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Jordan B. Leitner¹, James M. Jones¹, and Eric Hehman¹

Abstract

Two experiments examined *Engagement Regulation*, the systematic increase or decrease of self-esteem engagement in a domain following positive or negative outcomes, respectively. We hypothesized that, under threat, more positive outcomes increase engagement, and greater engagement augments the influence of subsequent outcomes on self-esteem and performance. Female participants completed an initial math test, received bogus feedback, and then completed a second test. Results indicated that more positive feedback evoked greater engagement and that this relationship was strongest under stereotype threat (Study 1). Under stereotype threat, engagement interacted with subsequent feedback, such that greater engagement to positive feedback increased performance, but greater engagement to negative feedback decreased self-esteem and performance (Study 2). Together, these findings suggest that Engagement Regulation facilitates self-esteem maintenance and positive performance under stereotype threat.

Keywords

stereotypes, self-esteem, self-regulation, motivation and performance

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Stereotype threat research has shown that members of stigmatized groups underperform in situations where they fear confirming negative group stereotypes (e.g., Spencer, Steele, & Quinn, 1999; Steele & Aronson, 1995). Whereas the majority of this research has focused on elucidating the causes of poor performance (e.g., Beilock, Rydell, & McConnell, 2007; Inzlicht, McKay, & Aronson, 2006; Schmader, Johns, & Forbes, 2008; Spencer et al., 1999; Steele, 1997), the current work examines the psychological antecedents of success in stereotype threat domains. We focus on engagement, the degree to which self-esteem is contingent on outcomes in a given domain. More specifically, we explore the effect of successful and unsuccessful performance outcomes on engagement, and the role of engagement in predicting subsequent performance.

Stereotype threat is involved in a wide variety of performance decrements across multiple domains. For example, when race was salient, Latinos performed worse than Whites on a quantitative task (Gonzales, Blanton, & Williams, 2002); when gender was salient, females performed worse than men on a similar task (Spencer et al., 1999); and when socioeconomic status (SES) was salient, low-SES children performed worse than high-SES children on a verbal task (Croizet & Claire, 1998).

However, despite the deleterious consequences of stereotype threat, many stigmatized individuals succeed. For instance, 90,700 females currently hold academic positions in science, technology, engineering, and mathematics (National Science Foundation, 2011) despite stereotypes against females in these domains (Furnham, Reeves, & Budhani, 2002; Yee & Eccles, 1988). The mechanisms by which these stigmatized individuals consistently overcome threat remain unknown, and may be better understood by considering the psychological processes used in response to threat and performance outcomes.

Decreased Engagement and Self-Esteem

One way in which stigmatized individuals may self-protect is by decreasing engagement or detaching self-esteem from performance outcomes.¹ The protective value of chronically

¹University of Delaware, Newark, USA

Corresponding Author:

Jordan B. Leitner, University of Delaware, 108 Wolf Hall, Newark, DE 19716, USA
Email: jleitner@psych.udel.edu

low engagement is demonstrated by graduate school application rejection notices decreasing self-esteem of students highly engaged with academic performance but having no effect on self-esteem of students with low academic engagement (Crocker, Sommers, & Luhtanen, 2002, Crocker & Wolfe, 2001).

Theoretical frameworks have posited that individuals decrease engagement in response to situational threats. For instance, Black participants demonstrate decreased engagement following negative feedback on threatening, but not nonthreatening, tests (Major, Spencer, Schmader, Wolfe, & Crocker, 1998, Study 2; Nussbaum & Steele, 2007). Although such decreased engagement offers protection from failure, succeeding in the face of threat would be psychologically beneficial if the experience was used as a barometer of self-esteem. Thus, for successful individuals, lower engagement is maladaptive because it precludes integrating positive performance feedback (e.g., "I succeeded on the test") into the self-concept (e.g., "I am smart"). Supportive of this perspective, positive academic experiences increase self-esteem for individuals who are more engaged in the academic domain (Crocker et al., 2002; Major et al., 1998; Study 1). Therefore, adjusting engagement to draw strength from positive outcomes and protect feelings of self-worth from negative outcomes is adaptive.

However, research has yet to establish the causal link between performance outcomes and engagement. Because the aforementioned research assessed engagement following threat manipulations and negative feedback, the independent effects of situational threat and feedback on engagement are unclear. One possibility is that situational threat does not directly decrease engagement. Instead, threat may increase sensitivity to all situational cues (Murphy, Steele, & Gross, 2007), and in a state of heightened sensitivity, negative feedback leads to decreased engagement. Thus, a goal of the current research was to examine the antecedents of engagement and determine whether decreasing engagement in response to negative outcomes and increasing engagement on positive outcomes are strategies that attenuate the pain of failure and maximize the fruits of success.

Decreased Engagement and Performance

Although lower engagement protects self-esteem from negative feedback under threat, there is disagreement over the effect of decreased engagement on performance. Some researchers suggest that decreased engagement undermines persistence (Crocker & Major, 1989; Steele, 1997) and performance (Schmader, Major, & Gramzow, 2001), while others have found no relationship between engagement and performance (Crocker & Luhtanen, 2003). Still others have demonstrated that lower engagement predicts *greater* persistence when it follows negative feedback in a stereotype threat situation (Nussbaum & Steele, 2007). The current

research intends to reconcile these conflicting findings by examining the performance consequences of engagement.

In summary, decreased engagement is effective in protecting self-esteem from negative evaluation, but increased engagement is necessary to reap the rewards of success. In addition, the effects of engagement on performance require further investigation.

Engagement Regulation

Individuals may protect against the dangers of failure and augment the benefits of success by regulating whether performance outcomes serve as a barometer of self-esteem, a process we refer to as Engagement Regulation. We posit that positive outcomes increase engagement, whereas negative outcomes decrease engagement. Although we anticipate that more positive feedback corresponds with greater engagement in nonthreatening situations, the feedback–engagement relationship may be heightened when one is apprehensive about the nature of the feedback. Specifically, as situational threat increases performance monitoring (Schmader et al., 2008) and vigilance to situational cues (Gardner, Pickett, & Knowles, 2005; Murphy et al., 2007; Pickett, Gardner, & Knowles, 2004), the effect of feedback on engagement may be stronger in the presence of threat, relative to the absence of threat (see Figure 1A). We conceptualize a situation as threatening if a person perceives it to be potentially harmful to self-esteem, group-esteem, public image, social acceptance, or psychological control. While the current work examines whether stereotype threat augments the effect of feedback on engagement, we theorize that individuals regulate engagement in any threatening situation.

Furthermore, as engagement determines whether one is sensitive to feedback, individuals may regulate engagement under threat to prepare the self for anticipated outcomes. Following negative feedback, decreased engagement protects self-esteem from future, presumably negative, evaluations, because low engagement isolates the experience (e.g., "I failed the test") from global self-evaluations (e.g., "I am a failure"). In contrast, following positive feedback, increased engagement stemming from positive feedback integrates subsequent, presumably positive, evaluations into one's self-perception of ability. As greater self-perceptions of ability may improve performance (Baumeister, Hamilton, & Tice, 1985; Wigfield & Eccles, 2000), we expect that greater engagement prior to negative feedback harms self-esteem and downstream performance, whereas greater engagement prior to positive feedback improves self-esteem and downstream performance (see Figure 1B). For individuals who chronically succeed in the face of threat, a pattern of increased engagement and positive feedback may strengthen self-esteem and elevate performance.

In summary, we hypothesize that (a) more positive feedback under threat increases engagement and (b) in the presence of threat, greater engagement to negative feedback

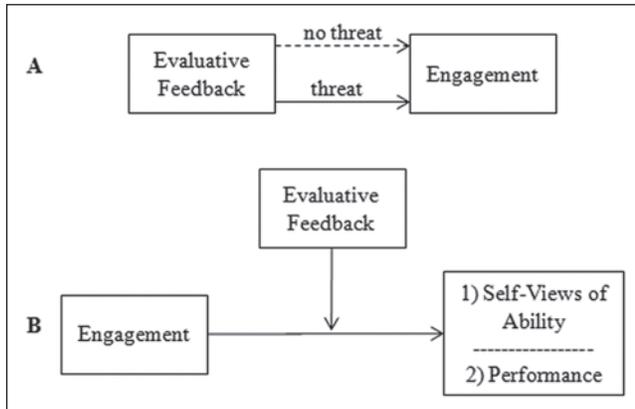


Figure 1. Hypothesized relationships

diminishes performance, while greater engagement to positive feedback augments performance.

Overview of the Studies

Two studies examined the antecedents and consequences of Engagement Regulation. Study 1 investigated the hypothesis that more positive outcomes increase engagement and that threat augments the effect of feedback on engagement. Study 2 manipulated engagement prior to performance feedback to examine whether feedback moderates the effect of engagement on self-esteem and performance.

Study 1

Study 1 examined the conditions that activate Engagement Regulation. Our primary goal was to test whether more positive performance feedback increases engagement and whether threat moderates this relationship. Accordingly, participants completed a stereotype threatening or stereotype neutral math test after which we manipulated evaluative performance feedback and measured engagement. Under threatening conditions, we expected participants to show greater engagement following positive, relative to negative, feedback. In the absence of threat, however, we expected the performance–engagement relationship to be attenuated.

Method

Participants and design. A total of 292 females from an Introductory Psychology class participated in a 2 (stereotype threat: threat, no threat) \times 2 (feedback: negative, positive) between-subjects design in exchange for partial course credit.

Procedure. Participants were seated at a computer and were given on-screen instructions indicating they would complete a computerized version of a mathematics intelligence test. A description conveyed that the test reliably measured global math intelligence. Experimenters were blind to

condition, and male in half the sessions. Experimenter gender effects were not observed.

Although all math assessments may evoke some stereotype threat in females, the threat of confirming the stereotype increases as accessibility of the negative stereotype increases (Dijksterhuis & van Knippenberg, 1998; Inzlicht & Ben-Zeev, 2000). Accordingly, we manipulated gender-math stereotype threat with a procedure previously shown to be successful (Spencer et al., 1999). In the stereotype threat condition, participants read a test description indicating that the test was designed to examine gender differences in math intelligence and that “similar tests have revealed that males typically outperform females.” In the no stereotype threat condition, participants were informed that “over 20,000 test administrations of this test have revealed that no gender differences exist in math intelligence.”

Next, participants completed a math test consisting of nine computerized Graduate Record Exam–style quantitative comparisons without time restriction. Each math problem presented one value in column A (e.g., $10x$) and one value in column B (e.g., $20x$). Participants indicated on a keyboard whether the value in column A was less than, greater than, or equal to Column B, or whether the problem provided insufficient information.

Participants then received feedback that their test performance was very poor (negative feedback: they scored in the 34th percentile of all test takers, and a bar graph depicted their math score as considerably lower than average) or feedback that their test performance was very good (positive feedback: they scored in the 94th percentile of all test takers, and a bar graph depicted their math intelligence score as considerably higher than average).

Finally, participants responded to a feedback manipulation check and a measure of engagement.

Measures. We assessed the effectiveness of our feedback manipulation by asking participants to indicate the extent to which they agreed with the statement “I feel that I performed better than others on the math test” on a scale from 1 (*disagree strongly*) to 7 (*agree strongly*).

To measure engagement to the intellectual performance domain, we used the three-item *disengagement* dimension of the Intellectual Engagement Inventory (IEI; Major & Schmader, 1998). Reliability was low (Cronbach’s $\alpha = .51$ across two studies), a matter we return to in the “General Discussion.” Items included “I really don’t care what tests say about my intelligence,” “no intelligence test will ever change my opinion of how intelligent I am,” and “how I do intellectually has little relation to who I am.” Participants responded on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. Responses were reversed and averaged such that more positive values indicate greater engagement with the intelligence testing domain.

Results. Participants tend to reject bogus feedback that greatly deviates from their actual score (Andersen & Nordvik,

Table 1. Descriptive Statistics and Variable Intercorrelations (Study 1)

	<i>M</i>	<i>SD</i>	1	2	3
1. Manipulation check ("performed better than others")	4.33	1.82	—		
2. Self-reported engagement	4.06	1.06	.20**	—	
3. Test performance (% correct)	40.13	20.69	.20**	.06	—

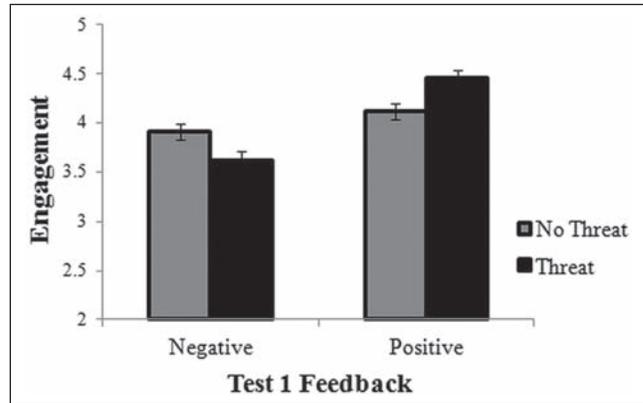
* $p < .05$. ** $p < .01$.

2002), and previous research has removed participants whose performance is inconsistent with their feedback (Heine et al., 2001). To ensure that our feedback manipulation was plausible, we omitted from our analyses any participant who answered every question incorrectly in the positive feedback condition, or answered every question correctly in the negative feedback condition. In all, 3 participants answering every question incorrectly were removed from the positive feedback condition.² No participants answered every question correctly in the negative feedback condition. Thus, 289 participants were included in the final analysis. Table 1 shows descriptive statistics and variable intercorrelations.

Manipulation check. Our stereotype threat manipulation was effective: Test performance under stereotype threat ($M = 37.34\%$, $SD = 19.60\%$) was worse than when threat was not present ($M = 42.52\%$, $SD = 21.35\%$), $F(1, 287) = 4.55$, $MSE = 422.85$, $p = .03$, $\eta^2 = .02$.

To assess whether participants were convinced by the bogus feedback manipulation, we examined the effect of feedback on participants' perceptions of test performance in a 2 (stereotype threat: threat, no threat) \times 2 (feedback: negative, positive) between-subjects ANOVA.³ As expected, relative to participants in the negative feedback condition ($M = 3.02$, $SD = 1.57$), participants in the positive feedback condition ($M = 5.49$, $SD = 1.10$) were more likely to report that they performed better than their peers, $F(1, 281) = 242.27$, $MSE = 1.80$, $p < .001$, $\eta^2 = .46$. No other effects were present, confirming that our manipulations were effective.

Interactive effect of threat and feedback on engagement. Due to heightened vigilance under threat, performance feedback was hypothesized to have a greater effect on engagement in the presence, compared with the absence, of stereotype threat. A 2 (stereotype threat) \times 2 (feedback) between-subjects ANOVA on self-reported engagement revealed that, as expected, there was no main effect for stereotype threat, $F(1, 285) = 0.01$, $p = .93$. A main effect did emerge for feedback, $F(1, 285) = 23.25$, $MSE = 1.03$, $p < .001$, $\eta^2 = .08$, but was qualified by the hypothesized interaction, $F(1, 285) = 6.26$, $MSE = 1.03$, $p = .01$, $\eta^2 = .02$ (see Figure 2). Planned contrasts indicated that when stereotype threat cues were present, participants who received positive feedback ($M = 4.45$, $SD = 0.96$) reported significantly greater

**Figure 2.** Interactive effect of feedback and threat on engagement in Study 1

Note: Error bars represent standard error of the mean.

engagement than participants who received negative feedback ($M = 3.62$, $SD = 1.00$), $F(1, 286) = 25.11$, $MSE = 1.02$, $p < .001$, $d = 0.90$. When the test was less threatening, participants who received positive feedback ($M = 4.12$, $SD = 1.06$) reported greater engagement than participants who received negative feedback ($M = 3.91$, $SD = 1.01$), though this difference did not reach significance, $F(1, 286) = 2.90$, $MSE = 1.02$, $p = .09$.

Discussion. Study 1 supports our primary hypothesis that threat determines the activation of Engagement Regulation. In the absence of stereotype threat, engagement was only marginally significantly related to performance feedback. In the presence of stereotype threat, however, participants reported significantly greater engagement following positive, relative to negative, feedback. These findings extend previous research by demonstrating that stereotype threat does not automatically evoke decreased engagement but rather heightens sensitivity to evaluative cues.

Although Study 1 elucidated the antecedents of Engagement Regulation, the effects of engagement on performance remain unclear. Previous research has suggested that greater engagement may augment (Major & Schmader, 1998), disrupt (Nussbaum & Steele, 2007), or have mixed consequences (Covington, 2000; Crocker & Luhtanen, 2003) for performance. Thus, important moderators may determine whether increased engagement manifests into motivation and augmented performance, or anxiety or impaired performance.

One such moderator may be the type of feedback one receives following engagement. As elevated engagement under threat increases sensitivity to feedback, greater engagement to negative feedback should diminish downstream self-esteem and performance, whereas greater engagement to positive feedback should enhance self-esteem and performance. Study 1 was limited in its ability to examine these possibilities because engagement was not assessed prior to feedback and performance.

Study 2

Therefore, the goal of Study 2 was to establish whether feedback moderates the effect of engagement on self-esteem and performance. Engagement and feedback were experimentally manipulated in a stereotype threatening domain before assessing state self-esteem and performance. To our knowledge, this is the first study to manipulate engagement. We expected that greater engagement prior to negative feedback would undermine subsequent self-esteem and performance but that greater engagement prior to positive feedback would enhance subsequent self-esteem and performance.

We expected feedback to influence self-esteem only for highly engaged participants and therefore anticipated that only highly engaged participants would prefer a task on which they had previously succeeded. We thus additionally assessed participants' task preference.

Method

Participants and design. A total of 615 female Introductory Psychology students completed a battery of pretesting questionnaires that included a measure of intellectual engagement (IEI; Major & Schmader, 1998; $M = 4.69$, $SD = 1.24$). From this sample, we recruited 112 students who scored between the 20th and 80th percentiles to participate in a 3 (engagement: low, control, high) \times 2 (feedback: negative, positive) between-subjects design in exchange for partial course credit. We targeted these moderately engaged participants because we sought to manipulate engagement using bogus feedback, and conjectured that these participants would be most susceptible to such a manipulation.

Procedures. Several weeks after pretesting, participants reported to our laboratory and entered identifying information in the computer so that "their IEI scores could be retrieved." In the low and high engagement conditions, participants were presented with bogus IEI results ostensibly derived from their pretesting questionnaire responses.

In the low engagement condition, participants were informed that they scored low on intellectual engagement, and viewed a bar graph depicting their intellectual engagement score as lower than average. In addition, an accompanying description stated that "individuals who score low on intellectual engagement tend to not base their self-esteem on intellectual test performance outcomes." In the high engagement condition, participants were informed that they scored high on intellectual engagement, and viewed a bar graph depicting their intellectual engagement score as above average. The description stated that "individuals who score high on intellectual engagement tend to base their self-esteem on intellectual test performance outcomes." Participants in the control condition received no IEI feedback.

To strengthen our manipulation, participants in the low and high engagement conditions were asked to explain *why* they have low or high intellectual engagement. Questions were worded such that participants were encouraged to

provide justification for the engagement induction that they received. More specifically, participants in the low engagement condition were asked, "Why do you not base your self-worth on intellectual assessments?" whereas participants in the high engagement condition were asked, "Why do you base your self-worth on intellectual assessments?"

Following the engagement manipulation, participants received the math test from Study 1 (i.e., "Test 1"). All tests included the stereotype threat description used in Study 1. Next, participants received the performance feedback (i.e., negative or positive) manipulation used in Study 1. Participants then completed measures of engagement (Major & Schmader, 1998, from Study 1), state self-esteem, and task preference. Finally, participants completed "Test 2," which was presented as "Part 2" of the math intelligence test.

Measures. Participants completed a modified version of the Rosenberg Self-Esteem scale (Rosenberg, 1965), a 10-item measure adapted to ask how participants feel about themselves at that moment, rather than in general, (e.g., "At this moment, I feel that I have a number of good qualities") on a 1 (*strongly disagree*) to 4 (*strongly agree*) scale, $\alpha = .89$. Responses were averaged, and higher scores represent higher state self-esteem.

Prior to receiving Test 2, participants were told that 10 problems on the "upcoming 20-item test" would be of a novel style (i.e., free response), and they were shown an example problem. However, for the other 10 problems, participants were given the option of choosing how many of each type of problem they would prefer to answer: novel-style free response problems or familiar-style quantitative comparisons similar to Test 1. For example, participants could choose to answer 3 free response and 7 quantitative comparison problems, or 5 free response and 5 quantitative comparison problems, and so on.

These options were intended to capture differences in task preference resulting from engagement and Test 1 feedback.⁴ It would be optimal for the self-esteem and performance of participants who believed they had performed poorly on Test 1 to select novel-style questions on Test 2, as the familiar-style questions had yielded negative outcomes. In contrast, for participants who believed that they performed well on Test 1, an optimal strategy for self-esteem and performance would be to select familiar-style questions as this type of question had previously yielded success.

Importantly, Test 2 only included 10 free response math word problems, and participants' task preferences did not affect the type of problems that were actually administered on Test 2. Participants were unrestricted by time and received feedback following each response. Following correct responses, participants were informed that they had answered correctly and were advanced to the next problem. However, following incorrect responses, participants could either (a) advance to the next question or (b) go back and attempt to resolve the problem correctly. Participants were allowed to "go back" a total of 5 times before being forced to advance

Table 2. Descriptive Statistics and Intercorrelations in Study 2

	M	SD	1	2	3	4	5	6
1. Manipulation check ("performed better than others")	4.21	1.85	—					
2. Self-reported engagement	4.24	1.02	.24**	—				
3. State self-esteem	3.27	0.44	.11	-.12	—			
4. Task preference for familiar-style problems	6.22	2.43	.13	.10	.14	—		
5. Test 1 performance (% correct)	36.69	19.73	.18	.03	-.06	-.17	—	
6. Test 2 performance (% correct)	60.99	21.30	.08	.12	-.06	-.14	.43**	—

* $p < .05$. ** $p < .01$.

to the next problem. To ensure that participants viewed the test as difficult, one problem did not have a correct solution and always indicated that participants were incorrect. We operationalized Test 2 performance as the percentage of solvable problems ($n = 9$) correctly solved.

Results. As in Study 1, we omitted participants whose Test 1 performance blatantly contradicted their feedback. In all, 4 participants answering every question incorrectly were removed from the positive feedback condition. No participants in the negative feedback condition answered every question correctly. Thus, 108 participants were included in the final analyses.

Results were equivalent whether our pretesting measure of engagement was included as a covariate or omitted from analyses. We report results without controlling for pretesting engagement. Table 2 shows descriptive statistics and variable intercorrelations.

Manipulation checks. A 3 (engagement: low, control, high) \times 2 (feedback: negative, positive) between-subjects ANOVA revealed a main effect of manipulated engagement on self-reported engagement, $F(2, 102) = 10.24$, $MSE = 0.89$, $p < .001$, $\eta^2 = .17$. Planned contrasts revealed that self-reported engagement did not differ between participants in the high engagement ($M = 4.45$, $SD = 0.91$) and control ($M = 4.64$, $SD = 0.88$) conditions, $F(1, 105) = 0.68$, $MSE = 0.91$, $p = .41$. However, participants in the high engagement and control conditions were more engaged than participants in the low engagement condition ($M = 3.73$, $SD = 1.06$), $F(1, 105) = 18.05$, $MSE = 0.91$, $p < .001$, $d = 0.83$. In addition, replicating our findings from Study 1, this analysis revealed a main effect for feedback, such that participants in the negative feedback condition ($M = 3.93$, $SD = 1.00$) reported being less engaged than participants in the positive feedback condition ($M = 3.54$, $SD = 1.03$), $F(2, 102) = 5.40$, $p = .02$, $d = 0.05$.

Although the lack of difference in self-reported engagement between the control and high engagement groups could be interpreted as evidence that our engagement manipulation was partially ineffective, we believe that subsequent results converge to demonstrate that participants in the high engagement condition truly became more engaged

than participants in the control condition. We return to this point in the "General Discussion."

A 3 (engagement) \times 2 (feedback) between-subjects ANOVA on perceptions of test performance again revealed that our bogus Test 1 feedback manipulation was successful. Relative to participants who received negative feedback ($M = 2.87$, $SD = 1.35$), participants who received positive feedback ($M = 5.57$, $SD = 1.21$) were more inclined to report that they had performed better than their peers on the test, $F(1, 102) = 119.69$, $MSE = 1.64$, $p < .001$, $\eta^2 = .54$. No other effects were present, $ps > .25$.

Interactive effect of engagement and feedback on state self-esteem. We predicted that greater engagement to positive feedback would augment state self-esteem but that greater engagement to negative feedback would diminish state self-esteem. Supporting this hypothesis, a 3 (engagement) \times 2 (feedback) between-subjects ANOVA on state self-esteem revealed a main effect for feedback, $F(1, 102) = 8.59$, $MSE = 0.16$, $p = .01$, $\eta^2 = .08$, qualified by the interaction, $F(2, 102) = 4.52$, $MSE = 0.16$, $p = .01$, $\eta^2 = .08$ (see Figure 3). Planned contrasts revealed that, following positive feedback, high engagement participants ($M = 3.41$, $SD = 0.42$) reported higher state self-esteem than control ($M = 3.29$, $SD = 0.42$) and low engagement ($M = 3.27$, $SD = 0.33$) participants, although these differences were not significant, $F_s < 0.1$, $ps > .48$. However, following negative feedback, high engagement participants ($M = 2.91$, $SD = 0.45$) reported nonsignificantly lower state self-esteem than control participants ($M = 3.05$, $SD = 0.38$), $F(1, 103) = 0.89$, $MSE = 0.17$, $p = .35$, and significantly lower state self-esteem than low engagement participants ($M = 3.34$, $SD = 0.36$), $F(1, 105) = 9.04$, $MSE = 0.17$, $p < .01$, $d = 0.93$.

Follow-up contrasts revealed that, for low engagement participants, Test 1 feedback was unrelated to state self-esteem, $F(1, 104) = 0.22$, $MSE = 0.16$, $p = .64$. Similarly, participants in the control condition reported only marginally lower levels of state self-esteem following negative, compared with positive, feedback, $F(1, 104) = 3.44$, $MSE = 0.16$, $p = .07$, $d = 0.60$. For high engagement participants, however, state self-esteem was significantly diminished following negative, relative to positive, feedback, $F(1, 104) = 12.99$,

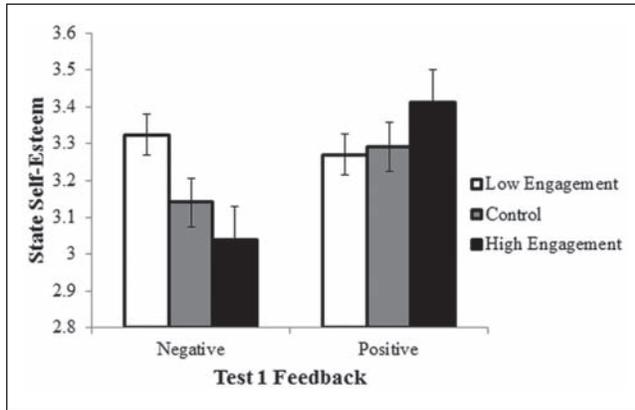


Figure 3. Interactive effect of feedback and engagement on state self-esteem in Study 2

Note: Error bars represent standard error of the mean.

$MSE = 0.16, p < .001, d = 1.15$. These findings support our hypothesis that engaging to positive feedback is beneficial for self-esteem but engaging to negative feedback is detrimental to self-esteem.

Interactive effect of engagement and feedback on task preference. Given that engagement increases sensitivity to feedback, we hypothesized that greater engagement would be associated with a bias for tasks likely to yield positive evaluation. In the current context, such a strategy would have been to select more familiar-style problems following positive feedback but novel problems following negative feedback. A 3 (engagement) \times 2 (feedback) between-subjects ANOVA on the number of familiar problems selected for Test 2 revealed no main effects, $ps > .11$, but the predicted interaction was significant, $F(2, 102) = 3.16, MSE = 5.70, p = .05, \eta^2 = .06$. Planned contrasts revealed that control ($M = 5.70, SD = 2.54$) and low engagement ($M = 6.35, SD = 2.18$) participants who received positive feedback did not differ in their preference for familiar-style problems, $F < 1, p = .40$. However, high engagement participants who received positive feedback ($M = 7.57, SD = 2.74$) selected marginally significantly more familiar-style problems than control and low engagement participants who received positive feedback, $F(1, 105) = 3.62, MSE = 5.74, p = .06$. Engagement did not significantly affect task preference for participants who received negative feedback, $F < 1, ps > .51$ (low engagement: $M = 5.78, SD = 2.46$; control: $M = 6.32, SD = 1.97$; high engagement: $M = 5.29, SD = 2.47$).

Follow-up contrasts revealed that, for participants in the control and low engagement conditions, feedback was unrelated to the style of problems that participants selected for Test 2, $Fs < 1, ps > .41$. In the engagement condition, however, participants selected significantly more familiar-style problems following positive, compared with negative, feedback, $F(1, 104) = 6.79, MSE = 5.62, p = .01, d = 0.87$.

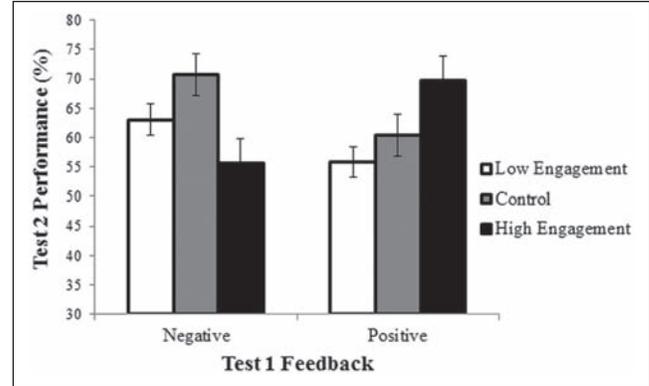


Figure 4. Interactive effect of feedback and engagement on performance in Study 2

Note: Means represent predicted value of Test 2 performance at mean level of Test 1 performance (36.69%). Error bars represent standard error of the mean.

Together, these findings support our hypothesis that greater engagement corresponds with a preference for tasks most likely to yield positive outcomes.

Interactive effect of engagement and feedback on performance. We hypothesized that greater engagement to negative feedback would decrease performance but that greater engagement to positive feedback would improve performance. A 3 (engagement) \times 2 (feedback) between-subjects ANCOVA on Test 2 performance, controlling for actual Test 1 performance, revealed no main effects but the predicted interaction was significant, $F(2, 101) = 4.24, p = .02, MSE = 341.21, \eta^2 = .08$ (see Figure 4).

We performed planned contrasts to test whether, controlling for Test 1 performance, greater engagement preceding negative Test 1 feedback corresponded with diminished Test 2 performance but greater engagement preceding positive Test 1 feedback corresponded with enhanced Test 2 performance. Supportive of our predictions, following negative Test 1 feedback, participants in the high engagement condition ($M = 55.70\%, SD = 18.72\%$) performed significantly lower on Test 2 than those in the control and low engagement conditions, $F(1, 102) = 4.34, MSE = 338.23, p = .04, d = 0.69$, whose performance did not significantly differ (control: $M = 70.76\%, SD = 19.47\%$; low engagement: $M = 63.00\%, SD = 15.14\%$), $F < 1.7, p = .20$. Conversely, following positive Test 1 feedback, participants in the high engagement condition ($M = 69.68\%, SD = 25.81\%$) performed significantly better on Test 2 than those in the control and low engagement conditions, $F(1, 102) = 4.32, MSE = 338.23, p = .04, d = 0.47$, whose performance did not significantly differ (control: $M = 60.37\%, SD = 24.76\%$; low engagement: $M = 55.84\%, SD = 16.66\%$), $F < 0.6, p = .45$. Furthermore, in neither the low engagement nor control conditions was Test 1 feedback significantly related to Test 2 performance, $Fs < 3.1, ps > .08$. In the high engagement condition, however,

Test 2 performance was significantly greater following positive, compared with negative, feedback, $F(1, 103) = 4.35$, $MSE = 341.29$, $p = .04$, $d = 0.67$.

These findings support our hypothesis that engaging to negative feedback disrupts performance but that engaging to positive feedback augments performance. For participants who were not engaged (i.e., participants in the control and low engagement conditions), initial feedback was unrelated to subsequent performance. For participants in the high engagement condition, however, performance was greater following positive, relative to negative, feedback.

Discussion. Study 2 replicated Study 1 in that participants reported greater engagement following positive, relative to negative, performance feedback in a stereotype threatening domain. In addition, the results of Study 2 suggest that feedback and engagement interact to influence downstream self-esteem and performance-related outcomes.

For participants in the control and low engagement conditions, Test 1 feedback did not affect subsequent self-esteem. This proved to be adaptive in that negative feedback did not diminish self-esteem for these participants. In contrast, participants in the high engagement condition reported significantly lower self-esteem following negative, compared with positive, Test 1 feedback. Because we manipulated engagement through bogus feedback, it is possible that these self-esteem effects were due to demand characteristics. Specifically, participants in the engagement condition may have shown heightened reactivity to feedback because they thought that the experimenter expected such behavior. While this is a possibility, our results are consistent with previous research where social desirability was not a concern (Crocker et al., 2002; Major et al., 1998), and thus do not believe demand characteristics to be responsible for the current effects. Consistent with this belief, results regarding self-esteem converge with the task preference and performance results that were less susceptible to demand characteristics.

Test 1 feedback affected subsequent task preference only for high engagement participants, who preferred more familiar-style problems following positive, rather than negative, feedback. We posit that high engagement participants were most strategic in their task selection because their self-esteem was most vulnerable to feedback. These findings extend research on achievement motivation (Wigfield & Eccles, 2000) by suggesting that evaluative feedback affects achievement-related choices for high engagement, but not low engagement, individuals.

Most central to our hypotheses, engagement interacted with Test 1 feedback to predict Test 2 performance. For control and low engagement participants, Test 1 feedback was unrelated to Test 2 performance. In contrast, high engagement participants demonstrated diminished performance following negative feedback as well as elevated performance following positive feedback. We hypothesized that greater engagement to positive feedback increases self-perceptions

of ability, which, in turn, affect performance. Thus, we explored whether the interactive effect of engagement and feedback on performance was mediated by state self-esteem. However, these tests revealed that self-esteem was not a significant mediator of the interactive relationship. One possibility is that this feedback–performance relationship was mediated by self-efficacy, rather than self-esteem, as self-efficacy is a stronger predictor of the motivational states that influence performance (Chen, Gully, & Eden, 2004). An additional possibility is that, for more engaged participants, feedback affected working memory resources involved in performance. More specifically, the combination of engagement and negative feedback may have produced a cognitive imbalance that consumed working memory resources. In contrast, the consonance created by engagement and positive feedback may have freed working memory resources typically devoted to performance monitoring in stereotype threatening situations (Schmader et al., 2008).

Overall, these findings illustrate the flexible nature of Engagement Regulation. Prior to a negative performance evaluation, lower engagement was a successful strategy for buffering self-esteem and future performance from the disruptive effects of negative feedback. However, prior to a positive performance evaluation, greater engagement was a successful strategy for maintaining high self-esteem and enhancing future performance. By responding to past experiences, Engagement Regulation may protect self-esteem and performance from future negative outcomes and enhance self-esteem and performance by integrating future positive outcomes into the self-concept.

General Discussion

The current findings provide support for the hypothesis that success in threatening domains is made possible through Engagement Regulation: the strategic and situational engagement with relevant domains. Results from Studies 1 and 2 suggest that stereotype threat activates Engagement Regulation. In the presence, but not the absence, of stereotype threat, more positive feedback elicited greater engagement. These findings extend previous work (Crocker & Wolfe, 2001; Major et al., 1998) by demonstrating that acute experiences of success and failure can affect whether self-esteem is contingent in a stereotype threatening domain.

In addition, the current findings extend previous research on the achievement consequences of engagement (Crocker & Major, 1989; Nussbaum & Steele, 2007; Schmader et al., 2001; Steele, 1997) by elucidating the conditions under which engagement augments and impairs performance. Consistent with previous theoretical frameworks (Covington, 2000; Crocker & Luhtanen, 2003), we did not find a direct relationship between engagement and performance. Rather, greater engagement augmented performance when it preceded positive feedback but impaired performance when it preceded negative feedback. As greater engagement corresponds with

both greater achievement motivation and greater anxiety (Crocker & Luhtanen, 2003), feedback may determine which correlate of engagement manifests into performance.

Based on these findings, we maintain that strategic Engagement Regulation prepares individuals for anticipated outcomes. Specifically, greater engagement following positive outcomes increases sensitivity to subsequent outcomes, whereas lower engagement following negative outcomes mitigates the influence of impending outcomes. Therefore, a cycle of engagement, positive feedback, and positive performance should contribute to positive mental health and long-term success.

The current work builds on extant research (Steele, 1997) and offers insight into one potential cause of achievement gaps between stigmatized and nonstigmatized populations. Specifically, one needs to engage with positive feedback to benefit from that feedback. For members of negatively stereotyped groups, situations that evoke stereotype threat will often lead to decreased performance and negative feedback. As shown in the current research, stigmatized individuals should decrease engagement following such negative feedback. Although lowered engagement should protect self-esteem from negative feedback, positive evaluations will have a limited influence on downstream performance. As members of stigmatized groups may chronically decrease engagement in response to negative feedback, positive feedback may ultimately benefit members of stigmatized groups less than nonstigmatized groups. However, the stigmatized individual who receives both negative and positive feedback would benefit from dynamic Engagement Regulation.

Limitations and Future Directions

Although our manipulation check in Study 2 revealed that participants in the low engagement condition reported lower engagement than participants in the control and high engagement conditions, it is notable that participants in the high engagement condition did not report greater engagement than participants in the control condition. This may have occurred because we measured engagement with a self-report measure validated to measure disengagement (i.e., the *disengagement* dimension of the IEI; Major & Schmader, 1998). Although we suggest that engagement and disengagement represent poles of the same psychological construct, subtle differences between them may exist. For example, engagement may correspond with approach motivations that are orthogonal to avoidance motivations associated with disengagement. Thus, the scale we used to measure engagement may actually be somewhat insensitive to changes in engagement. Future research might examine whether engagement and disengagement are indeed poles of the same psychological construct or represent two orthogonal processes driven by Engagement Regulation. In addition, we found that internal reliability of the self-report engagement scale (IEI; Major & Schmader, 1998) was low. These considerations make manipulating, rather than measuring,

engagement all the more appropriate. Study 2 extends previous research (e.g., Crocker et al., 2002; Major & Schmader, 1998; Schmader et al., 2001) by presenting the first experimental manipulation of engagement. Future research should consider using our method of manipulating engagement, which may provide a more valid test of its consequences.

Both Study 1 and Study 2 supported our hypothesis that, under threat, individuals report greater engagement following positive, compared with negative, performance feedback. We suspect that negative feedback evokes decreased engagement, whereas positive feedback evokes increased engagement. However, because we did not include a no-feedback condition, we are unable to establish whether negative and positive feedback have equivalent effects on engagement. Future research might examine whether negative and positive outcomes differentially modulate engagement.

Due to our efforts to understand how individuals succeed in the face of threat, we tested the existence of Engagement Regulation in the context of stereotype threat and found that, indeed, Engagement Regulation is activated by stereotype threat cues. However, we do not conceptualize Engagement Regulation to be a process exclusive to stereotype threat or the intellectual performance domain. Rather, we posit that heightened anxiety and vigilance activate Engagement Regulation. Accordingly, Engagement Regulation may occur in any threatening situation. Future research might investigate whether other types of threats, such as threats to public image or social acceptance, activate Engagement Regulation.

Although our findings indicate that greater engagement to more positive feedback augments performance (Study 2), state self-esteem did not mediate this relationship. Future research might focus on clarifying the mechanism by which these effects occurred. One possibility is that when more engaged participants received negative feedback on Test 1, they ruminated on the feedback, which, in turn, increased mind wandering (Mrazek et al., 2011) and diminished working memory (Beilock et al., 2007), two processes that disrupt test performance. However, when more engaged participants received a positive feedback on Test 1, they may have integrated the feedback into their self-efficacy, which, in turn, modified implicitly held stereotypes (Forbes & Schmader, 2010) and decreased the anxiety that typically disrupts performance (Schmader et al., 2008). Future research might investigate these possibilities by testing how engagement and feedback interact to predict working memory capacity, self-efficacy, anxiety, and performance monitoring.

In addition, future research should investigate the individual difference variables that moderate the influence of Engagement Regulation on self-esteem and downstream performance. One important factor that might determine the activation and consequences of Engagement Regulation is trait self-esteem. Previous research has demonstrated that individuals with higher self-esteem are more motivated to self-enhance (Taylor & Brown, 1988), repair negative moods (Heimpel, Wood, Marshall, & Brown, 2002), and emphasize

their positive attributes and suppress their negative attributes following failure (Brown & Smart, 1991). Therefore, we anticipate that individuals higher in trait self-esteem should be more likely to regulate engagement in response to outcomes and that this regulation will be adaptive for subsequent mental health and performance.

In conclusion, the current research demonstrated that Engagement Regulation contributes to positive self-esteem and performance in the face of stereotype threat. By regulating whether self-esteem is engaged to outcomes in a domain, individuals can determine the degree to which anticipated feedback affects self-esteem and performance. We believe that Engagement Regulation is a process that has implications for self-esteem and behavior in any domain where threat exists. Our findings are especially hopeful for individuals who aspire to succeed in stereotype threatening domains, as a pattern of regulated engagement and positive feedback may thwart the performance decrements so often associated with stereotype threat.

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Notes

1. Previous research has alternatively referred to lower engagement as disengagement (Major & Schmader, 1998) or lower contingencies of self-worth (Crocker & Wolfe, 2001).
2. Ideally, every participant would have answered half of the problems correctly, so that positive or negative feedback would be equally believable. However, as actual performance varied, we posit that the current exclusion criterion is appropriate because it removes the individuals who are *most* likely to reject the bogus feedback as believable, while keeping our power to detect significant effects high. Nevertheless, including these participants in our analyses did not change the overall pattern of results.
3. Four participants neglected to answer the feedback manipulation check.
4. This measure closely resembles the operational definition of task persistence used by Nussbaum and Steele (2007), who suggested that persistence is reflected by the tendency to

select familiar tasks following negative feedback. Alternate possibilities exist, however, for why one might choose more familiar tasks following negative feedback, such as decreased self-efficacy for trying something new. Therefore, we believe that this measure of task selection is a better proxy for task preference than persistence.

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