

Provided for non-commercial research and education use.  
Not for reproduction, distribution or commercial use.



This article appeared in a journal published by Elsevier. The attached copy is furnished to the author for internal non-commercial research and education use, including for instruction at the authors institution and sharing with colleagues.

Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Tex form) to their personal website or institutional repository. Authors requiring further information regarding Elsevier's archiving and manuscript policies are encouraged to visit:

<http://www.elsevier.com/copyright>



Contents lists available at ScienceDirect

## Journal of Research in Personality

journal homepage: [www.elsevier.com/locate/jrp](http://www.elsevier.com/locate/jrp)

## Brief Report

## Making lemonade? Defensive coping style moderates the effect of stereotype threat on women's math test performance

Sylvia P. Perry\*, Linda J. Skitka

*The University of Illinois at Chicago, United States*

## ARTICLE INFO

Article history:  
Available online 6 June 2009

Keywords:  
Stereotype threat  
Individual differences  
Gender  
Test performance  
Defensive  
Pessimism

## ABSTRACT

People high in defensive pessimism—a coping style characterized by ruminating on worse case scenarios when under stress—perform better under high than low academic pressure. The goal of the present study was to explore whether defensive pessimists might also perform better under high rather than low stereotype threat. Results supported hypotheses: specifically, some individuals' (e.g., defensive pessimists) performance was higher under high than low stereotype threat.

© 2009 Elsevier Inc. All rights reserved.

*When fate hands you a lemon, make lemonade.* –Dale Carnegie

## 1. Introduction

In contexts that they encounter, some people have been dealt the “lemon” of having to be vigilant to the possibility of confirming a negative stereotype about their group. At first glance, it seems rather difficult to “make lemonade” out of such a situation. For many, the fear of confirming a negative stereotype will lead them to confirm the stereotype (Steele & Aronson, 1995). This phenomenon, known as stereotype threat, has important implications for academic performance. Specifically, stereotype threat theory suggests that the situational fear of confirming negative stereotypes about one's group in the domain of academics leads to a number of negative outcomes overtime, including: (1) academic underperformance, (2) academic disidentification to protect one's self-esteem, and (3) internalized anxiety that in turn could lead to academic disidentification (e.g., “I am not a scholar”; Steele & Aronson, 1995). Research provides the strongest support for the first of these hypotheses: stereotype threat leads to situational academic underperformance on tasks such as challenging verbal or math tests (Schmader, 2002; Spencer, Steele, & Quinn, 1999; Steele & Aronson, 1995).

Although many researchers have found support for the stereotype threat effect on academic performance, to date, no one has investigated whether coping style might moderate this effect. If

people are likely to underperform in stereotype threat situations because they are stressful, the way people cope with stress may moderate the outcomes of a stereotype threat situation. Research by Norem and Cantor (1986) suggests that stereotype threat may not be so burdensome for everyone, because some students cope with stressful situations in a nontraditional way. Specifically, students high in defensive pessimism perform better rather than worse on academic tasks under challenging conditions. When defensive pessimists are faced with a challenging task, they set low expectations for their performance (even if these expectations are not realistic). Lowered expectations and stress serve as motivating, rather than debilitating, factors for defensive pessimists, signaling that they should prepare for the worst. These findings suggest that stereotype threat may lead some people to underperform (e.g., those low in defensive pessimism), but may facilitate performance for others (e.g., those high in defensive pessimism). The present study therefore investigates whether individual differences in defensive pessimism might moderate the effect of stereotype threat on academic performance.

## 2. Defensive pessimism

How individuals cope with stress is an important but neglected consideration in understanding who is likely to underperform in a stereotype threat situation. People use different coping styles to deal with stressful academic situations. Some use positive thinking such as optimism, whereas others use negative thinking and pessimism to deal with academic stress (Norem & Cantor, 1986). People use a defensive pessimism coping style when they set extremely low expectations for themselves even though they have performed

\* Corresponding author. Address: The University of Illinois, 1007 W Harrison St., Chicago, IL 60607, United States.

E-mail address: [sperry2@uic.edu](mailto:sperry2@uic.edu) (S.P. Perry).

well in the past. These pessimistic thoughts do not negatively affect the individual's performance, however. On the contrary, those who use a defensive pessimist coping style perform as well as those who use positive thinking as a coping style. When defensive pessimists are not allowed to ruminate about possible negative outcomes, they underperform relative to when they are allowed to ruminate (Norem & Cantor, 1986). Whether defensive pessimists have an opportunity to ruminate is important to consider when thinking about defensive pessimists in the context of a stereotype threat study. Specifically, research on defensive pessimism has shown that when defensive pessimists are encouraged about their performance, using statements like "Hmm, given how well you have done in the past... you will probably do very well on the upcoming task," they do less well than when they are not encouraged (Norem & Cantor, 1986). These kinds of statements force defensive pessimists to recognize the discrepancy between the expectations that they have set for their performance and their performance in the past. Therefore, while completing the task, defensive pessimists are less likely to feel that they have prepared for the worst, and are more likely to underperform on the task if they have been encouraged. One could argue that the statements made in the "low threat" condition of a stereotype threat study might also be encouraging statements to participants. Specifically, a statement such as "Previous scores on this test have shown no gender or racial differences in test scores" might reassure female or minority participants that their gender or race should not lead to performance deficits (Schmader, 2002). The low threat manipulation might actually be more threatening for defensive pessimists than the high threat manipulation, however, because it would prevent them from preparing for the worst.

The goal of the present study was therefore to test the *defensive pessimism hypothesis*. This hypothesis predicts that individual differences in defensive pessimism will moderate the effects of stereotype threat on women's performance on a math test. Specifically, women high in defensive pessimism should perform better under conditions of high as compared to low stereotype threat. Conversely, women low in defensive pessimism should show the opposite effect, that is, they should perform better under conditions of low as compared to high stereotype threat.

### 3. Method

#### 3.1. Participants

Eighty female participants from the University of Illinois at Chicago. Introduction to Psychology subject pool participated in the study. The participants were between the ages of 17 and 25. Students received partial credit for course requirements in an introductory psychology course for their participation.

#### 3.2. Procedure

At least 24 h prior to the experiment, participants completed an online pre-test measure that assessed demographic information (i.e., age, gender, and race) and defensive pessimism (Norem & Cantor, 1986). Upon arrival to the lab, participants were given an oral overview of the study including a description of the task involved and a cover story (instructions were adapted from Schmader, 2002). Specifically, participants were told,

We are developing some new tests that we are evaluating across a large group of UIC students. Today you will be taking a math test. You will have approximately 30 min to complete this test. We are interested in every individual's score because we will be comparing the individual scores to those of other

students. In the high stereotype threat condition, these instructions were followed by, Please answer all of your questions carefully and thoughtfully because this test is evaluative of your mathematic ability. We are also interested in how women score on this test relative to men. Because we are comparing women's scores to men's, each of your scores will also be used as an indicator of women's or men's math ability in general.

Participants in the low stereotype threat condition, in contrast, were told, "Please answer all of your questions carefully and thoughtfully because this test is evaluative of your personal mathematic ability. Previous scores on this test have shown no gender or racial differences in test scores." To place participants under time-pressure, participants were given 30 min to complete what should have been a 60-min math task. No participants were able to complete the test. After completing the math task, participants were debriefed, thanked, and given credit for their participation in the study.

#### 3.3. Measures

*Defensive pessimism.* Defensive pessimism was measured with Norem and Cantor's (1986) 12-item scale. Example items include, "I often start out expecting the worst, even though I will probably do OK," "I imagine how I would feel if things went well," and, "Considering what can go wrong helps me to prepare." The response scale for each item was anchored by *not at all true of me* and *very true of me* on a 7-point scale. Participants' responses were summed across items after reverse scoring con-trait items to create a total defensive pessimism score. Scores on this measure could range from 7 to 84 with higher scores indicating higher levels of defensive pessimism. The scale had an acceptable level of reliability with the current sample,  $\alpha = .84$ .

### 4. Results

The defensive pessimism hypothesis was tested by with moderated hierarchical regression. The defensive pessimism variable was centered by subtracting the sample mean from all individuals' scores to reduce multi-collinearity (Aiken & West, 1991). A block that included stereotype threat condition and centered defensive pessimism scores was entered first, followed by the stereotype threat and defensive pessimism interaction term in the second block. Stereotype threat condition and defensive pessimism did not account for any significant variance in women's math test performance,  $R^2 = .06$ ,  $F(2, 77) = 2.50$  ns. The block that included the interaction term, however, did explain significant variance in women's math test performance,  $R^2_{\text{change}} = .13$ ,  $F(1, 76) = 11.80$ ,  $p < .01$ . Analysis of the simple slopes (see Holmbeck, 2002) of stereotype threat separately for high and low defensive pessimists yielded results consistent with the defensive pessimism hypothesis. Specifically, women high in defensive pessimism performed better on the math test under conditions of high than low stereotype threat,  $\beta = .53$ ,  $B = 4.70$ ,  $t(76) = 5.96$ ,  $p < .05$ . In contrast, women low in defensive pessimism performed less well on the math test under conditions of high than low stereotype threat, replicating traditional stereotype threat underperformance effects,  $\beta = -.91$ ,  $B = -8.04$ ,  $t(76) = -3.89$ ,  $p < .001$  (see Fig. 1).

### 5. Discussion

The defensive pessimism hypothesis was fully supported. Specifically, a significant interaction revealed that women high in defensive pessimism performed better under conditions of high rather than low stereotype threat, whereas women low in defensive pessimism performed better under conditions of low rather than high stereotype threat on a challenging math test.

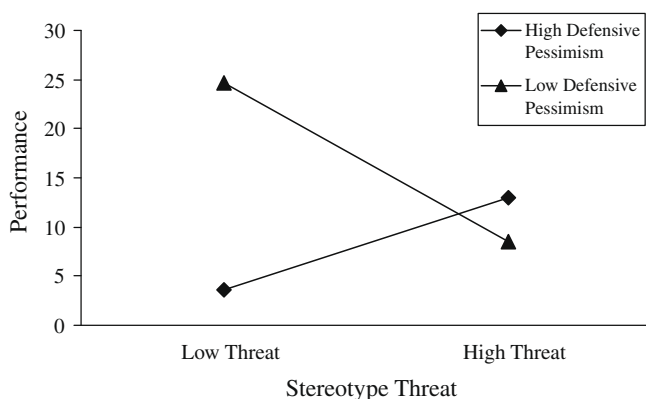


Fig. 1. Defensive pessimism moderates the relationship between stereotype threat and test performance.

These results showed that there are certain conditions when people may actually perform better under high than low stereotype threat. To date, there is limited research showing this reverse of the usual stereotype threat effect (Inzlicht, Aronson, Good, & McKay, 2006). The findings of the present study are important because they suggest that eliminating stereotype threat may actually be costly to certain individuals' performance, mainly defensive pessimists. Moreover, these findings suggest that whether people cope using optimism or defensive pessimism is an especially important component of understanding whether stereotype threat helps or harms performance. More research should investigate the relationship between stereotype threat and coping styles.

### 5.1. Anxiety and defensive pessimism

Research on defensive pessimism suggests that this coping style works primarily through its effects on reducing anxiety. As evidenced through a psycho-physiological study, rumination serves as a defense mechanism for defensive pessimists that reduces their anxiety when performing demanding tasks. Specifically, participants showed a decrease in anxiety on psycho-physiological measures when they were allowed to prepare for the worst compared to when they were distracted and therefore unable to ruminate (Norem & Illingworth, 1993). It would be useful to conceptually replicate this study in the context of stereotype threat to test whether engaging in rumination similarly alleviates the anxiety produced by stereotype threat among those high in defensive pessimism.

### 5.2. Limitations of the current study and stereotype threat research

One limitation of the current study is that defensive pessimists were not allowed much time to ruminate. Defensive pessimism research suggests that defensive pessimists do best with ample time to think about all of the possible negative outcomes of underperformance before they complete an exam. Therefore, our test of defensive pessimism was a conservative one. The effects for defensive pessimism are likely to be stronger when defensive pessimists are given more time to ruminate after learning information that induces stereotype threat, rather than having to plunge immediately into taking the test. The lack of much time to cope with stereotype threat is also a general limitation of most stereotype threat studies. When taking an exam in "real life", particularly a standardized test, most students know about the test and stereotypes about how well their group performs on it well before they arrive to take the exam. In most stereotype threat studies, however, students learn that they are about to take a test only minutes before they actually take it. The lack of time to cope with the situation is low in mundane realism, and therefore limits the degree to which the results of

most studies are likely to generalize to most normal test taking conditions because when students are not given advance warning of an exam, there is less opportunity for them to prepare for the exam in their "normal" way. Without giving students a more realistic time frame to think about the exam, researchers may create a more controlled environment, but possibly at the expense of external validity. Future research therefore should explore whether the effects of stereotype threat change as a function of whether participants are given a time lag between learning they will be taking an exam and when they take it. Our results suggest that if people are given a moment to use their usual coping strategies (regardless of whether these coping strategies involve defensive pessimism), they may not show decrements in performance, and may even show improved performance.

The results of our study also suggest that it would be useful to explore other coping strategies people use to deal with stress in general, and academic stress in particular, to explore if other coping strategies and styles also moderate previously observed stereotype threat effects. For example, positive coping strategies such as acceptance, positive reinterpretation, denial, or turning to religion could each plausibly have different effects than negative coping strategies such as behavioral or mental disengagement (Carver, Scheier, & Weintraub, 1989). It would be theoretically and practically important to discover which, if any, other coping strategies similarly allow people to effectively minimize the effects of stereotype threat on academic performance.

## 6. Conclusions

The current study contributes to our knowledge of how individual differences in coping style might affect performance under conditions of stereotype threat. Specifically, we found that defensive pessimists, who use negative thinking as a defense mechanism in stressful situations, performed significantly better under conditions of high than low stereotype threat. In demonstrating that some people can perform better under conditions of high rather than low levels of stereotype threat, we demonstrated that there are certain conditions when people can "make lemonade" and cope with the stress that stereotype threat produces in a way that improves, rather than diminishes, their performance. It is our hope that these findings will spark further interest in research on defensive pessimism as well as other coping strategies people might use to ameliorate the effects of stereotype threat on academic performance.

## References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*, 267–283.
- Holmbeck, G. N. (2002). Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *Journal of Pediatric Psychology*, *27*, 87–96.
- Inzlicht, M., Aronson, J., Good, C., & McKay, L. (2006). A particular resiliency to threatening environments. *Journal of Experimental Social Psychology*, *42*, 323–336.
- Norem, J. K., & Cantor, N. (1986). Defensive pessimism: "Harnessing" anxiety as motivation. *Journal of Personality and Social Psychology*, *51*, 1208–1217.
- Norem, J. K., & Illingworth, K. S. S. (1993). Strategy-dependent effects of reflecting on self and tasks: Some implications of optimism and defensive pessimism. *Journal of Personality and Social Psychology*, *65*, 822–835.
- Schmader, T. (2002). Gender identification moderates stereotype threat effects on women's math performance. *Journal of Experimental Social Psychology*, *38*, 194–201.
- Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Stereotype threat and women's math test performance. *Journal of Experimental Social Psychology*, *35*, 4–28.
- Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *65*, 797–811.