

## Abstract

People often reject creative ideas, even when espousing creativity as a desired goal. To explain this paradox, we propose that people can hold a bias against creativity that is not necessarily overt and that is activated when people experience a motivation to reduce uncertainty. In two experiments, we manipulated uncertainty using different methods, including an uncertainty-reduction prime. The results of both experiments demonstrated the existence of a negative bias against creativity (relative to practicality) when participants experienced uncertainty. Furthermore, this bias against creativity interfered with participants' ability to recognize a creative idea. These results reveal a concealed barrier that creative actors may face as they attempt to gain acceptance for their novel ideas.

Do people desire creative ideas? Most scholars would answer this question with an obvious “yes,” asserting that creativity is the engine of scientific discovery and the fundamental driving force of positive change (Hennessey & Amabile, 2010). Furthermore, creativity is seen as being associated with intelligence, wisdom, and moral goodness (Niu & Sternberg, 2006; Sternberg, 1985). However, although people strongly endorse this positive view of creativity, scholars have long been puzzled by the finding that organizations, scientific institutions, and decision makers routinely reject creative ideas, even when espousing creativity as an important goal (Staw, 1995). Similarly, research has documented that teachers dislike students who exhibit curiosity and creative thinking, even though teachers acknowledge creativity as an important educational goal (Westby & Dawson, 1995).

We offer a new perspective to explain this puzzle. Just as people have deeply rooted biases against people of a certain age, race, or gender that are not necessarily overt (Greenwald & Banaji, 1995), so too can people hold deeply rooted negative views of creativity that are not openly acknowledged. Revealing the existence and nature of a bias against creativity can help explain why people might reject creative ideas and stifle scientific advancement, even in the face of strong intentions to the contrary.

Creative ideas are both novel and useful (Hennessey & Amabile, 2010), and novelty is the key distinguishing feature of creativity beyond ideas that are merely well conceived. Yet

the requirement that creative ideas contain novelty can also promote a tension in evaluators' minds when they judge whether to pursue an idea. Indeed, evaluators have a hard time viewing novelty and practicality as attributes that go hand in hand, often viewing them as inversely related (Rietzschel, Nijstad, & Stroebe, 2009). There are several reasons why. Practical ideas are generally valued (Sanchez-Burks, 2005). However, the more novel an idea, the more uncertainty can exist about whether the idea is practical, useful, error free, and reliably reproducible (Amabile, 1996). When endorsing a novel idea, people can experience failure (Simonton, 1984), social rejection (Nemeth, 1986), and uncertainty about when their idea will reach completion (Metcalf, 1986). Uncertainty is an aversive state (Heider, 1958) that people feel a strong motivation to diminish and avoid (Whitson & Galinsky, 2008). Hence, people can also have negative associations with novelty—an attribute at the heart of what makes ideas creative in the first place.

Although positive associations with creativity are typically the focus of attention among both scholars and practitioners, negative associations may also be activated when people evaluate a creative idea. For example, research on associative

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thinking suggests that strong uncertainty feelings may make the negative attributes of creativity, particularly those related to uncertainty, more salient (Bower, 1981).

This evaluative process is not necessarily overt, which makes the bias against creativity potentially insidious. In fact, there is often strong normative pressure to endorse creative ideas (Flynn & Chatman, 2001) and a strong social desirability bias against expressing any view of creativity as negative (Runco, 2010). This resulting state is similar to that identified in research on racial bias: There is a conflict between an explicit preference toward creativity and unacknowledged negative associations with creativity (much as there can be a conflict between explicit and implicit attitudes toward a specific social group; Gaertner & Dovidio, 1986). In other words, uncovering a bias against creative ideas requires a method more subtle than simply asking directly. Therefore, we decided to employ a measure that assesses explicit attitudes in addition to implicit attitudes, which are less susceptible to self-presentation biases and normative pressures (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). In two studies, we tested whether uncertainty measured and manipulated in two different ways promotes a greater bias against creativity relative to practicality. In the second study, we investigated whether this bias deters peoples' ability to recognize creative ideas.

## Experiment 1

### Method

**Participants and design.** Participants ( $N = 73$ ) were randomly assigned to one of two conditions: uncertainty ( $n = 28$ ) or baseline ( $n = 45$ ). Fifty-one percent of the participants were men, and 49% were women (mean age = 22.74 years). Each participant took both an implicit and an explicit attitude test to assess his or her bias against creativity relative to his or her bias against practicality.

**Procedure and materials.** Participants in the uncertainty condition were told that they might receive additional payment, but this would be determined by a random lottery rather than by their performance. Participants in the baseline condition were not given the opportunity to receive extra money. A pilot study ( $N = 82$ ) verified that the uncertainty manipulation evoked significantly higher uncertainty feelings than did the baseline condition. All participants completed the Openness to Experience subscale of the NEO Personality Inventory (Costa & McCrae, 1992), a trait that is highly related to creativity (Feist, 1998).

Participants' automatic mental associations with creativity and practicality were assessed using the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). This measure relies on test takers' speed of response to determine the strength of their mental associations. The IAT measures participants' reaction times when categorizing stimuli from four categories. In this experiment, the categories consisted of

two attitude objects (creativity or practicality) and two evaluative dimensions (good or bad). In the computerized version of the IAT, participants press a key on the left of the keyboard in response to items from two paired categories (e.g., creativity + bad) and a key on the right of the keyboard in response to items from another pair (e.g., practicality + good). The categories assigned to the same response key vary between blocks. The speed of response in the blocks with one category pairing is compared with the speed of response in the blocks with the opposite category pairing, and this comparison is used to derive an index of the subject's implicit bias.

Our IAT used words related to creativity (e.g., *novel, creative, inventive, original*) and practicality (e.g., *practical, functional, constructive, and useful*), as well as words that named good things (*rainbow, cake, sunshine, laughter, peace, heaven*) and bad things (*vomit, hell, agony, rotten, poison, ugly*). Block order was counterbalanced such that half of the participants performed the creative + good component first, and the other half performed the creative + bad component first. The IAT score was calculated by subtracting response latencies for the creative + good blocks from response latencies for the creative + bad blocks; higher values indicate more bias against creativity relative to practicality. We scored the IAT using the  $D$  statistic (Greenwald, Nosek, & Banaji, 2003), a method less influenced by procedural variables, such as order or counterbalancing, and cognitive ability than standard scoring methods for the IAT are (Cai, Sriram, Greenwald, & McFarland, 2004).

Participants also explicitly rated their positive and negative feelings toward creativity- and practicality-related words on 7-point scales (1 = *strongly negative*, 4 = *neutral*, 7 = *strongly positive*). Words associated with creativity included *creative, inventive, original, and novel* ( $\alpha = .77$ ), and words associated with practicality included *practical, functional, constructive, useful* ( $\alpha = .88$ ). Participants indicated positive associations (i.e., above the scale midpoint) with both creativity-related words ( $M = 5.37$ ,  $SD = 0.75$ ) and practicality-related words ( $M = 5.43$ ,  $SD = 0.91$ ). Explicit-bias scores were calculated by subtracting ratings for creativity-related words from ratings for practicality-related words ( $M = 0.06$ ,  $SD = 0.91$ ). (See the Supplemental Material available online for additional details regarding Experiment 1 and a pilot study.)

### Results and discussion

Table 1 shows descriptive statistics and correlations among all major variables. An analysis of covariance (ANCOVA) controlling for openness to experience revealed no significant differences in explicit bias between the uncertainty condition ( $M = 0.02$ ,  $SD = 0.83$ ) and the baseline condition ( $M = -0.11$ ,  $SD = 0.96$ ),  $F(1, 70) = 0.07$ ,  $p = .78$ . However, a second ANCOVA that also controlled for openness to experience revealed that participants in the uncertainty condition showed an implicit bias against creativity relative to practicality ( $M = 0.15$ ,  $SD = 0.54$ ); this finding significantly differed from the

**Table 1.** Descriptive Statistics and Correlations Among All Variables in Experiment 1

Variable	M	Correlations		
		1	2	3
1. Openness to experience	4.01 (0.65)			
2. Condition (1 = uncertainty, 0 = baseline)	.38 (.43)	.11		
3. Explicit bias	0.06 (0.91)	-.32**	-.07	
4. Implicit bias	-0.09 (0.53)	-.25**	.35**	.29*

Note:  $N = 73$ . Standard deviations are given in parentheses. Twenty-eight participants were in the uncertainty condition, and 45 participants were in the baseline condition.

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

results of participants in the baseline condition, who showed an implicit bias in favor of creativity relative to practicality ( $M = -0.23$ ,  $SD = 0.47$ ),  $F(1, 70) = 13.13$ ,  $p = .001$ ; condition accounted for 11% of the variance in implicit bias.

The results of Experiment 1 show that people hold ambivalent attitudes toward creativity. Although participants in the baseline condition evidenced positive implicit associations with creativity relative to practicality, participants in the uncertainty condition exhibited an implicit bias against creativity relative to practicality. In Experiment 2, we wished to extend these findings to show that people's motivation to reduce uncertainty when solving a problem can activate the creativity bias. Specifically, scholars propose that effective and creative problem solving includes both generating many novel options and subsequently reducing uncertainty by identifying the single best option from the set (Cropley, 2006). We propose that this latter orientation toward identifying the optimal solution may prime an uncertainty-reduction motive or intolerance for uncertainty and thereby evoke the creativity bias. Additionally, we explored whether the creativity bias might also deter the recognition of a creative idea.

## Experiment 2

### Method

**Participants and design.** One hundred forty undergraduate students (55% female, 45% male; mean age = 20.66 years) were randomly assigned to one of two conditions: high tolerance for uncertainty ( $n = 70$ ) and low tolerance for uncertainty ( $n = 70$ ).

**Procedure and materials.** Before exposure to the experimental manipulation, participants took the Openness to Experience subscale. Participants in the high-tolerance-for-uncertainty condition were then told to write an essay supporting the statement, "For every problem, there is more than one correct solution." Participants in the low-tolerance-for-uncertainty condition were asked to write an essay supporting the statement, "For every problem, there is only one correct solution." After being exposed

to the experimental manipulation, each participant took the same implicit and explicit creativity versus practicality bias tests used in Experiment 1.

Subsequently, participants were asked to rate a creative idea (a running shoe with nanotechnology that adjusts fabric thickness to cool the foot and reduce blisters). We pretested this idea using a different sample of undergraduates ( $N = 36$ ), who rated this idea as being highly creative ( $M = 5.82$ ,  $SD = 0.80$ ), novel ( $M = 5.62$ ,  $SD = 1.02$ ), and practical ( $M = 5.85$ ,  $SD = 0.92$ ) on 7-point scales ranging from 1, *not at all*, to 7, *extremely so*. Participants in the main experiment rated the idea using the creativity scale, which employed the same six words related to creativity used in both the implicit and explicit bias tests ( $M = 5.41$ ,  $SD = 1.05$ ;  $\alpha = .78$ ).

In addition, a three-item manipulation check assessed participants' uncertainty when evaluating the running-shoe idea (e.g., "I feel uncertain about this idea"); the response scale ranged from 1, *not at all*, to 7, *very much so* ( $\alpha = .78$ ). Participants in the low-tolerance condition were significantly more uncertain ( $M = 4.36$ ,  $SD = 1.23$ ) than those in the high-tolerance condition ( $M = 3.87$ ,  $SD = 1.33$ ),  $F(1, 133) = 5.14$ ,  $p = .025$ . (See the Supplemental Material for additional details regarding Experiment 2, a pilot study, and one additional study.)

### Results and discussion

Table 2 shows descriptive statistics and correlations among all major variables. An ANCOVA controlling for openness to experience revealed that participants in the low-tolerance-for-uncertainty condition were not significantly different in their level of explicit bias against creativity ( $M = 0.20$ ,  $SD = 0.81$ ) compared with participants in the high-tolerance-for-uncertainty condition ( $M = 0.22$ ,  $SD = 0.94$ ),  $F(1, 133) = 0.14$ ,  $p = .71$ . However, a second ANCOVA controlling for openness to experience revealed that participants in the low-tolerance condition were more implicitly biased against creativity relative to practicality ( $M = 0.07$ ,  $SD = 0.43$ ) than participants in the high-tolerance condition were ( $M = -0.16$ ,  $SD = 0.46$ ),  $F(1, 133) = 7.87$ ,  $p = .007$ ; participants in the high-tolerance condition exhibited positive associations with creativity relative to

**Table 2.** Descriptive Statistics and Correlations Among All Variables in Experiment 2

Variable	<i>M</i>	Correlations				
		1	2	3	4	5
1. Openness to experience	5.59 (0.99)					
2. Condition (1 = low tolerance for uncertainty, 0 = high tolerance for uncertainty)	.50 (.50)	-.08				
3. Uncertainty feelings when evaluating an idea	4.12 (1.30)	-.04	.20*			
4. Explicit bias	0.21 (0.87)	-.23**	-.01	.01		
5. Implicit bias	-0.05 (0.46)	-.34**	.25**	-.13	.20*	
6. Creativity rating	5.41 (1.05)	.20*	-.33**	-.01	-.24**	-.33**

Note:  $N = 140$ . Standard deviations are given in parentheses. Seventy participants were in the low-tolerance-for-uncertainty condition, and 70 participants were in the high-tolerance-for-uncertainty condition.

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

practicality. A third ANCOVA controlling for openness to experience identified that participants in the low-tolerance condition rated the running-shoe idea as less creative ( $M = 5.06$ ,  $SD = 1.06$ ) than participants in the high-tolerance condition did ( $M = 5.76$ ,  $SD = 0.93$ ),  $F(1, 137) = 15.48$ ,  $p = .000$ .

A hierarchical regression showed that the relationship between experimental condition and creativity ratings,  $\beta = -0.64$ ,  $t(134) = -3.81$ ,  $p < .001$ , became less significant when implicit bias was included in the model,  $\beta = -0.56$ ,  $t(134) = -3.30$ ,  $p < .01$ . A bootstrap analysis of the indirect effect of condition on creativity ratings through implicit bias yielded a 95% confidence interval of  $[-.24, -.02]$ , which did not include zero; this result demonstrated partial mediation (Preacher & Hayes, 2004). Mediation analyses controlling for both explicit bias and openness to experience at each step indicated that relatively lower levels of uncertainty tolerance led to higher levels of implicit bias, which in turn contributed to lower ratings of creativity when controlling for participants' explicit bias and general openness to experience.

The results of Experiment 2 both replicated the finding that uncertainty promotes negative associations with creativity relative to practicality and extended this finding by showing that the bias against creativity interfered with participants' ability to recognize a creative idea.

## General Discussion

Robert Goddard, the father of modern rocket propulsion, endured ridicule and derision from his contemporary scientific peers, who stated that his ideas were ludicrous and impossible. This example is not unique, but it would puzzle creativity theorists, as research shows that expert raters who are themselves creative are even more likely to accurately recognize and assess creativity than expert raters who are less creative (Hennessey, Amabile, & Mueller, 2011). Our results show that regardless of the degree to which people are open minded, when they feel motivated to reduce uncertainty (either because they have an immediate goal of reducing uncertainty or they feel uncertain generally), they may experience more negative

associations with creativity, which results in lower evaluations of a creative idea. Our findings imply a deep irony. Prior research shows that uncertainty spurs the search for and generation of creative ideas (Audia & Goncalo, 2007), yet our findings reveal that uncertainty also makes people less able to recognize creativity, perhaps when they need it most.

Beyond merely having a preference for the status quo or for familiar ideas (Eidelman, Crandall, & Pattershall, 2009; Zajonc, 2001), people appear to have ambivalent feelings toward creativity. On the one hand, participants in the baseline condition of Experiment 1 and the high-tolerance-for-uncertainty condition of Experiment 2 demonstrated positive implicit associations with creativity relative to practicality. Additionally, 95% of participants in the uncertainty condition of Experiment 1 and the low-tolerance-for-uncertainty condition of Experiment 2 rated their explicit attitudes toward creativity-related words as positive—higher than 4, the midpoint of a 7-point scale; these ratings were statistically equivalent to the ratings of attitudes toward practicality-related words.

On the other hand, the implicit measure showed that participants in each high-uncertainty condition (i.e., the uncertainty condition of Experiment 1 and the low-tolerance condition of Experiment 2) associated words such as “vomit,” “poison,” and “agony” with creativity more than with practicality. Because there is such a strong social norm to endorse creativity, and people also feel authentic positive attitudes toward creativity, people may be reluctant to admit that they do not want creativity; hence, the bias against creativity may be particularly slippery to diagnose. The implicit measures may have picked up negative associations with creativity under conditions of uncertainty because the methodology is more resistant to social desirability bias (Greenwald et al., 2009).

If people hold an implicit bias against creativity, then we cannot assume that organizations, institutions, or even scientific endeavors will desire and recognize creative ideas even when they explicitly state that they want them. This is because when journals extol creative research, universities train scientists to promote creative solutions, research and development companies commend the development of new products, and

pharmaceutical companies praise creative medical breakthroughs, they may do so in ways that promote uncertainty by requiring gatekeepers to identify the single “best” and most “accurate” idea, thereby creating an unacknowledged aversion to creativity. In addition, our results suggest that if people have difficulty gaining acceptance for creative ideas, especially when more practical and unoriginal options are readily available, the field of creativity may need to shift its current focus from identifying how to generate more creative ideas to identifying how to help innovative institutions recognize and accept creativity. Future research should identify factors that mitigate or reverse the bias against creativity.

### Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

### Supplemental Material

Additional supporting information may be found at <http://pss.sagepub.com/content/by/supplemental-data>

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