

# Counterfactual Thinking

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Counterfactuals are mental representations of alternatives to the past and produce consequences that are both beneficial and aversive to the individual. These apparently contradictory effects are integrated in a functionalist model of counterfactual thinking. The author reviews research in support of the assertions that (a) counterfactual thinking is activated automatically in response to negative affect, (b) the content of counterfactuals targets particularly likely causes of misfortune, (c) counterfactuals produce negative affective consequences through a contrast-effect mechanism and positive inferential consequences through a causal-inference mechanism, and (d) the net effect of counterfactual thinking is beneficial.

Look in my face; my name is Might-have-been;  
I am also called No-more, Too-late, Farewell.

—Dante Gabrielle Rossetti

Popular wisdom typically equates thoughts of what might have been with negative emotional consequences. As the quotation above suggests, those who dwell on possibilities that never were, that is, on *counterfactual* versions of the past, are doomed to regret, despair, and an excruciating sense of loss. This theme echoes through numerous literary narratives: If only Madame Bovary had married someone other than the dull Henry Bovary . . . ; if only Cyrano had mustered sufficient courage to pursue directly his love Roxanne . . .<sup>1</sup> John Greenleaf Whittier (1898) wrote what is perhaps the most famous assertion of this theme: “For all sad words of tongue or pen, the saddest are these: ‘It might have been!’” (p. 153).

Although philosophers have long pondered the enigmatic character of counterfactuals (e.g., Goodman, 1947), social psychologists have only more recently examined their significance for feeling and thinking (e.g., Roese & Olson, 1995d). Research has indeed confirmed that negative emotions may result from counterfactual thinking. Other research, however, has shown that separate beneficial effects may also emerge from counterfactual thinking. Specifically, thoughts of what might have been may suggest paths to what may yet be. From this latter vantage point, short-term negative affect may be offset by inferential benefits that may aid the individual on a longer term basis. That counterfactual thinking is generally beneficial, or functional, for the individual forms the conceptual basis for the present theoretical overview of the counterfactual literature. This review is intended to be both comprehensive, in that the majority of studies conducted by social psychologists are considered, and theory driven,

in that diverse threads of counterfactual research are woven into an integrated functionalist tapestry.

Five main sections comprise this article. First, I define counterfactuals. Second, I articulate the theoretical framework of counterfactual functionality. Third, I examine determinants of counterfactual thinking in light of the functional approach. Fourth, I review consequences of counterfactual thinking, and finally I consider implications that integrate both beneficial and harmful consequences under the rubric of functionality.

Several assertions are subordinated under the central idea that counterfactual thinking has a net benefit for the individual. To begin with, counterfactual thinking is activated by negative affect. In functional terms, counterfactual thoughts thus come to mind in response to those experiences where corrective thinking would be most beneficial. Second, the content of counterfactuals often focuses on extreme or unusual antecedent events, which are particularly likely sources of the misfortune in question. Third, counterfactuals produce negative affective consequences through a contrast-effect mechanism, but these effects are offset by positive inferential consequences occurring through a causal-inference mechanism. I examine these ideas in turn and follow with a more detailed definition of counterfactual thinking.

## What Is Counterfactual Thinking?

The term *counterfactual* means, literally, contrary to the facts. Some focal factual outcome typically forms the point of departure for the counterfactual supposition (e.g., Madame Bovary’s or Cyrano’s angst). Then, one may alter (or *mutate*) some factual antecedent (e.g., her decision to marry dull Henry and his inability to court Roxanne directly) and assess the consequences of that alteration. Thus, counterfactuals are frequently conditional propositions and, as such, embrace both an antecedent and a consequent (e.g., If Madame Bovary had married a better man, she would have been happier; if Cyrano had approached Roxanne when passion first struck, his life might have been emotionally richer). For my purposes, I restrict the term *counterfactual* to alternative versions of the past. That is, counterfactual does not refer to future prospects but only to negations

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<sup>1</sup> See Flaubert (1857/1950) and Rostand (1898/1971), respectively.

of established fact (cf. Hoch, 1985; M. K. Johnson & Sherman, 1990).<sup>2</sup> More specifically, the defining feature of a counterfactual is the "falsity" of its antecedent (Goodman, 1983). The consequent may or may not be false; if it is, then the mutation of the antecedent undoes the factual outcome. Goodman used the term *semifactual* to describe cases in which the consequent remains true. These propositions, focusing on the same outcome having come about by alternative means, are frequently prefaced by "even if" rather than "if only" (e.g., "Even if Madame Bovary had married another man, she would still have grown discontented"). However, this review focuses exclusively on those counterfactuals in which both the antecedent and the consequent are false.<sup>3</sup>

One useful classification of counterfactuals is based on their direction of comparison (Markman, Gavanski, Sherman, & McMullen, 1993; McMullen, Markman, & Gavanski, 1995; Roese, 1994). Counterfactuals may posit alternative circumstances that are evaluatively better than actuality (i.e., *upward* counterfactuals) or evaluatively worse than actuality (i.e., *downward* counterfactuals). For example, when Mary looks back at her anniversary dinner, she can think that it could have been better (e.g., "If only we had gone to a finer restaurant") or that it could have been worse (e.g., "Good thing we didn't get a flat tire on the way to the restaurant"). The terminology and theoretical basis for this variable owe much to the social comparison literature, in which a similar distinction between upward and downward is used to characterize comparisons of oneself to other individuals (see Collins, 1996; Taylor, Buunk, & Aspinwall, 1990; and Wood, 1989). The direction of counterfactual comparisons is one of several ingredients that illuminates counterfactual thinking in terms of its functional basis.

### The Functional Basis of Counterfactual Thinking

Are counterfactual thoughts harmful (Sherman & McConnell, 1995) or beneficial (Roese, 1994)? Both assertions can draw on compelling research foundations for rhetorical ammunition. On the one hand, upward counterfactuals tend to evoke unpleasant feelings (Davis, Lehman, Wortman, Silver, & Thompson, 1995; Markman et al., 1993). Moreover, upward counterfactuals are generated spontaneously far more frequently than downward counterfactuals (Roese & Olson, in press). On the other hand, upward counterfactuals may also offer useful prescriptions for efficacious future behavior (M. K. Johnson & Sherman, 1990; Landman, 1993; Taylor & Schneider, 1989). Given the evidence for both harmful and beneficial effects, it makes little sense to deny one or the other completely. Rather, the purpose of this article is to integrate these two assertions into a coherent process model. The central thesis of this article is that both are correct, counterfactuals have both positive and negative consequences for the individual that often stand in a state of tension, but that the net result is an overall benefit for the individual. Just as frequent exercise may evoke short-term pain, its long-term potential for health gains constitutes a net benefit for the individual.

The essence of this argument of preparative functionality is that upward counterfactual comparisons may suggest causal conclusions that illuminate paths to future success. As discussed in detail in *Consequences of Counterfactual Thinking*, these thoughts imply or embody causal conclusions, and causal conclusions often suggest prescriptions that may facilitate success

in the future (M. K. Johnson & Sherman, 1990; Roese, 1994). Thus, if Tommy failed an exam and then realizes that he would have passed if only he had studied more, he has identified a causally potent antecedent action that may be subsequently deployed to enhance future performance.

This framework derives from the social comparison literature, in which upward social comparisons (i.e., comparisons of self with a better-off other) are shown to yield negative affect but also positive motivational and informational effects (cf. Lazarus & Folkman, 1984; Taylor et al., 1990; and Wood, 1989). In contrast, downward social comparisons (i.e., with a worse-off other) have been theorized to fulfill self-enhancement goals because such comparisons, like downward counterfactual comparisons with a hypothetical worse state of affairs, may evoke positive affect via a contrast effect.<sup>4</sup>

Evidence for the functional basis of counterfactual thinking consists of two essential components. First, the process in question should become more frequent, active, or powerful to the extent that there is a situational need for it. That is, when the situation demands it, the process in question should be activated. In the next section, I consider determinants of counterfactual thinking in terms of this kind of evidence. That is, counterfactual thinking is activated largely in response to negative affect, which may constitute an internal biological signal to an individual that all is not well. Second, the process should produce some kind of beneficial effect. In the final section of this article, I consider counterfactual consequences in terms of a preparative function. That is, certain kinds of counterfactuals (e.g., upward) may be

<sup>2</sup> The present treatment of counterfactuals as any proposition that deviates from fact follows that of Kahneman and Tversky (1982) and Kahneman and Miller (1986), which in turn derives from long-standing philosophical traditions (e.g., Goodman, 1947; Kwart, 1986; Lewis, 1973b). This treatment differs, however, from the use of the term by some theorists of causal reasoning (cf. Einhorn & Hogarth, 1986; Hilton, 1988; Lipe, 1991; McGill & Klein, 1993, 1995). In those articles, counterfactual reasoning refers specifically to cases in which a candidate antecedent is altered and its outcome effect considered, as opposed to contrastive reasoning in which a candidate outcome is altered and antecedent features that are distinctive between the candidate outcome and its alternative become possible causal explanations. The definition of counterfactual used here thus encompasses both the counterfactual and contrastive reasoning described by these theorists.

<sup>3</sup> The term *simulation* is often used in discussions of counterfactual thinking (Kahneman & Tversky, 1982; Taylor & Schneider, 1989). This term refers to any imaginative mental construction and thus embraces a broader category of which counterfactual thinking is just one subset. *Rumination* refers to a variety of thoughts that recur without immediate situational relevance; counterfactuals are a subset of this category as well (Martin & Tesser, 1996).

<sup>4</sup> Previous work has discussed an affective function of counterfactuals (e.g., Markman et al., 1993). That is, if individuals generate downward counterfactuals, the resulting contrast might make factual affairs seem more pleasant. Although participants induced to generate downward counterfactuals report more positive affect than those generating upward or no counterfactual thoughts (Roese, 1994, Experiments 1 and 2), individuals seem to generate downward counterfactuals spontaneously only rarely (Roese & Olson, 1995c, in press). Although such thoughts might be fabricated strategically, such a controlled process falls outside the scope of the present formulation (cf. Kahneman, 1995). Rather, this discussion is restricted to automatic activation of counterfactual processing.

particularly likely to evoke intentions and behaviors that facilitate future improvement.

## Determinants of Counterfactual Thinking

### *Two Stages of Counterfactual Generation*

What influences the generation of counterfactual thoughts? Such thoughts are easily fabricated on demand in response to specific queries, goals, or intentions. However, these "elaborative" or consciously constructed counterfactual thoughts have been the focus of little research attention, perhaps because their operation seems relatively transparent. Rather, it is *automatic* counterfactual thoughts, those that apparently pop into mind without conscious intent, that have fascinated researchers to a far greater extent (Kahneman, 1995; Seelau, Seelau, Wells, & Windschitl, 1995) and form the centerpiece of this review. In addressing the issue of the determinants of automatic counterfactual thinking, I emphasize the important distinction between the stages of activation and content. *Activation* refers to whether the process of counterfactual generation is initially switched on or off (e.g., Bargh, 1996; Higgins, 1996), whereas *content* refers to the specific makeup of the resulting counterfactual thought. For example, Violet has just failed an exam. Whether she wonders at all if she might have performed better or instead focuses only on what was reflects the issue of mere activation. If counterfactual processing is indeed activated, she might then muse that "If only I had studied harder, I would have passed." The content of this particular counterfactual focuses on an alteration to her study habits; but once activated, counterfactual content may take many forms. Violet may as easily have wondered whether curtailing her drinking or moving in with her aunt might have resulted in a better exam score. Activation and content are related but conceptually distinct aspects of counterfactual generation. Temporal order is an important aspect of this distinction. Initial activation is a necessary condition for any content effects to occur but not vice versa. Moreover, different variables influence these two stages of activation and content. In general, affect is the main determinant of activation, whereas "normality" (i.e., whether circumstances surrounding the outcome are "normal" or unusual) is the main determinant of content.

Each determinant has unique functional implications. Counterfactual processing is activated by negative affect, and, moreover, negative affect may constitute a signal to the organism that corrective thinking and action is required. Counterfactual content recapitulates normality by altering antecedents that are unusual back to their normal values. If negative events are generally abnormal, then the most plausible antecedents associated with negative events must also be abnormal (Hilton & Slugoski, 1986; Kahneman & Miller, 1986; Kelley, 1972). I consider the functional significance of these two determinants in greater detail in the next sections.

### *Activation*

*Theory.* When is counterfactual thinking "switched on" or activated? Affect may be the chief determinant of the mere activation of counterfactual processing. Specifically, counterfactual thinking may be triggered most often by negative emotional

experience. Feeling bad makes one think "if only," with such thoughts directed in large part to the avoidance of whatever is making one feel bad, thus resulting in imaginings of a better (or upward) counterfactual world. More generally, negative affect has been construed as a signal to the organism that there is an acute problem or threat (Schwarz, 1990; Schwarz & Bless, 1991). As a result, cognitive responses such as narrowed attention and heightened systematic thinking are "mobilized" in response to negative affect (Taylor, 1991; see also Peeters & Czapinski, 1990). To the extent that such cognitive mobilization permits identification, evaluation, and rectification of the problem at hand, then this mobilization process can be construed as functional.

Counterfactual thinking may be viewed as consistent with principles of approach and avoidance behavior (Brendl & Higgins, 1996; Lewin, 1935). When faced with the prospect of unpleasantness (predators, poisons, etc.), people behave so as to avoid that unpleasantness. But even if the unpleasantness is not avoided but experienced, the cognitive impulse toward avoidance may persist. Thus, even as the evoking event recedes into the past, its power to flag attention remains. In many cases, then, counterfactual thoughts are part of a virtual, rather than actual, process of avoidance behavior. After the fact, individuals continue to focus on the avoidance of things unpleasant, imagining steps that might have been taken that would have enabled the avoidance of that past unpleasant event. This pattern may be particularly strong if the outcome in question produces chronic negative consequences (e.g., missing out on a raise might lead to continued financial hardship, which may serve to continually reactivate thoughts of what might have been had the raise been obtained).

Negative affect signals to the organism that a problem needs rectifying, and counterfactual thinking (among other cognitive mechanisms) is mobilized to confront the problem. Counterfactual thinking may be functional if it leads to insights into more appropriate behavior and to actions that correct the individual's problems. For example, if George decides that his evening with Mary might have been more successful had he refrained from talking endlessly about himself, he may grasp the causal efficacy of modesty during conversations and implement this insight during his next encounter with Mary. In this way, counterfactual thinking is corrective following unsuccessful social experiences. Although the past cannot be changed, to the extent that similar circumstances may occur in the future, counterfactual reconstructions of the past pave the way for future improvement (Landman, Vandewater, Stewart, & Malley, 1995; Markman et al., 1993; Roese, 1994; Taylor & Schneider, 1989). The essential first step in such a functional process is its relatively greater activation in response to negative as opposed to positive affect.

*Methodology.* Questions of counterfactual activation sat dormant for a number of years as researchers assessed effects of various determinant factors on counterfactual thinking without any separation, either conceptually or methodologically, of activation versus content. In short, the methodology that dominated early counterfactual research was insufficient to test for effects on mere activation, focusing instead purely on content. For example, the factor of "antecedent normality" (i.e., whether an antecedent occurring before the focal outcome is normal or exceptional) was shown in several experiments to influence counterfactual thinking, yet such effects were based on assess-

ments of counterfactual content or were indirect in that they assessed only affective reactions. For example, in one early study, researchers presented participants with a vignette about an automobile accident (Kahneman & Tversky, 1982). The victim, Mr. Jones, is hit by an intoxicated driver on his way home from work. Antecedent normality was manipulated such that some participants read that Mr. Jones left work unusually early but drove home via his normal route, whereas others learned that he departed at his usual time but took an unusual route home. When asked to consider how the accident could have been avoided, participants tended to construct their counterfactuals around whichever antecedent was exceptional. Thus, when departure time was exceptional, they noted that Mr. Jones would still be alive if he had left work later; when the route taken was exceptional, they observed that Mr. Jones should have stuck to his more familiar route. In these types of demonstrations, counterfactual processing was demanded by the procedure, and effects were based on tabulations of which antecedent element most often formed the basis of counterfactuals (see also Wells, Taylor, & Turtle, 1987). These types of demonstrations therefore pointed to effects on counterfactual content but were insufficient to differentiate between activation and content.

*Evidence.* Three lines of research have shown that affect determines counterfactual activation. This research was based on methodologies that overcame the shortcomings of the research described above—most often the researchers examined activation in terms of the frequency with which counterfactual thoughts were generated.

Davis et al. (1995) assessed the counterfactual thoughts disclosed by bereaved individuals in two longitudinal studies. In their Study 2, negative affect assessed 3 weeks after the event (in this case, the death of a child) reliably predicted the self-reported frequency of counterfactual thinking 15 months later. That is, the worse parents felt shortly after the sudden death of their infant, the more frequently they later generated counterfactual thoughts that undid the death. Counterfactual activation was not predicted, however, by whether the circumstances surrounding the death were normal versus exceptional. This evidence is particularly compelling by virtue of its real-life relevance, yet such correlational findings preclude clear causal conclusions.

Sanna and Turley (1996) manipulated outcome valence (i.e., positive vs. negative outcomes) and outcome expectancy (i.e., confirmed vs. disconfirmed outcome expectancies) and observed effects on counterfactual activation as measured using a thought-listing task. Across three experiments that ranged from reactions to course grades to performance on an anagram task, counterfactuals were generated more frequently following negative rather than positive outcomes. Outcome expectancy (whether the outcome was surprising vs. expected) also influenced counterfactual activation, with unexpected outcomes evoking greater counterfactual activation. Klauer and Migulla (1995) also demonstrated that spontaneous counterfactual thinking is far more likely after failure than success, but they did not detect any effects of outcome expectancy (see also Köller & Möller, 1995).

Roese and Olson (in press) also assessed the impact of outcome valence on counterfactual activation but sought more direct evidence that it is the affective experience per se, and not purely cognitive perceptions of outcome valence, that underlies

the effects described above. Across several experiments that employed vignettes, retrospective self-reports, and laboratory achievement tasks with manipulated performance feedback, negative outcomes evoked more frequent counterfactual thinking than positive outcomes. Contrary to the findings of Sanna and Turley (1996), expectancies did not reliably influence activation. The experiments employed either a nondirective thought-listing measure or a response time measure. In the latter case, response latencies to a posttask counterfactual prompt (i.e., yes–no responses to the statement, “My score could easily have been different”) were shorter after negative rather than positive outcomes. This evidence was interpreted to mean that participants were more likely to have entertained spontaneously a counterfactual inference in the negative rather than positive outcome condition, thereby facilitating their reaction time. In all of the experiments reported by Roese and Olson (in press), self-report ratings of affect were shown to mediate the effects of outcome valence on activation, with negative emotions accounting for a significant portion of the variance in counterfactual activation. When affect ratings were held constant, the outcome valence effect disappeared. Other variables, such as expectancy, controllability, and antecedent normality, were not reliable mediators of the outcome valence effect, nor did they significantly affect activation when manipulated directly.

These three lines of research were based on appropriate measures of counterfactual activation as opposed to content, which provides converging evidence that affect is a major determinant of counterfactual activation, while casting doubt on the relative importance of other plausible determinants, such as outcome expectancy, controllability, or antecedent normality.<sup>5</sup> This evidence, however, should not be taken to mean that affect is the exclusive determinant of counterfactual thinking. Other determinants, untested in the research above, could plausibly be important determinants of counterfactual activation. One particularly important such determinant, outcome closeness, is considered next.

#### *Other Determinants of Activation: Closeness*

*Outcome closeness* refers to the perceived nearness to achieving a goal. For the frustrated traveler marooned in an airport concourse, a flight missed by mere minutes is more likely to evoke thoughts of what might have been than the same flight missed by 2 hours (J. T. Johnson, 1986; Kahneman & Tversky, 1982; Kahneman & Varey, 1990). This perceived closeness may be temporal, as in the example above, but it may also operate in terms of physical distance (as in the case of a soldier killed 1

<sup>5</sup> Expectancy violation might be a determinant of counterfactual activation (Roese & Olson, 1995a; Sanna & Turley, 1996), such that outcomes that are unexpected might trigger greater counterfactual thinking than expected outcomes. Because of the obvious covariation between outcome valence and expectancy (positive outcomes are typically expected, whereas negative outcomes are often unexpected), attributional theorists have attempted to separate the variables methodologically but with mixed conclusions (cf. Bohner, Bless, Schwarz, & Strack, 1988; Kanazawa, 1992; and Olson, Roese, & Zanna, 1996). A series of experiments, however, indicate that affect is the key mediator of effects from either outcome valence or outcome expectancy manipulations (Roese & Olson, in press).

meter rather than 50 meters from a foxhole) and even numerical proximity (such as being the 999th customer when the 1,000th customer wins a door prize). At least two reports indicate that closeness influences counterfactual activation (Meyers-Levy & Maheswaran, 1992; Roese & Olson, 1996, Experiment 3). In both, negative outcomes were either nearly avoided or nowhere near avoided. For example, a scenario depicted a man who forgot to submit an insurance policy either 3 days or 6 months before a serious fire (Meyers-Levy & Maheswaran, 1992, Study 2). When the missed opportunity was temporally close (only 3 days before) rather than far, counterfactual thoughts appeared more frequently on a subsequent thought-listing task. Thus, perhaps above and beyond the role of affect, the perception that an outcome almost happened triggers counterfactual thoughts that elaborate on that outcome.

Studies that used free-response thought-listing tasks have suggested that downward counterfactuals are generated spontaneously only rarely. For example, of the freely recorded counterfactual thoughts that followed recollections of recent life events, more than 90% were upward rather than downward (Roese & Olson, in press). If downward counterfactuals are generally hard to detect, what situations tend to evoke them? Outcome closeness may be a key determinant of the activation of downward counterfactuals. For example, to discover that a missed plane subsequently crashed, and hence to realize that you were almost killed, may powerfully generate downward thoughts of what could have been but fortunately was avoided (McMullen, in press). Although downward counterfactuals may be relatively rare, a narrowly avoided negative outcome may be one condition that powerfully evokes them.

The impact of closeness on counterfactual activation also represents a generally functional process. That is, it makes good sense to focus on near misses rather than far misses because they probably represent a more efficient locus for future improvement. Efforts that failed by just a hair will likely require only minor finetuning to prove effective in the future, whereas efforts that failed by a wide margin likely require a more extensive overhaul.<sup>6</sup>

To summarize, affect is an important determinant of counterfactual thinking. Negative emotional states, such as unhappiness, anger, and depression, trigger the activation of counterfactual thoughts. In addition, perceived closeness to a possible outcome may also trigger counterfactual activation. Several other determinants previously assumed to evoke counterfactual thinking, such as antecedent normality, expectancy, and controllability, have been found to produce weak or inconsistent activation effects. This of course does not mean that affect and closeness constitute an exhaustive list of counterfactual determinants. Other determinants, such as involvement with the outcome in question (e.g., Meyers-Levy & Maheswaran, 1992), may also activate counterfactual thinking, but it remains for future researchers to resolve whether such variables are as potent as the two variables discussed in detail. Once negative affect or closeness has switched on counterfactual processing, other variables may then constrain the content of the resulting counterfactual inferences. These determinants of content are considered in the next section.

### Content

*Theory.* Once activated, counterfactual processing may gravitate toward any of an almost innumerable set of antecedent

elements. Once selected, this antecedent is then altered (or mutated) in some way, with its alteration representing the means by which the focal outcome is "undone." For example, George might confront his unfulfilling career, mentally undoing his unpleasant situation by mutating his educational choices ("If only I had gone to college . . .") or characteristics of his colleagues ("If only my coworkers were more competent . . ."), perhaps his physical location ("If only I had an office with a pleasant lakeview . . ."), or any number of antecedents. All such mutations flow into the same consequent ("then my job would be more pleasant"). But which one will he seize upon? Of the almost infinite set of prospects, which will form the basis for a counterfactual supposition?

The chief determinant of counterfactual content appears to be extant norms (Kahneman & Miller, 1986). In short, counterfactual content recapitulates normality. That is, deviations from a priori norms or expected behavior most often form the basis of counterfactuals, with counterfactual content returning the deviation back to its normal state of affairs. If George's decision to forego college was highly unusual (e.g., his entire high school class did in fact attend college), then this antecedent should be the preferred route to undo reality: If only George had gone off to college (as everyone else did), he would now be happier in his job. Numerous experiments confirm that counterfactual content is reliably determined by perceived normality (e.g., Buck & Miller, 1994; Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Miller, Taylor, & Buck, 1991; Miller, Turnbull, & McFarland, 1990; and Wells et al., 1987). When an exception to a norm is detected, the exception is seized upon and shifted back to its normal state in the resulting counterfactual. Another determinant of content discussed in this section, actions versus inactions, may also derive from this logic. If *inaction* is conceptualized as the norm or status quo, with *actions* standing out as abrupt deviations from the norm, then actions might embody counterfactual content to a greater extent than inactions (Kahneman & Miller, 1986). Finally, the role of antecedent controllability in dictating counterfactual content is discussed below.

*Evidence.* The classic demonstration of the normality principle, the Jones vignette from Kahneman and Tversky (1982), was described in a previous section. In that study, participants tended to mutate whichever antecedent act was exceptional when asked to generate a counterfactual alternative to a fatal car crash. Wells et al. (1987, Experiment 2) provided further evidence of this effect by manipulating the intrapersonal normality of several antecedent actions on a between-subject basis. Participants read vignettes about a protagonist who mistakenly knocked down a police officer who was pursuing a bank robber. The protagonist's preceding actions, such as choice of route or departure time, were independently described as either routine or unusual for that protagonist. Counterfactuals that mutated an antecedent framed as exceptional were more likely to be recorded first in response to a solicitation to record six counterfactual alternatives. These demonstrations show fairly clearly that the content of counterfactuals frequently involves the conversion of exceptional antecedents back into normal antecedents.

*Conceptual challenges.* Gavanski and Wells (1989) offered

<sup>6</sup> I thank an anonymous reviewer for this insight.

an alternative interpretation of the normality principle. Specifically, they suggested that returning exceptional antecedents to their default level may not be a general principle but rather may be limited to cases where the outcome was also exceptional (as was the case in previous demonstrations, e.g., an automobile accident). They proposed instead that counterfactual judgments may operate on the basis of a correspondence heuristic (see also Bouts, Spears, & van der Pligt, 1992; and Einhorn & Hogarth, 1986), in which exceptional outcomes are presumed to follow from exceptional antecedents and normal outcomes are presumed to follow from normal outcomes. They showed that perceivers tend to undo exceptional outcomes by altering exceptional antecedents to make them more normal (e.g., a straight-A student might react to a failed exam by focusing on unusual pre-exam behaviors, such as heavy drinking, that she should have avoided), but normal outcomes were undone when both normal and exceptional antecedents were altered toward greater exceptionality (e.g., a mediocre student might react to an expected mediocre grade by thinking he could have done better by taking the unusual step of studying 5 nights in a row before the exam).

Nevertheless, because negative outcomes tend to be unexpected (Olson, Roese, & Zanna, 1996; Wong & Weiner, 1981) and because counterfactual thinking is far more likely to occur after negative outcomes, the points raised by Gavanski and Wells (1989) may apply only to a rather small subset of real-world counterfactual thinking. More generally, however, this perspective emphasizes the relation among Kahneman and Miller's (1986) normality principle, previous sociopsychological ideas (such as Jones & Davis's, 1965, noncommon effects and Kelley's, 1972, covariation principle), and animal learning theories of conditioning based on stimulus contingencies (Holyoak, Koh, & Nisbett, 1989; Rescorla & Wagner, 1972). People (as social perceivers) and animals (as perceivers of stimulus contingencies) are capable of occasionally crude yet normatively adequate covariation detection (Alloy & Tabachnik, 1984; Crocker, 1981), and causal conclusions are determined in part by this perceived covariation.<sup>7</sup> If an outcome is unusual (i.e., has appeared infrequently against a normative backdrop), the most obvious causal candidate will not be a long-present antecedent but rather an antecedent that is also unusual and that precedes the unusual outcome (Hilton & Slugoski, 1986; Holyoak et al., 1989; McGill, 1989). If for the past year, George's plants have thrived but last Tuesday withered and died, he is probably far closer to an accurate causal ascription if he points to something unusual—say, the battery acid he suddenly poured over his plants last Monday—rather than the water he typically pours over them. Simply put, the unusual antecedent is more logically plausible as a causal candidate than normally occurring features. By way of this covariation–normality heuristic, individuals' automatically activated counterfactual thoughts tend to identify the most likely cause of the misfortune in question.

*Other determinants of content: Action–inaction.* Are counterfactuals more likely to be constructed around actions than inactions? Kahneman and Miller (1986) suggested that this variable might influence counterfactual thinking because it reflects normality (i.e., inactions are normal, and actions are abnormal). Another rationale for this hypothesis centers on a correspondence heuristic (Einhorn & Hogarth, 1986; Gavanski & Wells, 1989), in which people assume that actions lead to outcomes

and that inaction leads to nonoutcomes. Subsequent researchers treated the variable as an independent determinant in its own right (Gleicher et al., 1990; Landman, 1987; Miller et al., 1990; Turley, Sanna, & Reiter, 1995), showing that counterfactuals may well gravitate more toward actions than inactions. In a demonstration by Kahneman and Miller, participants inferred Mr. George to feel greater regret after he switched to stock that lost money (an action), relative to Mr. Paul who lost the same amount of money after he considered but then decided against switching stock (an inaction).

The importance of the action–inaction variable has been controversial for at least three reasons. First, much of the supporting evidence is methodologically suspect (see N'gbala & Branscombe, 1994, for an extended critique). Virtually all demonstrations of the action–inaction effect were based on within-subject assessments of affect, with counterfactual thoughts presumed to be the principal mediator (e.g., Gleicher et al., 1990; Kahneman & Miller, 1986; Landman, 1987). Participants read vignettes describing two protagonists, one of whom acted and one whom did not, and then made judgments of presumed affect (e.g., regret and disappointment). Aside from the vagaries of within-subject comparisons, which may have artifactually heightened the effect by a juxtaposition of the two different behaviors, it is also unclear whether counterfactual thinking *per se* played any role in the observed effects because it was not measured directly.

Second, null action–inaction effects have been reported. Davis et al. (1995) examined the counterfactual thoughts generated by bereaved individuals and did not replicate the relation between antecedent actions versus inactions and counterfactual thinking. Third, N'gbala and Branscombe (1994) pointed out that, in many previous demonstrations, manipulations of action–inaction were confounded with the exceptional–normal dimension. That is, the actions were explicitly described as unusual, and the inactions were explicitly described as normal. When they removed this confound and manipulated action–inaction on a between-subject basis, they found that counterfactual content more often focused on the inaction than the action.

These three sources of controversy question the reliability of an action–inaction effect, pointing to questionable methodology and failures to replicate using sounder methods. Adding a further twist to this story is evidence that at least two moderator variables may influence action–inaction effects. Roese and Olson (1993a, 1993b) found that outcome valence moderated whether individuals mutated actions versus inactions. Although there was no action–inaction effect overall, individuals tended to mutate actions after success but inactions after failure. Gilovich and Medvec (1994) identified the passage of time as yet another moderator variable. They found that, in the context of feelings of regret, individuals tended to focus on actions over the short term but inactions after the longer term. The available evidence, then, suggests that the distinction between action and inaction is

<sup>7</sup> Dual process models specify under what circumstances causal ascriptions are driven by data (covariation) versus theory (existing knowledge and expectancies; e.g., Alloy & Tabachnik, 1984; Hilton & Knibbs, 1988; and Smith, 1994). Although a detailed consideration of such models is beyond the scope of this article, this theorizing offers the basic premise that theory-driven processing is superseded by data-driven processing when motivation, ability, or effort are maximized.

an important though controversial determinant of counterfactual content. That counterfactual content gravitates toward actions more than inactions is at best an oversimplification, perhaps varying as a function of outcome valence and the passage of time.

*Other determinants of content: Controllability.* Controllable antecedents seem to be more mutable than uncontrollable antecedents. That is, people are more likely to make mental alterations to preoutcome features that can be directly manipulated (Miller et al., 1990; N'gbala & Branscombe, 1995). In one demonstration, Girotto, Legrenzi, and Rizzo (1991) used scenarios depicting a drive home that is delayed by several events. Counterfactual mutations tended to center on events that were controllable (e.g., stopping for beer on the way home) rather than uncontrollable (e.g., waiting for a flock of sheep to cross the road). Similarly, Markman, Gavanski, Sherman, and McMullen (1995) showed that individuals playing a computerized game of chance favored mutations of whatever aspect of the game over which they believed they had control.

Placed in a broader context, controllability effects on content point to the highly useful manner in which counterfactual thoughts gravitate toward actions that are under the direct control of individuals. Stated somewhat differently, counterfactual thoughts center on actions that may have been personally manipulated to prevent the outcome in question (Davis & Lehman, 1995; Davis, Lehman, Silver, Wortman, & Ellard, 1996; Mandel & Lehman, 1996). The focus of counterfactuals and actions that are internal and controllable, with implications for avoidability and prevention, fits snugly within the functional framework: It is precisely these sorts of antecedent events that are maximally useful for dictating future actions for the individual (cf. Weiner, 1986).

*Summary.* Three determinants of counterfactual content were described: antecedent normality, antecedent action-inaction, and antecedent controllability. The evidence to date suggests that normality is the most important determinant of content, with several studies demonstrating that counterfactual content gravitates toward unusual antecedent events, altering them in the direction of normality. Evidence for the action-inaction effect is less clear, with failures to replicate calling into question its importance as a determinant. Moderating variables such as outcome valence and the passage of time might account for variations in the effect size of this variable, however. Finally, evidence is mounting that counterfactuals tend to focus on controllable rather than uncontrollable antecedents.

### *The Two-Stage Model*

Determinants of counterfactual thinking were discussed in terms of two stages, activation and content. Affect was identified as a major determinant of initial activation of counterfactual processing, whereas normality is the chief determinant of counterfactual content. Implications of this two-stage model are considered next.

*Does normality influence activation?* One intriguing question is whether the determinants of content, especially antecedent normality, also influence activation. The evidence to date suggests that they do not. It has previously been widely assumed, however, that they do. Kahneman and Miller (1986), for example, argued that antecedent normality influences activation, such

that counterfactual thoughts per se are more available following exceptional rather than routine antecedents. The greater availability of counterfactual thoughts was thought to mediate subsequent emotional effects. This conclusion, however, has not been supported by empirical evidence.

Using measures that explicitly assess counterfactual content, researchers have noted effects of antecedent normality (Kahneman & Tversky, 1982; Wells et al., 1987). Other evidence has been more ambiguous with respect to whether activation or content has been influenced. For example, affective reactions are exacerbated after exceptional, compared with normal, antecedent events (Kahneman & Miller, 1986; Macrae, 1992; Macrae & Milne, 1992; Miller & McFarland, 1986). (The emotional consequences of counterfactual thinking are considered in greater detail in *Consequences of Counterfactual Thinking*.) But were these emotional effects mediated by greater counterfactual activation, by shifts in content, or by some other unspecified mechanism? In these experiments, counterfactual thinking is not assessed directly, precluding any convincing mediational demonstrations.

Other evidence, however, suggests that the emotional effects are mediated only by content effects. That is, counterfactuals whose content targets an exception are perhaps more salient or poignant than counterfactuals, whose content "shuffles" normality. Thus, the shifts in affect observed in past research perhaps do not emerge as a function of the presence or absence of a counterfactual thought but of the content of counterfactuals that are generated in all conditions. Evidence that favors this interpretation comes from experiments in which antecedent normality consistently produces no reliable effects on appropriate measures of counterfactual activation but does indeed produce effects on measures of content (Roese & Olson, in press). In other research, self-reported descriptions of the normality of events surrounding a traumatic incident do not predict later counterfactual activation, although negative affect does (Davis et al., 1995, Study 2). These findings indicate that affect is the chief determinant of activation per se, with antecedent normality influencing content only. Thus, after negative outcomes, counterfactuals of all kinds are generated automatically, but those centering on exceptional antecedents are perhaps more salient or memorable than those centering on alterations to typical events (cf. Miller & Taylor, 1995).

*Function.* The operation of each of these determinant variables is consistent with the functional basis of counterfactual thinking. The activation of counterfactual thinking is triggered by negative affect, which is a basic biological signal to the organism that problems are acute and require corrective action. Thus, that counterfactual processing is activated under those circumstances in which it is most needed is consistent with the functional perspective. Furthermore, content is constrained by normality. What is normal must be predominantly beneficial or at the very least neutral for the organism's survival, otherwise the organism would be dead very quickly. It therefore stands to reason that once negative affect has alerted the organism to a problematic state of affairs, the most effective course of action would be to search for exceptions to the norm, as these are most likely to account for the present deleterious state of affairs. Thus, processing that actively searches for exceptions to the norm represents a functional approach to inferring the cause of a negative outcome and directing this inference to future avoid-

ance behavior. The functional basis of mutating actions over inactions may be subsumed under normality, to the extent that actions are viewed as abnormal. And mutating controllable antecedents are also functional (cf. Davis et al., 1996; Mandel & Lehman, in press; and McMullen et al., 1995), as counterfactuals centering on uncontrollable actions cannot point to any direct personal intervention.

The determinants of counterfactual thinking are generally consistent with a functional perspective, indicating the counterfactuals are generated when they are most needed and are constrained in ways that maximize their explanatory and inferential value. But an essential piece of the functional argument is whether counterfactual thoughts can ever produce consequences that are beneficial. As described in the next section, short-term negative affective consequences of counterfactual thinking are superseded by long-term inferential benefits.

### Consequences of Counterfactual Thinking

#### *Two Mechanisms*

Counterfactual thinking is a fascinating topic precisely because of its wide range of psychological consequences, including emotions (Landman, 1993), attitudes (Gleicher et al., 1995), expectancies (Olson, Roese, & Zanna, 1996), suspicion (Miller, Turnbull, & McFarland, 1989), superstition (Miller & Taylor, 1995), and self-inference (Roese & Olson, 1993a), to name just a few. Two mechanisms account for nearly all documented counterfactual consequences: contrast effects and causal inferences. *Contrast effects* occur when a judgment is made more extreme via the juxtaposition of some anchor or standard (Sherif & Hovland, 1961). For example, a swimming pool feels colder, by contrast, if one has just spent half an hour in a Jacuzzi. Similarly, a factual outcome may be judged worse if a more desirable alternative outcome is salient and better if a less desirable outcome is salient. *Causal-inference* effects, however, derive from the linkage of antecedent to outcome within a counterfactual conditional. This linkage may often suggest a causal inference. For example, Annie is convinced that if her father had never smoked, he would still be alive today. This counterfactual conditional suggests that smoking causes premature death. Contrast and causal-inference effects have been linked to a number of counterfactual consequences, sometimes with the result of parallel effects (e.g., both mechanisms might exacerbate negative affect) but other times of opposing effects (e.g., one might increase while the other decreases negative affect). In terms of the various effects demonstrated in the counterfactual literature, the contrast-effect mechanism generally produces aversive affective consequences, whereas the causal-inference mechanism is more often responsible for beneficial inferential effects.

#### *Contrast Effects*

*Affect.* Counterfactual thoughts may influence affective experiences via a contrast effect if the counterfactual alternative is clearly better or worse than actuality. For example, Roese (1994, Experiments 1 and 2) instructed participants to record details of a recent life event, then induced them to consider either upward or downward counterfactual alternatives to the event. Those induced to generate upward counterfactuals subse-

quently reported more negative affect than those who generated downward counterfactuals. Similarly, Markman et al. (1993) showed that situational factors (e.g., negative outcomes) that evoke upward as opposed to downward counterfactuals heighten feelings of dissatisfaction. The relation between direction of counterfactual comparison and affect remained significant, even after the influence of those situational factors was controlled statistically (see also McMullen et al., 1995; and Roese & Olson, 1995b).

A particularly striking example of this counterfactual contrast effect emerged from observations of Olympic athletes. Medvec, Madey, and Gilovich (1995) found, surprisingly, that silver medalists experience less satisfaction with their achievement than do bronze medalists. Most sports fans would assume that the honor of second place would confer greater pride and joy in athletes than the lesser honor of third place. But in several studies, these researchers showed that the upward counterfactual that "I almost came in first" is salient to the silver medalist, whereas the downward counterfactual that "I might have come in fourth and missed getting a medal" is salient to the bronze medalist. These differences in the direction of counterfactual thoughts were shown to influence perceived satisfaction among observers of athletes and also satisfaction reported by the athletes themselves. Proximity to a category boundary lures relevant counterfactual thoughts, such that "what might have been" centers on the closest crossing into a new category (Medvec & Savitsky, in press). For silver medalists, that category is The Best (vs. Everyone Else), whereas for bronze medalists, it is Non-Medal Winner (vs. Medal Winner).

*Judgment.* Various social judgments may also be influenced by counterfactual contrast effects (see Dunning & Madey, 1995; and Dunning & Pappal, 1989), often mediated by the affect generated by the contrast. In judgments of victim compensation, for example, thinking that a victim's misfortune could easily have been avoided constitutes a salient upward-comparison anchor, rendering the tragedy even more negative and poignant. Victim compensation may be affected as a function of such poignancy.

Miller and McFarland (1986, Study 2) demonstrated just such an effect by manipulating the closeness of a negative outcome to "not happening." Participants read of a man who was killed following a light plane crash in a remote northern region. After escaping the crash with only minor injuries, the man later perished while attempting to walk to safety. The manipulation of closeness centered on the man's distance from the nearest town at the time of his death: either 75 miles or  $\frac{1}{4}$  mile. Participants recommended greater monetary compensation to the victim's family when he had nearly made it to safety than when he died 75 miles from the town. In other words, the closeness of actuality to a desired but unobtained outcome activated a counterfactual representation centering on the desired outcome. The salience of this upward-comparison anchor then contributed to more extreme negative affect, which presumably mediated the observed effect on recommended compensation.

*Function and the contrast-effect mechanism.* Overall, the research above shows that counterfactuals can act as judgmental anchors that represent better or worse states of affairs. These anchors may then make subsequent affective and judgmental responses more extreme. These effects can be construed as predominantly harmful or aversive: Upward counterfactual thinking

is the most common response form of automatically activated counterfactual thinking, and its chief consequence is exacerbation of negative affect. In the next section, causal inferences are considered as a second yet independent mechanism by which counterfactual effects might occur. Unlike the contrast-effect mechanism, causal-inference effects may be predominantly beneficial for the individual.

### *Causal Inferences*

Counterfactual thoughts may produce different effects by way of their causal implications. Counterfactuals, if phrased as conditional propositions, imply causal conclusions (Lewis, 1973a).<sup>8</sup> The assertion of a false antecedent (the defining feature of a counterfactual conditional) sets up an inherent relation to a factual state of affairs. That is, a counterfactual conditional always refers back to some true conditional proposition. For example, the counterfactual statement, "If George and Mary hadn't fallen into the swimming pool, they wouldn't have gotten wet," is inherently linked to the factual statement, "George and Mary did fall into the pool and did indeed get wet." The relation of the counterfactual conditional to a relevant, factual conditional creates the essential requirements for Mill's (1843/1872) method of difference, which is, of course, the principal technique by which scientists infer causation: Jumping into swimming pools causes wetness.

Just as causal conclusions may be derived from the true experiment, in which two parallel factual occurrences are contrasted, so too may they be derived from the pairwise contrast between a factual and a counterfactual occurrence. To the extent that the two occurrences (which terminate in divergent outcomes) differ only in the presence of a particular antecedent, this antecedent can be inferred to be causal (Hart & Honoré, 1985; Jackson, 1977; Lewis, 1973a; Mackie, 1974; McGill, 1989; Simon & Rescher, 1966; Swain, 1978; Yagisawa, 1979). Thus, running a counterfactual simulation in one's head constitutes a proxy experiment (cf. Einhorn & Hogarth, 1986; and Hilton & Slugoski, 1986). In domains in which true experiments cannot be implemented, such as historical and legal analyses, counterfactual test cases are accepted methods of inferring or dramatizing causal relations (e.g., Breslauer, 1996; Fearon, 1991; Hart & Honoré, 1985; Tetlock & Belkin, 1996).

The assertion that counterfactuals often carry causal implications does not mean that counterfactuals are necessary for a causal inference to take place. Causal inferences frequently derive from other sources, such as knowledge structures regarding the general workings of the world (Read, 1987). Moreover, blame assignment is similarly influenced independently by factors other than counterfactual simulations (Davis & Lehman, 1995; Davis et al., 1996; Mandel & Lehman, 1996; Nario & Branscombe, 1995; N'gbala & Branscombe, 1995). Nevertheless, counterfactual conditionals represent one source of causal information that may be used by the individual.

Wells and Gavanski (1989, Experiment 1) demonstrated that counterfactual thinking influences judgments of causality. They manipulated whether the deletion of a salient antecedent action undid an outcome. Participants read about a woman who, because of a rare digestive illness, suffered a fatal reaction to the alcohol contained in her lunch, which was chosen by her companion. In one condition, her lunch companion chose from

among two dishes both made with wine. In the other condition, only the chosen dish contained wine. Mentally altering the lunch choice in the first condition does not undo the outcome (e.g., "Even if he had chosen the other lunch, she still would have become sick") but does indeed undo the outcome in the second condition ("If only he had ordered the other dish, she wouldn't have become sick"). Participants cited the companion's choice of dishes as more causally significant in bringing about the woman's death in the second than in the first condition. This effect of counterfactual thinking on causal reasoning has been replicated in various ways (Branscombe, Crosby, & Weir, 1993; Branscombe & Weir, 1992; Roese & Olson, 1996, in press; although failures to replicate have also appeared, see Mandel & Lehman, 1996, Experiment 3).

Considered in this section are causal-inference mediated effects on affect, judgments of blame, hindsight bias, expectancies, and intentions. The tension between function and dysfunction is particularly evident in this section, as judgmental biases (blame and hindsight) coincide with potentially useful inferences (expectancies and intentions). This section concludes with a consideration of the net functional impact of these causal-inference mechanism consequences.

*Affect.* As discussed previously, the generation of an upward counterfactual may cue a contrast effect, which may result in more negative affect. For example, Ruth's unhappiness after receiving a C on her term paper is accentuated when she imagines getting an A. Quite apart from this mechanism, counterfactuals may also influence emotional reactions by way of their causal implications. The realization that a better outcome might have occurred given some specific antecedent action may inspire hopefulness and other positive feelings. If Ruth had read the references suggested by her professor, she would have gotten a better grade, but this realization fills her with sudden hope for the next term. This effect rests on the causal inference that reading appropriate references causally influences term paper grades and that this inference may be employed for future success. Such effects were demonstrated by Boninger, Gleicher, and Strathman (1994; see also Gleicher et al., 1995). Participants who were led to realize that an action might have produced success in the past, and could well produce success in the future, reported more positive affect. These effects occurred only when mutating a target action undid a prior negative outcome, thus linking the effect clearly to causal inference. Moreover, these effects were only evident in participants dispositionally more likely to focus on future prospects. These findings highlight a possible benefit of affect deriving from the causal-inference mechanism: Positive affect may energize or motivate future striving independently of the expectancy-intention mechanism described below.

<sup>8</sup> Some philosophers have argued that causation may best be understood by way of counterfactual definitions. Lewis (1973a), for example, argued that "we think of a cause as something that makes a difference from what would have happened without it. Had it been absent, its effects . . . would have been absent as well" (p. 557). Other philosophers consider some kinds of counterfactuals to fall outside the rubric of causation. For example, Kim (1973) contended that some counterfactuals signify noncausal logical relations (e.g., If yesterday had not been Monday, today would not be Tuesday) or set-subset relations (e.g., If I had not twice used the letter c, then I could not have typed *Chicago*).

Although the affective consequences of counterfactual thinking are often described generically (e.g., positive vs. negative), some researchers have linked specific emotions to specific types of counterfactuals. Kahneman and Miller (1986) were the first to note that various counterfactual *emotions*, such as disappointment, regret, and relief, could not occur without a prior counterfactual inference. More specifically, the particular antecedent–consequent linkages in some counterfactuals, and their attendant causal implications, may lead to different emotional experiences. For example, Niedenthal, Tangney, and Gavanski (1994) found that the experience of shame is more likely to follow from counterfactual inferences that mutate characterological aspects of the self (e.g., “If only I were stronger, things would’ve turned out better”), whereas guilt relies more on counterfactual inferences that mutate one’s behavior (e.g., “If only I had been honest, things would’ve turned out better”). The experience of regret is also inherently linked to counterfactuals, deriving from mutations of one’s own planned or controllable actions (Gilovich & Medvec, 1995a, 1995b; Kahneman, 1995; Landman, 1993, 1995).

*Judgments of blame.* The most obvious counterfactual consequence hinging on the causal-inference mechanism is blame. Shifts in the salience of a particular antecedent, which produce changes in the likelihood of it incorporated into a counterfactual conditional, may influence blame judgments that center on that antecedent. Thus, for example, if Harry is mugged while jogging along a route he rarely takes during his usual time of running, observers are likely to think that, if he had stuck to his usual route, he would have avoided being mugged. Observers may also note the causal link between Harry’s route choice and his victimization and blame Harry for his misfortune (Branscombe & Weir, 1992; Macrae, 1992; Macrae & Milne, 1992; Macrae, Milne, & Griffiths, 1993; Miller & Gunasegaram, 1990; Turley et al., 1995).

Several theorists have cited such blame effects as a prime example of judgmental bias derived from counterfactual thinking (e.g., Olson, Roese, & Deibert, 1996; Sherman & McConnell, 1996). Because blame may be swayed by those factors that determine counterfactual content such as normality, unwarranted blame may be directed at individuals merely because they behaved unusually or counterstereotypically (Miller & Turnbull, 1990; Miller et al., 1990). Whether such effects are best considered bias or benefit is considered in Implications.

*Judgments of hindsight.* One causal-inference mediated consequence that deserves particular attention is the hindsight bias because it most closely represents the tension between bias and benefit. After the fact, outcomes are often judged to be more certain and predictable than their prospect was in foresight (Fischhoff, 1975; Hawkins & Hastie, 1990). Several theorists have assumed a negative relation between the “hindsight bias” (which amounts to an exaggerated sense of certainty that an outcome had to happen the way it did) and counterfactual thinking (which posits another outcome that almost happened instead of what did happen). To the extent that there is hindsight certainty regarding the occurrence of an outcome, so the argument goes, a counterfactual inference reflecting an alternative outcome should be less salient and less plausible (Kahneman & Varey, 1990; Sherman, 1991; Slovic & Fischhoff, 1977). For example, the more alternatives to a stated outcome participants considered, the lower the likelihoods they ascribed to those out-

comes (Fischhoff, 1976, Experiment 2). Also, participants who were requested to consider how a published experimental outcome might have turned out otherwise reduced their expectations that the experiment could be replicated (Slovic & Fischhoff, 1977, Experiment 2).

Roese and Olson (1996) argued, in contrast, that there are circumstances in which the counterfactual–hindsight relation is positive; that is, counterfactual thinking may increase rather than decrease the hindsight bias. The key to this argument is that counterfactuals yield causal conclusions that explain why an outcome occurred as it did. And explanation breeds certainty. Several experiments have shown that causal attributions influence the hindsight bias, such that explanatory clarity increases hindsight certainty (Nario & Branscombe, 1995; Wasserman, Lempert, & Hastie, 1991). Hence, any counterfactual that suggests a causal inference that accounts for an outcome should increase the hindsight bias. In other words, causal inferences mediate the positive effect of counterfactual thinking on the hindsight bias. For example, Bert is an ardent sports fan watching his favorite team suffer a humiliating defeat. Although the team’s loss might seem obvious and predictable in retrospect (the hindsight bias), Bert’s certainty of this derives from his attempts to explain and make sense of the outcome. “If the referees weren’t so inept, we would have won,” he thinks to himself, and in this way the counterfactual that specifies a more favorable outcome points to a causally potent antecedent factor (referee competence) that accounts for the loss. Across three experiments, Roese and Olson (1996) found that manipulations that heightened counterfactual thinking also heightened hindsight certainty, but such effects were mediated by causal inferences. Thus, only when a counterfactual is phrased as a conditional and only when the individual grasps the causal implications of this counterfactual conditional does any increase in hindsight magnitude occur. This evidence highlights a key facet of the functional argument, that counterfactuals influence causal inferences that may ultimately prove useful, while evoking exaggerated (and perhaps self-serving) certainty regarding the predictability of the past. The latter bias seems a small price to pay for the former benefit.

*Expectancies and intentions.* The heart of the functionalist argument is that counterfactual thoughts produce useful causal inferences. If Mary fails an exam and then muses that she would have passed had she worked through the study guide, she has identified a causally potent antecedent action. This action, if performed in the future, may permit the avoidance of future failure. To break this process down further, counterfactual thoughts may elucidate a causally potent antecedent action, which in turn triggers an expectancy of the consequences of that action in the future. This realization should then heighten intentions to perform that action, which may then influence the behavioral manifestation of that action. To the extent that the original causal inference is at least partly correct, subsequent performance will be enhanced.

In testing these ideas, theorists have assumed that upward counterfactuals better serve such a preparative function than downward counterfactuals (M. K. Johnson & Sherman, 1990). Although the latter may usefully guide behavior by pointing to the avoidance of pitfalls (e.g., “If I had smoked my whole life, my life expectancy would have been reduced; therefore, I’ll continue to be a nonsmoker”), it only does so to the extent of

maintaining the status quo. The example above accurately reflects that I do not smoke; if I continue to do so, I can at best maintain my current level of health. In contrast, upward counterfactuals point to possible improvement of the status quo. I may think, "If I had exercised more frequently during graduate school, I would not have gained weight as I approached the age of 30." Channeling this causal inference into future behavior may allow for improvement to rather than simply maintenance of current health.

Roese (1994, Experiment 2) documented directly the effect of counterfactuals on intentions to perform success-facilitating behaviors in the future. Participants recalled a recent exam on which they had performed poorly and then were induced to generate upward or downward alternatives to this outcome. Control participants were not induced to generate any counterfactuals. Those generating upward counterfactuals subsequently gave higher intention ratings (collected in the context of a separate portion of the experiment) to perform success-facilitating behaviors for future exams, relative to the two other conditions. Similarly, Landman et al. (1995) reported that upward counterfactual thinking among a sample of midlife women was associated with the envisioning of future changes in career, lifestyle, and interpersonal relationships. Roese (1994, Experiment 3) showed that these intentions are linked to behavior. Participants induced to generate upward as opposed to downward counterfactuals later performed better on an anagram task, at least in part because they had followed through on counterfactual-related intentions. Some correlational evidence also suggests that students' frequency of upward-counterfactual thinking after grade feedback is associated with subsequent behavioral intentions and improvement in academic performance (Nasco & Marsh, 1996).

A more general effect on expectancies following from the causal-inference mechanism centers on perceived personal control. To the extent that counterfactually mediated causal inferences suggest future efficacious action, they extend to generalized expectancies of personal efficacy. For example, McMullen et al. (1995) induced participants to generate upward or downward alternatives to a past event. Generation of upward counterfactuals heightened perceived control over the event and also confidence in general. In separate research, beliefs in personal control (or self-efficacy, to use the terminology of this literature) have been linked to numerous performance benefits (Bandura, 1995; Olson, Roese, & Zanna, 1996). For example, individuals with strong beliefs in personal efficacy show greater persistence in the face of immediate failure (Carver, Blaney, & Scheier, 1979) and, on a long-term basis, show greater adjustment in terms of mood stability and general physical health (e.g., Mueller & Major, 1989).

*Function and the causal-inference mechanism.* The research described above documents a number of counterfactual consequences rooted in the causal-inference mechanism. The affect deriving from causal inferences may be unpleasant if it reflects self-blame, but it may also itself be motivating if it energizes action consistent with the causal judgment. Two judgmental consequences, blame and hindsight bias, may well be considered sources of error. Directing blame where it is not warranted or becoming overconfident in one's predictive powers can be maladaptive. On the other hand, counterfactual effects on expectancies, intentions, and perceived control may carry broader benefits that offset these narrower detriments.

tancies, intentions, and perceived control may carry broader benefits that offset these narrower detriments.

### Summary

This section has identified two general mechanisms by which counterfactuals may produce widely variegated effects. Generally speaking, the affective consequences of the contrast-effect mechanism were aversive, whereas the judgmental consequences of the causal-inference mechanism were beneficial, leading to future improvement in performance and adjustment.

### Implications

Counterfactual thinking is a common feature of mental life that is often intermeshed with potent emotional states. That counterfactual thinking is generally beneficial, or functional, for the individual constituted the theoretical superstructure for this overview of the counterfactual literature.

Three main arguments were presented for the functional basis of counterfactual thinking. First, counterfactual thinking is activated by negative affect. In other words, counterfactual thoughts come to mind in response to those situations where corrective thinking is most essential. Second, the content of counterfactuals recapitulates what is normal for the individual, suggesting that these thoughts focus on particularly likely sources of misfortune. Third, counterfactuals produce negative-affective consequences via a contrast-effect mechanism, but these effects are offset by positive inferential consequences occurring via a causal-inference mechanism. In the latter case, such effects were both specific, in terms of heightening intentions and behaviors associated with improvement in performance, and general, in terms of increasing perceptions of personal control, which has beneficial consequences for ongoing adjustment and psychological well-being.

One important concern is that the functional argument hinges on the extent to which counterfactual thoughts accurately identify causal relations that are of behavioral significance to the individual. It can be argued that counterfactuals are dysfunctional precisely because human beings are not adept at accurate causal judgments, often deviating from what purely rational models might predict (e.g., Sherman & McConnell, 1995, 1996). With incorrect inferences in hand, individuals may be vulnerable to costly mistakes. But it is often difficult to determine whether the demonstration of inaccuracy is representative of normal cognitive functioning or whether the domain selected is so extreme and artificial as to be pointlessly arcane (Funder, 1987; Kruglanski, 1989). Demonstrating that a particular car's brakes cause uncontrollable fishtailing is misleading if the demonstration takes place on an icy off-ramp during a blizzard; the brakes may function effectively in virtually all other road conditions. The attributional literature shows that, in spite of certain regular biases, people are remarkably adept at manipulating and understanding complex troves of covariation information. It is likely that counterfactual thinking enables efficacious causal judgments a lot of the time and that such accuracy is sufficient for improvement beyond baseline performance. Nevertheless, the issue of the everyday accuracy of causal judgments per se has not been satisfactorily addressed in attributional research in general (Gilbert, in press; Gilbert & Malone, 1995).

This perspective contains several implications for ongoing theory and research. First, this overview has emphasized the deep interweaving of affect and counterfactual thinking (Landman, 1993). Emotional experience is both a determinant and a consequence of counterfactual thinking, with the former constituting a generally functional mobilization of problem-solving resources and the latter representing an unpleasant by-product. However, this bidirectional causal linkage suggests that positive feedback loops (or "vicious circles") may characterize some counterfactual thought patterns, in which negative affect unleashes counterfactual thinking, which then increases negative affect, further activates counterfactual thinking, and so on. Individuals with depression may be particularly susceptible to such feedback loops, in that they are relatively less able to suppress negative thoughts and break free of such cycles (Wenzlaff, Wegner, & Roper, 1988). Under normal conditions, however, most individuals seem adept at inhibiting counterfactual ruminations before they become chronically debilitating, thereby canceling the negative affect deriving from contrast effects, while preserving the inferential benefits deriving from the causal-inference mechanism (Roese & Olson, in press).

Second, this perspective has implications for understanding coping and adjustment. Evidence is accumulating that counterfactual thought processes are an essential component of healthy functioning (Landman, 1993, 1995; Landman et al., 1995). If counterfactuals are observed to cause long-term emotional dysfunction in some extreme cases, this pattern might be interpreted not that counterfactual thinking is inherently harmful but rather that a normally operative inhibition mechanism has been blocked. As noted above, individuals with depression have particular difficulty suppressing negative thoughts, and such a general failure of inhibitory processes might account for the unleashing of vicious circles of counterfactual thinking and resulting negative affect (Roese & Olson, in press; see also Markman & Weary, in press). That is, counterfactual thinking that is not shut down normally but spins repeatedly into unhealthy ruminations may occur in some individuals, but this likely represents a breakdown in a normally functional process of checks and balances, of activation and inhibition. A clearer understanding of the relation of counterfactual thinking to coping and adjustment might emerge if the various distinctions articulated here—activation versus content, contrast effects versus causal-inference effects, and activation versus inhibition—are taken into account. Moreover, individual differences may center on each of these various distinctions in unique ways (Kasimatis & Wells, 1995; Markman & Weary, in press; Sanna, 1996, in press).

A related strand of this argument is that counterfactual functionality is maximized in situations that are in some way controllable and are likely to repeat in the future (Markman et al., 1993; McMullen et al., 1995). In traumatic circumstances that are uncontrollable at the individual level (e.g., war) or are unlikely to repeat (e.g., infant deaths, examined by Davis et al., 1995), the normal counterfactual generation process produces no inferences useful for future action, only unpleasant affect. Nevertheless, just as evidence that hard braking when one is driving on ice causes uncontrollable skidding cannot be used to invalidate the general usefulness of brake systems on automobiles, demonstrations of dysfunctionality in extreme cases cannot invalidate the usefulness of counterfactual thinking in gen-

eral. Numerous biological structures and behaviors, from body hair to sexual urges, evolved by way of the most general pan-species mechanisms. They are most profitably understood in terms of their globally adaptive significance rather than locally inappropriate applications. Counterfactual thinking is similarly best understood in terms of its broadest level of consequences.

Third, different kinds of emotions may derive from counterfactuals of differing content (Landman, 1993, 1995; Niedenthal et al., 1994). An unsettled issue at this point is the degree to which different kinds of emotions trigger counterfactual activation. For my purposes, I have used the generic term *negative affect* to describe the main trigger of counterfactual activation, but clearly sadness, anger, and frustration might uniquely influence counterfactual thinking. Some affective activation findings might be due in part to variation in arousal or anxiety. One promising theoretical direction might be to build on this functional perspective through the conceptualization of various affective states in terms of their informational significance (Schwarz, 1990; Schwarz & Bless, 1991). That is, if some emotional states represent "warnings" of greater severity than others (e.g., abject fear might symbolize greater peril than mild sadness), then they might be expected to produce more powerful cognitive-activation effects.

A concern likely to dominate future research is the relation between counterfactual and causal reasoning. I have approached these as separate constructs and have relied on evidence that demonstrates an effect of the former on the latter. However, these assumptions may be controversial. First, some might argue that counterfactual and causal statements are not separate constructs but semantically identical, differing merely in wording. Thus, asserting that "If not for Watergate, Nixon would not have resigned" expresses exactly the same idea as "Watergate caused Nixon's resignation." On the basis of this argument, the entire counterfactual literature might be viewed as an elaborate reformulation of traditional attribution theories. This criticism is countered by much of the evidence reviewed above, which points to several divergences between counterfactual and causal thoughts. Unlike the latter, for example, counterfactuals evoke affect by way of a contrast effect, and this mechanism stands apart from the attribution-dependent affective consequences described by Weiner (1986) and others. Also, counterfactuals may be more memorable (Fillenbaum, 1974) and more persuasive (Gleicher et al., 1995) than generic causal propositions that contain essentially the same information. Although the picture is far from complete, these findings suggest the usefulness of treating counterfactuals as a conceptually distinct construct. Second, another controversy hinges on whether counterfactuals do influence causal reasoning. Although this effect, demonstrated by Wells and Gavanski (1989), forms the linchpin of the functional perspective, others have questioned it (Mandel & Lehman, 1996; N'gbala & Branscombe, 1995). Because evidence that replicates and extends the Wells and Gavanski research has also appeared (Roese & Olson, 1996, in press), future attempts at a resolution will no doubt center on the methodological differences between these various experiments. Such future research will obviously carry huge implications for the functional perspective.

One final piece of evidence raises this discussion of global counterfactual functionality to a more general level. Some neurological findings indicate that among the deficits that accrue

from prefrontal cortex damage, such as deficits in planning and insight, is an inability to generate counterfactual thoughts (Knight & Grabowecy, 1995). Without these kinds of thoughts, patients find it "difficult to avoid making the same mistakes over and over again" (p. 1359). These findings underscore the fact that counterfactual thinking plays an important role in the planning and execution of ongoing behavior and point to future research that more directly links such cognitive functioning to its neuroanatomical substrates.

### Coda

Thoughts of what might have been are a pervasive feature of mental life. They are most often triggered by unpleasant emotional experiences, and one of their immediate consequences is to exacerbate that unpleasantness. However, the content of such thoughts may identify causally efficacious variables; the realization of which may facilitate future performance. Counterfactual thinking, although not without its warts, produces net beneficial effects for individuals. Without counterfactual thinking, we might all be considerably worse off.

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