

Fast track report

The pen is mightier than the word: Object priming of evaluative standards

ABRAHAM M. RUTCHICK^{1*}, MICHAEL L. SLEPIAN²
AND BENNETT D. FERRIS³

¹*Department of Psychology, California State University,
Northridge, USA*

²*Department of Psychology, Tufts University, Medford, USA*

³*Department of History and Social Sciences, Phillips Exeter
Academy, Exeter, USA*

Abstract

Because red pens are closely associated with error-marking and poor performance, the use of red pens when correcting student work can activate these concepts. People using red pens to complete a word-stem task completed more words related to errors and poor performance than did people using black pens (Study 1), suggesting relatively greater accessibility of these concepts. Moreover, people using red pens to correct essays marked more errors (Study 2) and awarded lower grades (Study 3) than people using blue pens. Thus, despite teachers' efforts to free themselves from extraneous influences when grading, the very act of picking up a red pen can bias their evaluations. Copyright © 2010 John Wiley & Sons, Ltd.

Teachers try to be fair when evaluating student work. They turn off the television, close the window, and otherwise free themselves from distraction. Many teachers correct papers in short bursts to minimize the effects of fatigue; some even counterbalance the papers' order or read them anonymously to maximize equitable evaluation. Clearly, when teachers pick up their red pens, they make every effort to free themselves from extraneous influence, but it may already be too late: Once the red pen is in hand, they may have already lost.

Writing in red is widely associated with correction and evaluative harshness. The American Heritage Dictionary (1992) defines *Red-pencil* as “to censor, cut, revise, or correct”. Red pens (1992) are used to indicate mistakes, and have been used in this way for some 300 years (Aoki, 2004). In fact, the strength of this association has been explicitly recognized by school districts in England, the United States, and Australia, who have recommended that teachers stop using red pens because the sight of papers covered in red corrections is stressful to students (Aoki, 2004; Feller, 2005; Hale, 2003; Lion, 2008). Because of this long-standing association, we propose that red pens are not neutral objects, but rather are laden with meaning; as such, they could potentially prime the concepts with which they are associated.

In addition to the many experiments demonstrating the behavioral impact of various subliminal and subtle presentations of words and images (e.g., on computer screens), a small but growing body of research has shown that physical objects and environments can also influence cognition and behavior. For instance, the presence of guns can intensify aggression (Berkowitz & LePage, 1967), the trappings of the business world induce more competitive behavior (Kay, Wheeler, Bargh, & Ross, 2004), and merely seeing a sports drink leads participants to perform with greater endurance (Friedman & Elliot,

*Correspondence to: Abraham M. Rutchick, Department of Psychology, California State University, 376 Sierra Hall, 18111 Nordhoff Street, Northridge, CA 91330, USA. E-mail: abraham.rutchick@csun.edu

2008). The presence of funeral homes can increase charitable behavior (Jonas, Schimel, Greenberg, & Pyszczynski, 2002), and even the height of a room's ceiling can influence cognitive processing (Meyers-Levy & Zhu, 2007). These examples of *object priming* show that, in essence, any object that is closely associated with a concept could potentially influence behavior by making that concept more accessible.

Colors, too, carry implicit associations that can influence cognition and behavior. Elliot, Maier, Moller, Friedman, and Meinhardt (2007) found that participants exposed to red writing on the cover of an experimental packet performed more poorly on a subsequent anagram task compared to participants exposed to green or black writing. In subsequent studies, Elliot et al. (2007) demonstrated that even brief exposure to the color red could produce this effect, and provided evidence suggesting that the effect takes place outside participants' conscious awareness. Further evidence that the link between red and failure is automatic was recently provided by Moller, Elliot, and Maier (2010), who found that words related to failure and negativity were responded to more quickly if they were displayed in red compared to other colors.

More recent research, however, suggests that exposure to red is not always linked to impaired performance and negativity. Mehta and Zhu (2009) conducted a series of studies comparing the effects of exposure to red and blue in a variety of contexts. They found that red increased the accessibility of avoidance-related words, whereas blue increased the accessibility of approach-related words. Participants preferred prevention-oriented products (e.g., a toothpaste that reduces the incidence of cavities) to promotion-oriented products (a toothpaste that whitens teeth) when their computer screens had red backgrounds; they had the opposite preferences when their screens had blue backgrounds. In the context of product design, participants who designed a children's toy using parts drawn in red produced toys that were judged to be more appropriate and practical; those who used parts drawn in blue produced designs that were more creative. Mehta and Zhu (2009) suggest that exposure to red facilitates effective performance of tasks that demand vigilance, attention, and a focus on detail.

In the context of achievement, exposure to red induces participants to adopt an avoidance orientation. Elliot, Maier, Binser, Friedman, and Pekrun (2009) demonstrated that participants briefly exposed to red on the cover of a test they were about to take exhibited more avoidance behaviors (knocking fewer times on a laboratory door, physically leaning further away from a computer screen displaying the test) than did participants exposed to other colors. These behaviors were only observed when participants were taking a test; however, an otherwise equivalent context unrelated to achievement (making ratings of likeability) revealed no differences between colors. This avoidance orientation, then, likely explains how red affects performance on anagrams and similar tasks (Elliot et al., 2007).

Because the color red is implicitly associated with avoidance and failure, and red pens specifically have long been associated with errors, we propose that exposure to a red pen activates the concepts of errors, poor performance, and evaluative harshness. In the current paper, we conducted three studies to demonstrate the activation of these concepts and assess the influence of red pens on error-marking and evaluation in a realistic context. Study 1 examined whether the use of red pens increases the cognitive accessibility of the concepts of errors and evaluative harshness. Study 2 examined whether participants mark more errors when using red pens than when using blue pens. Study 3 compared the subjective evaluations made by people using red pens to those made by people using blue pens.

STUDY 1

If, as we propose, red pens are associated with errors and harsh evaluations, the use of red pens should spontaneously activate these concepts. To test this hypothesis, participants performed a word-stem completion task in which several of the word stems could be completed with words related to errors and poor performance (e.g., "wrong"). We predicted that participants using red pens would be more likely to form such words.

One hundred and twenty students recruited from various university locations volunteered to participate in the study. Each participant was given a word-stem completion task (Gilbert & Hixon, 1991; Tulving, Schacter, & Stark, 1982), in which they were asked to fill in the missing letters of a series of words. Five of the word-stems could be completed with words related to errors and poor performance ("FAI_" which could be completed as "FAIL" or "fair"; "_RRO_" ERROR or arrow; "MIN_ _" MINUS or mines/minty/etc.; "_LUNK_" FLUNK or plunk/clunk; and "WRO_ _" WRONG or wrote). The likelihood with which people complete words related to errors and poor performance should

reflect the degree to which these concepts are accessible. The remaining 12 word-stems were unrelated to the concepts of errors and performance (e.g., “RIC_,” which could be completed as “rice” or “rich”). Participants were given a red or black pen, assigned randomly, to complete the word-stems. They were given as much time as they needed to complete the task, after which they were thanked, probed for suspicion, debriefed, and dismissed.

Participants using red pens completed more word-stems with words related to errors and poor performance ($M = 2.33$, $SD = 1.09$) than did participants using black pens ($M = 1.81$, $SD = 1.04$), $t(118) = 2.69$, $p < .01$, Cohen's $d = 0.49$. This suggests that using red pens made the concept of errors and poor performance more cognitively accessible.¹

STUDY 2

If the concepts of errors, poor performance, and harsh evaluation are activated by using red pens, people using red pens to correct others' work should mark more errors than participants using pens of other colors. To test this hypothesis, participants were instructed to correct an essay using either a red or a blue pen. We predicted, then, that as a result of object priming, participants who used red pens would mark more errors than participants who used blue pens.

One hundred and three participants, who volunteered their time, were recruited in and around a university campus. Participants were given a two-paragraph excerpt taken from an essay ostensibly written by a student who was learning English. The excerpt concerned the consequences of a recent medical examination undergone by the author, and contained a number of errors. The essay was printed in black ink on white paper. Participants were instructed to mark any errors in punctuation, spelling, grammar, and word choice, and were randomly assigned to use either a red or blue pen in marking the essay. Participants were given as much time as they wished to complete their evaluation.

Judges unaware of the hypothesis tallied the number of marks made by each participant;² compound marks (e.g., crossing out a misspelled word and writing the word correctly above it) were counted as one error. As predicted, evaluators using red pens marked more errors ($M = 24.3$, $SD = 16.95$)³ than did participants using blue pens ($M = 19.1$, $SD = 7.12$), $t(101) = 2.05$, $p = .04$, Cohen's $d = 0.40$.

These findings constitute initial evidence in support of our central hypothesis that red pens induce evaluators to mark more errors. However, it is not clear from this study alone that red pens promote evaluative harshness; the marking of errors could simply reflect increased vigilance and attention to detail (see Mehta & Zhu, 2009). To refine our findings, we next examined a more clearly subjective evaluative task: Assigning a grade to an essay that lacked objective errors.

STUDY 3

Participants were instructed to evaluate an essay and were provided with either a red or a blue pen. As they read, they were asked to mark flaws in the essay and make critical comments at their discretion. We hypothesized that using a red pen to complete this task would cause participants to assign lower grades than using a blue pen.

One hundred and twenty-nine students were recruited from introductory psychology courses, and were compensated with partial course credit. Participants were given a one-page essay ostensibly written by an eighth-grade student. The essay was a persuasive argument advocating field trips in middle school education, and as before was printed in black ink on white paper. The essay contained no grammatical or spelling errors, although (as might be expected of an eighth grader's work) there were a number of suboptimal word choices. For instance, one sentence read, “As you can see, eradication of field trips wouldn't be good.” Participants were instructed to evaluate the essay, indicating flaws (such as points at which the phrasing or word choice could be improved), and to award the essay a grade from zero (worst) to one hundred (best). As in Study 2, participants were randomly assigned to use either a red or blue pen in evaluating the essay.

¹To examine the possibility that using red pens simply activated negativity or influenced mood, a separate study was conducted in which participants ($n = 131$) completed the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) using either a red or black pen. Participants using red pens did not indicate that they were experiencing less positive affect ($t(129) = .78$, $p = .44$) or more negative affect ($t(129) = .76$, $p = .45$) than participants using black pens.

²Interrater agreement for this tally exceeded 98%.

³One participant marked 124 errors. Excluding this outlier did not substantially change the results: $t = 1.98$, $p = .05$, Cohen's $d = 0.39$.

As predicted, participants using red pens assigned lower grades⁴ ($M = 76.2$, $SD = 12.29$) than did participants using blue pens,⁵ ($M = 80.0$, $SD = 9.36$), $t(127) = 2.00$, $p = .048$, Cohen's $d = 0.35$. In addition, judges unaware of the hypothesis examined the essays and counted the number of critical comments made by each participant. As might be anticipated, the number of comments made was negatively correlated with the grade awarded, $r = -.22$, $p = .01$. However, evaluators using red pens did not make significantly more comments ($M = 17.6$, $SD = 10.24$) than participants using blue pens ($M = 16.0$, $SD = 9.16$), $t(127) = 0.94$, $p = .35$.

DISCUSSION

The current studies provide evidence that the use of red pens increases the cognitive accessibility of the concepts of error-marking and poor performance, leads to increased error-marking, and induces harsher evaluation. Repeated pairings of red pens and error-marking have likely created a strong mental association; the presence of red writing in effect denotes an error. Consequently, exposure to a red pen in the context of grading a paper can influence behavior, likely without the awareness of the person being influenced.

These findings extend the existing literature on the impact of exposure to the color red by forging a link with the literature on object priming, by examining explicitly evaluative behavior, and by demonstrating that using red pens increases the cognitive accessibility of failure-relevant concepts. Elliot and his colleagues (Elliot et al., 2007, 2009; Moller et al., 2010) have shown an association between the color red and the concepts of failure and avoidance. The current findings add to this body of research by showing that a red pen may have context-specific associations beyond the color red itself, and that these associations affect behavior in an ecologically relevant context.

Although we propose that the red pen effect is driven by increased accessibility of the concepts of errors, poor performance, and evaluative harshness (and provide initial evidence that negative mood does not drive the effect), there are other possibilities. For example, red pens could influence levels of testosterone and aggression (Hagemann, Strauss, & Liebing, 2008; Hill & Barton, 2005), or exposure to the color could activate an avoidance orientation (Elliot et al., 2009), leading evaluators to be more cautious and critical. It will be important to more directly examine the meditational mechanism of the red pen effect in future research.

The current findings are qualified by additional limitations, primarily concerning the participants in the studies. Due to time constraints associated with conducting the experiments in a realistic setting, little was known about the participants beyond their presence in the university environment; their age, ethnic background, level of education, and other factors were not assessed. Several of these individual differences, such as verbal ability, educational background, and field of study, could influence participants' ability to detect errors, their propensity to mark them, and the harshness with which they make evaluations. However, these uncontrolled differences should manifest as random variability, and thus make it more difficult to detect the effects we report. A second concern is that participants likely had little experience marking errors and evaluating others' work. It may well be the case that, while inexperienced evaluators are subject to the influence of red pens, trained teachers who are accustomed to making corrections are unaffected. In future studies, we intend to examine this issue by comparing novices to teachers-in-training and experienced teachers, directly examining the potential role of expertise in moderating the red pen's influence.

Our current findings could be extended in several ways. First, additional examinations of the mechanism by which the effect occurs should be conducted. Although red pens induce both increased error-marking and the accessibility of the concepts of errors and failure, it is not clear whether these concepts' increased accessibility mediates the error-marking effect. This should be clarified in future investigations. Second, the boundary conditions on the effect imposed by cultural differences should be explored. If, as we argue, the object priming effect is mediated by the increased accessibility of the concept of error-marking, the effect should only occur if evaluators are from a culture in which the red pen-error association exists. If the effect were to occur in participants from cultures that lack this association, it would suggest that

⁴One participant neglected to assign a grade and was excluded from analysis.

⁵To examine the possibility that the observed effect was driven by the color red itself rather than red pens *per se*, we replicated Study 3 using colored folders. Participants ($n = 113$; three neglected to assign a grade) evaluated the essay using blue pens; the experimental materials were contained in either a red folder or a gray folder (a manipulation akin to that used by Elliot et al., 2009). Essays contained in red folders were not awarded lower grades than those contained in gray folders ($t(108) = 0.59$, $p = .56$), nor did they receive more critical comments ($t(111) = 0.02$, $p = .99$).

another mediator (e.g., testosterone, negative affect) might underlie the effect described in the current studies. Third, the impact of red pens on the recipients of corrected essays should be examined. As we have noted, anecdotal reports suggest that some teachers are moving away from the use of red pens in grading, as they believe that red writing has a demoralizing effect on students (e.g., Aoki, 2004; Hale, 2003; Lion, 2008). Indeed, it seems sensible to avoid presenting students' work covered in a color automatically associated with failure and negativity (Moller et al., 2010). To our knowledge, this demoralization has not been empirically demonstrated, and would be an important complement to the current findings.

Red pens, ubiquitous in academic settings, are not inert objects; they are laden with meaning. By virtue of their strong association with failure and error-marking, red pens can change the ways teachers correct student work. Although educators have recently (and perhaps rightly) become concerned with the effect of red ink on students, we suggest that a greater concern could be the effect of red pens on teachers.

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