEI means and standard deviations for the total sample, the self-affirmation condition, and the other-affirmation condition are reported in Tables 3 to 5, respectively. Pre-SEI subscale scores by school are found in Table 6. Subscale scores of the pre- and post-SEI were calculated for each student by averaging the item responses of each scale. A One-Way ANOVA was run to determine if there were any significant differences among the pre-SEI means of each subscale for the three schools and for each condition. There were no

significant differences found. A summary of the ANOVA results for each subscale by school and condition are presented in Tables 7-8.

Score transformation. Because a significant difference of Fall GPAs was found among schools, the Fall and Winter GPA scores for the students were transformed to z scores so that scores could be combined for analyses. Z scores were calculated for each student using the sample standard deviation and mean of the Fall and Winter GPA scores for their specific school. The z score of each student represents the distance their GPA is from the overall sample mean GPA of their school. Using the winter and fall GPA z scores, a GPA difference z score was also calculated for each student as another measure of academic achievement. It was calculated by subtracting the students' fall z score from their winter z score. The means and standard deviations for the transformed scores by school and condition are reported in Tables 9 and 10, respectively.

Main Analyses

Self-affirmation intervention. The Levene's Test of Equality of Error Variances, which evaluates the homogeneity of variance assumption for conducting an Analysis of Covariance (ANCOVA), indicated that the fall z scores and winter z scores did not differ significantly, $F(1, 45) = 3.09, p = 0.085$. Therefore, an ANCOVA was appropriate to use for the data analyses. An ANCOVA was run comparing the winter GPA z scores between the African-American students in the self-affirmation and other-affirmation conditions, with the fall GPA z scores as a covariate. Results of the ANCOVA indicated that the students in the self-affirmation group did not have a significantly higher winter z score GPA than the students in the other-affirmation group, $F(1, 44) = 0.202, p = 0.66; M_{sa} = -0.07, SD_{sa} = 0.87; M_{oa} = 0.17, SD_{oa} = 1.01$. The variance accounted for (Adjusted R^2) by the intervention was 0.37, or 37%. The effect size was also small, $d = 0.26$.

An ANOVA was run comparing the GPA difference scores between the African-American students in the self-affirmation and other-affirmation conditions. The analyses were run to determine if students in the self-affirmation group experienced a greater increase in their GPA than students in the other-affirmation group. Results of the ANOVA indicated that students in the self-affirmation group did not have a significant higher GPA difference z score than students in the other-affirmation group, $F(1, 45) = 0.25, p = 0.61$. The variance accounted for (adjusted R^2) by the intervention was 0.02, or 2%. The effect size was also very small, $d = 0.14$.

Psychological engagement. An ANCOVA was conducted for each of the three subscales on the SEI. Only students who completed both the pre-SEI and post SEI measures were included in these analyses ($N = 37$). Each ANCOVA compared the means of one subscale on the post-SEI between the African-American students in the self-affirmation and other-affirmation conditions. The corresponding pre-SEI subscale scores were used as a covariate. The Levene's Test of Equality of Error Variances for, indicated that the relationship between the psychological disengagement pre-SEI scores and the post-SEI did not differ significantly as a function of the intervention conditions. Results of the ANCOVA indicated that, contrary to what was hypothesized, the students in the self-affirmation group did not experience greater engagement in school as measured by any of the subscales on the SEI. The variance accounted for by the

psychological engagement subscales were very small, ranging from 1% to 2%. The effect sizes ranged from very small to small, 0.05- 0.13. See Table 11 for a summary of these ANCOVA results.

Post-hoc analyses. Because the students in this study were at-risk for academic failure, it is possible that these students were disengaged as well. According to stereotype threat theory, students who are disengaged from the academic domain maintain high levels of self-esteem because their self-esteem is no longer affected by academic outcomes (Steele & Aronson, 1995; Steele, 1997). Therefore, an intervention designed to fortify self-worth, like the one in this study, would be ineffective. To investigate whether the students' level of engagement affected the intervention's success, post-hoc analyses were run. For the regression analysis, the intervention condition, pre-SEI subscale score, and the interaction between pre-SEI and intervention condition were entered as predictors. The reference group for the analysis was the other-affirmation condition. Therefore, negative regression coefficients indicate that students in the self-affirmation intervention experienced a decrease in academic achievement as a result of the predictor variable.

Tables 12 - 14 provide a summary of the results from the regression analysis of each pre-SEI subscale. The analysis indicated overall significant results for the CRSW and FG subscales, ($F(3, 33) = 7.43, p \leq 0.05$ and $F(3, 33) = 3.28, p = 0.03$, respectively). The regression did not indicate any significant interaction effects, although the interaction between FG subscale scores and the intervention condition was almost significant and predicted a decrease in academic achievement. However, pre-SEI subscale scores for CRSW and FG were found to predict academic achievement scores post intervention. Specifically, according to the standardized beta coefficients, for every 1 *SD* change in engagement level on the CRSW and FG subscales, academic achievement increases by 0.92 and 0.51 points, respectively. The overall regression model for the TSR subscale was not significant, $F(3, 33) = 1.72, p = 0.18$. However, the relationship between the pre-SEI TSR subscale scores and academic achievement was almost significant effect ($p = 0.07$), predicting an increase in academic achievement. Overall, the results indicate that engagement scores prior to the intervention were a better predictor of academic achievement post intervention. Also, given that the means of the CRSW and the FG pre-SEI subscale scores fell in the *agree* to *strongly agree* range (see Table 3), it seems that the students felt psychologically engaged with school, in that they had control over their school work and found school to be important in reaching their goals. The TSR scores fell between the *disagree* and *agree* range, indicating that student relationships with their teachers are more tentative with this sample of students.

Discussion

The present study was a partial replication of a study by Cohen and his colleagues (2006), which examined the effects of a self-affirmation intervention on the academic and psychological engagement outcomes of high school students. Because Cohen and his colleagues (2006) found that African-American student achievement increased when they had the opportunity to complete exercises to affirm themselves in a domain of their choice, this study was designed to determine the utility of this intervention in African-American high school students who are at risk for academic failure. Furthermore, the study addressed the postulation made by Cohen and Garcia that self-affirmations promote psychological processes that can lead to reversing a negative recursive cycle of underachievement and disengagement.

Results of the study indicated that the African-American high school students who took part in the self-affirmation intervention did not have significantly higher GPAs at the end of the second quarter than the students who were in the other affirmation condition nor did they have significantly lower levels of psychological disengagement. The overall mean GPA of students in both the self- and other-affirmation group increased and the level of psychological engagement changed very little from pre- to post-intervention for both affirmation groups. Students in both affirmation groups on average agreed with having positive teacher–student relationships, seeing the importance of education for their future, and valuing learning and using strategies that promote success.

The results of this study are in stark contrast to the evidence suggesting that value-affirming interventions have a significant impact on raising the academic achievement of African-American students (Cohen et al., 2006, 2009; Miyake et al., 2011). In this discussion, I will explore the reasons for and implications of these differences and conclude with limitations of this study and future research goals. Particularly, reasons for the differences are based on the way in which the present study replicated the Cohen et al. (2006) study, the presence of a supportive school environment, and the students' level of disengagement. Theoretical implications for self-affirmation interventions and stereotype threat theory are also discussed.

Differences between Present Study and Cohen et al. (2006)

There are several differences between this replication study and the study by Cohen et al. (2006), including the timing of the intervention, the setting of the intervention, and the presence of a reward for participation. First, the timing of the present intervention was after the first quarter in the Fall semester, whereas Cohen and his colleagues administered the intervention “as close to the start of the fall term as possible, when evaluative stress was assumed to be high” (p. 1308). If self-affirmations have the power to alter negative recursive processes for learning, (Cohen & Garcia, 2008; Yeager & Walton, 2011), it may be beneficial for the intervention to take place before African-American students experience potentially threatening situations in the academic learning environment. Perhaps, then, the effectiveness of the intervention was reduced in the present study because it took place midway through the Fall semester, when students already had multiple opportunities to experience stereotype threat. As Yeager and Walton (2011) reported in their review of psychological interventions, when a value-affirmation intervention is administered earlier in the school year, students' grades improved more as opposed to the intervention being administered later in the school year.

At the same time, researchers have not explicitly outlined how early is early. They speculate that administering the intervention at a time when there is high evaluative stress is ideal (Cohen et al., 2006; Steele, 2010). Arguably, at the end of the first school quarter, stress can be high because students receive their grades, a concrete assessment of their academic progress. It is also still early enough in the school year for students to make subsequent improvements in their academic achievement. Providing a way for students to fortify the self at this juncture may be beneficial and has the possibility to interrupt a negative recursive cycle that may already be in motion.

Second, the setting for the intervention in this study may have reduced the connection between the self-threat and the self-affirmation for the students. In studies testing the effects of self-affirmations on various behaviors, the affirmation intervention is given immediately *before* or *after* a threatening event because it provides a readily available resource of information to draw on in order to fortify the self in times of threat. The intervention in the Cohen et al. (2006) was given in the classroom before the start of lesson in an academic course. In the present study, the students were moved to another environment (i.e. the cafeteria or another classroom), which may not have been perceived as threatening to the students. If the students do not perceive a threat to self, then the self-affirmation is no more than a “positive self-verification or self-evaluation strategy” (McQueen & Klein, 2006, p. 300) and therefore does not act to buffer the effects of stereotype threat. African-American students’ achievement, then, would not be affected, just like it was not for the non-stereotyped students in other self-affirmation studies (Cohen et al., 2006, 2009; Miyake et al., 2010).

On the other hand, the intervention may not have been effective because only some of the students experienced stereotype threat. In two of the schools (CAL 1 and CAL 2), the space where the students completed the intervention was also a space where students usually completed standardized tests. The students from the third school (VAS) completed the test in a space where recreational activities took place (i.e., afterschool activities and lunch). Therefore, moving the students to a different location may not have reduced the threat and the results may be indicative of an inconsistency in being threatened.

Last, unlike the Cohen et al. (2006) study, the students in this study were monetarily compensated after completing the post-measures of the study. This was made known to the students before they agreed to participate in the study. There is evidence to suggest that the presence of an incentive may reduce the effects of stereotype threat. When testing the stereotype threat effect using the traditional experimental model (Steele & Aronson, 1995), McFarland, Lev-Arey, and Ziegert (2003) found no difference in performance between African-American undergraduate students in the control and diagnostic conditions when all students were told that if their scores fell within a certain range they would receive monetary compensation. The researchers suggested that a monetary incentive created a motivation to achieve that was powerful enough to override the effects of stereotype threat on performance. Perhaps, then, the knowledge of receiving an incentive for participation reduced the likelihood of stereotype threat being activated in the academic environment for all students participating in the study. As mentioned before, if the students were not experiencing stereotype threat at the time of the intervention, then the self-affirmation intervention would not have an effect on the student’s performance.

Another way in which the incentive may have affected the results was that the presence of the incentive could have changed the meaning of the intervention for the students. If the meaning of the intervention is changed, then its effect on academic achievement may also change (Yeager & Walton, 2011). Although the students were told that they were completing an exercise about their values, students were aware that they were receiving payment for their ideas and thoughts about values. Therefore, the meaning of the intervention for the students could have been completing worksheet on values in exchange for something else (i.e., money or iPod shuffle), processing what values they found to be most or least important, or both. The inconsistent meaning would then render the intervention ineffective at reducing stereotype threat in a robust way. Alternatively, there are affirmation studies in which participants received monetary compensation and the intended effect of the affirmation intervention still manifested (e.g. Cohen, Aronson, & Steele, 2000).

In conclusion, the differences between the current study and the study conducted by Cohen and his colleagues (2006) highlighted questions around whether the students in this sample were truly experiencing stereotype threat and whether the meaning of the intervention was changed. In order for the self-affirmation intervention to be effective, it has to be perceived as a meaningful values-affirming exercise and the students have to feel a threat to the self. It is difficult to directly assess either of these aspects without risking its effectiveness. Attempts have been made at uncovering whether stereotype threat was reduced through a measure of cognitive activation for racial stereotypes (Cohen et al., 2006). On the other hand, there are no known attempts to assessing how students process the intervention, but researchers agree that disclosing the total meaning of the intervention to students can eliminate its effectiveness (Yeager & Walton, 2011). Therefore, the way in which the intervention was implemented, may have had subtle effects on the student's academic outcomes, but it is hard to tell because some aspects were not and cannot be directly measured without risking the fidelity of the intervention.

Supportive School Environment and Student Disengagement Level

Supportive school environment. The psychological engagement scores from this study indicated students in *both* conditions (a) valued school as an important part of reaching future goals, (b) valued learning, (c) and reported engaging in strategies that promote success, *before* and *after* the administration of the interventions. Furthermore, as indicated by the post-hoc analyses, the pre-SEI engagement scores predicted post-intervention achievement outcomes, although only marginally so for teacher-student relationships. Also, students in both conditions experienced a slight increase in their GPA on average. Based on these results, it seems that the students were already engaged in psychological processes that led to positive recursive cycles at school. The students may have been engaged because of preexisting structural supports at their school site, which in turn reduced the effectiveness of the self-affirmation intervention.

There is much research to suggest that when students participate in extracurricular activities with friends, form positive relationships with teachers and mentors, or feel like they belong within the school environment, they will engage in behaviors that promote positive academic achievement outcomes (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Mahoney & Cairns, 1997; Walton & Cohen, 2007). The students involved in this study were already receiving some type of school support for their academics. Students from the VAS were participating in a selective extracurricular program geared towards supporting the social

emotional needs of students in order to help their academic and behavioral difficulties. The CAL 1 school is a smaller academic setting than most comprehensive high schools. As reported by the academic counselor, (Ms. D. Brown, personal communication, September 15, 2010) most students come to this school because they were not being successful in the larger school environment. The class sizes are much smaller and teachers and the principal develop personal relationships with the students. Most students' academics improve after coming to the school (Brown, 2010). Last, at the CAL 2 school, some of the students who participated were receiving mandatory Math and English support classes as a part of their high school curriculum. These classes are smaller than the regular classes, therefore providing more opportunities for individualized support from teachers.

On the other hand, both of the self-affirmation intervention studies reported using students who had supportive school environments (Cohen et al., 2006, 2009; Miyake et al., 2011). The students in the study by Miyake et al. were in an environment with instructional supports and the students in the study by Cohen et al. (2006) was in a school with "adequate material, social, and psychological resources and support to permit and sustain positive academic outcomes" (p. 1309). Therefore, although the students in this study were already receiving psychological and academic support from their school environment, based on previous research, the self-affirmation intervention still could have had significant effects on the African-American students' academic achievement. As Yeager and Cohen (2011) also indicated, multiple social-psychological interventions can be used to produce additive effects on the academic achievement of students.

Disengagement level. Although there is evidence to suggest that most of the students were already engaged in recursive processes that led to positive academic achievement, it is still possible that the students were already disengaged with the academic domain that boosting their self-esteem would not have a significant impact on their academic achievement. As several theorists have argued, when students no longer value academics as an important part of their self-esteem, they are able to maintain high levels self-esteem in the face of low academic achievement (Osborne, 1995, 1997; Steele, 1997). Therefore, a self-affirmation intervention would have little effect on disengaged students because their self-esteem is not threatened and a different kind of intervention would be more beneficial, such as a small and more personal academic environment (Finn & Rock, 1997), such as the ones that most of the students experienced.

No formal measurement of student level of disengagement was used to determine how much the students in this study based their self-esteem on their academic performance. It was assumed that because these students were identified as being at-risk for academic failure, they were not yet psychologically disengaged with the academic domain. In future studies, it would be beneficial to determine how much a student bases their self-esteem on their academic performance through the use of measures of academic contingencies of self-worth, such as the one developed by Lawrence and Crocker (2009).

Conclusions. In sum, the supportive environment that the students in this study were a part of may have been powerful enough to overshadow the effects of the self-affirmation intervention on academic achievement. At the same time, it is also possible that the students in

this study were so disengaged with the academic domain that a self-affirmation intervention would have no effect on them because they did not base their self-esteem on their academic performance. Additionally, both of the aforementioned possibilities as well as the ones pertaining to replication differences have implications for the larger theoretical questions of this study. In the next section, I will discuss whether or not this kind of intervention is appropriate or beneficial for this population of students.

Theoretical Implications

What developmental stage is appropriate for an affirmation intervention? A larger purpose of this study was to address a concern raised by Cohen and Garcia (2008) on the appropriate developmental stage/age for an affirmation intervention. Recall that in the discussion on the differences between the present study and the study by Cohen et al. (2006) a central question that emerged is whether or not the students actually experienced stereotype threat. There were procedural differences that potentially influenced the presence of stereotype threat; however, for this sample, there was no strong evidence to suggest that these students did or did not experience stereotype threat. The only developmental reason that would suggest why these students did not feel threatened comes from previous research.

Previous research on self-affirmation interventions focused mainly on students who are presumably still identified with the academic domain (i.e. middle and college aged students) because their identification with the domain puts them at risk for experiencing stereotype threat. College students are obviously identified with the academic domain because they are continuing their education beyond high school (Steele & Aronson, 1995) and studies have shown that African-American students begin to disidentify with academics between the 8th and 10th grades, which is around the beginning of high school (Osborne, 1995, 1997). If by the time African-American students reach high school they have disidentified with the academic domain, then presumably they will not be affected by stereotype threat and a self-affirmation intervention would not be effective for them. Because most of the students in the study were above the 9th grade, they may have already disidentified with the academic domain, and therefore were not affected by stereotype threat. Consequently, the self-affirmation intervention would be ineffective.

What type of population could benefit from a self-affirmation intervention? The students in the present study, on the other hand, were high school students that were arguably identified with the academic/school domain. Although there was no formal measure of school identification, students from both VAS and CAL 1 voluntarily entered into the programs that supported them academically. Students from CAL 2 were ninth graders, students who are theoretically on the cusp of becoming disidentified. Therefore, given the high probability of these high school students being identified with academics or school, one could expect the intervention to have an effect on their achievement.

Perhaps the lack of an effect for these high school students comes from the fact that there was a different psychological barrier, other than stereotype threat, to their academic success. First, there is currently mixed evidence the stereotype threat affects the academic achievement of high school students (Keller, 2002, 2007; Keller & Dauenheimer, 2003; Kellow & Jones, 2005, 2008; Stricker & Ward, 2004; Wicherts, Dolan, & Hessen, 2005), suggesting that it may or may

not influence the academic achievement of this population of students. Second, as mentioned before, the students in this study were all receiving some kind of intervention that could theoretically increase their sense of belonging to the school environment and consequently their academic achievement. It is possible, that for high school students at risk for academic failure, stereotype threat is simply one among many psychological threats that can affect African-American student achievement, but is not the most salient for them.

The possibility of other psychological barriers to success brings up some questions to consider for the role stereotype threat plays in the academic success of high school students. Given that there is not strong evidence for stereotype threat effects in high school, a concern worth investigating is whether there are unique psychological barriers that occur for high school students that are not present for middle or college students. Furthermore, because this study focused primarily on academically at-risk high school students, it would be useful to determine if there are differential effects of the self-affirmation interventions on high school students based on achievement level.

Limitations

There are several limitations to this study that must be considered. The first, and most important, is the sample size of this study. The sample size was very small resulting in small estimates of effect sizes and the variance accounted for by the interventions. Given the small sample size, it is also possible that the students who participated in the study were those who would not have responded to the intervention. A larger sample size would increase the variation of students in the study, thereby increasing the amount of students who may have been impacted by the intervention.

Another limitation of this study is the relatively lower reliability estimates of this sample on the SEI subscales in comparison to previous research (i.e., Appelson et al., 2006; Betts et al., (2010). The reliability estimates of this sample, although not extremely low, may indicate that this measure may not be assessing engagement in the same way as the population of students used in the other studies. A third limitation was that the sample in this study came from three different schools. The schools were comparable in terms of student population characteristics, but were in a different region. Regional differences in the schooling process may have impacted the results of the study as well. Finally, the study focused only on students at-risk for academic failure; therefore, the generalizability of these results to the high school population is limited.

Conclusions and Future Research Directions

The purpose of this study was to determine if a self-affirmation intervention would alleviate the effects of stereotype threat on African-American high school students identified to be at risk for academic failure. The study also addressed whether there was a consequent change in the psychological engagement of the students as a result of the intervention. Results of this study were in contrast to previous studies (Cohen et al., 2006; Miyake et al., 2010) and indicated that the self-affirmation did not have a significant impact on the academic achievement of the students. It is hard to tell whether the contradictory results of this study were due to the absence of stereotype threat, preexisting interventions that reduced it, or other psychological threats that may have been more salient for these African-American students.

The current research just scratches the surface in examining how this intervention would impact high school students. It would be beneficial for future research to examine other high school populations, including high-achieving students, students from different socioeconomic backgrounds, and students from different educational contexts. Also, because there is no support for the disidentification process for African-American females, it would also be helpful to examine the effectiveness of this intervention by gender. This would give a more complete picture of the utility of this intervention in the high school populations and address the questions raised by Cohen and Garcia (2008) on the developmental level appropriate for such an intervention and what population of students can benefit from it.

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Table 1

Gender and Age of African-American Participants by School

School	Gender ($n = 47$)			Age ($n = 37$)		
	Males	Females	Total	n	M	SD
VAS	12	6	18	18	16.72	1.13
CAL 1	7	9	16	9	17.08	0.76
CAL 2	5	8	13	10	14.28	0.75

Notes. VAS = Virginia School; CAL 1 = California School #1; CAL 2 = California School #2

Table 2

Sample Items from the TSR, CRSW, and FG Subscales of the SEI

Teacher- Student Relationships (TSR)

My teachers are there for me when I need them.

Control and Relevance of School Work (CRSW)

After finishing my schoolwork I check it over to see if it's correct.

Future Aspirations and Goals (FG)

My education will create many future opportunities for me.

Table 3

Descriptive Statistics for Pre- and Post- SEI Subscale Scores: Total Sample

Variables	Pre-SEI (<i>n</i> = 20)			Post-SEI (<i>n</i> = 17)		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
TSR	2.76	0.44	1.89 - 3.89	2.72	0.44	1.44 - 3.56
CRSW	3.23	0.36	2.44 - 3.89	3.29	0.42	2.25 - 4.00
FG	3.71	0.36	2.80 - 4.00	3.59	0.40	2.60 - 4.00

Notes. *N* = 37. TSR = Teacher–Student Relationships; CRSW = Control and Relevance of School Work; FG = Future Aspirations and Goals.

Table 4

Descriptive Statistics for Pre- and Post- SEI Subscale Scores: Self-Affirmation Condition

Variables	Pre-SEI			Post-SEI		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
TSR	2.82	0.43	1.97 - 3.89	2.69	0.47	1.44 - 3.33
CRSW	3.30	0.39	2.44 - 3.89	3.31	0.41	2.63 - 4.00
FG	3.74	0.34	3.00 - 4.00	3.58	0.46	2.60 - 4.00

Notes. $n = 20$. TSR = Teacher–Student Relationships; CRSW = Control and Relevance of School Work; FG = Future Aspirations and Goals.

Table 5

Descriptive Statistics for Pre- and Post- SEI Subscale Scores: Other Affirmation Condition

Variables	Pre-SEI			Post-SEI		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
TSR	2.68	0.48	1.89 - 3.56	2.75	0.42	1.78 - 3.56
CRSW	3.14	0.32	2.56 - 3.67	3.26	0.45	2.25 - 3.86
FG	3.67	0.40	2.80 - 4.00	3.60	0.33	3.00 - 4.00

Notes. $n = 17$. TSR = Teacher–Student Relationships; CRSW = Control and Relevance of School Work; FG = Future Aspirations and Goals.

Table 6

Descriptive Statistics for Pre-SEI Subscale Scores by School

Variables	VAS (<i>n</i> = 18)			CAL 1 (<i>n</i> = 9)			CAL 2 (<i>n</i> = 10)		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
TSR	2.61	0.03	1.88 - 3.11	2.78	0.46	1.97 - 3.64	2.99	0.58	2.00 - 3.89
CRSW	3.14	0.38	2.44 - 3.67	3.21	0.35	2.55 - 3.80	3.39	0.31	2.89 - 3.89
FG	3.62	0.37	3.00 - 4.00	3.87	0.22	3.40 - 4.00	3.74	0.42	2.80 - 4.00

Notes. VAS = Virginia School; CAL 1 = California School #1; CAL 2 = California School #2.
 TSR = Teacher–Student Relationships; CRSW = Control and Relevance of School Work; FG =
 Future Aspirations and Goals.

Table 7

ANOVA Results for Pre-SEI Subscales by Condition

Variables	<i>F</i>	<i>Adjusted R²</i>	<i>p</i>
TSR	0.85	0.00	0.36
CRSW	1.91	0.02	0.18
FG	0.27	-0.02	0.61

Notes. *N* = 37. TSR = Teacher–Student Relationships; CRSW = Control and Relevance of School Work; FG = Future Aspirations and Goals.

Table 8

ANOVA Results for Pre-SEI Subscales by School

Variables	<i>F</i>	<i>Adjusted R²</i>	<i>p</i>
TSR	2.44	0.07	0.10
CRSW	1.54	0.03	0.23
FG	1.51	0.08	0.24

Notes. *N* = 37. TSR =Teacher–Student Relationships; CRSW = Control and Relevance of School Work; FG = Future Aspirations and Goals.

Table 9

Descriptive Statistics for Standardized Achievement Variables by School

Variables	VAS (<i>n</i> = 18)		CAL 1 (<i>n</i> = 16)		CAL 2 (<i>n</i> = 13)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Fall <i>z</i> scores	0.01	1.00	-0.01	1.00	0.01	1.00
Winter <i>z</i> scores	0.01	1.00	0.12	0.87	0.00	1.00
GPA _{diff} <i>z</i> scores	0.01	1.00	0.01	1.00	-0.01	1.00

Notes. *N* = 47. VAS = Virginia School; CAL 1 = California School #1; CAL 2 = California School #2.

Table 10

Descriptive Statistics for Standardized Achievement Variables by Condition

Variables	Self- Affirmation Condition ($n = 24$)			Other-Affirmation Condition ($n = 23$)		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
Fall z scores	-0.11	1.02	-2.25 - 1.52	0.13	0.94	-1.57 - 1.99
Winter z scores	-0.07	0.87	-1.92 - 1.36	0.17	1.01	-1.57 - 1.80
GPA _{diff} z scores	-0.06	0.77	-1.42 - 1.25	0.082	1.17	-2.37 - 2.71

Table 11

ANCOVA Results for Post-SEI Subscales (N = 37)

Variables	<i>p</i>	<i>F</i>	<i>Adjusted R²</i>	<i>d</i>
TSR	0.24	1.41	0.35	0.13
CRSW	0.79	0.07	0.12	0.12
FG	0.62	0.25	0.24	0.05

Notes. TSR = Teacher–Student Relationships; CRSW = Control and Relevance of School Work; FG = Future Aspirations and Goals.

Table 12

Post-hoc Regression Results for the Pre-SEI TSR Subscale

Variables	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Condition	1.07	1.87	0.59	0.57
PreTSR	0.89	0.47	0.43	0.07
Interaction ^a	-0.53	0.67	-0.84	0.43

Notes. $N = 37$. PreTSR = pre-SEI scores for the Teacher–Student Relationships subscale.

^a The Interaction variable represents the interaction effect between the engagement scores and the intervention condition.

*Adjusted R*² = 0.06

Table 13

Post-hoc Regression Results for the Pre-SEI CRSW Subscale

Variables	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Condition	3.82	2.35	2.09	0.11
PreCRSW	2.33	0.59	0.92	0.07
Interaction ^a	-1.37	0.73	-2.50	0.43

Notes. $N = 37$. PreCRSW = pre-SEI scores for the Control and Relevance of School Work subscale.

^a The Interaction variable represents the interaction effect between the engagement scores and the intervention condition.

*Adjusted R*² = 0.34

Table 14

Post-hoc Regression Results for the Pre-SEI FG Subscale

Variables	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Condition	1.05	2.92	0.57	0.72
PreFG	1.31	0.53	0.51	0.02
Interaction ^a	-0.38	0.78	-0.79	0.63

Notes. *N* = 37. PreFG = pre-SEI scores for the Future Aspirations and Goals subscale.

^a The Interaction variable represents the interaction effect between the engagement scores and the intervention condition.

*Adjusted R*² = 0.16