

The Psychology of the Affirmed Learner: Spontaneous Self-Affirmation in the Face of Stress

Shannon T. Brady
Stanford University

Stephanie L. Reeves
University of Waterloo

Julio Garcia
University of Colorado at Boulder

Valerie Purdie-Vaughns
Columbia University

Jonathan E. Cook
The Pennsylvania State University

Suzanne Taborsky-Barba, Sarah Tomasetti,
and Eden M. Davis
University of Colorado at Boulder

Geoffrey L. Cohen
Stanford University

A key question about achievement motivation is how to maintain it over time and in the face of stress and adversity. The present research examines how a motivational process triggered by a social-psychological intervention propagates benefits over a long period of time and creates an enduring shift in the way people interpret subsequent adversity. During their first or second year of college, 183 Latino and White students completed either a values affirmation intervention or control exercise as part of a laboratory study. In the affirmation intervention, students wrote about a core personal value, an exercise that has been found in previous research to buffer minority students against the stress of being negatively stereotyped in school. This single affirmation improved the college grade point average (GPA) of Latino students over 2 years. Students were re-recruited for a follow-up session near the end of those 2 years. Results indicated that GPA benefits occurred, in part, because the affirmation shifted the way Latino students spontaneously responded to subsequent stressors. In particular, in response to an academic stressor salience task about their end-of-semester requirements, affirmed Latino students spontaneously generated more self-affirming and less self-threatening thoughts and feelings as assessed by an open-ended writing prompt. They also reported having a greater sense of their adequacy as assessed by measures of self-integrity, self-esteem, and hope, as well as higher academic belonging. Discussion centers on how and why motivational processes can trigger effects that persist over surprisingly long periods of time.

Keywords: self-affirmation, threat, academic achievement, psychological intervention, motivation

Supplemental materials: <http://dx.doi.org/10.1037/edu0000091.supp>

How to sustain motivation over time and in the face of adversity is a classic question in psychology and education. The difference between kindling motivation and sustaining it has been empha-

sized by a number of scholars (Hidi & Baird, 1986; Hidi & Harackiewicz, 2000; Mitchell, 1993). Dewey (1913) spoke of it as the difference between “catch” and “hold” factors. Understanding

Shannon T. Brady, Graduate School of Education, Stanford University; Stephanie L. Reeves, Department of Psychology, University of Waterloo; Julio Garcia, Department of Psychology and Neuroscience, University of Colorado at Boulder; Valerie Purdie-Vaughns, Department of Psychology, Columbia University; Jonathan E. Cook, Department of Psychology, The Pennsylvania State University; Suzanne Taborsky-Barba, Sarah Tomasetti, and Eden M. Davis, Department of Psychology and Neuroscience, University of Colorado at Boulder; Geoffrey L. Cohen, Graduate School of Education, Department of Psychology, and (by courtesy) Graduate School of Business, Stanford University.

Sarah Tomasetti is now at the Keck School of Medicine, University of Southern California. Eden M. Davis is now at the Department of Human Development and Family Sciences, University of Texas at Austin.

Support for this research was provided by grants from National Science Foundation and the Spencer Foundation. We thank Parissa Jahromi for help coding the essays; Shoshana Jarvis, Mabelle Bong, and Kody Manke for assistance; and Ewart Thomas and David Yeager for consultation on statistical analyses.

Correspondence concerning this article should be addressed to Shannon T. Brady, Graduate School of Education, Stanford University, 520 Galvez Mall, Stanford, CA 94305. E-mail: shannonbrady@gmail.com

the mechanisms that “hold” motivation and performance will help us understand how to foster student success in ways that persist. In the present research, we examine this question in an important applied context: the minority achievement gap in college. The gap in educational outcomes between privileged and less privileged students is a major concern in a society where economic outcomes hinge on educational success (Putnam, 2015). Closing the gap even partially would improve the lives of many students and their families.

A large and growing body of research documents powerful and lasting effects of targeted social-psychological interventions designed to foster and preserve students’ motivation in school, especially the motivation of students from groups that have been historically stereotyped, underrepresented, or marginalized in mainstream education contexts in the United States (Silverman & Cohen, 2014; Yeager & Walton, 2011). In a values affirmation intervention, for example, students spend 15 min writing about a core personal value one or more times throughout the year. In past research, this intervention not only bolstered African American middle school students’ academic grades, but also lessened their likelihood of being assigned to the remedial track (G. L. Cohen, Garcia, Apfel, & Master, 2006; G. L. Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009). Effects persisted for years after the initial intervention. How, when, and why a motivational process has effects that persist rather than decay over time is an important theoretical and applied question.

Here we explore the idea that values affirmation can have long-term effects on students’ motivation and performance when it changes the way they later construe stressors and adversities. In particular, we suggest that an affirmation intervention may initiate a process that ultimately leads a student to engage in *spontaneous affirmation*—which we define as the tendency to spontaneously call to mind self-affirming topics, in the form of important life domains, values, and personal traits and activities and to spontaneously downplay self-threatening topics, such as worries, stress, and fears—at later moments of stress. How might this work? As a consequence of completing the affirmation, a student performs better or is less stressed in the short term, which leads them to feel greater agency in school. Greater agency leads to further increases in performance. This cycle continues, and the student accumulates not only academic achievements, but also psychological resources, such as a secure, positive, and agentic sense of self and a feeling of belonging in school. When an academic stressor arises, the student has these psychological resources to draw on and can view the stressor in a more adaptive light, spontaneously generating more self-affirming responses (e.g., “I’ve overcome problems in the past, I can do it again,” “There are many positive things in my life”) and less self-threatening ones (e.g., “I’m scared of failing”). This spontaneous affirmation process continues to support the student’s academic performance and agency by rendering subsequent stressors less focal in attention and cultivating confidence in coping with the stressors. If the process posited here is accurate, it could help explain how a motivational process triggered by an intervention could have effects that span long periods of time: the psychological effects of the intervention are repeatedly relived in students’ subjective experiences.

The Role of the Self in Motivation

People’s views of themselves as having efficacy, agency, and integrity is a key driver of achievement motivation (Bandura, 1978; Zajacova, Lynch, & Espenshade, 2005). Because our self-concept is a constant companion for each of us, how people construe their self can affect motivation over the long term. For example, research on self-determination theory presupposes a self with core needs that, if thwarted, impede motivation and thriving (Deci, Vallerand, Pelletier, & Ryan, 1991; Ryan & Deci, 2000).

Our focus in this paper is on individuals’ concept of the self as morally and adaptively adequate—what Steele (1988) referred to as self-integrity or adaptive adequacy (see also G. L. Cohen & Sherman, 2014). It is analogous to global agency or generalized self-efficacy. The conventional notion of self-efficacy focuses on a student’s perception of himself or herself as able to bring about adaptive outcomes in a specific domain such as math (Bandura, 1978). By contrast, adaptive adequacy refers to a general sense of efficacy—a sense that the self is competent, able to adapt to challenges, and in control of important outcomes. It does not hinge on students’ feeling that they are highly esteemed or exceptional but is rather a general perception that, by dint of one’s efforts, “things will be okay.”

When an individual’s sense of adaptive adequacy is secure, motivation, learning, and performance benefit. When it is threatened, these suffer (Beilock, Rydell, & McConnell, 2007; G. L. Cohen, Purdie-Vaughns, & Garcia, 2012; Inzlicht & Kang, 2010; Schmader & Johns, 2003; Sherman & Cohen, 2006; Steele, 1997). Unfortunately, school environments can be chronically threatening for many students from negatively stereotyped, underrepresented, or marginalized groups (Cook, Purdie-Vaughns, Garcia, & Cohen, 2012). Certainly, objective bias and discrimination on campus are a source of threat (Wong, Eccles, & Sameroff, 2003). However, a school context may be threatening for these students regardless of the actual level of bias because of *social identity threat* (G. L. Cohen, Steele, & Ross, 1999; Hanselman, Bruch, Gamoran, & Borman, 2014; Steele, 1997; Steele, Spencer, & Aronson, 2002). Social identity threat is the understandable concern that one could be judged or treated negatively because of how one’s group has been historically viewed. While answering a question in class, any student may worry about the consequences that an incorrect answer could have for the self. But students from stereotyped or underrepresented groups contend with the additional worry that poor performance could be seen to confirm negative stereotypes about the intellectual ability of their group. This “threat in the air” can severely hamper school achievement (Steele, 1997). For example, in one study, African American students performed worse on a verbal GRE test when the test was presented as diagnostic of their verbal ability—and thus relevant to the racial stereotype of limited intellectual ability—than when the same test was presented as a nonevaluative tool to examine problem-solving processes (Steele & Aronson, 1995). Because the typical school context is intellectually evaluative, it is a situation in which the possibility of a negative stereotype about intellectual ability being in play is a constant for many African American, Latino, and Native American students, as well as for female students in science and math fields (see G. L. Cohen et al., 2012; Cook et al., 2012; Steele et al., 2002).

Hundreds of studies have documented the cognitive and motivational costs of contending with social identity threat, including increased vigilance and stress (Blascovich, Spencer, Quinn, & Steele, 2001; Murphy, Steele, & Gross, 2007; Steele, 1988), interference with attention and working memory (Beilock et al., 2007; Schmader & Johns, 2003), impaired decision-making (Inzlicht & Kang, 2010), underperformance (Steele & Aronson, 1995), self-handicapping behavior (Brown & Josephs, 1999; Keller, 2002; Stone, 2002), and disengagement (Major, Spencer, Schmader, Wolfe, & Crocker, 1998; Smith, Sansone, & White, 2007). Over time, a common response to chronic identity threat in academic settings is for students to disidentify with school, thereby disavowing it as a valid basis of self-evaluation so that performing poorly no longer undermines their sense of self-worth (Osborne & Walker, 2006; Steele et al., 2002).

At timely moments, it is possible to intervene so that social identity threat is lessened and these accumulative costs are reduced. One way to do so is through self-affirmation, an act that reasserts the integrity of the self (G. L. Cohen & Sherman, 2014). Though self-affirmation can take a number of forms (McQueen & Klein, 2006), the most common method used in experimental laboratory and field settings is *values affirmation*, in which people reflect in writing on core values, such as religion or relationships. Because people derive a sense of global personal worth from these transcendental values, reflecting on them can bring about a more expansive sense of the self and its resources (Crocker, Niiya, & Mischkowski, 2008; Sherman & Cohen, 2006). Against this broadened self-view, a specific threat or stressor commands less vigilance (G. L. Cohen & Sherman, 2014; Critcher & Dunning, 2015). Affirmations appear to be more effective when they are unrelated to the threatening domain, because this permits people to reassert their self-integrity in a way unlikely to be challenged or undermined in the immediate situation (see G. L. Cohen & Sherman, 2014, for a review).

In randomized experiments, values affirmation interventions have been found to improve the academic performance of students from stereotyped or underrepresented backgrounds over long periods of time. Long-term benefits on grades similar to those previously described for African American middle school students (G. L. Cohen et al., 2006, 2009; see also Bowen, Wegmann, & Webber, 2013) have been found for Latino middle school students (Sherman et al., 2013), women in an introductory physics course (Miyake et al., 2010), and first-generation college students (Harackiewicz et al., 2014). Though majority group students do experience stress and threat in school, they typically do not experience *chronic, identity-relevant* threat. Thus, threat does not undermine their academic performance the way that it does for students from stereotyped or underrepresented backgrounds. As such, affirmation interventions typically have null effects for majority group students (G. L. Cohen et al., 2009; Harackiewicz et al., 2014).

Affirmation interventions, like all psychological interventions, do not operate in isolation (Yeager & Walton, 2011). By lessening threat and its consequences, they enable students to take better advantage of the resources for learning in their environment. Affirmed individuals are more attentive to their errors (Legault, Al-Khindi, & Inzlicht, 2012), more interested in feedback (Trope & Neter, 1994), and better able to perform well in stressful situations (Creswell, Dutcher, Klein, Harris, & Levine, 2013). In

each of these examples, affirmation catalyzes the positive impact of other educational resources—feedback, mistakes, aptitude, and instruction. Thus, inherent in our conceptualization of affirmation is a key conditionality: Affirmation does not operate alone but activates dormant or underutilized forces (Bronfenbrenner, 1977; G. L. Cohen & Sherman, 2014). Without the presence of those forces—an adequate curriculum, solid teachers, financial aid to free up time for studying, and so on—affirmation should have little to no impact.

The Psychology of the Affirmed Learner

Given this analysis, a key question is *how* affirmations initiate a shift in the self that enables students to better tap into their internal and external resources. To date, only two studies have found evidence of mediation for the effects of affirmation on long-term performance (G. L. Cohen et al., 2009; Harackiewicz et al., 2014). In both cases, affirmation led to improved short-term academic performance for students from underrepresented backgrounds, and the early academic benefit mediated later academic benefits. Cohen and colleagues have suggested that once the self-affirmation process is initiated, it can change students' psychology in a lasting way, thereby sustaining its effects (G. L. Cohen et al., 2009; G. L. Cohen & Sherman, 2014). Success begets future success in a recursive cycle. Affirmation might promote in a student more adaptive coping with an early stressor, leading the student to have greater confidence. This permits them to better cope with subsequent stressors. As this process repeats itself over time, the affirmed learner might build up a strong sense of the self's adequacy that further promotes resilience (Bronfenbrenner, 1979; G. L. Cohen & Sherman, 2014). If so, when faced with a later stressor, previously affirmed minority students should be relatively more likely to respond with self-affirming thoughts and relatively less likely to respond with self-threatening ones, that is, to spontaneously affirm themselves in a moment of stress.

To our knowledge, no study has assessed in a controlled manner the way in which self-affirmed learners respond to a stressor in vivo or has tested whether an initial self-affirmation can lead students to spontaneously affirm themselves at a later moment of stress. Indeed, few studies have even explored the downstream effects of affirmation on students' psychology. Those that have examined downstream effects hint at changed psychology, suggesting that later adversity is less likely to "get under the skin" of affirmed students. Relative to students who have not completed an affirmation intervention, affirmed minority students exhibit lower cognitive activation of racial stereotypes in school (G. L. Cohen et al., 2006), feel that they belong in school even after poor performance (Cook et al., 2012), and are confident they have the right background for challenging courses (Harackiewicz et al., 2014). For these students, everyday stressors, like poor performance, are less predictive of a drop in academic motivation and belonging (Cook et al., 2012; Sherman et al., 2013). However, these changes have not been found to mediate affirmation effects (Cook et al., 2012; Sherman et al., 2013; cf. Walton & Cohen, 2011).

Research on spontaneous affirmation in any form is limited. Though the idea that people spontaneously engage in self-affirmation at times of threat dates to Steele's (1988) original formulation of self-affirmation theory, in the existing research literature self-affirmation has almost always been experimentally

induced. Spontaneous affirmation, when addressed, is treated largely as an individual difference variable (Cornil & Chandon, 2013; Creswell et al., 2013; Persoskie et al., 2015; Pietersma & Dijkstra, 2012) rather than an ongoing motivational process triggered by an intervention or experience. In a review of self-affirmation literature in 2010, Harris and Epton noted, “There is much to discover about whether, when and how people self-affirm in their everyday lives and the consequences of doing so” (p. 450).

Study Overview

In the present research, we directly examined the performance and psychology of affirmed learners over time. Our participants were Latino and White college students. Due to their growing numbers, Latino students are an increasingly important population in higher education in the United States (Liu, 2011; Santiago & Callan, 2010), and one that underperforms relative to their White and Asian peers (Espenshade & Radford, 2013; Owens & Massey, 2011; Zajacova et al., 2005). Early in their college careers, students completed either a values affirmation or a control exercise as part of a laboratory study. We assessed the effects of affirmation on students’ grade point averages (GPAs) over the following 2 years. Near the end of those 2 years, we also assessed the effects of affirmation on their psychology by bringing students back to the laboratory, creating a situation of psychological threat, and assessing their spontaneous thoughts and feelings. Specifically, academic stressors were first made salient to students. Then students were given a lined piece of paper and asked to write in an open-ended fashion about whatever was on their mind. McGuire, a pioneer of using these kinds of responses to understand students’ psychology, asserted, “Open-ended responses are a *camino real* in the sense that they lead to interesting realms of information but not in the sense that they provide easy passage” (McGuire & McGuire, 1988, p. 100; see also Kelly, 1955). Trained coders blind to participant condition content-analyzed the essays and, in particular, assessed the degree of spontaneous affirmation in them. As noted earlier, we operationalize spontaneous affirmation as a tendency to write more about life domains, values, personal traits, and activities that affirm the integrity of the self and to write less about domains that threaten it, such as sources of worry, stress, and fear. This conceptualization of affirmation accords with classic research on self-affirmation (and dissonance theory; Festinger, 1957), which suggests that the degree of psychological threat is a function of the number of self-affirming and self-threatening cognitions (Steele, 1988).

After the open-ended writing task, we assessed students’ self-perceived confidence in coping with the end-of-semester stressors that had been made salient. This measure was included *after* the opportunity to spontaneously affirm to test whether spontaneous affirmation might mediate effects of affirmation condition on students’ confidence in coping.

In addition, before the stressor salience task, participants responded to measures tapping into their sense of adaptive adequacy and academic belonging. The adaptive adequacy measures assessed students’ self-integrity (e.g., “I am comfortable with who I am”), their self-esteem (e.g., “I feel that I have a number of good qualities”), and their sense of hope (e.g., “Overall, I expect more good things to happen to me than bad”). Self-integrity and self-esteem are two classic measures of a person’s view of their

efficacy or adequacy (Fein & Spencer, 1997; Sherman et al., 2009; Tesser, Crepaz, Collins, Cornell, & Beach, 2000). Our interest in hope was driven by our conceptualization of it as a key indicator of the self’s ability to exert control over important outcomes, as well as previous research finding that greater hope predicts better grades for college students over time, even after controlling for previous performance (Snyder et al., 2002). Academic belonging assesses the degree to which students feel that they belong and are accepted in school, an index of the perceived goodness of fit between the self and one’s school environment (Walton & Cohen, 2007).

Our prediction was simple. Latino students who had completed an affirmation should perform better academically, as measured by their academic grades. They should also engage in spontaneous affirmation to a greater extent, spontaneously generating relatively more self-affirming thoughts and relatively fewer self-threatening thoughts. In addition, we expected that they should have greater psychological resources, as measured by adaptive adequacy and academic belonging.

Beyond spontaneous affirmation, two other broad categories of coding were assessed, on a secondary basis, from students’ open-ended essays to add nuance to our assessment of the spontaneous psychology of the affirmed learner. The first captured the extent to which students saw their academic future in a positive or negative light—as a source of affirmation to look forward to or a source of threat to dread. Sherman and Cohen (2006) posited that affirmation might be able to “help sustain optimism and effort in the sometimes long wait for success” (p. 227). As such, we expected that affirmed students would spontaneously display greater optimism and less dread about school in their open-ended writing after the academic stressor salience task.

The other secondary coding dimension examined cognitive processing strategies, aside from spontaneous affirmation, that students use at moments of stress. Drawing on previous research (Creswell et al., 2007; Gross, 2002; Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Pennebaker, 1997), we assessed three strategies. The first was reappraisal, or students’ attempt to change their interpretation of a stressor so as to shift its emotional impact (e.g., “I wish I didn’t have to go to work, but I’m trying to stay positive and think that maybe it could be fun”). In past research, reappraisal has been highlighted as a key mechanism undergirding benefits from expressive writing (Frattaroli, 2006; Pennebaker, Mayne, & Francis, 1997; cf. Creswell et al., 2007). The second strategy was problem-analyzing, or students’ tendency to analyze the causes and meanings of problems. Searching for the causes underlying a stressor (“Why did this happen to me?”) has been tied to psychological and health benefits in some contexts (Taylor, 1983). Additionally, a study in which college students reflected in writing about their transition to college found that increased use of cause and insight words was associated with greater improvements in working memory (Klein & Boals, 2001), which could plausibly enhance student performance and experience (Holmes & Gathercole, 2014). The final strategy was rumination, a tendency to dwell on negative past experiences, events, or feelings (e.g., “That was so terrible. It was really bad.”). Rumination is generally considered a maladaptive cognitive processing strategy that can prolong depressive affect and interfere with problem-solving (Nolen-Hoeksema et al., 2008). It seemed reasonable to expect that spon-

taneous affirmation would be associated with less rumination, as past research has found that affirmation can reduce thoughts related to failure (Koole et al., 1999). Insofar as spontaneous affirmation takes attention away from the stressor, it may interrupt ruminative cycles. All three of these categories tap into the way in which students process salient stressors. Processing stressors can sometimes confer benefits, as when people find a silver lining, larger meaning, or way to distance themselves from the stressor (Gross, 2014; Jamieson, Mendes, & Nock, 2013; Pennebaker & Chung, 2011). But if people spontaneously self-affirm, they may not need to shift their perception of the stressor. Self-affirmation might reduce the need for cognitive adaptations to a threat (Sherman & Cohen, 2006).

Beyond assessing the psychology of the affirmed learner and the processes propagating motivational change through time, the present study addressed three other novel questions. First, can affirmation be used to mitigate an important social problem, the ethnic achievement gap in college? As alluded to earlier, though Latino students are attending college at unprecedented rates (Fry & Taylor, 2013), their achievement in college and their completion rates lag behind those of White students (Espenshade & Radford, 2013; Owens & Massey, 2011; Snyder & Dillow, 2013; Zajacova et al., 2005). Certainly, this is partially explained by well-known structural, social, and economic factors, such as ethnic group differences in attending 4-year versus 2-year colleges, quality of high school, and family poverty (Duncan & Murnane, 2011; Long & Kurlaender, 2009; Lopez & Cohn, 2011; Reardon, 2013). If the gap is also partially because of identity threat undermining Latino students' motivation and performance over time, the affirmation intervention might reduce the gap. If a brief, cost-effective intervention were shown to have such a benefit, this would have significant applied implications.

Second, can an affirmation intervention delivered outside of the classroom still confer long-term benefit on students' performance inside the classroom? Previous studies documenting benefits of affirmation on students' grades have invariably delivered the affirmation intervention in a classroom and by a teacher. If affirmation initiates a positive intrapsychic process (e.g., "I can cope here"), then its benefits might occur even when delivered in contexts outside the classroom. If, however, affirmation works by sending a social signal (e.g., "My teacher cares about my values"), its benefits may be limited when delivered outside the classroom.

Third, previous research has found that expecting benefits from an affirmation intervention can undermine those benefits, perhaps because people feel that externally imposed affirmations rob them of autonomy or stigmatize them as in need of help (Sherman et al., 2009; Silverman, Logel, & Cohen, 2013; Steele, 1997). But there is also evidence that this is not the case if people feel that they have a choice about engaging in affirmation (Silverman et al., 2013; Walton, Logel, Peach, Spencer, & Zanna, 2014). It is worth note that in these past studies, outcomes have been limited to the same laboratory session in which the affirmation intervention was delivered and so it is unclear what the effects outside of the lab would be. Therefore, on an exploratory basis, the present study crossed the affirmation manipulation with an expectation of manipulation to examine the effects of expectation on outcomes outside of the lab. Over longer timeframes, people have the opportunity to affirm on their own, rather than feeling forced or obligated to do so, and

thus awareness or expectation of affirmation's benefits may not have the same undermining effects.

To summarize, the present study tested whether a values affirmation intervention delivered in the laboratory could promote the academic performance of Latino college students over the course of 2 years and the extent to which long-term changes in psychological resources and spontaneous coping might accompany and drive such benefits.

Method

The first part of the study was an initial lab-based affirmation intervention in the spring semester of students' first or second year of college. It included the values affirmation intervention and an exploratory manipulation of expectations about the effect of the affirmation intervention. For the subsequent 2 years after the session, we examined the effect of the affirmation intervention and the expectation manipulation on students' official grades.

The second part of the study occurred 2 years later, again in the spring semester. During this follow-up session, measures were administered to assess students' level of spontaneous affirmation after end-of-semester academic stressors were made salient to them, their confidence in their ability to cope with those stressors, and their general perception of themselves as having adaptive adequacy and belonging in school.

Participants

One hundred eighty-three Latino and White first-year and second-year college students participated in the first part of the study. Because of the study's focus, Latino students were oversampled. Latinos comprised 6% of the undergraduate population at the university but 48% of our sample. Of the total participants, 62% were female and 78% were first-year students at the time of participation.

Transcript data were collected for at least one postintervention semester from one hundred seventy-one participants (93% of the sample) and for all four postintervention semesters from one hundred thirty-one participants (72% of the sample). Complete data for the full sample were not available due to participants' choosing not to release their official transcripts ($N = 1$) or discontinuing college temporarily or permanently ($N = 39$). Availability of transcript data did not vary by condition, race, or their interaction, all $ps > .24$.

One hundred one students completed the second part of the study. Of these follow-up participants, 52% were Latino and 65% were female. Most participants (72%) were in their third year of college at the time.

Procedure

Figure 1 provides an overview of the timeline of the study and the number of participants who took part at each stage.

Part one: Initial laboratory session and delivery of experimental manipulations. Students were recruited to participate in a laboratory study ostensibly about cognitive processes and problem solving. A White female experimenter, blind to condition, greeted participants upon their arrival to the lab and explained that they would complete reading and writing activities, academic

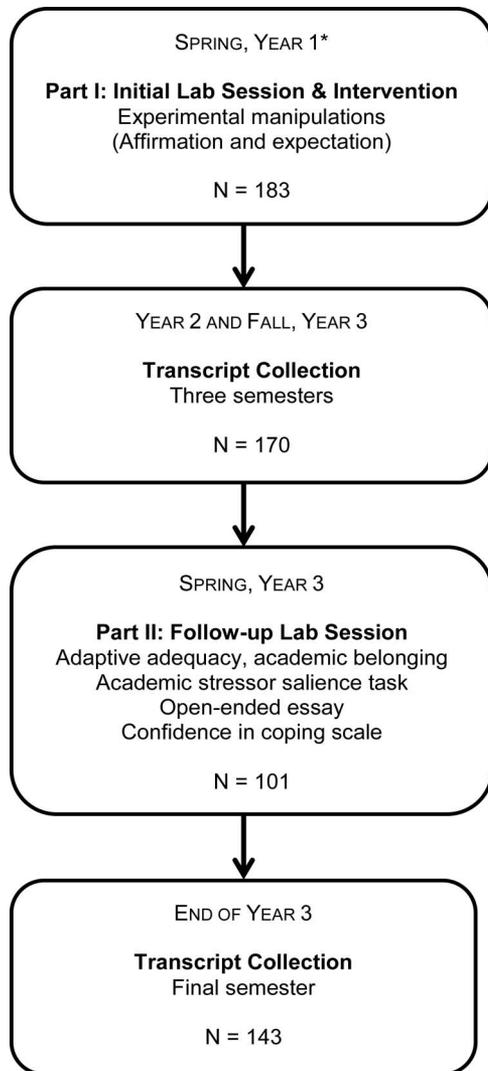


Figure 1. Diagram of study timeline and number of students participating in each component. In total, 171 students provided at least one semester of transcript data. * For participants who were second-year students at initial participation, the timeline begins during their second year and ends during their fourth year.

exams, and a survey. Two experimental manipulations were embedded in the reading and writing tasks in a 2 (Affirmation Intervention: affirmation or control) \times 2 (Expectation: positive expectation or no expectation) fully crossed between-subjects design. After these tasks, students completed verbal tests similar to those on the SAT and survey measures.

The experimental situation was designed to evoke an evaluative classroom situation and, for Latino students, to elicit social identity threat (Steele & Aronson, 1995; Marx & Goff, 2005). The tests were described as an assessment of intellectual ability and, like the ethnicity of most teachers in the United States, the ethnicity of the experimenter was White. Because the present report addresses the long-term effects of affirmation, the short-term effects will not be discussed.¹

At the end of the session, students were asked to sign a form to release their college transcript to the research team. All students except one acquiesced.

Affirmation intervention. During the initial session, students completed either a values affirmation exercise or a control exercise as validated in prior research (e.g., Logel & Cohen, 2012). In both conditions, participants ranked the personal importance of 11 values (e.g., religion, relationships with friends and family, sense of humor). Participants in the affirmation condition then wrote about their most important value and why it was important to them. Participants in the control condition wrote about their ninth-ranked value and why it may be important to someone else. This control exercise holds constant writing about values in a positive manner but it does not affirm the self.

Expectation manipulation. On an exploratory basis, the affirmation manipulation was crossed with a manipulation of expectations about the benefits of the writing exercise students were about to complete. In the positive expectation condition, students were led to believe that the activity (the affirmation exercise in the affirmation condition, the control exercise in the control condition) would be beneficial. Students read a report about how writing about values can reduce stress and boost long-term performance. The report was formatted to resemble an article from a scientific journal. For participants in the affirmation condition, the report claimed that writing about one's *own* values can reduce stress and enhance performance. For participants in the control condition, the report claimed that writing about *others'* values could lead to these outcomes. By contrast, students in the no expectation condition read a report about a new paper-manufacturing technique. The purpose of the expectation manipulation was to assess whether any effects of the affirmation intervention would be undone by awareness or expectation of potential benefits.

Part two: Follow-up laboratory session and collection of measures of spontaneous affirmation, confidence in coping, adaptive adequacy, and belonging. Two years after the first part of the study, participants were recontacted and asked to participate in the follow-up session. Of the original sample, 78% of participants were still enrolled at the university. This level of attrition is consistent with national averages at state universities (ACT, 2012). Of the participants still enrolled at the university, 71% were successfully re-recruited via email, and this did not vary by race, condition, or their interaction, all $ps > .27$. The email solicitation asked students to participate in a "follow-up psychology study" for a study they had participated in 2 years previously. No additional details were given about the previous study.

The follow-up study occurred in the fourth academic semester after the original intervention (see Figure 1). This corresponded to the final semester in which grade data were collected. As the purpose of the session was only to collect measures, all students went through the same procedures and no new experimental manipulations were introduced.

First, students completed surveys that assessed both their sense of adaptive adequacy and their sense of academic belonging. This was

¹ There were few significant short-term effects, suggesting that effects of the affirmation were delayed in nature, consistent with G. L. Cohen et al. (2006) and Sherman et al. (2013, Study 2) who found only long-term rather than short-term effects of affirmation.

done at the beginning of the session so as to get a pure read of these outcomes unaffected by the subsequent tasks. Then, students completed an academic stressor salience task designed to make salient all of the academic work that had to be completed by the end of the semester. In the task, students listed all of the assignments, projects, and tests they needed to complete before the end of the semester. They indicated the number of hours each day they expected to work on these tasks, as well as their ideal grade in each of their courses and the grade they expected to receive. To reinforce the stressful nature of these tasks, students indicated how stressed they were feeling about the end of the semester using a numerical scale.²

To measure spontaneous affirmation after the academic stressor salience task, we gave students a lined piece of paper and asked them to write about whatever was on their mind (Elbow, 1998). The directions stated, "Please spend the next a few [sic] minutes writing a full page or more about *anything* that is on your mind. Don't worry about spelling and punctuation." On average, participants wrote 223 words ($SD = 78.11$). Word count did not vary by ethnicity, condition, or their interaction, all $ps > .57$. Students' essays were coded as described below.

Finally, students responded to a brief scale assessing their self-perceived confidence in their ability to cope with the end-of-semester stressors they had listed.³

Dependent Measures

Grades. University grades were obtained from students' official transcripts. Grade point average (GPA) was calculated for each semester during the regular academic year for which data were available. Preintervention GPA was calculated by averaging grades across all available preintervention semesters. Postintervention GPA was calculated by averaging grades across all available postintervention semesters, excluding the semester of intervention. Because of differences in the number of semesters students were enrolled at the university, usually due to participating in a study abroad program or taking a leave of absence, students differed in how many semesters of postintervention GPA data were available for them, ranging from 0 to 4 semesters. One hundred seventy-one students (93%) had grade data for at least one postintervention semester and could thus be included in analyses of GPA outcomes (11 students had no postintervention GPA data and 1 student declined to release their transcript). One hundred thirty-one students (72%) provided data for all four postintervention semesters. The number of postintervention semesters for which grade data were available did not vary by ethnicity, condition, or their interaction (all $ps > .16$).

Psychological outcomes. During the follow-up study, students completed a series of scales to assess their sense of adaptive adequacy and their sense of belonging in school.⁴

Adaptive adequacy was assessed with three scales: self-integrity, self-esteem, and hope. Self-integrity captures the extent to which people feel a general sense of efficacy and moral adequacy, and it was measured with a seven-item scale used in previous self-affirmation research (adapted from Sherman et al., 2009; $\alpha = .87$; sample item: "Right now, I am comfortable with who I am"; 1 = *strongly disagree*, 6 = *strongly agree*). Self-esteem is a general evaluation of the goodness of the self, measured with a state version of the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965; $\alpha = .93$; sample item: "Right now, I feel

that I am a failure," reverse-coded; 1 = *strongly disagree*, 6 = *strongly agree*). Hope was assessed using the eight-item Adult Hope Scale (Snyder et al., 1991; $\alpha = .82$). The scale captures the general sense of the efficacy of the self that undergirds a perception of adaptive adequacy. The scale encompasses both a sense of personal agency based on past accomplishment (sample item: "I've been pretty successful in my life") and a sense of one's capacity to find paths to desired future goals (sample item: "I can think of many ways to get the things in life that are important to me"; 1 = *definitely false*, 5 = *definitely true*). The three scales—self-integrity, self-esteem, and hope—were highly correlated ($.57 < rs < .80$), formed a highly reliable scale ($\alpha = .86$), and loaded on a single factor in a factor analysis (eigenvalue = 2.37, all factor loadings $> .84$). We averaged the three scores to create a single index of adaptive adequacy.

Academic belonging was measured with a 10-item scale adapted from Walton and Cohen (2007; $\alpha = .82$; sample item: "I feel like I belong in my school"; 1 = *strongly disagree*, 6 = *strongly agree*).

Assessment of open-ended essays. After data collection, trained coders blind to participants' ethnicity and condition assignments evaluated the essays. Coding was standardized through the use of a detailed manual. For each construct, the manual provided an operational definition and the scale to be used for its assessment. The unit of analysis for each construct was a student's entire essay. In total, four coders were used, but each construct was coded in its entirety by a single pair of independent coders. For each construct, coders trained on a small random subset of the essays (fewer than 10% of the total number of essays). After reaching adequate reliability on the construct and refining the codebook if necessary, the coders evaluated the remaining essays. The coders achieved adequate reliability on all constructs, all intraclass correlations $> .80$. To determine a student's final score for a construct, the two coders' scores were averaged.⁵

Consistent with common content coding procedures, coding categories were not considered to be independent of each other. As

² The academic stressor salience task was different in both delivery and content from expressive writing tasks known to reduce stress and improve performance. Expressive writing can reduce stress (Pennebaker, 1993; Ramirez & Beilock, 2011), but critically it does so when participants are guided to express their thoughts and feelings as related to the stressor, not to simply enumerate the sources of stress as done here (Pennebaker, 1997). The single numerical item at the end of the task asked students, "How stressed do you feel when you think about the end of the semester and finals week?" We do not report the results of this item in the main text because we conceptualized the item as part of the academic stressor salience task procedures rather than as an outcome. On average students rated themselves as quite stressed ($M = 5.21$ on a 7-point scale, $SD = 1.45$), and this did not differ by ethnicity, affirmation condition, or their interaction, all $ps > .17$.

³ The academic stressor salience task, the open-ended essay prompt, and the confidence in coping with end-of-semester stressors scale are provided in the supplemental materials.

⁴ Several secondary outcomes were assessed that go beyond the focus of this study on spontaneous affirmation and feelings of adaptive adequacy. These include physical well-being, number of cross-race friends, and perceptions of the role of race on campus.

⁵ In the rare cases in which the scores assigned by the two coders differed greatly (by more two or more levels), the discrepancy was resolved through discussion.

discussed by Creswell et al. (2007), this approach permits more accurate measurement of constructs that are conceptually related.

Table 1 provides the operational definitions of each construct, the scale coders used to assess it, and examples of essay responses that exemplify it.

Spontaneous affirmation. Coders assessed the degree of spontaneous affirmation in each essay, operationalized as the extent to which the essay emphasized affirming relative to threatening content. The coders first assessed each essay's emphasis on affirming topics, that is, the degree of focus on positive sources of worth and meaning, in particular, on self-defining values and life domains, relationships, and personal traits and activities. For example, one essay that scored high on this dimension stated, "I am an ultimate optimist. . . . I love the unconditional support from my loved ones." Next, coders assessed the essay's emphasis on threatening topics, that is, sources of worry, stress, and fear tied to events that could threaten the self's integrity. For example, one essay that scored high on the threat dimension stated, "I am worried about finals and the amount of time I have to study for them." As expected, the affirmation code and threat code were inversely correlated, $r = -.66$. In principle and practice, an essay could have both a high degree of affirmation and a high degree of threat. The ultimate construct of interest was the degree to which the balance of affirming relative to threatening cognitions is positive or negative. Accordingly, we created a spontaneous affirmation composite by reverse-coding the threat code, standardizing both, and averaging them.

It is worth noting that, given the paucity of studies to date that examine spontaneous affirmation, there are not yet standard measurement tools for coding spontaneous affirmation from written material. Our measures are similar to those from two published studies (Cornil & Chandon, 2013; Creswell et al., 2007), but refine them in two ways. First, we conceptualized self-affirming topics broadly in way that is consistent with theory on self-affirmation (Sherman & Cohen, 2006; Steele, 1988) rather than narrowly, assessing *only* the extent to which people write about personal values. Second, we coded both self-affirming topics and self-threatening topics and created a composite. This concurs with classic research on self-affirmation (and dissonance theory; Festinger, 1957), which suggests that the degree of psychological threat is a function of the number of self-affirming *and* self-threatening cognitions (Steele, 1988).

Domains of affirmation versus threat. To supplement the spontaneous affirmation construct, coders counted the number of affirming domains each essay mentioned (e.g., work, relationships, school) and the number of threatening domains mentioned. A domain could be counted in both categories if the participant cited it as both a source of affirmation and a source of threat. For example, one essay tied friendships, first, to affirming thoughts by discussing an upcoming vacation with peers and, second, to threatening thoughts by discussing a particular relationship with a friend that had recently become stressful. A composite was again created by subtracting the number of threatening domains from the number of affirming domains. The grand mean was -0.65 ($SD = 1.84$), indicating that, on average, students identified more threatening domains than affirming domains. This was expected, given that the open-ended essay followed the stressor salience task.

Secondary codes. As noted previously, we also evaluated the essays on two other broad dimensions to add more texture to our understanding of the psychology of the affirmed learner. The first dimension tapped perceptions of the future, and it encompassed two coding categories: school-related optimism and school-related dread. To the extent that the future is viewed as a source of affirmation, students should be optimistic about school-relevant topics. To the extent that the future is viewed as a threat, students may express dread about school-relevant topics. We assessed this dimension because self-affirmation should mitigate the extent to which a salient stressor engulfs attention in a negative way, tainting perceptions not only of the present but also of the future (Sherman & Cohen, 2006).

The second dimension of interest was cognitive processing strategies, aside from spontaneous affirmation, that students might use in the face of stress. Recall that spontaneous affirmation is a tendency to call to mind affirming domains and to downplay threatening ones in the face of a stressor—a broadening of one's psychological perspective that renders a specific threat less emotionally draining. In other words, the threat becomes less dire in the context of a broader image of the self and its assets. We contrast spontaneous affirmation with cognitive processes that focus on the threat and on processing it in ways intended to gain insight, meaning, or predictability.

The three alternative cognitive processing codes were reappraisal, problem-analyzing, and rumination. Reappraisal was defined as the extent to which the response includes attempts to reconstrue emotional events in ways that change their emotional impact (Gross, 2002). For example, one essay high in reappraisal stated, "What if I don't get a job after I graduate. What if I fail my classes and don't end up graduating? [This all makes] me very nervous. . . . I need to take some deep breaths and focus. . . ."

Problem-analyzing was defined as the extent to which the response focused on the causes or meaning of stressors. For example, one essay high in problem-analyzing commented, "Lately I have been worried about getting into the engineering school. . . . I see the opportunity slipping away due to my own shortcomings or failure of properly applying myself."

Rumination was defined as a tendency to dwell on negative past experiences, events, or feelings in a disorganized and cyclical fashion (Nolen-Hoeksema et al., 2008). An essay high in rumination began,

School is stressing me out, I have zero dollars to my name . . . my boyfriend is talking to his ex-girlfriend, my roommates annoying me, and I feel like I'm going to pass out at all hours of the day. Building on top of everything is the fact that I never get to get any of this off of my chest!

Confidence in coping with end-of-semester stressors. After responding to the academic stressor salience task and the open-ended essay prompt, students completed a scale assessing their perceived ability to cope with their end-of-semester academic requirements (seven items; $\alpha = .89$, sample items: "I am confident that I will do well on my finals" and "I feel overwhelmed about the end of the semester," reverse-coded; 1 = *strongly disagree*, 6 = *strongly agree*; see supplemental materials for full scale).

Table 1
Coding Constructs, Definitions, and Illustrative Responses

Code	Description	Illustrative response	ICC ¹
Affirmation 0 = <i>Antiaffirming</i> 1 = <i>Somewhat antiaffirming</i> 2 = <i>Neutral</i> 3 = <i>Somewhat affirming</i> 4 = <i>Very affirming</i>	The extent to which the response discusses antiaffirming topics such as threat/stress vs. affirming topics such as values, positive relationships, or excitement towards future plans	<i>Antiaffirming response:</i> "Finals . . . I am crazy stressed about all of them. I have a final presentation today, a final tonight and 18-page research paper due Friday and another final Tuesday . . . I still haven't heard back from the place I had an interview at so that's stressful . . . I also realized this morning I have a crazy amount of errands to run." <i>Affirming response:</i> "I look into the future and I am optimistic about what I can become. I am an ultimate optimist, but at the same time I know that things could use improvement around the world. I love the unconditional support from my loved ones. I am grateful for the fact that they raised me to respect myself. How can I respect others if I don't respect myself?"	.85
Threat 0 = <i>None</i> 1 = <i>A little</i> 2 = <i>Some</i> 3 = <i>A lot</i>	The extent to which the response expresses worries, fears, or stress	"I am worried about finals and the amount of time I have to study for them. I need good grades because of a low GPA and because they are required for nursing school. I also need to find an apartment for August and my roommate is leaving for 6 weeks and can't help me look . . . I'm so tired and my head hurts so bad and I never get headaches like this. I'm worried about work and not having enough hours to pay for rent and vacation this summer. I also need to find a clinical job."	.82
Affirming domains (count)	The total number of affirming domains mentioned in the response	"As much as I would love to go home (CA), I have to finish my major by Aug. 2010. Graduating from college is going to be my greatest accomplishment and it will beat my LA Marathon medal off of first place. . . . The only thing motivating me right now is the fact that I'll be in California in July. I've been here for 4 years and I have not been as homesick as the last few months. Other than that I'm excited that my parents will be in Colorado for the first time. And the fact that they are proud of me makes it worthwhile. I am going to be the first in my family to graduate from college but hopefully not the last. . . . School is more important and I really need to get into grad school." (coded as 3 affirming domains)	.95
Threatening domains (count)	The total number of threatening domains mentioned in the response	"First thing on my mind is, what is all these questions going to say about me? Second, I'm surprised at some of my answers. I think I'm more depressed than I previously thought. This is probably due to the increased stress I've felt in the last couple of weeks. I'm curious about the change in my habits . . . I'm stressed about school because I cannot find an internship, so I feel the only way to keep my chance up is to do well in school. I am very low on money and hate depending on my parents for financial income. I want to feel independent and not be a financial drain on them. I found out a couple days ago that my ex-girlfriend is dating another guy . . . I feel like I would be happier if I could be more active, but I tore my ACL, had no snowboarding season which I am very passionate about, and I cannot do any activities for quite some time." (coded as 6 threatening domains)	.97
Reappraisal 0 = <i>None</i> 1 = <i>A little</i> 2 = <i>Some</i> 3 = <i>A lot</i>	The extent to which the response includes attempts to construe emotional events in ways that changes their emotional impact	"I'm really jealous of my friends who have parents who are impressed and proud of them no matter what. I feel like all I do is try to impress them and get nothing out of it. Either way though, I feel that my parents' craziness has actually helped me to form my work ethic and regardless of their inattention to my problems/accomplishments, I am proud of the work I do and I'm confident that it will all help me grow in the end."	.89
Rumination 0 = <i>No</i> 1 = <i>Yes</i>	Whether the response includes negative dwelling on past experiences, events, or feelings	"During finals I have realized that I have not prioritized my time well enough. This makes me feel very disappointed and a bit sad. I wonder how it is that I can be so happy and yet still unsuccessful at school. . . . I feel irresponsible because college here is expensive and even though my parents don't pay I know I will pay loans for most of my life. The fact that I have not met my goals and done well academically does get me down."	.89

(table continues)

Table 1 (continued)

Code	Description	Illustrative response	ICC ¹
Problem-analyzing 0 = None 1 = A little 2 = Some 3 = A lot	The extent to which the response includes analysis of problems, including the causes and meaning of problems	"Lately, I am constantly feeling as though my abilities, skills, mind, and my personality are completely out of my control. I have an anxiety disorder that I am medicated for, but this is different. The feeling I have could be related to Alice falling down the rabbit hole without any control of feelings, emotions, or activities. Why am I this different? Why is this happening to me? I consciously know when I am having anxiety but I cannot control it."	.83
School-relevant optimism 0 = None 1 = A little 2 = Some 3 = A lot	The extent to which the response includes optimism about the future relevant to academics (e.g., finals, major, career)	"Today as well as for the rest of the weekend I am very busy . . . This will be my hardest test but I think I can do well. This semester I am confident in my grades and the least stressed I have been about finals because I have a good grade going into most of them. I finally get done on May 4th and will have one more year left, this has gone so fast."	.81
School-relevant dread 0 = None 1 = A little 2 = Some 3 = A lot	The extent to which response includes dread about the future relevant to academics (e.g. finals, grades, graduating on time)	"Lately, (this school year) I regret how badly I did last school year . . . [my GPA] is a 3.2 now. I need a 3.3 to graduate with engineering honors! I was hoping that I could bring it up this semester, but it is flat out kicking my ass. Engineering is so hard, I definitely am not cut out for it, but it's too late to change. I don't have time or money to start a new career. Thankfully I'm doing well enough on the other 3 classes, but just well enough to keep my GPA afloat, not to help me raise it. Never did I think I would face such a competitive world and though I know God has a plan for me, I can't help but worry about my academic performance every single day."	.83

Note. ICC = intraclass correlation coefficient.

¹ For variables with more than two levels, the ICC was calculated using the consistency statistic. For binary variables, ICC was calculated using the exact statistic.

Results

Analytic Plan

All outcomes from the follow-up session were initially analyzed using a $2 \times 2 \times 2$ analysis of variance (ANOVA) with affirmation condition, expectation condition, and student ethnicity (Latino or White) as between-subjects factors. With two exceptions, there were no significant main effects or interactions involving the exploratory expectation manipulation along either preintervention measures (indicating random assignment was effective) or postintervention measures, all $ps > .07$. These two exceptions are discussed briefly at the end of the Results section. Thus, given the exploratory nature of the expectation manipulation, we collapsed across expectation conditions in the analyses presented below. The reported effects of affirmation on the key outcomes were robust to including expectation and its interactions in statistical models.

In the results reported below, regression was used for analyses with postintervention GPA as an outcome. Analysis of covariance (ANCOVA) was inappropriate because there was heterogeneity in the relationship between the baseline covariate (preintervention GPA) and the outcome (postintervention GPA), such that there was a stronger relationship between these two variables in the affirmation condition, $r(88) = .54, p < .001$, than in the control condition, $r(81) = .32, p = .003$, with the Covariate \times Affirmation interaction reaching significance, $b = .18, t(164) = 2.42, p = .02$. Therefore, we used conventional regression as outlined by Judd and McClelland (1989) to model the data more accurately, including the interactions between affirmation condition and the covariate. All dichotomous predictors were contrast-coded (-1 for control condition and for White students; $+1$ for affirmation condition and for Latino students). Preintervention GPA was mean-centered

on 0 for the sample being analyzed (Judd & McClelland, 1989). Importantly, simply discarding the covariate and conducting an ANOVA on postintervention GPA leaves intact the statistical significance of all key effects.

Our primary focus was on the effect of affirmation among students likely to experience identity threat in school, in the present case, Latino students. Theory and empirical research heavily suggest that the affirmation intervention should benefit these students more than White students, who are less likely to experience identity threat (G. L. Cohen et al., 2009; Miyake et al., 2010; Sherman et al., 2013). Following from this, we used a planned contrast approach to test our *ex ante* hypothesis of a positive effect of affirmation among Latino students. Our prediction was that the effect would be significant for Latino students, but nonsignificant for White students (for a review of this planned contrast approach, see Rosenthal & Rosnow, 1985; for other studies that use a similar approach, see Yeager et al., 2014 and Walton & Cohen, 2011, supplemental online materials). Despite our focus on the planned contrasts, we nevertheless present omnibus tests for each analysis.

ANOVA is robust to nonnormality and unequal variance when the number of participants in each cell of the design is roughly equal (the largest cell sample size is not more than 1.5 times the smallest cell sample size; Morgan, Leech, Gloeckner, & Barrett, 2004) and the sample size is sufficiently large ($N > 15$ per group; Green & Salkind, 2003). These criteria were met in the present study. However, in cases where either non-normality (using the Shapiro-Wilk test) or unequal variance (using Levene's test) was significant we used multiple methods to determine the robustness of the analytic results. Among the methods used were nonparametric tests that do not require the underlying distribution to be

characterized by normality and equal variance, and data transformations to lessen heterogeneity of variances. All results were robust to these alternative tests, as discussed in greater depth in the supplemental materials. For consistency and simplicity, the results reported below feature tests on the nontransformed data using ANOVA or regression (for analyses including baseline GPA as a covariate). Effect size (*d*) was calculated using the difference between the relevant means divided by the root mean square from the full statistical test (J. Cohen, 1988).

Preliminary Analyses

Effectiveness of random assignment. Random assignment was effective. No significant differences between experimental conditions along student gender, age, class year, or preintervention GPA emerged for either Latino students or White students, all *ps* > .19.

Differential attrition. In regards to our access to the key outcome of GPA, there was no differential attrition by condition. The availability of these data did not vary by affirmation condition, ethnic group, or their interaction, all *ps* > .24. Furthermore, those students for whom we were able to collect follow-up GPA data did not differ from those whose data was not collected in terms of gender, class year, age, or preintervention GPA, all *ps* > .74. Nor was there differential attrition by condition in terms of recruitment to participate in the follow-up study. There was no tendency for successful recruitment to vary by affirmation condition, ethnic group, or their interaction either for the full sample, all *ps* > .60, or for the students still enrolled at the university, all *ps* > .27.

There were, however, two ways in which the students who were successfully re-recruited differed from those who were not. First, there was a tendency for the former to have higher baseline GPA (*M* = 2.81, *SD* = 0.71) than the latter (*M* = 2.54, *SD* = 0.77), *t*(169) = -2.39, *p* = .02. This is unsurprising, as low academic performance is a reason students leave college (Stinebrickner & Stinebrickner, 2013). Indeed, in our sample, students who were still enrolled at the university at the time of the follow-up and thus eligible to participate had higher baseline GPA than those who

were no longer enrolled, *t*(169) = -2.52, *p* = .01. Second, students who were successfully re-recruited were also slightly older at the time of the initial lab study (*M* = 19.55, *SD* = 1.48) those who were not successfully re-recruited (*M* = 19.11, *SD* = 0.54), *t*(168) = -2.55, *p* = .01 (one student did not provide age data). The difference was due primarily to three students who were outliers in terms of age (more than 3 *SD* above the mean) participating in the follow-up. Age did not predict any of the outcomes in this study, and results were unchanged when controlling for it. The students who participated in the follow-up study did not differ from those who did not participate in terms of gender, ethnicity, or class year, all *ps* > .05.

Our differential attrition analyses revealed one anomaly. As indicated by an interaction between follow-up status and condition for White students, there was a tendency for affirmed White students who were successfully re-recruited to have lower GPAs than White students who were not successfully re-recruited, while the opposite was true for nonaffirmed White students, *F*(1, 87) = 4.75, *p* = .03. No such interaction was found for Latino students, and results for White students on all of the follow-up study outcomes remain the same when controlling for baseline GPA.

Primary Analyses

Table 2 provides means, standard deviations, and intercorrelations for variables discussed in the primary analyses.

Long-term effects on GPA. Figure 2 shows GPA over time as a function of ethnicity and condition. With preintervention GPA controlled, regression indicated a significant Ethnicity × Affirmation interaction on average postintervention GPA over the 2 years following the intervention, *b* = .16, *t*(164) = 3.06, *p* = .003. Latino students had higher postintervention GPAs in the affirmation condition than the control condition, *b* = .18, *t*(164) = 2.28, *p* = .02, *d* = 0.52. The opposite was true for White students, with affirmed students performing less well than control students,

Table 2
Means, Standard Deviations, and Correlations for All Variables

Measure	<i>M</i> (<i>SD</i>)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Preintervention GPA	2.70 (.75)	—												
2. Average postintervention GPA	2.76 (.76)	.41***	—											
3. Final postintervention semester GPA	2.88 (.89)	.37***	.83***	—										
4. Adaptive adequacy	4.65 (.54)	.07	.02	.14	—									
5. Academic belonging	4.67 (.62)	.08	.14	.19	.44***	—								
6. Spontaneous affirmation	-.05 (.88)	.04	-.02	.04	.49***	.26*	—							
7. Domains (aff vs. threat)	-.56 (1.84)	.19	.03	.06	.41***	.17	.74***	—						
8. Optimism related to school	.76 (.68)	.14	.14	.18	.23*	.11	.29*	.37***	—					
9. Dread related to school	.99 (.80)	-.03	.10	.03	-.35***	-.16	-.63***	-.45***	-.00	—				
10. Reappraisal	.52 (.82)	-.02	.11	.09	.07	.22*	.01	-.02	.33**	.15	—			
11. Problem-analyzing	1.06 (.86)	.06	-.01	-.04	-.42***	-.12	-.55***	-.43***	-.06	.38***	.26*	—		
12. Rumination	.18 (.38)	.08	-.08	-.17	-.40***	-.00	-.41***	-.35***	-.16	.42***	.15	.48***	—	
13. Confidence in coping with end-of-semester stressors	4.84 (.87)	.19	.27*	.49***	.56***	.34*	.41***	.36***	.23*	-.39***	-.20	-.27*	-.42***	—

Note. GPA = grade point average; aff = affirmation.
* *p* < .05. *** *p* < .001.

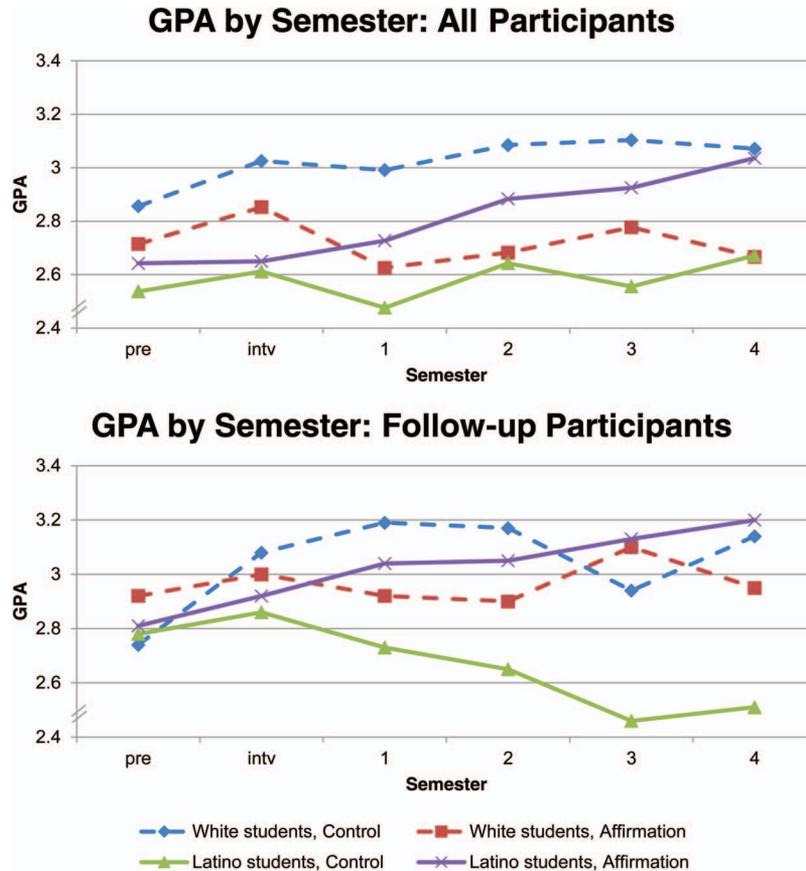


Figure 2. Raw student grade point average (GPA) by ethnicity and affirmation condition. The top panel shows all study participants. The bottom panel shows students successfully re-recruited for the follow-up portion of the study. See the online article for the color version of this figure.

$b = -.15$, $t(164) = -2.06$, $p = .04$, $d = 0.43$.⁶ Even without the baseline covariate, a test using ANOVA revealed the same pattern: an Ethnicity \times Affirmation interaction, $F(1, 167) = 8.90$, $p = .003$, indicating a positive effect of affirmation for Latino students, $t(167) = 2.09$, $p = .03$, $d = 0.48$, and a negative effect for White students, $t(167) = 2.09$, $p = .04$, $d = 0.44$.

Consistent with predictions and past research (G. L. Cohen et al., 2009; Sherman et al., 2013), affirmation improved the long-term academic performance of Latino students. This was true both in the overall sample (Figure 2, top panel) and among students participating in the follow-up portion of the study (Figure 2, bottom panel). The magnitude of the boost for Latino students is noteworthy. In previous research, affirmation has been shown to reduce gaps in performance between majority group students and minority group students by approximately 20–50% (G. L. Cohen et al., 2006; Harackiewicz et al., 2014; Sherman et al., 2013). In the present study, the difference was almost completely eliminated. There was a large gap by ethnicity in raw GPA in the semester during which the initial lab study occurred. Latino students, regardless of condition, had lower GPAs than nonaffirmed White students (compared with control White students: $d_{\text{Latino-Control}} = 0.57$, $d_{\text{Latino-Affirmation}} = 0.51$). Two years later during the fourth postintervention term, Latino students in the control condition were still

performing significantly less well than nonaffirmed White students, $t(139) = -1.98$, $p = .05$, $d = 0.46$. But Latino students in the affirmation condition had GPAs that were comparable to those of nonaffirmed White students, $t(139) = -0.18$, $p = .86$, $d = 0.04$. For Latino students, affirmation led to a 90% reduction in the ethnic achievement gap.

Follow-up study outcomes. Table 3 provides all descriptive and inferential statistics for the follow-up study outcomes, including the statistical significance of all planned contrasts, main effects, and interactions. Effect sizes are noted for each planned contrast and main effect.

Survey measures of accumulated psychological resources. We examined whether ethnicity and affirmation affected students' adaptive adequacy and academic belonging. As predicted, planned

⁶ Supplemental analyses of students' transcripts revealed no evidence that the condition effects for either ethnic group arose from changes in the kinds of courses students took. There were neither main nor interactive effects of ethnicity or condition on the number of credit hours students completed, the number of math and science courses they took, the proportion of their classes that were science or math courses, or the level of courses they took (these latter data were available only for math and science courses), all $ps > .12$.

Table 3
 Follow-Up Outcomes: Psychological Outcomes and Essay Coding Results by Ethnicity and Condition

	Latino Students							White Students							Eth × Aff interaction		Main effect of ethnicity			Main effect of affirmation			
	Control (n = 21)		Affirmation (n = 31)		Planned contrast			Control (n = 26)		Affirmation (n = 23)		Planned contrast			F	p	F	p	d	F	p	d	
	M	SD	M	SD	t	p	d	M	SD	M	SD	t	p	d	F	p	F	p	d	F	p	d	
Psychological outcomes (before essay)																							
Adaptive adequacy	4.43	.72	4.91	.35	3.31	.001	.94	4.62	.47	4.54	.52	.62	.62	.14	7.09	.009	.80	.37	.27	3.84	.05	.43	
Academic belonging	4.29	.70	4.76	.62	2.80	.006	.79	4.76	.52	4.79	.53	.21	.83	.06	3.31	.07	4.31	.04	.34	4.49	.04	.38	
Essay: Spontaneous affirmation																							
Spontaneous affirmation (standardized)	-.42	1.09	.26	.69	2.80	.006	.79	.08	.85	-.29	.80	1.48	.14	.43	9.16	.003	.02	.88	.08	.83	.36	.20	
Domains (aff vs. threat)	-1.33	2.40	.00	1.70	2.62	.01	.74	-.29	1.66	-.91	1.37	1.21	.23	.34	7.34	.008	.03	.86	.02	.96	.33	.20	
Essay: Secondary coding																							
Optimism related to school	.60	.62	.95	.76	1.88	.06	.53	.81	.66	.59	.60	1.15	.25	.33	4.55	.04	.32	.58	.15	.25	.62	.12	
Dread related to school	1.24	.89	.69	.63	2.46	.02	.70	.96	.76	1.17	.89	.95	.35	.27	5.78	.02	.42	.52	.19	1.11	.29	.24	
Reappraisal	.40	.74	.44	.77	.13	.90	.04	.50	.77	.76	1.00	1.11	.27	.32	.48	.49	1.62	.21	.24	.78	.38	.13	
Problem-analyzing	1.40	.85	.73	.72	2.91	.004	.82	.96	.68	1.33	1.06	1.54	.13	.44	9.89	.002	.22	.64	.16	.90	.35	.22	
Rumination	.33	.48	.06	.25	2.51	.01	.71	.19	.40	.17	.39	.17	.87	.05	2.71	.10	.04	.84	.03	3.56	.06	.38	
Confidence in coping (after essay)																							
Confidence in coping with end-of-semester stressors	4.01	1.17	4.65	.71	2.69	.008	.76	4.52	.91	4.34	.57	.74	.46	.21	5.86	.02	.35	.55	.06	1.86	.18	.27	

Note. aff = affirmation; eth = ethnicity.

contrasts revealed that Latino students felt a stronger sense of both adaptive adequacy and belonging in school in the affirmation condition than in the control condition (see Table 3). White students, as expected, were unaffected by condition. Although, as noted previously, the planned contrasts rather than the Ethnicity × Affirmation interaction yields a more precise test of our predictions, the interaction was significant for adequacy and marginal for academic belonging. In summary, 2 years after the intervention, affirmed Latino students had acquired more psychological resources than nonaffirmed Latino students.

Open-ended responses to academic stressor salience task.

Spontaneous affirmation. The key question was whether the affirmation manipulation increased the likelihood that Latino students would spontaneously affirm themselves in the face of a stressor. Our quantitative analyses show that it did. But before more fully discussing the quantitative results we think that it would be illustrative in demonstrating the differences between conditions to provide examples of the essays students wrote. The first essay below was written by a Latino student in the control condition, while the second was written by a Latino student in the affirmation condition. Each essay was rated near the mean of their respective conditions on the spontaneous affirmation score.

A Latino student in the control condition wrote:

What is mainly on my mind is school and my financial situation. This semester hasn't been going well since I don't feel the need to be motivated in the classes that I am in. All of my classes are boring and seem irrelevant with exception to my statistics course. My [engineering] class is just too abstract for me to handle, and all the kids are seniors. . . . Everyone knows someone who they can do homework in the class with except me. It has caused me to be less motivated. . . . My computing class is just as boring. . . . Overall I am ready to get this semester over with and summer to begin. As for summer I will be

living in [city name] which means I need to find a job in order to pay rent and eat. This is hard to do currently with finals coming up. Finding a job that I will enjoy is very important to me since I plan on spending most of my time working in order to make next year a little easier for me. Besides that I plan on relaxing and enjoying my time off of school.

In contrast, a Latino student in the affirmation condition wrote:

Today as well as for the rest of the weekend I am very busy. I need to study for all of my finals as well as work and babysit and house sit. Just thinking about it is making me feel overwhelmed. Tonight I am going to spend my Friday night studying for my psychopathology final. . . . Then tomorrow I have to [go to] work at 9:00 then work on a group project at 1:00 and then a final at 4:30. Then I will spend Saturday night babysitting and studying for my Biology final. Next I will start studying for developmental psych. This will be my hardest test but I think I can do well. This semester I am confident in my grades and the least stressed I have been about finals because I have a good grade going into most of them. . . . I am looking forward to summer. I am going on vacation on the 15th to Las Vegas for my birthday. It will be extremely well deserved to get rid of the stress of school. I am house sitting for the next ten days which is nice because I will get . . . 400 extra dollars to bring on my trip. This makes me so happy I cannot wait.

The student in the control condition is worried about academics and finances. He describes his classes as "boring" and "irrelevant." He mentions his lack of connection with other students and makes negative attributions about his abilities ("too abstract for me to handle"). He discusses his need to find a summer job, but seems to view doing so as another source of dread ("hard to do"). He views having a job as a way to improve his life next year ("make next year a little easier for me") and expresses some positive emotion

about his plans for the summer (“plan on relaxing”). But on the whole there is little affirmation and a considerable amount of threat.

The student from the affirmation condition begins in a similar manner, by discussing classes and mentions that she feels “overwhelmed.” The nature of the stressors before her seems similar to those described in the first essay. But rather than focusing on negative aspects of the courses or doubting her abilities, she generates a plan for studying for finals. Like the first student, she mentions a hard course but expresses optimism and confidence about her future in it (“I think I can do well”). She also looks forward to the summer (“Las Vegas for my birthday”) and conveys a personal sense of accomplishment when she states that the summer break will be “well-deserved.”

The second student is neither excessively self-congratulatory nor illusory in her optimism. She acknowledges the stressors before her. She does not distort or even seem to reappraise them much. Instead she sees the stressors in a larger context of a life and future that are, on the whole, positive. Threat does not dominate but stands in balance with sources of affirmation.

Spontaneous affirmation and domains of affirmation versus threat. Table 3 displays the key means and inferential statistics. As predicted, a planned contrast indicated that Latino students who had completed an affirmation intervention 2 years earlier spontaneously displayed greater affirmation and less threat in their open-ended essays than did Latino students in the control condition. Affirmed Latino students also mentioned more domains of affirmation, relative to domains of threat, than did their nonaffirmed peers. On average, affirmed Latino students mentioned an equal number of domains of affirmation and domains of threat, paired t test, $t(30) = 0.00$, $p = 1.00$, $d = 0.00$, while control Latino students mentioned one more domain of threat than affirmation, $t(20) = -2.54$, $p = .02$, $d = 0.67$. White students, as expected, did not differ by affirmation condition in the extent of spontaneous affirmation they displayed in their essays or the number of domains of affirmation versus threat they mentioned. For both spontaneous affirmation and domains of affirmation versus threat, the Ethnicity \times Affirmation interaction was significant (see Table 3). These results dovetail with research suggesting that self-affirmation limits the extent to which threats engulf attention (Critcher & Dunning, 2015). Here we show that a psychological shift, triggered by the affirmation manipulation 2 years earlier, increased students’ likelihood of spontaneously affirming themselves in the face of an altogether new stressor.

Notably, the effect of the affirmation manipulation on Latino students’ tendency to spontaneously self-affirm persists even when controlling for students’ average GPA from the postintervention semesters prior to the follow-up study, $F(1, 48) = 13.89$, $p = .001$, $d = 1.18$, suggesting that their more positive psychological outlook does not *only* reflect a stronger history of performance.

Perceptions of the future. As displayed in Table 3, there was a marginal effect such that affirmed Latino students tended to display more optimism related to school than nonaffirmed Latino students. There was a significant effect such that affirmed Latino students expressed less dread related to school than did nonaffirmed Latino students. White students were again unaffected by affirmation condition on both optimism and dread related to school. The Ethnicity \times Affirmation interaction was significant for both outcomes. These results suggest that the affirmation manip-

ulation, given 2 years earlier, increased the degree to which Latino students saw their futures in an affirming rather than threatening light when faced with a stressor.

Cognitive processing. Was spontaneous affirmation distinct from other forms of cognitive processing examined in previous research on reactions to stressors? It was. As displayed in Table 3, the extent to which students engaged in reappraisal was unaffected by ethnicity, affirmation condition, or their interaction. For rumination and problem-analyzing, planned contrasts indicated that Latino students engaged in both of these cognitive processing strategies significantly less in the affirmation condition than in the control condition. Once again, White students were unaffected by condition. Omnibus tests indicated a marginal main effect of affirmation for rumination and a significant Ethnicity \times Affirmation interaction for problem-analyzing.

On the whole, these findings suggest that spontaneous affirmation is not simply a conventional form of reappraisal, in which a specific stressor is reconstrued or distorted (cf. Gross, 2002; Jamieson et al., 2013), but rather a process of putting a stressor in a broader context. The findings also suggest that affirmed learners are relatively less likely to dwell on their past and present problems and to dread the future. They seem to see the stressor through a wide-angle lens that encompasses a positive life and sense of self. By contrast, nonaffirmed Latino students seemed to see the stressor through a telephoto lens, zeroing in on its causes and its persistence into the future.

Confidence in coping with end-of-semester stressors. After completing the spontaneous affirmation task, participants indicated their confidence in their ability to cope with the requirements of the end of the semester. As expected, Latino students expressed greater confidence in their ability to cope in the affirmation condition than the control condition (see Table 3). White students were unaffected. The Ethnicity \times Affirmation interaction was significant.

Process Analysis: The Role of Spontaneous Affirmation and Coping Confidence in Performance

We deliberately sequenced the measure of confidence in coping with end-of-semester stressors after the opportunity to self-affirm so that we could test whether spontaneous affirmation statistically mediated effects of affirmation condition on confidence in coping and whether confidence in coping mediated actual performance. If so, this would provide evidence that in addition to being an interesting outcome in its own right, spontaneous affirmation helps to perpetuate effects on performance.

To test this process model, we computed structural equation models using the R package lavaan (Rosseel, 2012). Our analyses focused on Latino students only. For White students, affirmation condition did not predict spontaneous affirmation or coping, and thus a path model testing these pathways would not be appropriate. The hypothesized model asserted that spontaneous affirmation and confidence in coping would sequentially mediate the effect of affirmation condition on semester GPA. The outcome variable was GPA in the semester of the follow-up study, Postintervention Semester 4. In specifying the model, a dummy variable was used to represent affirmation condition (control = 0, affirmation = 1). We included a path from affirmation condition directly to confidence in coping in case any effect of the manipulation on per-

ceived coping was not mediated by spontaneous affirmation. Similarly, we compared models with and without the direct path from spontaneous affirmation to GPA to examine whether any effects of spontaneous affirmation on GPA were unmediated by confidence in coping.

As displayed in Figure 3, the model with the direct path from spontaneous affirmation to GPA fit the data extremely well, $\chi^2(3, N = 51) = 2.64, p = .45$, comparative fit index (CFI) = 1.00, root mean square error of approximation (RMSEA) < .001. All paths were significant except the path from affirmation to coping ($p = .14$). Including this path improved model fit, however, and is consistent with theory, so it was retained. We found evidence for the hypothesized mediation pathway. There was a significant indirect effect of affirmation condition on GPA through two sequential mediators: spontaneous affirmation and confidence in coping. Surprisingly, the path from spontaneous affirmation to semester GPA was significant and negative. While this finding is addressed in the Discussion, the key result—that affirmation's effect on semester GPA was mediated through spontaneous affirmation and confidence in coping with end-of-semester stressors—supports the hypothesized model.

To supplement the path analysis, we created two separate bootstrapped mediation models that tested, first, the indirect effect of affirmation on coping through spontaneous affirmation and, second, the indirect effect of affirmation on semester GPA through confidence in coping for Latino students only. Both were significant ($ps < .05$). Taken together, the process analyses suggest that the higher grades of affirmed Latino students arose partly from a tendency to see stressors in a self-affirming manner that bolstered their confidence in their ability to overcome challenges.

Downward Trend Among Re-recruited Latino Students in the Control Condition: A Potential Confound?

Latino students in the control condition who were successfully re-recruited to participate in the second part of the study had different academic trajectories than their counterparts who were not successfully re-recruited. Specifically, there was a significant Time \times Follow-Up Status interaction on GPA for Latino students in the control condition, $F(5, 115) = 3.38, p = .007$, such that

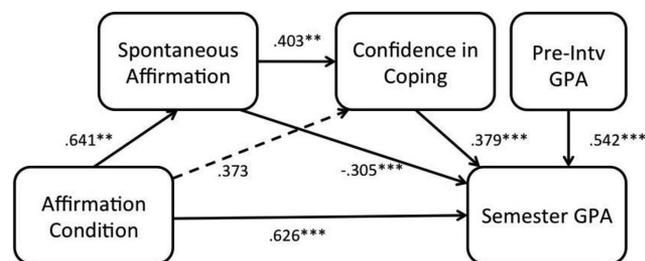


Figure 3. Latino students only: Three-path mediation model showing the effect of affirmation condition on semester grade point average (GPA) mediated by spontaneous self-affirmation and confidence in coping with end-of-semester stressors. Coefficients are unstandardized. The path indicated by the dashed line is nonsignificant ($p = 0.14$). It is included for theoretical reasons and because it improves model fit. ** $p < 0.01$, *** $p < 0.001$. Pre-Intv = preintervention.

control Latino students who participated in the follow-up experienced a decline in their GPA over time while those who did not participate did not experience this decline. No such interactions were observed for the GPAs of successfully re-recruited versus nonrecruited Latino students in the affirmation condition or White students in either condition, all $ps > .11$. Although successfully re-recruited and nonrecruited Latino students did not differ in their baseline GPA in either condition, the unique decline in GPA observed among Latino students in the control condition who were not re-recruited raises concern about a potential threat to validity for conclusions based on data from the follow-up.

First, we should note that this concern does not pertain to the primary academic outcome, GPA. All students except one released their transcripts to the research team, and 93% of students had at least one semester of postintervention GPA available. Availability of GPA data did not depend on condition, ethnicity, or their interaction, and therefore nonrepresentative rerecruitment is not a threat to the GPA results, a key contribution of our research.

Second, the pattern observed could be due to one of two factors. The first possibility is that we happened to overrecruit Latino students whose GPAs declined with time only in the control condition. This would be a threat to the validity of the follow-up outcomes. However, a second possibility is that follow-up status is a proxy for a third variable—such as academic identification—that predicts both increasing threat with time, and thus a decreasing GPA, as well as responsiveness to the intervention.

This second possibility would not be a threat to validity and is in line with past research. Steele (1997) asserted the *vanguard hypothesis* in his original formulation of stereotype threat. Specifically, he posited that threat has the greatest effect on the students who are most identified with school. Numerous studies have provided empirical support for this hypothesis, consistently finding that it is students with initially high performance or high academic identification whose achievement is most undermined by social identity threat (Aronson et al., 1999; Keller, 2007; Leyens, Désert, Croizet, & Darcis, 2000; Sherman et al., 2013; Spencer, Steele, & Quinn, 1999; Steele, 1997).

Consistent with this possibility, the Latino students who were recruited had higher baseline GPAs than those who were not recruited, regardless of condition, and so we would expect the effects of threat to be greater for them. Viewed from this perspective, the downward trend for nonaffirmed Latino students who participated in the follow-up may be the unfortunate default state of affairs: those who begin college as high performers are at the greatest risk of performance decrements over time due to their high identification and susceptibility to identity threat. Following from this, affirmed Latino students would have also experienced this downward performance trend had they not been affirmed. Furthermore, it is worth recalling that nonaffirmed Latino students who participated in the follow-up did not differ from affirmed Latino students who participated in the follow-up on any baseline characteristic. That is, at baseline there was no evidence that these two samples were different. The fact that the two groups differed only at the time of the follow-up study may demonstrate the long-term corrosive effects of identity threat, as well as the ability of affirmation to mitigate such effects.

We cannot determine which of the two possibilities is accurate, though theory and the available evidence make the second possibility reasonable. However, we took further analytic steps to rule

out the possible threat to validity. We borrowed a technique common in political science and sociology to address differential nonresponse in a survey sample: poststratification weighting. This technique permitted us to carry out conservative analyses that could help correct for differential recruitment if it did, in fact, occur. Reassuringly, all of the reported results were robust to these more conservative analyses.⁷

Effect of Expectation Manipulation

The results reported below concern the manipulation of expectations and are exploratory in nature, given that they were not predicted and emerged only on two outcomes, postintervention GPA and school-related optimism. The reported results come from a regression on postintervention GPA and an ANOVA on school-relevant optimism. Ethnicity, expectation condition, and affirmation condition were included as predictors in each model. For the regression, all dichotomous predictors were contrast-coded (−1 for no expectation; +1 for positive expectation).

Controlling for preintervention GPA, there was a main effect of expectation on average postintervention GPA. Students in the positive expectation condition, who were led to believe that the writing exercise (affirmation or control exercise) would be beneficial, earned higher GPAs ($M = 2.87$, $SE = 0.07$) than those who were not led to have these expectations ($M = 2.64$, $SE = 0.07$), $b = 0.11$, $t(160) = 2.15$, $p = .03$, $d = 0.35$. There was also a main effect of expectation on school-relevant optimism, such that participants displayed more school-relevant optimism in their open-ended essays in the positive expectation condition ($M = 0.94$, $SD = 0.73$) than in the no expectation condition ($M = 0.55$, $SD = 0.56$), $F(1, 93) = 7.12$, $p = .009$, $d = 0.59$. Though exploratory, these effects concord with prior research showing that expectancies can affect psychological functioning and performance, as in the well-documented placebo effect (Crum & Phillips, 2015).

Discussion

Latino students are entering college at unprecedented rates, suggesting that they are motivated to be in college. An important question, then, is what can be done to help ensure that this motivation translates into academic thriving and graduation? We found that a single affirmation intervention delivered in the laboratory early in students' college career improved the academic performance of Latino students, nearly eliminating the achievement gap between Latino and White students. This finding has practical implications for educators and policymakers concerned with the persistent racial and ethnic achievement gaps in American education today.

Understanding how a brief intervention had such long-term benefits helps advance an understanding of motivational processes. How a motivational process like affirmation persists over long periods of time is an important theoretical question. The answer, our results suggest, is that the effects of the affirmation intervention were relived in students' subjective experience, even 2 years later. The intervention triggered a process that unfolded over time and produced a different kind of learner: one with stronger sense of adequacy and belonging in school and one who spontaneously marshaled greater self-affirming and less self-threatening responses when faced with an academic stressor.

Such spontaneous affirmation did not involve the reappraisal of a specific stressor. Instead, it was a tendency to see stressors in a larger context. More affirming relative to threatening domains were called to mind. Academic stressors did not engulf attention or trigger a cognitive domino effect of worries about the past, present, and future, as seemed to be the case for nonaffirmed Latino students. On the whole, the spontaneous affirmation data capture in vivo the ability of affirmation to untether well-being from adversity, as documented in prior research (Cook et al., 2012; Sherman et al., 2013). Our study provides a close-up view of the psychology of the affirmed learner to better understand why adversity is less likely to "get under the skin": it is construed in the context of a more expansive view of the self and its assets.

According to the present empirical findings, the initial affirmation manipulation was not a self-contained intervention. Rather it served as a trigger for a powerful psychological process. When this process was launched during the first years of college, a sensitive period (G. L. Cohen & Garcia, 2014; Cook et al., 2012; Walton & Cohen, 2011), Latino students saw subsequent adversity in a more optimistic light, which presumably helped them to overcome those adversities, and increase their confidence still further, in a repeating cycle that built up their adaptive assets (G. L. Cohen & Sherman, 2014). Indeed, the degree to which Latino students spontaneously affirmed mediated the degree to which their GPA improved.

Though the concept of spontaneous affirmation was posited in Steele's (1988) original formulation of self-affirmation theory, only recently has it become the focus of research (Cornil & Chandon, 2013; Ferrer et al., 2014; Pietersma & Dijkstra, 2012). As the literature on spontaneous affirmation grows, researchers should sharpen an understanding of what spontaneous affirmation is and how to measure it. Though a reliable and valid scale may be able to assess individual differences in the propensity for spontaneous affirmation (see Ferrer et al., 2014, for discussion of a measure under development), the development and use of behavioral measures, such as the open-ended task used here, offers a useful supplemental strategy. Not only do behavioral measures avoid common pitfalls of self-report measures, but they also allow researchers to examine the texture of an affirmed person's psychology (McGuire & McGuire, 1988; McGuire, McGuire, Child, & Fujioka, 1978).

The research laboratory is often seen as an isolated, confined context; yet at times it may be a powerful and memorable situation

⁷ Because we obtained GPA data from all participants who were enrolled at the university during the semester of the follow-up, we know the GPAs of all students who could have been re-recruited. Using post-stratification weighting, we then weighted the successfully re-recruited subsample to have the same GPA as all students who could have been re-recruited effectively counting the data for students differentially to adjust for the possibility of bias. To do this, we used the R package *anesrake*, developed based on recommendations from a blue-ribbon panel convened to advise the 2008 American National Election Study (Pasek, 2012). After creating the post-stratification weights based on average post-intervention GPA from semesters three and four, we used the standard *lm()* function with the *weights* argument in the R programming language. We reconduted the key analyses using the weighted sample. As noted in the main text, all of the reported results were robust to these more conservative analyses. As might be expected, some results showed less extreme effects (e.g., the significance level for confidence in coping with end-of-semester stressors changed from $p = .008$ to $p = .03$), but all key effects, including interactions, remained statistically significant.

for inducing change (Walton & Cohen, 2011; Wilson & Linville, 1985). These findings also provide the first evidence that an affirmation delivered in the laboratory can affect students' academic performance outside the lab (cf. Sherman, Bunyan, Creswell, & Jaremka, 2009). In previous affirmation studies showing effects on students' grades, the affirmation intervention was delivered in the context of a class by students' actual teachers. Our findings suggest that, although this may be helpful, it may not always be necessary. The perception that "my teacher cares enough about me to ask about my personal values" may drive some of the affirmation effects found in the classroom (cf. Bowen et al., 2013) but the present results suggest that this perception is not necessary for affirmation benefits to occur. Nevertheless, it may be necessary for affirmation exercise to seemingly be sanctioned by an institutional authority, whether that person is a teacher or a university researcher.

Negative Effect of Affirmation for White Students?

There were no significant differences by affirmation condition for White students on any of the laboratory study follow-up measures. There was, however, an unexpected negative effect of affirmation on GPA. Because this negative effect was obtained only on a single outcome and was unexpected, it should be regarded tentatively. That said, negative effects of affirmation have occasionally been observed for nonstereotyped students (Dee, 2015; Miyake et al., 2010; Vohs, Park, & Schmeichel, 2013). Miyake et al. (2010) suggest that negative effects may occur for nonstereotyped students because they remind these students of valued domains other than academics, which could lead them to invest their efforts elsewhere. Perhaps, also, some subset of White students is performing well in school because of stress and psychological threat and alleviating this may be counterproductive.

The benefits of any social intervention hinge on its being given at the right time, place, and to the people who need it. A one-size-fits-all approach is apt to disappoint. Far more effective is allocating interventions to the people they will most likely benefit, as in medical science.

Effect of Expectation Manipulation

Previous research has suggested that expecting benefits from affirmation on academic performance can undermine those benefits, at least within the same laboratory session (Sherman et al., 2009; Silverman et al., 2013). In contrast, we found that expecting benefits of affirmation did not undermine the effect of affirmation on GPA. Rather, positive expectations increased GPA and school-relevant optimism, regardless of ethnicity or affirmation condition. Though this was unexpected, it echoes other findings suggesting the power of positive expectations on health, achievement, and well-being (Crum & Langer, 2007; Crum & Phillips, 2015; Jussim & Harber, 2005; Rosenthal & Jacobson, 1968). As such, the tendency for awareness of affirmation's effects to undermine its those effects may be circumscribed to situations when people feel forced to engage in affirmation exercises (Silverman et al., 2013) or find the insinuation that one is "in need" of affirmation to be stigmatizing (Steele, 1997; Yeager & Walton, 2011). As long as these conditions are avoided, people may be able to be "unblinded" to the intended effects of affirmation without neutralizing its

benefits for them. Training students to self-affirm at times of stress may be a promising direction for future research (see Walton et al., 2015).

Limitations and Future Directions

The present study involved only a single assessment of spontaneous affirmation at a single moment of stress. Future studies should strive to collect multiple assessments of affirmed students' spontaneous responses to stressors. Additionally, the study involved students at only one college, and affirmation effects and processes may vary as a function of context. Hanselman and colleagues (2014) provided evidence that the effectiveness of the affirmation intervention increases in schools with higher levels of race-based threat (e.g., larger racial achievement gaps and greater underrepresentation for minority students).

Another limitation concerns generalizability. Students who participated in the follow-up study had higher baseline GPAs and showed greater responsiveness to affirmation in terms of their GPA than did those who did not participate. Thus, our spontaneous affirmation results may apply less well to Latino students who have a history of lower achievement.

An area of future research is suggested by the negative coefficient of the path between spontaneous affirmation and GPA in the mediation model. To the extent that spontaneous affirmation led to greater confidence in coping with end-of-semester stressors, it had a positive effect on GPA. But spontaneous affirmation that was not mediated through confidence in coping had a negative relationship with GPA. More research is needed to disentangle when spontaneous affirmation is beneficial and when it may be counterproductive (Critcher, Dunning, & Armor, 2010; Vohs et al., 2013). It is possible that there was treatment heterogeneity for Latino students and that for those students for whom a positive recursive cycle was not initiated spontaneous affirmation to the extent that it occurred, signified their level of disidentification or disengagement from academics (e.g., "I have other things more important than school work to feel good about"). Future research should address this ambiguity. This does not detract from our key result—that the affirmation intervention triggered a degree of spontaneous affirmation that in turn predicted better coping and higher grades.

Conclusions

A motivational intervention, self-affirmation, changed the psychological world of its beneficiaries, an effect evident even 2 years later. Even a small improvement in how a student perceives adversity can compound into a large benefit when repeated through time. The affirmed learner's psychology is transformed, such that later events are more likely to be seen through the prism of a positive view of the self and its assets. For the affirmed, threat does not engulf the cognitive field—whereas for the nonaffirmed, threat seems to pull the past, present, and future into it. Affirmation, which can seem like a small and brief psychological intervention, is not so small or brief after all when its effects are repeatedly relived in people's subjective experience.

References

- ACT. (2012). National collegiate retention and persistence to degree rates. Iowa City, IA: ACT.

- Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When white men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of Experimental Social Psychology*, 35, 29–46. <http://dx.doi.org/10.1006/jesp.1998.1371>
- Bandura, A. (1978). Self-efficacy: Toward a unifying theory of behavioral change. *Advances in Behaviour Research and Therapy*, 1, 139–161. [http://dx.doi.org/10.1016/0146-6402\(78\)90002-4](http://dx.doi.org/10.1016/0146-6402(78)90002-4)
- Beilock, S. L., Rydell, R. J., & McConnell, A. R. (2007). Stereotype threat and working memory: Mechanisms, alleviation, and spillover. *Journal of Experimental Psychology: General*, 136, 256–276. <http://dx.doi.org/10.1037/0096-3445.136.2.256>
- Blascovich, J., Spencer, S. J., Quinn, D., & Steele, C. (2001). African Americans and high blood pressure: The role of stereotype threat. *Psychological Science*, 12, 225–229. <http://dx.doi.org/10.1111/1467-9280.00340>
- Bowen, N. K., Wegmann, K. M., & Webber, K. C. (2013). Enhancing a brief writing intervention to combat stereotype threat among middle-school students. *Journal of Educational Psychology*, 105, 427–435. <http://dx.doi.org/10.1037/a0031177>
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32, 513–531. <http://dx.doi.org/10.1037/0003-066X.32.7.513>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Brown, R. P., & Josephs, R. A. (1999). A burden of proof: Stereotype relevance and gender differences in math performance. *Journal of Personality and Social Psychology*, 76, 246–257. <http://dx.doi.org/10.1037/0022-3514.76.2.246>
- Cohen, G. L., & Garcia, J. (2014). Educational theory, practice, and policy and the wisdom of social psychology. *Policy Insights from the Behavioral and Brain Sciences*, 1, 13–20. <http://dx.doi.org/10.1177/2372732214551559>
- Cohen, G. L., Garcia, J., Apfel, N., & Master, A. (2006). Reducing the racial achievement gap: A social-psychological intervention. *Science*, 313, 1307–1310. <http://dx.doi.org/10.1126/science.1128317>
- Cohen, G. L., Garcia, J., Purdie-Vaughns, V., Apfel, N., & Brzustoski, P. (2009). Recursive processes in self-affirmation: Intervening to close the minority achievement gap. *Science*, 324, 400–403. <http://dx.doi.org/10.1126/science.1170769>
- Cohen, G. L., Purdie-Vaughns, V., & Garcia, J. (2012). An identity threat perspective on intervention. In M. Inzlicht & T. Schmader (Eds.), *Stereotype threat: Theory, process, and application* (pp. 280–296). New York, NY: Oxford University Press.
- Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, 65, 333–371. <http://dx.doi.org/10.1146/annurev-psych-010213-115137>
- Cohen, G. L., Steele, C. M., & Ross, L. D. (1999). The mentor's dilemma: Providing critical feedback across the racial divide. *Personality and Social Psychology Bulletin*, 25, 1302–1318. <http://dx.doi.org/10.1177/0146167299258011>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Cook, J. E., Purdie-Vaughns, V., Garcia, J., & Cohen, G. L. (2012). Chronic threat and contingent belonging: Protective benefits of values affirmation on identity development. *Journal of Personality and Social Psychology*, 102, 479–496. <http://dx.doi.org/10.1037/a0026312>
- Cornil, Y., & Chandon, P. (2013). From fan to fat? Vicarious losing increases unhealthy eating, but self-affirmation is an effective remedy. *Psychological Science*, 24, 1936–1946. <http://dx.doi.org/10.1177/0956797613481232>
- Creswell, J. D., Dutcher, J. M., Klein, W. M., Harris, P. R., & Levine, J. M. (2013). Self-affirmation improves problem-solving under stress. *PLoS ONE*, 8, e62593. <http://dx.doi.org/10.1371/journal.pone.0062593>
- Creswell, J. D., Lam, S., Stanton, A. L., Taylor, S. E., Bower, J. E., & Sherman, D. K. (2007). Does self-affirmation, cognitive processing, or discovery of meaning explain cancer-related health benefits of expressive writing? *Personality and Social Psychology Bulletin*, 33, 238–250. <http://dx.doi.org/10.1177/0146167206294412>
- Critcher, C. R., & Dunning, D. (2015). Self-affirmations provide a broader perspective on self-threat. *Personality and Social Psychology Bulletin*, 41, 3–18. <http://dx.doi.org/10.1177/0146167214554956>
- Critcher, C. R., Dunning, D., & Armor, D. A. (2010). When self-affirmations reduce defensiveness: Timing is key. *Personality and Social Psychology Bulletin*, 36, 947–959. <http://dx.doi.org/10.1177/0146167210369557>
- Crocker, J., Niiya, Y., & Mischkowski, D. (2008). Why does writing about important values reduce defensiveness? Self-affirmation and the role of positive other-directed feelings. *Psychological Science*, 19, 740–747. <http://dx.doi.org/10.1111/j.1467-9280.2008.02150.x>
- Crum, A. J., & Langer, E. J. (2007). Mind-set matters: Exercise and the placebo effect. *Psychological Science*, 18, 165–171. <http://dx.doi.org/10.1111/j.1467-9280.2007.01867.x>
- Crum, A. J., & Phillips, D. J. (2015). Self-fulfilling prophesies, placebo effects, and the social-psychological creation of reality. In R. A. Scott, S. M. Kosslyn, & N. Pinkerton (Eds.), *Emerging trends in the social and behavioral sciences* (pp. 1–14). Hoboken, NJ: Wiley. <http://dx.doi.org/10.1002/9781118900772.etrds0296>
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26, 325–346. <http://dx.doi.org/10.1080/00461520.1991.9653137>
- Dee, T. S. (2015). Social identity and achievement gaps: Evidence from an affirmation intervention. *Journal of Research on Educational Effectiveness*, 8, 149–168. <http://dx.doi.org/10.1080/19345747.2014.906009>
- Dewey, J. (1913). *Interest and effort in education*. Boston, MA: Riverside Press. <http://dx.doi.org/10.1037/14633-000>
- Duncan, G. J., & Murnane, R. J. (2011). *Whither opportunity?: Rising inequality, schools, and children's life chances*. New York, NY: Russell Sage Foundation.
- Elbow, P. (1998). *Writing with power: Techniques for mastering the writing process*. New York, NY: Oxford University Press.
- Espenshade, T. J., & Radford, A. W. (2013). *No longer separate, not yet equal: Race and class in elite college admission and campus life*. Princeton, NJ: Princeton University Press.
- Fein, S., & Spencer, S. J. (1997). Prejudice as self-image maintenance: Affirming the self through derogating others. *Journal of Personality and Social Psychology*, 73, 31–44. <http://dx.doi.org/10.1037/0022-3514.73.1.31>
- Ferrer, R. A., Taber, J. M., Klein, W. M. P., Harris, P. R., Lewis, K. L., & Biessacker, L. G. (2014). The role of current affect, anticipated affect and spontaneous self-affirmation in decisions to receive self-threatening genetic risk information. *Cognition and Emotion*, 29, 1456–1465.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row Peterson & Co.
- Fratraro, J. (2006). Experimental disclosure and its moderators: A meta-analysis. *Psychological Bulletin*, 132, 823–865. <http://dx.doi.org/10.1037/0033-2909.132.6.823>
- Fry, R., & Taylor, P. (2013). *Hispanic high school graduates pass Whites in rate of college enrollment*. Pew Hispanic Center. Retrieved from http://www.pewhispanic.org/files/2013/05/PHC_college_enrollment_2013-05.pdf
- Green, S. B., & Salkind, N. J. (2003). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, 39, 281–291. <http://dx.doi.org/10.1017/S0048577201393198>

- Gross, J. J. (Ed.). (2014). *Handbook of emotion regulation* (2nd ed.). New York, NY: Guilford Press.
- Hanselman, P., Bruch, S. K., Gamoran, A., & Borman, G. D. (2014). Threat in context: School moderation of the impact of social identity threat on racial/ethnic achievement gaps. *Sociology of Education*, *87*, 106–124. <http://dx.doi.org/10.1177/0038040714525970>
- Harackiewicz, J. M., Canning, E. A., Tibbetts, Y., Giffen, C. J., Blair, S. S., Rouse, D. I., & Hyde, J. S. (2014). Closing the social class achievement gap for first-generation students in undergraduate biology. *Journal of Educational Psychology*, *106*, 375–389. <http://dx.doi.org/10.1037/a0034679>
- Hidi, S., & Baird, W. (1986). Interestingness: A neglected variable in discourse processing. *Cognitive Science*, *10*, 179–194.
- Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st Century. *Review of Educational Research*, *70*, 151–179. <http://dx.doi.org/10.3102/00346543070002151>
- Holmes, J., & Gathercole, S. E. (2014). Taking working memory training from the laboratory into schools. *Educational Psychology*, *34*, 440–450. <http://dx.doi.org/10.1080/01443410.2013.797338>
- Inzlicht, M., & Kang, S. K. (2010). Stereotype threat spillover: How coping with threats to social identity affects aggression, eating, decision making, and attention. *Journal of Personality and Social Psychology*, *99*, 467–481. <http://dx.doi.org/10.1037/a0018951>
- Jamieson, J. P., Mendes, W. B., & Nock, M. K. (2013). Improving acute stress responses: The power of reappraisal. *Current Directions in Psychological Science*, *22*, 51–56. <http://dx.doi.org/10.1177/0963721412461500>
- Judd, C. M., & McClelland, G. H. (1989). *Data analysis: A model comparison approach*. San Diego, CA: Harcourt Brace Jovanovich.
- Jussim, L., & Harber, K. D. (2005). Teacher expectations and self-fulfilling prophecies: Knowns and unknowns, resolved and unresolved controversies. *Personality and Social Psychology Review*, *9*, 131–155. http://dx.doi.org/10.1207/s15327957pspr0902_3
- Keller, J. (2002). Blatant stereotype threat and women's math performance: Self-handicapping as a strategic means to cope with obtrusive negative performance expectations. *Sex Roles*, *47*, 193–198. <http://dx.doi.org/10.1023/A:1021003307511>
- Keller, J. (2007). Stereotype threat in classroom settings: The interactive effect of domain identification, task difficulty and stereotype threat on female students' maths performance. *British Journal of Educational Psychology*, *77*, 323–338. <http://dx.doi.org/10.1348/000709906X113662>
- Kelly, G. A. (1955). *The psychology of personal constructs* (Vol. 1). New York, NY: Norton.
- Klein, K., & Boals, A. (2001). Expressive writing can increase working memory capacity. *Journal of Experimental Psychology: General*, *130*, 520–533. <http://dx.doi.org/10.1037/0096-3445.130.3.520>
- Koole, S. L., Smeets, K., van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology*, *77*, 111–125. <http://dx.doi.org/10.1037/0022-3514.77.1.111>
- Legault, L., Al-Khindi, T., & Inzlicht, M. (2012). Preserving integrity in the face of performance threat: Self-affirmation enhances neurophysiological responsiveness to errors. *Psychological Science*, *23*, 1455–1460. <http://dx.doi.org/10.1177/0956797612448483>
- Leyens, J.-P., Désert, M., Croizet, J.-C., & Darcis, C. (2000). Stereotype threat: Are lower status and history of stigmatization preconditions of stereotype threat? *Personality and Social Psychology Bulletin*, *26*, 1189–1199. <http://dx.doi.org/10.1177/0146167200262002>
- Liu, M. C. (2011). *Investing in higher education for Latinos: Trends in Latino college access and success*. Denver, CO: National Conference of State Legislatures. Retrieved from <http://www.ncsl.org/documents/educ/trendsinalatinosuccess.pdf>
- Logel, C., & Cohen, G. L. (2012). The role of the self in physical health: Testing the effect of a values-affirmation intervention on weight loss. *Psychological Science*, *23*, 53–55. <http://dx.doi.org/10.1177/0956797611421936>
- Long, B. T., & Kurlaender, M. (2009). Do community colleges provide a viable pathway to a baccalaureate degree? *Educational Evaluation and Policy Analysis*, *31*, 30–53. <http://dx.doi.org/10.3102/0162373708327756>
- Lopez, M. H., & Cohn, D. (2011). *Hispanic poverty rate highest in new supplemental census measure*. Washington, DC: Pew Hispanic Center. Retrieved from <http://www.pewhispanic.org/files/2011/11/148.pdf>
- Major, B., Spencer, S., Schmader, T., Wolfe, C., & Crocker, J. (1998). Coping with negative stereotypes about intellectual performance: The role of psychological disengagement. *Personality and Social Psychology Bulletin*, *24*, 34–50. <http://dx.doi.org/10.1177/0146167298241003>
- Marx, D. M., & Goff, P. A. (2005). Clearing the air: The effect of experimenter race on target's test performance and subjective experience. *British Journal of Social Psychology*, *44*, 645–657. <http://dx.doi.org/10.1348/014466604X17948>
- McGuire, W. J., & McGuire, C. V. (1988). Content and process in the experience of self. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 97–144). New York, NY: Academic Press. [http://dx.doi.org/10.1016/S0065-2601\(08\)60225-7](http://dx.doi.org/10.1016/S0065-2601(08)60225-7)
- McGuire, W. J., McGuire, C. V., Child, P., & Fujioka, T. (1978). Salience of ethnicity in the spontaneous self-concept as a function of one's ethnic distinctiveness in the social environment. *Journal of Personality and Social Psychology*, *36*, 511–520. <http://dx.doi.org/10.1037/0022-3514.36.5.511>
- McQueen, A., & Klein, W. M. P. (2006). Experimental manipulations of self-affirmation: A systematic review. *Self and Identity*, *5*, 289–354. <http://dx.doi.org/10.1080/15298860600805325>
- Mitchell, M. (1993). Situational interest: Its multifaceted structure in the secondary school mathematics classroom. *Journal of Educational Psychology*, *85*, 424–436. <http://dx.doi.org/10.1037/0022-0663.85.3.424>
- Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. *Science*, *330*, 1234–1237. <http://dx.doi.org/10.1126/science.1195996>
- Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2004). *SPSS for introductory statistics: Use and interpretation*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Murphy, M. C., Steele, C. M., & Gross, J. J. (2007). Signaling threat: How situational cues affect women in math, science, and engineering settings. *Psychological Science*, *18*, 879–885. <http://dx.doi.org/10.1111/j.1467-9280.2007.01995.x>
- Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science*, *3*, 400–424. <http://dx.doi.org/10.1111/j.1745-6924.2008.00088.x>
- Osborne, J. W., & Walker, C. (2006). Stereotype threat, identification with academics, and withdrawal from school: Why the most successful students of colour might be most likely to withdraw. *Educational Psychology*, *26*, 563–577. <http://dx.doi.org/10.1080/01443410500342518>
- Owens, J., & Massey, D. S. (2011). Stereotype threat and college academic performance: A latent variables approach. *Social Science Research*, *40*, 150–166. <http://dx.doi.org/10.1016/j.ssresearch.2010.09.010>
- Pasek, J. (2012). Anesrake: ANES raking implementation (Version 0.7) [Comprehensive R Archive Network]. Retrieved from <http://cran.r-project.org/web/packages/anesrake/index.html>
- Pennebaker, J. W. (1993). Putting stress into words: Health, linguistic, and therapeutic implications. *Behaviour Research and Therapy*, *31*, 539–548. [http://dx.doi.org/10.1016/0005-7967\(93\)90105-4](http://dx.doi.org/10.1016/0005-7967(93)90105-4)
- Pennebaker, J. W. (1997). *Opening up: The healing power of expressing emotions*. New York, NY: Guilford Press.
- Pennebaker, J. W., & Chung, C. K. (2011). Expressive writing: Connec-

- tions to physical and mental health. In H. S. Friedman (Ed.), *Oxford handbook of health psychology* (pp. 417–437). New York, NY: Oxford University Press. <http://dx.doi.org/10.1093/oxfordhb/9780195342819.013.0018>
- Pennebaker, J. W., Mayne, T. J., & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology*, *72*, 863–871. <http://dx.doi.org/10.1037/0022-3514.72.4.863>
- Persoskie, A., Ferrer, R. A., Taber, J. M., Klein, W. M., Parascandola, M., & Harris, P. R. (2015). Smoke-free air laws and quit attempts: Evidence for a moderating role of spontaneous self-affirmation. *Social Science & Medicine*, *141*, 46–55. <http://dx.doi.org/10.1016/j.socscimed.2015.07.015>
- Pieterma, S., & Dijkstra, A. (2012). Cognitive self-affirmation inclination: An individual difference in dealing with self-threats. *British Journal of Social Psychology*, *51*, 33–51. <http://dx.doi.org/10.1348/014466610X533768>
- Putnam, R. D. (2015). *Our kids: The American dream in crisis*. New York, NY: Simon & Schuster.
- Ramirez, G., & Beilock, S. L. (2011). Writing about testing worries boosts exam performance in the classroom. *Science*, *331*, 211–213. <http://dx.doi.org/10.1126/science.1199427>
- Rearson, S. F. (2013). The widening income achievement gap. *Educational Leadership*, *70*, 10–16.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rosenthal, R., & Jacobson, L. (1968). Pygmalion in the classroom. *The Urban Review*, *3*, 16–20. <http://dx.doi.org/10.1007/BF02322211>
- Rosenthal, R., & Rosnow, R. L. (1985). *Contrast analysis: Focused comparisons in the analysis of variance*. New York, NY: Cambridge University Press.
- Rossee, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*, 1–36. <http://dx.doi.org/10.18637/jss.v048.i02>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78. <http://dx.doi.org/10.1037/0003-066X.55.1.68>
- Santiago, D., & Callan, P. (2010). *Ensuring America's future: Benchmarking Latino college completion to meet national goals: 2010–2020*. Washington, DC: Excelencia in Education.
- Schmader, T., & Johns, M. (2003). Converging evidence that stereotype threat reduces working memory capacity. *Journal of Personality and Social Psychology*, *85*, 440–452. <http://dx.doi.org/10.1037/0022-3514.85.3.440>
- Sherman, D. K., Bunyan, D. P., Creswell, J. D., & Jaremka, L. M. (2009). Psychological vulnerability and stress: The effects of self-affirmation on sympathetic nervous system responses to naturalistic stressors. *Health Psychology*, *28*, 554–562. <http://dx.doi.org/10.1037/a0014663>
- Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 38, pp. 183–242). San Diego, CA: Academic Press.
- Sherman, D. K., Cohen, G. L., Nelson, L. D., Nussbaum, A. D., Bunyan, D. P., & Garcia, J. (2009). Affirmed yet unaware: Exploring the role of awareness in the process of self-affirmation. *Journal of Personality and Social Psychology*, *97*, 745–764. <http://dx.doi.org/10.1037/a0015451>
- Sherman, D. K., Hartson, K. A., Binning, K. R., Purdie-Vaughns, V., Garcia, J., Taborsky-Barba, S., . . . Cohen, G. L. (2013). Deflecting the trajectory and changing the narrative: How self-affirmation affects academic performance and motivation under identity threat. *Journal of Personality and Social Psychology*, *104*, 591–618. <http://dx.doi.org/10.1037/a0031495>
- Silverman, A., & Cohen, G. L. (2014). Fostering positive narratives: Social-psychological interventions to maximize motivation in the classroom and beyond. In S. A. Karabenick & T. C. Urdan (Eds.), *Motivational interventions* (Vol. 18, pp. 177–211). Bingley, UK: Emerald Group Publishing Limited. <http://dx.doi.org/10.1108/S0749-742320140000018005>
- Silverman, A., Logel, C., & Cohen, G. L. (2013). Self-affirmation as a deliberate coping strategy: The moderating role of choice. *Journal of Experimental Social Psychology*, *49*, 93–98. <http://dx.doi.org/10.1016/j.jesp.2012.08.005>
- Smith, J. L., Sansone, C., & White, P. H. (2007). The stereotyped task engagement process: The role of interest and achievement motivation. *Journal of Educational Psychology*, *99*, 99–114. <http://dx.doi.org/10.1037/0022-0663.99.1.99>
- Snyder, C. R., Harris, C., Anderson, J. R., Holleran, S. A., Irving, L. M., Sigmon, S. T., . . . Harney, P. (1991). The will and the ways: Development and validation of an individual-differences measure of hope. *Journal of Personality and Social Psychology*, *60*, 570–585. <http://dx.doi.org/10.1037/0022-3514.60.4.570>
- Snyder, C. R., Shorey, H. S., Cheavens, J., Pulvers, K. M., Adams, V. H., III, & Wiklund, C. (2002). Hope and academic success in college. *Journal of Educational Psychology*, *94*, 820–826. <http://dx.doi.org/10.1037/0022-0663.94.4.820>
- Snyder, T. D., & Dillow, S. A. (2013). *Digest of education statistics 2012* (No. NCES 2014–015). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.
- Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology*, *35*, 4–28. <http://dx.doi.org/10.1006/jesp.1998.1373>
- Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 261–302). New York, NY: Academic Press.
- Steele, C. M. (1997). A threat in the air. How stereotypes shape intellectual identity and performance. *American Psychologist*, *52*, 613–629. <http://dx.doi.org/10.1037/0003-066X.52.6.613>
- Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *69*, 797–811. <http://dx.doi.org/10.1037/0022-3514.69.5.797>
- Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34, pp. 379–440). New York, NY: Academic Press.
- Stinebrickner, T., & Stinebrickner, R. (2013). *Academic performance and college dropout: Using longitudinal expectations data to estimate a learning model* (Working Paper No. 18945). Cambridge, MA: National Bureau of Economic Research. Retrieved from <http://www.nber.org/papers/w18945>
- Stone, J. (2002). Battling doubt by avoiding practice: The effects of stereotype threat on self-handicapping in white athletes. *Personality and Social Psychology Bulletin*, *28*, 1667–1678. <http://dx.doi.org/10.1177/014616702237648>
- Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist*, *38*, 1161–1173. <http://dx.doi.org/10.1037/0003-066X.38.11.1161>
- Tesser, A., Crepez, N., Collins, J. C., Cornell, D., & Beach, S. R. H. (2000). Confluence of self-esteem regulation mechanisms: On integrating the self-zoo. *Personality and Social Psychology Bulletin*, *26*, 1476–1489. <http://dx.doi.org/10.1177/01461672002612003>
- Trope, Y., & Neter, E. (1994). Reconciling competing motives in self-evaluation: The role of self-control in feedback seeking. *Journal of*

- Personality and Social Psychology*, 66, 646–657. <http://dx.doi.org/10.1037/0022-3514.66.4.646>
- Vohs, K. D., Park, J. K., & Schmeichel, B. J. (2013). Self-affirmation can enable goal disengagement. *Journal of Personality and Social Psychology*, 104, 14–27. <http://dx.doi.org/10.1037/a0030478>
- Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, 92, 82–96. <http://dx.doi.org/10.1037/0022-3514.92.1.82>
- Walton, G. M., & Cohen, G. L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science*, 331, 1447–1451. <http://dx.doi.org/10.1126/science.1198364>
- Walton, G. M., Logel, C., Peach, J., Spencer, S., & Zanna, M. P. (2015). Two brief interventions to mitigate a “chilly climate” transform women’s experience, relationships, and achievement in engineering. *Journal of Educational Psychology*, 107, 468–485. <http://dx.doi.org/10.1037/a0037461>
- Wilson, T. D., & Linville, P. W. (1985). Improving the performance of college freshmen with attributional techniques. *Journal of Personality and Social Psychology*, 49, 287–293. <http://dx.doi.org/10.1037/0022-3514.49.1.287>
- Wong, C. A., Eccles, J. S., & Sameroff, A. (2003). The influence of ethnic discrimination and ethnic identification on African American adolescents’ school and socioemotional adjustment. *Journal of Personality*, 71, 1197–1232. <http://dx.doi.org/10.1111/1467-6494.7106012>
- Yeager, D. S., Purdie-Vaughns, V., Garcia, J., Apfel, N., Brzustoski, P., Master, A., . . . Cohen, G. L. (2014). Breaking the cycle of mistrust: Wise interventions to provide critical feedback across the racial divide. *Journal of Experimental Psychology: General*, 143, 804–824. <http://dx.doi.org/10.1037/a0033906>
- Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education: They’re not magic. *Review of Educational Research*, 81, 267–301. <http://dx.doi.org/10.3102/0034654311405999>
- Zajacova, A., Lynch, S. M., & Espenshade, T. J. (2005). Self-efficacy, stress, and academic success in college. *Research in Higher Education*, 46, 677–706. <http://dx.doi.org/10.1007/s11162-004-4139-z>

Received February 4, 2015

Revision received September 16, 2015

Accepted September 17, 2015 ■