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COUNTERFACTUALS AS SELF-GENERATED PRIMES: THE EFFECT OF PRIOR COUNTERFACTUAL ACTIVATION ON PERSON PERCEPTION JUDGMENTS

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Three experiments tested whether counterfactual events can serve as primes. The evidence supports the hypothesis that counterfactuals prime a mental simulation mind-set that leads people to consider alternatives. Exposure to counterfactual scenarios affected person perception judgments in a later, unrelated task and this effect was distinct from semantic construct priming. Moreover, these effects were dependent on the availability of salient possible outcomes in the person perception task. Direction of the counterfactual comparison, upward or downward, did not moderate any of the effects, providing evidence that the process of thinking counterfactually, and not the content of the counterfactuals, was responsible for the priming effects. These experiments also provide evidence that the effects of mind-set accessibility, similar to semantic construct accessibility, are limited by the applicability of the primes to the later judgments. Implications for the nature of priming effects are discussed.

Imagine you are at a concert of one of your favorite bands. Seating is on a first come, first served basis. At the concert the announcer reveals that a trip to Hawaii will be given to a lucky fan and that the winner will be determined by the seat number currently occupied. Now imagine your view of the stage is partially obstructed and you see a much better seat in the near vicinity. You change seats, and shortly after that

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Address correspondence to Adam D. Galinsky who is now at the Management Department, University of Utah, 1645 E. Campus Center Dr. #106, Salt Lake City, UT 84112-9304; E-mail: galinsky@business.utah.edu. the winning seat number is announced. It turns out that the winning seat was the seat you had just moved from. What would your reaction be? The literature on counterfactual thinking suggests a number of different reactions you might have. You might feel as if you had almost won, mentally simulating the alternative outcome (Kahneman & Tversky, 1982; Kahneman & Varey, 1990). You might experience the cognitions, "if only I had not moved, I would have won," thereby locating causality in your movement (Wells & Gavanski, 1989). You might feel a poignant sense of disappointment and regret (Kahneman & Miller, 1986). Emotional reactions and judgments of causality are often driven by not only what *actually* happened, but also what *almost* happened or what *normally* happens.

Over the past 15 years, research on counterfactual thinking has demonstrated a wide variety of judgmental consequences of engaging in counterfactual thinking. Previous research, however, has focused almost exclusively on judgments related to the counterfactual events themselves, with particular emphasis on emotional reactions or judgments of causality. Little research has yet focused on whether and how counterfactuals affect judgments in future, unrelated tasks. The literature on priming effects has shown that social judgments (Higgins, Rholes, & Jones, 1977) can be influenced by unrelated, yet applicable, constructs incidentally activated during a preceding event. In this article, we are interested in similar consequences that result from incidentally activated counterfactual thoughts and mental simulation. Specifically, we propose that mental simulations triggered by exposure to events in which an alternative outcome almost occurred exert an influence on subsequent judgment by priming a mental simulation mind-set. This makes mental simulation more likely to be used in a subsequent person perception task.

COUNTERFACTUAL THINKING AND THE SIMULATION HEURISTIC: CAUSES AND CONSEQUENCES

Kahneman and Tversky (1982) originally discussed counterfactual thinking and mental simulation within the context of the availability heuristic. According to Kahneman and Tversky's (1973) formulation of the availability heuristic, there are two classes of mental operations that bring things to mind: the retrieval of instances from memory and the mental construction of scenarios or examples. They named the latter class the "simulation heuristic" because complex questions are answered about both future and past events—including prediction, assessments of probabilities, and assessments of causality—through running a simulation model. Often, running a counterfactual simulation in one's head is the mental equivalent of conducting an experiment (Einhorn & Hogarth, 1986). One could, through process of mental simulation, assess the probability that a particular plan will succeed, assess alternatives, and evaluate the various risks involved. One could also seek to explain through simulation why a particular event did not work out.

The commencement of a particular simulation is often initiated when an event *nearly* occurred (e.g., missing one's flight by 5 minutes as opposed to 50 minutes) or when antecedents to that event are *exceptional* in some way (missing one's flight after taking a new route to the airport) (Kahneman & Miller, 1986; Roese, 1997). The relative ease of altering some feature of reality determines the strength and psychological closeness of counterfactual alternatives. In addition, surprising outcomes (e.g., ones that violate expectancies) and negative events spontaneously activate a simulated search for alternative realities (Sanna & Turley, 1996; Roese & Hur, 1997; Roese & Olson, 1997).

The availability of counterfactual alternatives produces a number of well-replicated judgmental consequences: (a) amplification of emotion (Kahneman & Miller, 1986; Macrae & Milne, 1992), (b) altered judgments of causality (Wells & Gavanski, 1989, but see Mandel and Lehman (1996) for a distinction between causal attribution and counterfactual thinking), (c) increased victim compensation awards (Miller & McFarland, 1986), (d) increased suspiciousness (Miller, Turnbull, & McFarland, 1989), and (e) exacerbation of the hindsight bias (Roese & Olson, 1996). For example, Medvec, Madey, and Gilovich (1995) found both increased joy and increased regret, depending on the salient counterfactual alternative among the reaction of Olympic athletes. Athletes who won silver medals were rated as appearing less joyful than athletes who won the bronze, despite the better objective finish for the silver medallists. Medvec et al. explained this effect by noting that for silver medallists the salient counterfactual alternative is winning a gold medal, whereas the salient counterfactual alternative for bronze medallists is not receiving anv medal.

The Medvec et al. (1995) finding highlights the distinction between upward and downward counterfactual events. In the literature, counterfactuals are classified according to the direction of comparison. Upward counterfactual thoughts focus on more positive alternatives to reality, which intensifies emotional reactions such as regret and disappointment because one evaluates the factual outcome against the greater positivity of the alternative reality. On the other hand, downward counterfactual thoughts focus on more negative alternatives to the current reality, which produces emotions ranging from increased joy to a sense of relief because one avoided the negativity of the alternative reality.

THE EFFECTS OF PRIMING ON JUDGMENT AND BEHAVIOR

A large literature in social psychology has explored how the incidental activation of a knowledge structure in one context can affect judgments in a separate, unrelated context. The pervasiveness of this phenomenon has led to the conclusion that there is a fundamental law of cognitive structure activation (Sedikides & Skowronski, 1991). A knowledge structure activated by incidental exposure to a stimulus in the environment can exert an influence on the interpretation of later ambiguous events and behaviors to which the primed construct is *applicable* and *rele*vant. This well-established effect is typically demonstrated in an "unrelated studies" paradigm, in which primes are incidentally (sometimes subliminally) presented in "Study 1" and impressions are assessed in a separate and "unrelated Study 2." For example, Higgins and colleagues (1977) exposed participants to trait words as part of a perception task. They later read a passage, as part of an ostensibly unrelated reading comprehension study, in which the main character, Donald, was acting ambiguously on a dimension relevant to the trait constructs. Specifically, Donald was pretested to seem ambiguous with regard to the traits reckless and adventurous. Having been exposed to one of these traits (e.g., reckless) in "Study 1" participants categorized Donald according to that trait in "Study 2." Importantly, trait judgments were assimilated to only applicable primed constructs, and not to inapplicable, but similarly valenced constructs (e.g., disrespectful).

Recent research has suggested that mind-sets, or cognitive orientations, and not just semantic constructs can serve as primes. Gollwitzer, Heckhausen, and Steller (1990) found that establishing deliberative and implementation mind-sets in a prior context later affected narrative construction and information recall in later, unrelated tasks. In their experiment, after participants were given either deliberative (weighing the pros and cons of initiating action with regard to an unresolved personal problem) or implementation (planning the implementation of a chosen personal project) mind-set instructions, they participated in an "second experiment" in which they completed half-finished fairy tales. Deliberative mind-set participants tended to ascribe deliberative actions to the main character, from contemplating courses of action to seeking advice. Implementation mind-set participants, on the other, had their characters plunge headfirst into action.

Similarly, Chen, Shechter, and Chaiken (1996) also demonstrated the effects of cognitive orientations on subsequent processing. Priming an accuracy motivation mind-set led participants to engage in an unbiased form of systematic processing of subsequently encountered persuasive arguments relative to participants primed with an impression manage-

ment mind-set. These experiments suggest that mind-sets tune information processing, attention and thought production.

MENTAL SIMULATION MIND-SET

Witnessing a counterfactual event and engaging in mental simulation might lead perceivers to use mental simulation when constructing future judgements. It should be noted that the activation of counterfactual alternatives is scenario specific, triggered only by near misses and norm violations. Why would attending to scenario specific alternatives lead to consideration of alternatives when making unrelated future judgments?

We suggest that upward and downward counterfactual events activate a mental simulation mind-set, a mind-set akin to the simulation heuristic. We contend that perceiving counterfactual alternatives primes the idea that there is more than one possibility to be considered: It is the consideration of available alternatives in subsequently encountered information, rather than the content of the previously encountered counterfactual alternatives, that influences later judgments. Gollwitzer et al. (1990) define mind-sets according to the Wurzburg School, which states that mind-sets are a cluster of cognitive processes that are well-learned because they serve a functional purpose. According to Gollwitzer et al., deliberation in one task transfers to another unrelated task (to the degree that deliberation is relevant to the new context) because deliberation is a well-learned functional strategy for approaching problems. In essence, simply deliberating in one context activates the tendency to approach the world using that mind-set as a guide. Roese (1994) points out that counterfactual thinking, like deliberative thinking, is a pervasive feature of mental life and its ubiquity stems from its functionality and assistance in performing goal-directed behavior. Roese (1994; see also Johnson and Sherman, 1990) linked the two types of mental simulation, past reconstructions and future considerations, in discussing the preparative, and thus functional, nature of counterfactuals. In one of the few experimental demonstrations of counterfactual thinking affecting future intentions and behavior, Roese found that engaging in upward counterfactual thought led to increased intentions to perform success-facilitating behaviors in the future. In another experiment, Roese showed that engaging in upward counterfactual thought after completing an anagram task facilitated performance on a second anagram task. These experiments, although showing the positive effects of counterfactuals on future intentions and performance in the same domain and context that produced the counterfactual thoughts, did not demonstrate whether counterfactuals could affect future judgments and behavior unrelated to the context in which counterfactual thinking occurred.

COUNTERFACTUAL PRIMES

Other recent research has explored the consequences of activating the simulation heuristic. Koehler (1991) and Hirt and Markman (1995) discussed the role of the simulation heuristic in debiasing the explanation bias. The explanation bias occurs when participants are asked to generate an explanation for hypothetical outcomes: They come to see that event as more likely to occur relative to participants not encouraged to construct explanations (Anderson, Lepper, & Ross, 1980; Ross, Lepper, Strack, & Steinmetz, 1977). Being asked to generate any other explanation for an outcome, even when the new explanation explicates the same outcome, is enough to eliminate bias because participants generate additional alternatives spontaneously (Hirt & Markman, 1995). Hirt and Markman suggested that generating one additional alternative serves as a catalyst, breaking the single-mindedness that occurs when the focal hypothesis is assumed to be true. In addition, they provided evidence that the activation of the simulation heuristic mind-set is responsible for the debiasing effects of counterexplanation: Participants asked to construct multiple explanations were more likely to construct multiple alternative outcomes, and this generation was dependent on the simulational possibilities of the initial alternatives. Thus, considering a second explanation put participants into a mind-set in which additional, relevant alternatives were constructed, simulated, and assessed. The Hirt and Markman experiments, like those of Roese (1994), do not address whether contemplation of alternatives in one context can lead to generation of alternatives in a later, unrelated context.

Galinsky and Moskowitz (2000) demonstrated behavioral consequences of counterfactual primes by having participants read scenarios that were pretested to produce spontaneous counterfactual activation in one context and solve a problem-solving task in the second context. Participants primed with a counterfactual were more likely to solve the Duncker Candle Problem, suggesting that they noticed an alternative function for one of the objects, an awareness critical to solving the problem. In another experiment, counterfactual primes attenuated the confirmation bias in a trait hypothesis-testing context by increasing the selection of questions designed to elicit hypothesis-disconfirming answers, but without increasing the selection of neutral questions.

Unlike the mind-set primes used by Gollwitzer et al. (1990), the activation of the simulation heuristic by Hirt and Markman (1995), or the directed instructions to engage in counterfactual thinking by Roese (1994), attention was not drawn to counterfactual possibilities in the Galinsky and Moskowitz (2000) experiments or in the experiments report here. Therefore, like spontaneous trait inferences (Moskowitz & Roman, 1992), we consider the priming effects of counterfactuals to be self-generated: Participants are not instructed to engage in mental simulation and counterfactual construction; they presumably do so on their own. The experiments reported here were concerned with whether counterfactual primes could affect person perception judgments and impressions.

PRIMING POTENTIAL OF COUNTERFACTUALS

There are other possible mechanisms, in addition to the activation of a mental simulation mind-set, through which counterfactuals could exert a priming influence. Two mechanisms—trait constructs and primed affective constructs—in addition to a mental simulation mind-set will be discussed.

Counterfactual events could influence subsequent judgments through activation of a semantic category or trait construct. If downward and upward counterfactuals activate trait constructs associated with the alternative outcomes considered, those accessible traits would have effects on later judgments relevant to the activated constructs. In the case of a person who switches his/her lottery ticket and wins the lottery, the simulated alternative would be losing. One could categorize this person as adventurous because the perceiver might conclude that risks must be taken in order to achieve positive outcomes. This categorization is likely because the behavior achieved a positive outcome in the face of negative possibilities. On the other hand, one who switches and loses generates the simulated alternative of winning. Framing the action as a loss of an otherwise attainable outcome might lead to the behavior being categorized as reckless-the individual has tempted fate (Miller & Taylor, 1995). If trait constructs are activated by counterfactuals, then these activated constructs would be predicted to influence reactions to a later person perception task.

For example, consider the following passage about Donald (Higgins et al., 1977), which is ambiguous along the trait dimensions reck-less-adventurous and independent-aloof:

Donald spent a great amount of his time in search of what he liked to call excitement. He had already climbed Mount McKinley, driven in a demolition derby, shot the Colorado rapids in a kayak, and piloted a jet-powered boat—without knowing very much about boats. He had risked injury, and even death, a number of times. Now he was in search of new excitement. Other than business engagements, Donald's contacts with people were rather limited. He felt he didn't really need to rely on anyone.

After exposure to a counterfactual prime, Donald's actions would be interpreted in line with the traits activated by the downward (adventurous) and the upward (reckless) counterfactual thoughts.

COUNTERFACTUAL PRIMES

There is some suggestive evidence that perception of focal actors in a counterfactual scenario is dependent upon the downward and upward nature of the counterfactual thoughts. In a study by Johnson (1986), participants rated an individual who suffers a negative event with salient upward counterfactual alternatives (similar to the one described in the introduction), more negatively overall than did control participants. Participants also rated an individual who nearly experiences a negative event, and thus inspires counterfactual thoughts that focus on downward alternatives, more positively overall than did control participants. Unfortunately, the Johnson study used a number of semantic differentials (e.g., good/bad; positive/negative; strong/weak) that were not trait-specific. Therefore, it is difficult to discern the particular traits participants felt could describe the target person and whether counterfactuals were acting as self-generated semantic primes.

A second possibility is that counterfactuals manifest an influence through a primed affective construct. The inferred regret or elation caused by being exposed to an upward or downward counterfactual event might carry through to a later judgment relevant to that emotion. Johnson and Tversky (1983) found that negative moods increased the judged probability of negative events occurring, whereas positive moods decreased the predicted likelihood of negative events occurring. If experienced and judged mood operate as a prime, subsequent judgments might be influenced so that a target would be interpreted in a mood-consistent light. For example, if one reads the passage about Donald after reading an upward counterfactual event, the attendant emotional reaction of regret and disappointment would make the ambiguous actions of Donald seem more reckless because the potential negative consequences of the actions would be salient. Reading a downward counterfactual event would produce the opposite effect: The ambiguous actions would seem adventurous because the negative consequences would be minimized by the primed positive emotions.

In addition, negative mood has been found to alter the evaluative connotations and interpretation of traits attributed to social groups. For example, in a neutral or positive mood the intelligence of Jews may be evaluated (by non-Jews) positively, but in a negative mood this same intelligence may be considered conniving and insidious (Esses & Zanna, 1995). Thus, the priming effects might generalize to semantically inapplicable, but ambiguously valenced traits.

Third, counterfactual events might influence judgments without priming specific constructs. Counterfactual activation, instead, might prime a process of mental simulation and consideration of alternatives. If it is a process of mental simulation that is primed, then counterfactual events would influence subsequent judgments by making people simulate different potential outcomes and alternative realities. For example, in the Donald passage (cf. Higgins et al., 1977), the salient alternative consequences of Donald's exploits that can result from simulation are negative: It explicitly states that Donald has risked death and injury many times. Thus, if counterfactuals activate a mental simulation mind-set, participants should rate Donald as reckless regardless of whether a downward or upward counterfactual had been read. Both upward and downward counterfactuals would lead to increased judgments of recklessness because both counterfactuals would lead perceivers to partially base their judgments on the simulation of the potential outcomes of Donald's behavior.

Before we examine whether counterfactuals influence judgments on an unrelated task, we investigated whether trait judgments of the focal actor of a brief vignette would differ when the vignette ended with counterfactual versus noncounterfactual, but similarly valenced, events. We chose the trait dimension reckless-adventurous for two related reasons. First, this trait dimension appeared to be one likely to be influenced, either through mental simulation, semantic construct activation or affective construct activation, by a counterfactual event like the one described at the outset of this article. Second, this trait dimension is embedded in the time-tested stimulus material used in numerous person perception experiments, the Donald paragraph. Its potential relevance to both the prime paragraph and the person perception paragraph made it the ideal trait dimension for study.

EXPERIMENT 1

Experiment 1 examined the first mechanism described above—whether counterfactual events could produce sufficient trait construct activation to serve as semantic primes. Moskowitz and Roman (1992) showed that trait constructs can be spontaneously inferred as a natural consequence of social perception—from exposure to a single trait implying sentence. These spontaneously inferred traits operated as primes as their increased accessibility guided a subsequent judgment. Just as trait-implying sentences produce self-generated primes, a counterfactual scenario might lead to trait inferences being spontaneously generated as a result of mental simulation.

METHOD

Participants and Design. Participants were 78 undergraduates who volunteered to participate while taking a break in the library. The experiment had a 2 (counterfactual/no counterfactual) × 2 (positive/negative event) between-participants design.

COUNTERFACTUAL PRIMES

Procedure and Stimulus Materials. Participants were approached individually and were asked to read one of four scenarios describing the actions of a woman Jane, who was attending a rock concert. In all of the scenarios, a trip to Hawaii is awarded to a concert-goer whose seat number was randomly drawn. Half of these scenarios described "counterfactual" events. In the downward counterfactual scenario, Jane wins the trip to Hawaii when the new seat she had just switched to (in order to get a better view of the stage) was chosen. In the upward counterfactual scenario, Jane loses the trip to Hawaii when the seat that she had just switched from wins. These scenarios were adapted from an upward counterfactual scenario in Johnson (1986). The other half of the scenarios did not contain outcomes that almost did not occur. Jane either wins or loses a trip to Hawaii (determined by the number of the current seat occupied), but there is no mention of switching seats.

Galinsky and Moskowitz (2000) established that the counterfactual scenarios used in this and the subsequent experiments activate more counterfactual thoughts than the no-counterfactual scenarios. Participants in their experiment were asked to write down some examples of the thoughts that might run through the target woman Jane's head after the rock concert. This thought protocol is the standard measure of assessing spontaneous counterfactual activation because although participants are instructed to write down Jane's thoughts, the instructions do not direct them toward counterfactual thoughts (Roese & Hur, 1997). Participants who read either an upward or a downward counterfactual scenario produced significantly more counterfactual thoughts and if-only constructions compared to no-counterfactual scenarios. Specifically, the scenario in which Jane wins after moving seats produced significantly more downward counterfactual thoughts than the scenario in which Jane simply wins. Similarly, the scenario in which Jane does not win after moving seats produced significantly more upward counterfactual thoughts than the scenario in which Jane simply does not win the trip. This replicated previous research (Roese & Oleson, 1996, 1997) that found that events that almost occurred produce spontaneous counterfactual musings. After reading the scenario, participants were asked to rate Jane on a 9-point scale anchored by the traits reckless and adventurous.

RESULTS AND DISCUSSION

A 2 (counterfactual/no counterfactual) × 2 (positive/negative event) between-participants analysis of variance (ANOVA) was run on ratings of Jane. The only reliable effect that emerged from this analysis was a main effect for valence, F(1,74) = 4.00, p = .05. Jane was judged to be more adventurous (M = 4.4) when she won a trip to Hawaii then when she did not win the trip to Hawaii (M = 3.8). Similar to our results, N'gbala and Branscombe (1997, Experiment 2) did not find any differences in impression-based evaluations, even when counterfactual mutations differed between the experimental conditions. The effect of outcome valence on trait judgments is consistent with previous research that has found that judgments of responsibility are positively correlated with the severity of the consequences of an action (Walster, 1966) and that people often think that good outcomes come to good people (Lerner & Miller, 1978). As Allison, Mackie, and Messick (1996) point out, individuals often use outcomes, disconnected from a priori odds or intentions, to impose order and control over the world.

It appears then that downward and upward counterfactual scenarios, independent of valence, do not activate trait judgments along a dimension related to risk-taking. The results from this experiment suggest that although outcome valence reliably affected trait judgments, it is unlikely that counterfactuals produce spontaneous trait inferences or that they produce appreciable trait construct activation along the dimension of recklessness and adventurousness. However, it is possible that participants were being strategic, or overconscious, in their ratings of Jane. If the interest is in whether counterfactuals spontaneously prime the constructs of adventurous and reckless, the data may be failing to reflect such activation due to the explicit nature of the measure. Typical tests for semantic construct activation assess accessibility through ratings of an unrelated character (person) on the dimension supposedly made accessible by the priming stimulus (e.g., Higgins et al., 1977; Devine, 1989). Experiment 2 adopts this methodology not only to examine the viability of the semantic priming hypothesis, but also to pit the three proposed mechanisms against one other.

EXPERIMENT 2

The second experiment investigated the influence of counterfactual primes on later judgments of an ambiguous target person. It was predicted that the mutable nature of Jane switching seats that led to her almost winning or losing would activate the simulation heuristic (Kahneman & Tversky, 1982)—that it is the third mechanism described above, priming a mental simulation mind-set, through which counterfactuals exert their influence. To examine this requires a paradigm in which a critical test of the three mechanisms is possible. Such a test is provided by the unrelated studies paradigm of Higgins et al. (1977) and subsequent priming research.

As stated in the introduction, the priming of a "mental simulation" mind-set mechanism predicts a different reaction to the Donald paragraph from the "semantic" or "affective" priming mechanisms. Both the priming of trait construct and affective construct hypotheses predict increased judgments of Donald's recklessness following an upward counterfactual prime, but increased judgments of Donald's adventurousness following a downward counterfactual prime. In contrast, the priming of mental simulation hypothesis predicts that a simulation mind-set will be activated by both downward and upward counterfactuals, and utilized when forming an impression in the subsequent person perception task. Because negative alternative consequences are salient in the story about Donald, mental simulation, whether initiated by an upward or downward counterfactual, should produce judgments of Donald as reckless: Both a downward and an upward counterfactual will exert a similar influence on judgments of Donald. One may note that because Donald risked injury and death and emerged unscathed that the opposite prediction could be made: Donald would be rated as less, rather than more, reckless. We contend that the judgments of Donald, like causality judgments of or emotional reactions to counterfactual events, are influenced not by what actually happened to Donald, but what could have happened in the past or could happen in the future.

In addition, these materials are well suited for testing these models because Donald is ambiguous on more than one pair of oppositely valenced traits (adventurous-reckless; independent-aloof) (Higgins et al., 1977). This allowed us to test whether priming effects of counterfactuals would occur only for applicable traits. What types of judgments are applicable to counterfactuals? Unlike the priming of trait constructs, there is no semantic link between the prime and the target of judgment in counterfactual priming if a mental simulation mind-set is activated. Applicability for counterfactual primes depends on the judgmental context (i.e., the trait dimensions being considered) and the potential mutability of the target event-whether alternative scenarios and outcomes are available to come to mind. This twofold understanding of applicability is analogous to that of semantic priming in which semantic construct activation has no effect if the trait words used as the primes and the trait words used in the judgments have no semantic link, or when the target information in the person perception task is not ambiguous (i.e., able to be influenced). We consider the paragraph about Donald-specifically the behaviors that describe his riskiness—to be applicable to mental simulation because assessing the likelihood of outcomes is relevant to that judgment. As Kahneman and Tversky (1982) point out, the simulation heuristic is used to predict outcomes and assess probabilities. As with semantic primes, the consequences of activating a mental-simulation mind-set depend on the availability of relevant information in the subsequently encountered information. Increasing the accessibility of the simulation heuristic should make alternatives more accessible, but only if they are already available-or mutable-in the person perception paragraph. In the Hirt and Markman (1995) study, alternative explanations were available but not accessible until the simulation heuristic was activated. In addition, Hirt and Markman demonstrated that activating the simulation heuristic had no debiasing effect when there were no plausible alternatives available. Borrowing this logic, we predicted that a counterfactual prime would not influence judgments in general, but only judgments on dimensions applicable to mental simulation. Independent-aloof judgments in general seem somewhat immune to the influences of mental simulation; it is difficult to imagine or construct (or simulate) behaviors that are both relevant to independence or aloofness and mental simulation. In addition, the Donald paragraph does not include any information that suggests the mutability of Donald's ambiguously standoffish behavior (i.e., no information that could potentially provoke thoughts about how outcomes related to the independent-aloof trait dimension could have been different). Ratings of Donald along the riskiness dimension, and not the independent-aloof dimension, should be affected by counterfactual primes.¹

In contrast, if counterfactuals were activating an affective construct, the effects of this activated affect should generalize to all mood-congruent traits. To this end, we had half of the participants rate Donald on an applicable pair of related traits (reckless–adventurous). The other half made judgments on an inapplicable pair of traits (aloof–independent) relevant to Donald's behavior, but not to the mental simulation mind-set primed by the counterfactual.

Finally, half the participants rated Jane's emotional reaction. This factor was included for two reasons. First, this question highlights the scenario's counterfactual nature, and we wanted to rule out the possibility that counterfactuals operate as primes only when attention is drawn to the scenario's counterfactual nature. Second, there exists the possibility

1. There is the possibility that no effect would emerge on the independent-aloof dimension because the Donald paragraph contains less information relevant to this dimension compared to the amount of information that is relevant to the reckless-adventurous dimension. We used the same scenario that Higgins, Rholes, and Jones (1977) used and countless other studies have used. If no effects were possible on this dimension because of limited information, then no effects would have emerged in the previous studies. We took effects in the previously published studies with the same information as evidence that there was sufficient information to allow judgments along this dimension to be potentially influenced. that affective constructs will be primed sufficiently only when participants have rated Jane's emotional reaction.

METHOD

Participants and Design. Participants were 167 undergraduates who received credit for participation as part of a course requirement. The experiment had a 2 (counterfactual/no counterfactual) × 2 (positive/negative event) × 2 (applicable/not applicable judgment) × 2 (emotional expression/no expression) between-participants design.

Procedure and Stimulus Materials. Participants received the stimulus materials as part of a larger questionnaire packet. With regard to the whole questionnaire packet, participants were instructed to go through the packet one page at a time, never going ahead until a page was completed and never going back to any previous pages once they were completed. When participants reached the scenario about Jane, the instructions simply asked them to read the story carefully. As in Experiment 1, the valence and counterfactual nature of the scenario were orthogonally crossed. For half of the participants, Jane's winning or losing was a result of a seat change. For the other half there was no mention of a move.

On the following page, half of the participants were asked to rate Jane's emotional reaction. For half of the participants who read a positive outcome (i.e., Jane wins the trip to Hawaii), the first question on this page asked them to estimate the amount of joy that Jane felt on 7-point scale anchored at one (none at all) and seven (very much). For half of the participants who read a negative outcome (i.e., Jane does not win the trip to Hawaii), the first question on this page asked them to estimate the amount of regret that Jane felt on a similar 7-point scale. We chose the two different questions in order to be consistent with both outcome valence and the counterfactual emotions documented in previous studies (Kahneman & Tversky, 1982; Miller, Turnbull, & McFarland, 1990). All participants were asked to estimate the frequency with which Jane attends concerts and frequency that they attend concerts. These questions were included as a plausible justification for having read the scenario, especially for those participants not asked to judge Jane's emotional reaction.

Next, participants were given a counting backward task in order to clear working memory (Higgins et al., 1977). The two pages following the counting backward task concerned the impression formation task, and were presented in a different font from the concert scenario and its related questions in order to separate the two tasks for the participants. That is, we expected the differing fonts to create the perception that the two tasks were separate and unrelated. Previous research has found that

when the priming and judgment tasks are not sufficiently separated, participants attempt to control for any effects they perceive the prime might have on their subsequent judgments (Martin, 1986; Moskowitz & Skurnik, 1999). Participants were instructed to form an impression of Donald as they read the paragraph. On the following page, participants were asked to characterize Donald on a 9-point scale. For participants making the applicable judgment, the rating scale was anchored at adventurous (1) and reckless (9). For participants making the inapplicable judgment, the rating scale was anchored at independent (1) and aloof (9). We did not include the type of trait judgment (reckless-adventurous and independent-aloof) as a within-subjects variable because past (Moskowitz & Roman, 1992) and current research (Galinsky & Moskowitz, 1999) suggest that the second judgment assimilates to the valence of the first judgment. The first judgment establishes a general evaluation of the target that constrains judgments on the second trait encountered.

RESULTS

Judgments of Jane's Emotional Reaction. For those participants who read a negative event and were asked to rate Jane's emotional reaction, we tested whether Jane was perceived as experiencing more regret in the upward counterfactual scenario than in the no counterfactual/negative event scenario. There was significantly greater perceived regret in the upward counterfactual event condition (M = 5.53) than in the no counterfactual/negative event condition (M = 2.45), t(37) = 4.7, p < .001. Similarly, for those participants who read a positive event and were asked to rate Jane's emotional reaction, we tested whether Jane was perceived as experiencing more joy in the downward counterfactual scenario condition than in the no counterfactual/positive event condition. There was not significantly greater perceived joy in the downward counterfactual event condition (M = 6.57) than in the no counterfactual/positive event condition (M = 6.55), t(37) < 1. This lack of perceived emotional difference between the counterfactual and no-counterfactual conditions when reading a positive event is likely due to a ceiling effect, as participants in both conditions are reporting maximal amounts of joy. Winning a trip to Hawaii, a rare and unexpected positive event, inspires a uniform positive emotional reaction-regardless of the normality and mutability of the sequence which produced that outcome.

Impressions of Donald. A 2 (counterfactual/no counterfactual) × 2 (positive/negative event) × 2 (applicable/not applicable judgment) × 2 (emotional expression/no expression) between-participants analysis of



FIGURE 1. Judgments of Donald as a function of prime and applicability of trait judgments.

Note. Higher numbers indicate judgements of greater recklessness on the applicable trait judgment and great aloofness on the inapplicable trait judgment.

variance (ANOVA) was run on impressions of Donald. A significant main effect for the applicability variable, F(1, 151) = 33.5, p < .001, and a significant main effect for the counterfactual variable, F(1, 151) = 4.1, p < 0.1.05, were qualified by a significant applicability × counterfactual interaction, F(1, 151) = 4.8, p = .03. Simple effects tests demonstrated that when participants judged Donald on an applicable trait (adventurous/reckless), they rated him as more reckless following exposure to a counterfactual scenario (M = 6.62) than after a non-counterfactual event (M = 5.21), F(1, 151) = 7.1, p < .01, whereas participants judging Donald on an inapplicable trait (independent/aloof) were not differentially influenced by the prime scenarios (M = 3.91 for a counterfactual scenario and M = 3.94 for a non-counterfactual scenario), F(1, 151) < 1 (see Figure 1). No other effects were significant and all higher-order interactions involving counterfactual and valence had F's < 1. In addition, whether or not participants rated Jane's emotional reaction did not have any effect on judgments of Donald.

DISCUSSION

Exposure to a counterfactual event produced judgments of Donald (on an unrelated task) as more reckless than when Donald was judged without prior exposure to a counterfactual. This was true regardless of the

outcome valence (i.e., winning or losing) of the counterfactual event (i.e., whether it was an upward or downward counterfactual event). Exposure to a counterfactual event and its production of mental simulation appeared to prime the process of mental simulation, which then generalized to a subsequent task-evaluating Donald's behavior. Given that the counterfactual event (the movement to and from seats by Jane) did not affect judgments of recklessness and adventurousness about the prime scenario in Experiment 1, and that ratings did not vary as a function of counterfactual valence in Experiment 2, it appears that direct priming of trait constructs can not account for the results of the experiment. Also, because the upward counterfactual scenario produced greater judgments of regret than the negative no-counterfactual scenario, and because the downward counterfactual produced maximum judgments of joy, the results also are inconsistent with the affective priming hypothesis. This hypothesis would predict differences in trait ratings of Donald on both applicable and inapplicable traits as a function of whether an upward or downward counterfactual served as the prime.

The third hypothesis, that mental simulation would be primed by exposure to a counterfactual scenario, garners the most support. The mental simulation that occurred when reading about Jane's movements at the concert carried through to the subsequent impression formation task. Other research (Galinsky & Moskowitz, 2000) had found that the counterfactual prime scenarios reliably produced spontaneous counterfactual thoughts and awareness of alternative realities. In addition, the judgmental consequences of mental simulation were observed only when the process of mental simulation was relevant and applicable to the judgment. Judgments of Donald's recklessness-adventurousness were systematically affected by exposure to counterfactuals. For this trait dimension, mental simulation was relevant to assessing Donald's ambiguous actions in which death was courted: The potential, and mutable, outcomes to Donald's outdoor activities that were available in the person perception information became accessible following the counterfactual prime. On the other hand, mental simulation with regard to Donald's ambiguously standoffish behavior provided no basis for judgment of whether he was independent or aloof. The simulation heuristic, having been activated in a previous task, became an available mental process to be used in understanding and comprehending subsequent, applicable person perception information.

EXPERIMENT 3

We suggested that mental simulation produced the judgments of Donald as more reckless because there were negative consequences ("he had risked injury, and even death, a number of times") for Donald's actions potentially available. To examine whether our assumption that the salience of negative consequences in the paragraph about Donald makes the simulated outcomes to the story about Donald necessarily focused on injury, death—and thus recklessness—and to more closely explore whether it is in fact the availability of these negative alternative possibilities that become focused on as a result of priming a mental simulation mind-set, a follow-up experiment was conducted. This experiment also served as a replication of our primary results from Experiment 2.

A new Donald paragraph was created in which the negative consequences were omitted from the scenario in order to create a story in which the potential simulated outcomes would be less likely to focus on harm. Specifically, the sentence, "He had risked injury, and even death, a number of times" was removed. In order to pretest whether the two different scenarios differed in the availability of negative consequences, 22 participants were either given the original Donald scenario to read, or they were given the new Donald scenario to read and asked to rate which were the most salient consequences of Donald's activities using a 9-point scale anchored on -4 (negative consequences) and +4 (positive consequences). Participants who read the old Donald paragraph reported that the negative consequences of Donald's actions were significantly more salient (M = 0.60) than did participants who read the new Donald paragraph (M = 2.3), t(20) = 2.1, p = .05.²

However, the decrease in negative consequences in the new Donald paragraph may have also served to reduce the ambiguity of the paragraph, thereby reducing its susceptibility to accessibility effects (Higgins, 1996). To ascertain whether the two paragraphs were equally ambiguous, a different group of 22 participants read the old and new Donald paragraphs and rated Donald on a 9-point scale anchored at adventurous (1) and reckless (9). No differences emerged between the two

2. The results of the pretest may not seem entirely consistent with our hypotheses. The consequences are rated as more neutral (near the midpoint of the scale) than negative. Although the pretest data do not show that negative consequences are more available in absolute terms, the relative difference between the old and new Donald is important because it demonstrates that the sentence referring to the possibility of death had a discernable impact on the rated negative consequences. The fact that Donald from the original story evoked "neutral" rather than negative consequences may seem to be at odds with the fact that he was rated as more reckless in the counterfactual conditions in Experiment 2. We are claiming that the potential simulational possibilities are more negative than neutral, not that the observed outcomes are in and of themselves negative. The fact that the mention of death and possible injury enhanced the salience of the negative consequences increases the potential simulation of those possibilities when constructing impressions of Donald's behavior, regardless of whether the consequences of Donald's behavior are rated as extremely negative in the absence of priming the simulation heuristic.

paragraphs, t(20) < 1. Ratings of the new Donald (M = 5.45) were equally close to the midpoint of the scale as were the ratings of the old Donald (M = 5.18), suggesting that the new Donald paragraph was sufficiently vague (Srull & Wyer, 1979). To get further evidence that the new Donald paragraph was sufficiently ambiguous enough to capture the effects of primes, we also utilized the pretesting procedure of Higgins et al. (1977); 26 new participants read either the old or new Donald paragraph and were asked to characterize Donald's personality in a word or two. No differences between the two conditions emerged in the categorizations of Donald. Of those participants who read the new Donald paragraph, 46% described Donald as adventurous (or used a synonym of adventurous) and 39% categorized Donald as reckless (or used a synonym of reckless). Of those participants who read the old Donald paragraph, 46% categorized Donald as adventurous and 46% categorized Donald as reckless. These spontaneous categorizations of Donald as both adventurous and reckless suggest that the overall dimension of recklessness and adventurousness is still applicable in the new Donald paragraph. The combination of the pretest results suggest that the new Donald paragraph was sufficiently vague and ambiguous (Higgins et al., 1977; Higgins & Brendl, 1995; Srull & Wyer, 1979) to serve as suitable person-perception stimulus material in a priming experiment. That is, the new Donald meets the ambiguity standards based on the primary methods for identifying ambiguity in paragraphs used to draw out priming effects. Having shown that the old and new Donald paragraphs differed in the availability of negative consequences but did not differ in their level of ambiguity with regard to recklessness, we used a similar procedure to Experiment 1, but manipulated whether participants formed an impression of the old or new Donald.

METHOD

Participants and Design. Participants were 90 undergraduates who received credit for participation as part of a course requirement. The experiment had a 2 (counterfactual/no counterfactual) \times 2 (positive/negative event prime) \times 2 (old Donald paragraph/new Donald paragraph) between-participants design.

Procedure and Stimulus Materials. Participants received the stimulus materials as part of a larger questionnaire packet. With regard to the whole questionnaire packet, participants were instructed to go through the packet one page at a time, never going ahead until a page was completed and never going back to any previous pages once they were completed. When participants reached the scenario about Jane, the instructions simply asked them to read the story carefully because they



FIGURE 2. Judgments of Donald as a function of prime and type of Donald paragraph. *Note.* Higher numbers indicate judgements of greater recklessness.

would be asked questions about it later. After participants were given a counting backward task in order to clear working memory, they received the same impression formation instructions presented in Experiment 2. Half of the participants were given the original Donald paragraph that suggested potential negative consequences for Donald's actions and the other half of the participants were given the new Donald paragraph in which the suggestion of negative consequences were omitted. All participants were asked to characterize Donald on a 9-point scale anchored at adventurous (1) and reckless (9). After completing the entire questionnaire packet, participants were debriefed. None of the participants mentioned noticing a connection between the priming and judgment tasks.

RESULTS AND DISCUSSION

A 2 (counterfactual/no counterfactual) × 2 (positive/negative event prime) × 2 (old Donald paragraph/new Donald paragraph) between-participants ANOVA was conducted on impressions of Donald. A significant main effect for the Donald paragraph, F(1, 82) = 6.2, p < .02, was qualified by a significant counterfactual × Donald paragraph interaction, F(1, 82) = 5.5, p = .02 (See Figure 2). The main effect of valence and its related interactions were not significant, all Fs < 1. Participants who were primed with a counterfactual, regardless of whether is was upward or downward, and who read the original Donald paragraph rated Donald as significantly more reckless (M = 6.1) than participants who read the new Donald paragraph (M = 4.1), t(86) = 11.02, p < .01. Participants who were not primed with a counterfactual did not differ in their evaluation of the old Donald paragraph (M = 5.1) and new Donald paragraph (M = 5.0), t(86) < 1. The lack of any difference between these two conditions serves to confirm further that the newly created Donald paragraph was as ambiguous as the old Donald paragraph.

We next compared each of the counterfactual prime conditions against the two no-counterfactual prime control conditions. A planned contrast showed that participants who were primed with a counterfactual and read the old Donald paragraph rated Donald as more reckless than participants not primed with a counterfactual who read the old Donald paragraph, and who read the new Donald paragraph, t(86) = 2.3, p < .03. This result serves as a direct replication of the results from Experiment 2. On the other hand, a planned contrast showed that participants who were primed with a counterfactual and read the new Donald paragraph rated Donald as less reckless than participants not primed with a counterfactual who read the old Donald paragraph and who read the new Donald paragraph, t(86) = 1.93, p = .057. This result suggests that participants still used the simulation heuristic to construct their impressions of Donald based on his outdoor activities. In assessing the probable outcomes, only positive consequences came to mind and Donald was rated as less reckless.

The mental simulation and consideration of alternative outcomes primed by exposure to a counterfactual event produced divergent judgmental effects depending on the availability of the potential consequences of Donald's actions. These results replicate Experiment 2 by again demonstrating that counterfactual primes can produce more extreme judgments in a later person perception task. When negative possibilities permeated the Donald paragraph, counterfactual primes led to judgments of increased recklessness. When these negative possibilities were stripped from the paragraph, counterfactual primes led to evaluations of Donald as more adventurous. Again, as in Experiment 2, the effects of counterfactual primes were not moderated by the valence of the counterfactual event. Both downward and upward counterfactuals led to greater perceptions of recklessness when negative consequences were available in the person perception task.

GENERAL DISCUSSION

The main conclusion from the three experiments is that counterfactuals can serve as primes, and that the process of mental simulation fundamental to the perception of a counterfactual is the mechanism by which counterfactuals exert their priming influence. The experiments presented here shed light on the nature and consequences of both priming effects and counterfactuals. These studies provide converging evidence that the simulation heuristic (the awareness of counterfactual alternatives) originally proposed by Kahneman and Tversky (1982) can be made accessible by exposure to mutable events, in which an alternative outcome almost occurred, and can affect subsequent judgments (Hirt & Markman, 1995). Counterfactual events, with their accessible alternatives to reality, had been shown to affect judgments about the mutable event itself, whether they were real world judgments, such as victim compensation, emotional reactions, or judgments of causality. We have demonstrated that the simulation heuristic goes beyond judgments about the counterfactual event itself and extends to future, unrelated judgments for which the simulation heuristic is applicable.

ALTERNATIVE EXPLANATIONS AND LIMITATIONS OF THE PRESENT RESEARCH

We have proposed that counterfactual primes affect judgments and behavior by increasing the accessibility of mental simulation and consideration of alternatives. We attempted to rule out a number of alternative explanations for the effects of counterfactual primes. The three experiments attempted to distinguish the influences of counterfactual events from those of semantic constructs and affect. In Experiment 1 there was no evidence that exposure to the counterfactual scenarios activated constructs related to risk taking. In Experiment 3 there was a reversal of the effect of counterfactual primes when the Donald paragraph was altered to remove explicit mention of negative potential alternatives, even though removing these alternatives did not reduce the ambiguity of Donald's behavior. The combination of these two experiments suggests that counterfactual primes had a pattern of effects inconsistent with a semantic construct hypothesis. The results of Experiment 2 were also incompatible with the affect hypothesis. Although the upward and downward counterfactuals produced different affective judgments, they had equivalent effects on perceptions of Donald. Despite little evidence that activated constructs or affect influenced the person perception task, there are surely situations in which counterfactuals could lead to the activation of a specific trait construct or in which counterfactual-induced affect could affect person perception tasks. For example, counterfactual affect (Kahneman & Miller, 1986) may have priming consequences when individuals experience the counterfactual event directly. The different alternative accounts are not necessarily mutually exclusive and could all operate simultaneously. Nonetheless, the activation of the simulation heuristic hypothesis found the most support in our experiments.

One alternative explanation for our results is that participants primed with a counterfactual alternative simply became more conservative in their judgments. That is, the surprising outcomes of the counterfactual scenarios may have triggered a belief that the world is an unpredictable place and that fate is not to be tempted (Miller & Taylor, 1995). The close counterfactual alternative to reality upset the participants' belief in a rational and predictable world and they subsequently saw any behaviors with suggestions of threat as being particularly reckless. Thus, uncertainty and unpredictability regarding the future increased the conservatism in participants' subsequent assessments of judgment and behavior (hence, judging Donald as reckless). Although Experiment 3 demonstrated that when the person perception task was stripped of available negative counterfactual consequences, judgments of Donald's recklessness disappeared, the conservatism alternative hypothesis could claim that the available negative consequences are required for increased cautiousness to emerge. We conducted a follow-up experiment in which participants, after being exposed to the prime scenarios of Jane at the rock concert, were asked to evaluate the probability of a plan succeeding. There was no evidence that counterfactual primes led to more conservative judgments, independent of mental simulation. Counterfactual primes did not lead to lower estimates of success relative to noncounterfactual primes. These results provided further evidence that when counterfactuals serve as primes they exert their influence through increasing the accessibility of the simulation heuristic.

Roese and Olson (1995) have suggested a reciprocal relationship between expectancies and counterfactuals that has implications for this alternative explanation. Counterfactuals are generated when expectancies are violated under exceptional circumstances, and the counterfactual is then used to update or alter expectancies for similar actions or outcomes in the future. One potential implication from this theory is that the effects of counterfactual primes emerge because participants are updating expectancies for situations material to the contents of the counterfactual scenario. However, because the priming of the counterfactual and subsequent tasks were perceived by participants as truly separate in Experiment 3, participants were most likely not applying an updated expectancy in the impression formation task. We feel that the activation of a mental-simulation mind-set is a more parsimonious and convincing explanation of our results than any of the other alternative explanations.

The present research has a number of limitations that restrict its generalizability—the demonstration along only one trait dimension, the reliance on the Donald paragraph, and the use of Likert scales. First, we have only demonstrated judgmental effects along one dimension-reckless-adventurousness. Although we consider that this trait dimension is one of the most amenable to influence by mental simulation based on Kahneman and Tversky's (1982) description of the simulation heuristic, future research should explore other trait dimensions that can be influenced by counterfactual primes. Second, paragraphs other than the Donald paragraph should be used. Finally, because these effects have only been demonstrated using Likert scales, future research should use more open-ended procedures that allow participants to write out their impressions of Donald. Other research has demonstrated effects of counterfactual primes outside the person perception paradigm. Galinsky and Moskowitz (2000) extended the judgmental effects of counterfactual primes to behavioral effects. They found that activating a mental simulation mind-set led participants to select available, but inaccessible alternatives, in a number of problem-solving tasks.

PRIMING MIND-SETS

These experiments extend previous work on the priming of mind-sets. Both Gollwitzer et al. (1990) and Chen et al. (1996) demonstrated that the activation of a particular cognitive orientation in a prior context drove subsequent information processing and memorial strategies. The procedure of the Chen and colleagues experiment is particularly relevant to our experiments. They primed the impression management and accuracy motivation mind-sets by exposing participants to different scenarios (e.g., the accuracy scenarios emphasized thinking and behaving objectively). Similarly, we exposed participants to a scenario that previous research had found to instigate spontaneous counterfactual thinking (Galinsky & Moskowitz, 2000). Mind-sets become activated and utilized in subsequent domains because they are a functional, well-learned strategy for approaching the world.

The effects of counterfactual primes further the preparative function of counterfactual thought and mental simulation, in which past reconstructions lead to future consideration of alternatives. Roese (1994) found that directed counterfactual thinking led to specific increases in preparedness and ultimately performance by specifying the necessary conditions to avoid replication of previous errors. The work presented here has extended this work by demonstrating that the process of reconstructing the past can lead to future consideration of alternatives on unrelated tasks. The process of understanding the past by contemplating alternatives changes our understanding of and predictions about the future.

In the Roese (1994) experiments, the direction of the counterfactual thoughts were a critical determinant of subsequent performance. In the experiments presented here direction of the counterfactual thoughts did not produce divergent judgments. In the Roese experiments, participants generated counterfactual thoughts about one anagram task and then completed a second anagram task: The counterfactual activation and subsequent performance were in the same domain, namely an anagram task. In our experiments, participants did not perceive a link between the priming scenarios that activated counterfactual thinking and the person perception judgments. The differences between our experiments and those of Roese (1994) suggest that when subsequent judgments and behavior are in the same domain as the one in which the counterfactuals are generated, the direction of the counterfactual thoughts affects judgments and behavior. When counterfactuals are activated in a context independent from the subsequent judgmental or behavioral context, the direction of the counterfactual thoughts does not affect performance or judgments.

The experiments by Gollwitzer et al. (1990) and Chen et al. (1996) did not test whether their mind-set priming effects were limited to applicable material-as semantic construct priming research has demonstrated (Higgins, 1996). That is, they demonstrated that their various mind-set manipulations had divergent effects, but they did not demonstrate where and if these effects would not occur. We demonstrated that our mental simulation mind-set did not produce effects on subsequent judgments that did not lend themselves to influence by mental simulation, namely Donald's independence. By demonstrating that the mind-set priming effects are limited to applicable material which can potentially be transformed by the cognitive processes and orientations proffered by the mind-set, these experiments further suggest a uniform law of priming effects. Primed constructs and mind-sets exert influence on future, unrelated tasks and judgments to the extent that the prime is relevant and applicable to the judgmental dimensions and to the extent that the object of judgment is potentially able to be influenced (i.e., ambiguous for semantic primes and mutable for counterfactual primes).

Future research should further explore the differentiation of mind-set primes and semantic primes by investigating whether awareness of a priming influence leads to contrast effects following mind-set primes as it does with semantic primes (Martin, 1986; Moskowitz & Roman, 1992; Moskowitz & Skurnik, 1999; Strack, Schwarz, Bless, Kübler, & Wänke, 1993; Wegener & Petty, 1997). The majority of priming studies that find assimilation of person perception judgments to an activated construct do so when the primes are outside of awareness, especially when participants believe no relationship exists between the priming task and the judgment task (Higgins, 1996). Participants interpret their reaction to the target to have originated in the target's behavior, rather than appreciating that the reaction had roots in the incidental exposure to previous information. Martin (1986) suggested that contrast effects occur when participants are conscious of the primes because they attempt to remove the influence of the prime from their judgments and overcompensate for the influence of the prime. Wegener and Petty (1997) suggest that such corrections are based on "naive theories" of influence. These theories might be especially important when participants become conscious of mind-set primes and the possibility of judgmental contamination, because the direction and strength of the influence is probably harder to delineate than it is for semantic construct primes, which often involve trait-related words embedded in sentence completion tasks, word puzzles, or ostensible visual perception tasks.

A number of recent experiments have demonstrated that construct accessibility goes beyond social judgments and extends to behavioral effects. Bargh, Chen, & Burrow (1997) found that the incidental activation of a semantic construct resulted in behavioral tendencies and actions consistent with the activated construct. In one experiment, incidental activation of the construct "rude" through a sentence completion task led participants to interrupt an experimenter more quickly, despite no mention of concepts related to speed or slowness during the priming task. Galinsky and Moskowitz (2000) also found behavioral effects for counterfactual primes. In their experiments, the activation of the simulation heuristic affected both problem-solving tasks and the solicitation of hypothesis-relevant information. Like semantic primes, mind-set primes affect both judgment and behavior, suggesting that the incidental exposure to a wide variety of stimuli can alter perception and action.

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