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When Debiasing Backfires: Accessible Content and Accessibility Experiences in Debiasing Hindsight

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Two studies demonstrated that attempts to debias hindsight by thinking about alternative outcomes may backfire and traced this to the influence of subjective accessibility experiences. Participants listed either few (2) or many (10) thoughts about how an event might have turned out otherwise. Listing many counterfactual thoughts was experienced as difficult and consistently increased the hindsight bias, presumably because the experienced difficulty suggested that there were not many ways in which the event might have turned out otherwise. No significant hindsight effects were obtained when participants listed only a few counterfactual thoughts, a task subjectively experienced as easy. The interplay of accessible content and subjective accessibility experiences in the hindsight bias is discussed.

After the outcome of an event is known, people "tend to view what has happened as having been inevitable" (Fischhoff, 1982a, p. 428) and assume that they could have predicted the outcome all along. Initially documented by Fischhoff (1975), this *hindsight bias* has been observed in many domains of judgment (for reviews see Christensen-Szalanski & Willham, 1991; Hawkins & Hastie, 1990). After learning about the outcome, judges presumably update their mental models of the event in light of the outcome information, elaborate causal links that might have led up to the event, and deemphasize information that seems irrelevant in light of the outcome (see Hawkins & Hastie, 1990). When later asked to report the expectations they had prior to knowing the outcome, judges draw on this updated mental model to rejudge the event, resulting in the impression that the outcome was highly likely and predictable (see Wasserman, Lempert, & Hastie, 1991, for empirical support).

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The most frequently recommended remedy for debiasing hindsight effects is to search for reasons why the event might have turned out otherwise, thus counteracting the influence of outcome knowledge (Fischhoff, 1982b). Although this strategy can attenuate hindsight bias, it does not eliminate it (e.g., Arkes, Faust, Guilmette, & Hart, 1988; Koriat, Lichtenstein, & Fischhoff, 1980; Slovic & Fischhoff, 1977). Worse, there are good theoretical reasons to assume that this strategy may sometimes backfire, leaving judges all the more convinced that the event was inevitable. To see why, suppose that a judge is highly motivated to "argue against the inevitability of the outcome" (Fischhoff, 1982b, p. 343) and searches for many reasons why the event may have turned out otherwise. Unfortunately, finding such reasons is likely to be difficult, and the judge may infer from this difficulty that there are not many—or else they would not be so difficult to generate. The present experiments test this possibility, which is consistent with recent research into the interplay of semantic and experiential information.

As Schwarz et al. (1991) suggested, any attempt to recall information from memory, or to generate arguments, renders two distinct sources of information accessible: the content that comes to mind and the subjective ease or difficulty with which the content can be recalled or generated. These feelings of ease or difficulty, which we refer to as *accessibility experiences*, qualify the conclusions drawn from *accessible content* (for reviews see Schwarz, 1998; Schwarz & Vaughn, in press). In general, inferences are consistent with the implications of accessible content when recall or generation is experienced as easy but opposite to the implications of accessible content when recall or generation is experienced as difficult. Schwarz et al. (1991) observed, for example, that participants rated themselves as less assertive after they had to recall 12 examples of assertive behavior (experienced as difficult) rather than only 6 examples (experienced as easy), even though the former task brought twice as many examples to mind. Apparently,

participants concluded from the experienced difficulty that there were not many examples, consistent with Tversky and Kahneman's (1973) availability heuristic. Supporting this interpretation, the observed pattern reversed when participants could misattribute the experienced difficulty to allegedly distracting music played in the background, thus undermining the informational value of the experienced difficulty. In this case, self-rated assertiveness increased with the number of examples recalled (see Schwarz, 1998, for an extended conceptual discussion).

We therefore predicted that attempts to debias hindsight through the generation of counterfactual alternatives will be successful only when the task is experienced as easy, but will backfire when the task is experienced as difficult.

Experiment 1: Probability of Alternative Outcome

To manipulate accessible content and accessibility experiences, we asked participants to list either 2 (easy) or 10 (difficult) thoughts about how an event could have turned out otherwise. We hypothesized that if retrospective judgments of likelihood are based primarily on accessible content, generating many counterfactuals should attenuate hindsight bias more than generating merely 2 counterfactuals. But if conclusions drawn from accessible content are qualified by the accompanying accessibility experience, we should observe the opposite pattern. In this case, participants should find the alternative outcome less likely with the more reasons they tried to generate for its possible occurrence.

Method

Participants

Fifty-six undergraduates who were enrolled in a cognitive psychology course participated for extra course credit and were randomly assigned to condition.

Procedure

Participants received a questionnaire entitled "Social Judgments" during a regularly scheduled class session and read the following scenario, adapted from Fischhoff's (1975) study:

> For some years after the arrival of Hastings as Governor-General of India, the consolidation of power involved serious war. The first of these wars took place on the northern frontier of Bengal where the British were faced by plundering raids of the Gurkhas of Nepal. Attempts had been made to stop raids by an exchange of lands, but the Gurkhas would not give up their claims to country under British control, and Hastings decided to deal with them once and for all. The campaign began in November, 1814. It was not glorious. The Gurkhas were only some 12,000 strong; but they were brave fighters, fighting in a territory well-suited to their raiding tactics. The older British commanders were used to war in the plains where the enemy ran away from a resolute attack. In the mountains of Nepal it was not easy even to find the enemy. The troops and transport animals suffered from the extremes of heat and cold, and the officers learned caution only after sharp reverses. Major-General Sir D. Octerlony was the one commander to escape from these minor defeats.

Outcome. There were three outcome conditions. In the control condition, no outcome was provided; the scenario simply read as described above. In the other two conditions, a final sentence was added to the scenario. Participants in the British-win condition read, "The British overcame the Gurkhas and ultimately won the war." Participants in the Gurkha-win condition read, "The Gurkhas overcame the British and ultimately won the war."

Thoughts listing. In the control condition, participants did not list any counterfactual thoughts. In the 2-thoughts and 10-thoughts conditions, participants were asked, "Please list [2 or 10, respectively] thoughts about how this scenario might have turned out differently; how could the [British or Gurkhas, respectively] have won this war?" Participants listed thoughts about a possible Gurkha victory if they had been told that the British had won and about a possible British victory if they had been told that the Gurkhas had won.

The choice of 2 versus 10 thoughts as an operationalization of recall difficulty was based on an informal pretest indicating that generating 2 counterfactual thoughts was experienced as easy, whereas generating 10 thoughts was experienced as difficult. Formal manipulation checks (presented as part of Experiment 2) subsequently confirmed this observation.

Probability judgment. In the control condition, participants were asked, "In an answer ranging from 0–100%, estimate the probability that the [British or Gurkhas, respectively] will ultimately win the war." Approximately half of participants in the control condition rated the probability of a British win, and the remaining rated the probability of a Gurkha win.

In the British-probability condition, participants were asked, "In an answer ranging from 0–100%, estimate the probability that the scenario might have turned out differently. That is, estimate the probability that the British could have won the war." In the Gurkha-probability condition, participants analogously rated the probability of a Gurkha victory. Participants rated probabilities of a Gurkha victory if they had been told that the British had won and of a British victory if they had been told that the Gurkhas had won.

Summary. Control-condition participants were not given outcome information, they listed no counterfactuals, and they simply rated the probability of either a British or Gurkha victory. Participants in the British victory condition listed either 2 or 10 counterfactuals about a possible Gurkha victory, and they then rated the probability of a Gurkha victory. Participants in the Gurkha victory condition listed either 2 or 10 counterfactuals about a possible British victory, and they then rated the probability of a British victory. This resulted in a 2 (thoughts listing: 2, 10) $\times$ 2 (outcome: British win, Gurkha win) factorial design with a nonfactorial control group. All participants were thanked and debriefed.

Results and Discussion

We conducted a 2 $\times$ 2 analysis of variance (ANOVA) on the factorial portion of the data. Comparisons with the control condition were made using the Dunnett procedure (see Winer, Brown, & Michels, 1991). An alpha of $p < .05$ was used for all statistical tests in this article.

Thoughts Listing

A 2 $\times$ 2 ANOVA revealed that all participants assigned to the 2-thoughts condition listed 2 thoughts ($M = 2.00$, $SEM = 0.00$), whereas participants assigned to the 10-thoughts condition listed an average of 6.73 ($SEM = 0.50$) thoughts, $F(1, 32) = 73.36$, $p < .05$. Examples of thoughts listed were as follows: "Draw the Gurkhas out to terrain more adjusted to their fighting techniques," and "They could have tried to attack from different directions and not concentrated forces in only one area."

In all conditions participants' probability judgments were independent of whether the rating pertained to a Gurkha or a British victory.

Table 1
Mean Probability Judgments by Thoughts Listing for Experiments 1 and 2

Probability	Thought listing			
	Control	0 thoughts	2 thoughts	10 thoughts
		Experiment 1		
Alternate				
M	.552		.447	.241
SEM	.042		.043	.038
n	20		17	19
Original	.448		.553	.759
		Experiment 2		
Original				
M	.483	.582	.543	.680
SEM	.026	.031	.032	.023
n	19	20	19	21

Note. In Experiment 1, in the 2- and 10-thoughts cells, "Alternate" represents the actual rated probability of an alternate victor winning (e.g., a Gurkha win after reading the British-win outcome). In Experiment 2, in the 2- and 10-thoughts cells, "Original" represents that of the original victor winning (e.g., a British win after reading a British-win outcome). To further simplify comparisons between the two experiments, probability of original by means of subtraction from 1.0 is also presented for Experiment 1. In both experiments, participants listed counterfactual thoughts about a combatant winning that was opposite to the outcome. A 0-thoughts-listing condition was not included in Experiment 1.

Probability Judgment

A 2 × 2 ANOVA revealed a thoughts-listing main effect only. Descriptive statistics are listed in the top half of Table 1. Participants in the 10-thoughts condition rated outcomes as less likely than did participants in the 2-thoughts condition, $F(1, 32) = 12.72$, $p < .05$. Participants in the 10-thoughts condition also rated outcomes less likely than control participants who did not receive outcome information, Dunnett $F(2, 53) = 14.62$, $p < .05$, a pronounced hindsight bias. Participants in the control and 2-thoughts conditions did not differ from each other.[1]

In short, participants who generated many counterfactuals about how the war could have turned out otherwise considered this alternate outcome less likely than those who generated only a few counterfactuals. This suggests that far from attenuating the hindsight bias, attempts to generate many reasons for an alternative outcome may actually backfire, also indicated by a correlation between the actual number of thoughts listed and judged probability, $r(34) = -.40$, $p < .05$. The more counterfactuals participants listed, the lower was the reported probability.

Experiment 2: Probability of Original Outcome

Experiment 2 extended Experiment 1 in several ways. In Experiment 1, evidence for a backfire effect of generating many thoughts about alternative outcomes was limited to the observation that generating 10 thoughts induced a hindsight bias relative to a group without outcome knowledge, whereas generating merely 2 thoughts did not. Experiment 2 included an additional control group in which participants received outcome knowledge but did not list any thoughts about alternatives. We predicted that generating 10 thoughts about alternatives would increase the hindsight bias over and above the effect of merely knowing the outcome. In addition, we included a manipulation check that asked participants to rate how easy or difficult they found it to bring the requested number of thoughts to mind.

Finally, participants in Experiment 2 judged the probability of the original outcome, instead of the probability of the alternative outcome (assessed in Experiment 1), thus testing the generalization of the results of Experiment 1 across different probability judgments. That is, participants in Experiment 2 received outcome information about a British (or Gurkha, respectively) victory, listed counterfactual thoughts about the alternate combatant winning, and subsequently rated the probability of the original victor winning (e.g., a British victory after reading a British-victory outcome).

Method

Participants

Seventy-nine undergraduates who were enrolled in an introductory social psychology course participated for extra course credit and were randomly assigned to condition.

Procedure

The procedures were the same as in Experiment 1, except as noted below.

[1] These data might also be viewed in an alternative way. Because reading about a British or Gurkha victorious outcome did not matter, one might conduct a one-way ANOVA on probability judgments, using only thoughts listing (i.e., control, 2-thoughts, and 10-thoughts) as the independent variable. Consistent with the results reported in the text, there was a significant effect of thoughts listing, $F(2, 53) = 14.62$, $p < .05$, with only the 10-thoughts condition differing significantly from the other two.

Probability judgment. Participants who received outcome information rated the probability of a British victory if the scenario informed them that the British had won or of a Gurkha victory if the scenario informed them that the Gurkhas had won. Each participant was given the following question: "If we hadn't already told you who had won, what would you have thought the probability of the [British or Gurkhas, respectively] winning would be? In an answer ranging from 0–100%, estimate the probability that the [British or Gurkhas, respectively] could have won the war."

Thoughts listing. In addition to the conditions used in Experiment 1, a 0-thoughts listing condition, in which participants received outcome information, was included in Experiment 2.

Manipulation check. Finally, by answering the following question, each participant in the thoughts-listing conditions made one overall rating (on a 7-point scale; 1 = *very easy*, 7 = *very difficult*) of the degree to which they found it difficult to list thoughts about alternatives: "To what degree did you find it difficult to list thoughts about the [British or Gurkhas, respectively] winning the war?"

Summary. As in Experiment 1, participants in the control condition were not given outcome information, listed no counterfactuals, and rated the probability of either a British or Gurkha victory. In contrast to Experiment 1, participants in the British-victory condition listed either 0, 2, or 10 thoughts about a possible Gurkha victory, but then they rated the probability of a British victory. In an analogous fashion, participants in the Gurkha-victory condition listed either 0, 2, or 10 thoughts about a possible British victory, but then they rated the probability of a Gurkha victory. This results in a 4 (thoughts listing: control, 0, 2, 10) × 2 (outcome: British win, Gurkha win) factorial design with a nonfactorial control condition. All participants were thanked and debriefed.

Results and Discussion

The findings were analyzed in a manner similar to Experiment 1, except for the inclusion of a 0-thoughts listing condition, as described above.

Thoughts Listing

Only participants in the 2- and 10-thoughts conditions listed thoughts about alternatives. Thus, these data were analyzed by 2 (thoughts listing: 2, 10) × 2 (outcome: British win, Gurkha win) ANOVA. There was only a thoughts-listing main effect. Participants who were asked to list 2 thoughts listed an average of 1.78 ($SEM = 0.12$) thoughts, whereas those asked to list 10 thoughts listed an average of 8.76 ($SEM = 0.31$) thoughts, $F(1, 36) = 368.19$, $p < .05$. Examples of thoughts listed were as follows: "They could have made assassination attempts on British commanders," and "If the army was reinforced with more fighters they could have won." As in Experiment 1, the judgment's focus on a British or Gurkha victory did not affect number of thoughts listed.

Subjective Difficulty

Adding to Experiment 1, we asked participants in Experiment 2 to make one overall rating of how difficult they found listing alternatives to be. Participants in the 10-thoughts condition rated this task as relatively more difficult ($Mdn = 6.00$) than participants in the 2-thoughts condition ($Mdn = 3.00$), Mann–Whitney $U = 23.40$, $p < .05$. As with thoughts listing, whether the rating focused on a British or Gurkha victory did not matter.

Probability Judgment

A 4 × 2 ANOVA revealed a main effect for thoughts listing only, $F(3, 71) = 7.99$, $p < .05$. Descriptive statistics are listed in the bottom half of Table 1. Planned contrasts (Rosenthal & Rosnow, 1985) indicated that participants in the 0-thoughts condition, who received outcome information but did not list any counterfactuals, rated the actual outcome as more likely than those in the control condition, who received no outcome knowledge, $t(75) = 2.41$, $p < .05$. This result replicates the hindsight effect (Fischhoff, 1975).

More important, listing 10 thoughts about the respective alternative outcome increased this hindsight bias. That is, participants in the 10-thoughts condition exhibited a *backfire effect*, whereby they rated the actual outcome as more likely than did participants in both a control condition in which outcomes were known (as in Experiment 1), $t(75) = 4.84$, $p < .05$, and a 0-thoughts condition in which outcomes were known but no thoughts were generated, $t(75) = 2.43$, $p < .05$. Together, these results replicate and extend our notion of backfire effects. The 10-thoughts and 2-thoughts conditions also differed from each other, $t(75) = 3.35$, $p < .05$, like they did in Experiment 1. In short, the 10-thoughts condition differed from all others.

The probability ratings provided by participants in the 2-thoughts condition did not differ significantly from either the 0-thoughts condition, $t(75) = 0.83$, $p > .05$, or the control condition, $t(75) = 1.41$, $p > .05$. Thus, thinking about few (2) alternatives did not decrease the hindsight bias relative to participants in the 0-thoughts condition, with outcome knowledge, or in the control condition, without outcome knowledge.

As in Experiment 1, generating many counterfactuals about how the war could have turned out otherwise therefore increased rather than decreased the hindsight bias. This is also reflected in correlations between the actual number of thoughts participants listed and judged probability, $r(38) = .51$, $p < .05$, as well as participants' ratings of the ease of thought generation and judged probability, $r(38) = .78$, $p < .05$. The more thoughts participants listed about alternatives, and the more difficult they rated this task to be, the higher they rated the probability.

General Discussion

As numerous studies demonstrated (see Christensen-Szalanski & Willham, 1991; Hawkins & Hastie, 1990, for reviews), knowing the outcome of an event reliably produces the impression that the outcome was relatively inevitable. Hence, people feel that they could have anticipated it all along and often erroneously recall or reconstruct that they did, in fact, anticipate it. This hindsight bias can interfere with our ability to learn from the past because it fosters false confidence in the accuracy of our theories about the world (Fischhoff, 1982b). To counteract the impact of highly accessible outcome information, it may seem useful "to force oneself to argue against the inevitability of the reported outcome, that is, to try to convince oneself that it might have turned out otherwise" (Fischhoff, 1982b, p. 343). However, the present research highlights that this strategy far from guarantees success. Ironically, it is particularly likely to backfire when one takes the task seriously and tries to generate many reasons for why the event may have turned out otherwise, realizing along the way that such reasons are difficult to bring to mind.

Participants who were asked to list many counterfactuals about how the British–Gurkha war might have turned out otherwise considered the alternative outcome less likely (Experiment 1) and the obtained outcome more likely (Experiment 2) than participants who were asked to list only 2 thoughts. Thus, we obtained augmented hindsight effects relative to a control group without outcome knowledge (Experiments 1 and 2) and relative to a 0-thoughts group with outcome knowledge (Experiment 2) when participants had to generate many thoughts about an alternative outcome—that is, under conditions that would be assumed to most attenuate hindsight if accessible thought content were all that mattered (see Fischhoff, 1982a, 1982b).

Theoretically, we attribute these backfire effects to the operation of a variable that has so far been neglected in debiasing research, namely people's subjective accessibility experiences. Generating many thoughts about alternatives is a difficult task, and the experienced difficulty is informative in its own right (see Schwarz, 1998; Schwarz & Vaughn, in press, for reviews). Consistent with the logic of Tversky and Kahneman's (1973) availability heuristic, people infer from the experienced difficulty that there are not many ways in which the event could have turned out otherwise—or else, thinking of these ways would not be so difficult. Hence, their difficult search for alternative outcomes leaves them all the more convinced that the obtained outcome was relatively inevitable and that they had anticipated this outcome all along. Consistent with this interpretation, participants' ratings of thoughts-listing difficulty were significantly correlated with the size of the obtained hindsight bias (Experiment 2).

The effects of generating too many thoughts about alternatives, however, should not distract from the observation that counterfactuals did reduce hindsight under some conditions, without eliciting a bias in the opposite direction (see also Sanna, 1996, 2000; Sanna & Turley-Ames, 2000; Sanna, Turley-Ames, & Meier, 1999, for related views on the functionality of counterfactuals and mental simulations in other domains). Specifically, participants who generated only 2 thoughts reported postevent probabilities that did not differ significantly from the probabilities reported by participants who had no outcome knowledge to begin with. This observation is consistent with our theoretical analysis and also with suggestions of prior research (e.g., Arkes et al., 1998; Koriat et al., 1980; Slovic & Fischhoff, 1977). As the subjective difficulty ratings of Experiment 2 indicated, participants found it relatively easy to bring 2 thoughts about alternatives to mind. Consistent with the logic of the availability heuristic (Tversky & Kahneman, 1973), this ease of generation presumably suggested that there were a few ways in which the British–Gurkha war could have turned out otherwise, thus attenuating the hindsight bias.

That the ironic effects of generating many alternatives went unnoticed in previous discussions of debiasing strategies reflects psychologists' common focus on thought content. Unfortunately, this exclusive focus on thought content misses that human thinking is accompanied by a variety of subjective experiences, ranging from ease or difficulty of recall and thought generation (e.g., Schwarz, 1998) to perceptual and conceptual fluency (e.g., Jacoby, Kelley, & Dywan, 1989; Winkielman, Schwarz, Reber, & Fazendeiro, in press), affective responses (e.g., Schwarz & Clore, 1996), and bodily feedback (e.g., Stepper & Strack, 1993). These experiences are informative in their own right and often qualify the conclusions we draw from accessible thought content (see Schwarz & Clore, 1996; Skurnik, Schwarz, & Winkielman, 2000, for reviews). Paralleling these metacognitive observations in the judgment literature, recent research into the psychology of memory accuracy (see Koriat, 1993; Koriat, Goldsmith, & Pansky, 2000, for reviews) suggests that "the quality of phenomenal experience may be critical in leading the rememberer to accept a memory as true" (Koriat et al., 2000, p. 487). Which conclusions people draw from these experiences depends on their subjective theories, which are themselves malleable and context dependent (e.g., Skurnik et al., 2000; Winkielman & Schwarz, 2001). Unless researchers take these metacognitive processes into account, many apparently straightforward suggestions will produce surprising results, as the present studies into debiasing hindsight illustrate.

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