

Assimilation and Contrast in Counterfactual Thinking and Other Mental Simulation-Based Comparison Processes

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In the film *It's a Wonderful Life* (1946), George Bailey (played by James Stewart) is feeling suicidal after misplacing an \$8,000 loan. To save him, Clarence, his guardian angel, gives him an opportunity to see how his prosperous town of Bedford Falls would have turned out if he had never been born. George learns that if he had not been born, his wife Mary would have instead become a bitter old maid, and Bedford Falls would have become run-down because the family-owned Bailey Loan Company would have gone out of business. Realizing that he meant so much to a great many people, George decides not to throw his life away.

Although it is rare for individuals to be provided with the opportunity to see what would have happened if a different decision had been made or, more dramatically, if they had never lived at all, it is nevertheless very common for people to reflect upon selves that could be, would be, could have been, and should have been.

Thinking about and comparing oneself to standards, be they real or imagined, evokes a powerful array of emotions and impacts the nature of self-evaluations. Some of these responses are *contrastive* in nature, in that they are displaced away from a comparison standard, whereas others are *assimilative* in nature, in that they are pulled toward a comparison standard. The goal of this chapter is to examine when and how *mental simulation*—the consideration of alternatives to present reality—produces emotional responses that reflect either contrast or assimilation. We will begin by examining the comparison domain that is most commonly associated with mental simulation—counterfactual thinking—after which we will broaden our focus by considering how mental simulation may play a pivotal role in

determining assimilative and contrastive responses to other types of comparisons. Finally, we will advance a model of mental simulation-based comparison processes and situate it within the context of other currently prevailing comparison models.

CONTRAST EFFECTS IN COUNTERFACTUAL THINKING

Since the publication of Kahneman and Tversky's (1982) seminal chapter on the simulation heuristic, the vast majority of research on counterfactual thinking has focused on the contrastive nature of cognitive and emotional responses to counterfactuals. Norm theory (Kahneman & Miller, 1986), the guiding theoretical formulation for the bulk of social psychological research on counterfactual thinking (Roese & Olson, 1995), focuses on the perceived discrepancy between an outcome and a judgmental (i.e., counterfactual) standard. Thus, for instance, the comparison between a student's B on an exam and the A that the student would have liked to attain elicits disappointment. The innovation of norm theory over previous social judgment formulations (e.g., Helson's, 1964, adaptation level theory; Thibaut & Kelley's, 1959, comparison level theory) was the assertion that judgmental standards, or norms, may be constructed online in response to specific outcomes. Although norms are constructed, in part, from beliefs and expectancies derived from past experience, the particular character of each norm is, as Roese and Olson (1995) describe it, "reconstructed uniquely in light of a specific outcome" (p. 7). According to norm theory, abnormal outcomes are those that evoke norms that differ from the outcome and are, thus, counterfactual in nature. When mutable or changeable aspects of events (e.g., magnitude of effort, voluntary actions, or decisions) precede an outcome, it becomes easy to imagine how the outcome could have been different, and thus the outcome will be perceived as abnormal. On the other hand, when more immutable and less changeable aspects of events (e.g., abilities, physical laws) precede an outcome, it becomes more difficult to imagine how the outcome could have been different, and thus the outcome will be perceived as normal.

Contrastive Effects on Judgments

Counterfactual thinking has been shown to have implications for a variety of social judgments, including expressions of sympathy and blame. For instance, Miller and McFarland (1986) found that thinking about how a victim's misfortune could easily have been avoided made the outcome seem more poignant, thereby causing people to feel more sympathy for the victim and recommend a higher level of monetary compensation. In kind, Davis, Lehman, Silver, Wortman, and Ellard (1996) found that the more that victims of spinal cord injuries believed they could have avoided their accident, the more they blamed themselves for having caused the accident.

Counterfactual thinking also influences judgments of causality (e.g., Cheng & Novick, 1990; Hilton & Slugoski, 1986; Lipe, 1991). For instance, Wells and Gavanski (1989) hypothesized that an event will be judged as having caused an outcome if the alternative event that most readily comes to mind successfully

undoes that outcome. In one of their experiments, a woman was described as having died from an allergic reaction to a meal ordered by her boss. When the boss was described as having considered ordering another meal without the allergic ingredient, his causal role in her death was judged to be greater than when the alternative meal was also described as having had the allergic ingredient.

Contrastive Effects on Affect

Regret is a negative emotion that derives from imagining how one's present situation would have or could have been better (for a review, see Connolly & Zeelenberg, 2002), and Kahneman and Miller (1986) suggested that emotions such as regret and disappointment derive from counterfactual inferences. Moreover, such "counterfactual emotions" may be differentiated on the basis of the types of antecedents that are mutated. For instance, Niedenthal, Tangney, and Gavanski (1994) showed that the experience of shame relies upon counterfactual inferences that mutate characterological aspects of the self (e.g., "If only I were a more honest person . . ."), whereas guilt is engendered by counterfactual inferences that mutate one's behavior (e.g., "If only I had listened to her more closely . . .").

Upward and Downward Counterfactual Thinking Researchers (e.g., Markman, Gavanski, Sherman, & McMullen, 1993; McMullen, Markman, & Gavanski, 1995; Roese, 1994) have also classified counterfactuals on the basis of their direction of comparison. Borrowing a theoretical distinction drawn in the social comparison literature between upward and downward comparisons (e.g., Collins, 1996; Taylor, Buunk, & Aspinwall, 1990; Wood, 1989), researchers classified counterfactuals into those that construct imagined alternatives that are evaluatively better than reality (i.e., *upward* counterfactuals) and those that are evaluatively worse than reality (i.e., *downward* counterfactuals).

To empirically demonstrate contrastive emotional responses following the generation of upward and downward counterfactuals, Markman et al. (1993) employed a computer-simulated blackjack game that examined the spontaneous generation of counterfactuals within the context of two factors—outcome valence and event repeatability. Negative and repeatable outcomes evoked a greater tendency to engage in upward than downward counterfactual thinking and, in turn, upward counterfactuals heightened feelings of dissatisfaction (see also McMullen et al., 1995). In addition, Roese (1994) induced participants to consider either upward or downward counterfactuals about a recent life event. Those who generated upward counterfactuals subsequently reported more negative affect than those who generated downward counterfactuals.

Medvec and her colleagues have provided particularly compelling demonstrations of counterfactual contrast. In observations of Olympic athletes, Medvec, Madley, and Gilovich (1995) found that silver medalists actually experienced less satisfaction with their achievement than did bronze medalists, presumably because the former were focused on not having won the gold medal (i.e., an upward counterfactual), whereas the latter were focused on the possibility of not having won a medal at all (i.e., a downward counterfactual). Similarly, Medvec and

Savitsky (1997) found more negative affect expressed by students who nearly attained a cutoff point (i.e., a grade of 89%), than by students who just barely attained a cutoff point (i.e., a grade of 87%). According to Medvec et al., proximity to category boundaries draws attention to counterfactual outcomes, thereby eliciting contrastive effects on subsequent affective responses (see also Mellers, Schwartz, Ho, & Ritov, 1997).

Affective Assimilation Up to this point, a survey of the counterfactual thinking literature would indicate that affective contrast is the norm: Upward counterfactuals always produce negative affect, whereas downward counterfactuals always produce positive affect. Recently, however, this assumption has been strongly challenged (e.g., Markman & Tetlock, 2000; McMullen, 1997; McMullen & Markman, 2000, 2002). To illustrate, consider the case of flight attendant Kim Stroka, who claimed that she was too distraught to return to work after her co-worker died on United Airlines Flight 93, which was hijacked after taking off from Newark Liberty International Airport en route to San Francisco on September 11, 2001. Stroka had apparently traded shifts with her co-worker and, thus, would have died instead of her colleague if she had worked her normal shift. Claiming that she was having difficulty eating and sleeping and that she was being treated by a psychologist for posttraumatic stress disorder, Stroka applied for medical and disability payments but was turned down by the state appellate court. According to the court, Stroka was not entitled to the award because, "nothing happened while she was working which led to her current condition" (Associated Press Online, 2003).

Clearly, Kim Stroka is reflecting on a downward counterfactual. She did not die, but she can easily imagine how she could have died—indeed, she *would* have died. Just as clearly, however, generating this downward counterfactual has not made her feel any better. Instead, her consideration of the downward counterfactual world engenders feelings of sadness, guilt, and fear. The Stroka case helps us make the more general point that although contrast-based affective reactions to counterfactuals are common, they are hardly the rule. Rather, Stroka's downward counterfactual is assimilative in nature, in that her affective experience has been pulled toward the counterfactual standard. In the next section, we will discuss the important aspects of a model that attempts to explain how the very same counterfactual can engender dramatically different affective reactions. According to the model, assimilative versus contrastive responses to upward and downward comparisons are mediated by *simulation mode*—the extent to which one is engaging in *reflective* versus *evaluative* processing.

THE REFLECTION AND EVALUATION MODEL OF COMPARATIVE THINKING

Inclusion/Exclusion

In an effort to define a coherent set of principles that explain when assimilation and contrast effects occur in social comparison, Stapel and Koomen (2000, 2001;

see also Blanton, 2001) suggested that comparison is more likely to lead to assimilation when this information is "included in," or perceived as part of one's self-construal, whereas contrast is more likely when such inclusion processes do not occur (Gardner, Gabriel, & Hochschild, 2002; Schwarz & Bless, 1992). Thus, contextual features such as closeness/low relevance (Tesser, 1988), controllability (Major, Testa, & Bylsma, 1991), attainability (Lockwood & Kunda, 1997), and similarity (Brown, Novick, Lord, & Richards, 1992), all produce assimilation effects because they encourage the inclusion of social comparison information in self-construals. Conversely, Stapel and Koomen suggest that comparison information is more likely to be excluded from the self to the extent that the information is perceived to be distinct and the self is perceived to be immutable, with contrast effects being the likely result.

The inclusion/exclusion mechanism can also be used to understand how assimilation and contrast effects arise in temporal and counterfactual comparisons. Regarding the former, Strack, Schwarz, and Gschneidinger (1985) found that recalling long-past events elicited a contrast effect on judgments of well-being, and recalling very recent events elicited an assimilation effect. Schwarz and Bless (1992) later argued that long-past events are excluded from one's construal of *my life now*, and thus exert contrast effects on judgments of one's present standing, whereas recent events are included in one's construal of *my life now* and, thus, exert assimilation effects. Likewise, McMullen (1997) suggested that the inclusion of information about the counterfactual standard in self-construals should produce assimilation effects (e.g., "To think . . . I could have been on that plane"), whereas the exclusion of such information should produce contrast effects (e.g., "If I had been on that plane [but I was not], I would have been killed").

Reflective and Evaluative Modes of Mental Simulation

The Reflection and Evaluation Model (REM) of comparative thinking (Markman & McMullen, 2003, 2005) was developed in order to provide an organizing framework for understanding how assimilation and contrast effects arise following counterfactual, social, and temporal comparisons. At the heart of the model is the assertion that two psychologically distinct modes of mental simulation operate during comparative thinking. The first of these modes is *reflection*, an experiential ("as if") mode of thinking whereby one vividly simulates that information about the comparison standard is true of, or is part of, oneself or one's present standing. The second of these modes is *evaluation*, whereby the outcome of a mental simulation run is used as a reference point against which to evaluate oneself or one's present standing.

Figure 8.1 depicts the interaction between simulation direction and simulation mode. To illustrate with a counterfactual thinking example, consider the student who receives a B on an exam but realizes that an A was easily attainable with some additional studying. In the case of upward evaluation (UE), the student switches attention between the outcome (a grade of B) and the counterfactual standard (a grade of A). According to the REM, such attentional switching ("I got a B . . . I could have gotten an A but instead I got a B") involves using the standard as a

reference point and thereby instigates evaluative processing. In the case of upward reflection (UR), however, the student's attention is focused mainly on the counterfactual itself. Focusing on the counterfactual instigates reflective processing whereby the student considers the implications of the counterfactual and temporarily experiences the counterfactual as if it were real ("What if I had actually gotten an A?"). In a sense, the student is "transported" into the counterfactual world (Green & Brock, 2000; Kahneman, 1995). Likewise, consider the case of a driver who pulls away from the curb without carefully checking rear and side-view mirrors, and subsequently slams on the brakes as a large truck whizzes by. In the case of downward evaluation (DE), the driver switches attention between the counterfactual standard (being hit by the truck) and the outcome (not being hit by the truck), thereby instigating evaluative processing ("I was fortunate to not have been hit by that truck"). In the case of downward reflection (DR), however, the driver's attention is mainly focused on the counterfactual itself, thereby instigating reflective processing ("I nearly got hit by that truck") (see Figure 8.1).

Accessibility Mechanism

Reflective and evaluative processing of counterfactuals yield predictable affective reactions and, according to the model, this is accomplished through an accessibility mechanism. Recent work by Mussweiler and his associates (e.g., Mussweiler, 2003; Mussweiler, Ritter, & Epstude, 2004; Mussweiler & Strack, 2000) within the social comparison domain suggests that comparative self-evaluation produces two informational consequences. First, comparing oneself to a given standard increases the accessibility of standard-consistent knowledge about the self. Thus, upward comparisons render knowledge indicating a high standard of the self more accessible, whereas downward comparisons render knowledge indicating a low standard of the self more accessible. Secondly, comparative self-evaluation provides a reference point against which the implications of this knowledge can be evaluated.

In a similar vein, counterfactual comparisons can also yield two informational consequences. First, making counterfactual comparisons should enhance the

Direction	Mode	
	Reflection	Evaluation
Upward	"I almost got an A"	"I got a B...I failed to get an A"
Downward	"I nearly got hit by that truck"	"I was fortunate to not have been hit by that truck"

FIGURE 8.1 The interaction between simulation direction and mode.

accessibility of cognitions about the self that are evaluatively consistent with the counterfactual standard. In turn, affect should be derived from thoughts about the standard that implicate the self, thereby yielding affective assimilation (Schwarz & Clore, 1983; Strack et al., 1985). To illustrate, consider an individual who learns that the aircraft she had originally planned to take had crashed with everyone on board killed. Simulating the counterfactual possibility, "I could have been on that plane" (DR), renders standard-consistent cognitions about the self more accessible (e.g., "I could be dead," "I would never have been able to see my family again," "I would never have been able to accomplish what I wanted to in life"), and reflecting on these accessible cognitions produces counterfactual-congruent (in this case, negative) affect. On the other hand, employing the counterfactual as a standard against which to evaluate reality (DE) produces positive affect via a contrast effect: "I'm lucky to be alive." Notably, then, the relationship between simulation mode and the accessibility mechanism is of critical importance: Reflective and evaluative modes of mental simulation both activate and enhance the operation of the accessibility mechanism. The more vivid the simulation (cf. Strack et al., 1985), and the easier it is to engage in the simulation (Sherman, Cialdini, Schwartzman, & Reynolds, 1985), the greater will be the accessibility of self-implicating cognitions and, thus, the stronger will be the emotional experience derived from engaging in the comparison.

More generally, the notion that the very same counterfactual can produce both assimilative and contrastive reactions has intriguing implications for affective experience, as it may be that the mixed emotions (Larsen, McGraw, and Cacioppo, 2001) that are often felt after events such as switching from the doomed plane flight are the result of reflective and evaluative modes of mental simulation operating in parallel (cf. Biernat & Manis, 1994; Biernat, Manis, & Kobrynowicz, 1997; Mussweiler, 2003; see also Markman & McMullen, 2003, for a more detailed discussion of this issue). In this way, one may feel fortunate to be alive, yet deeply troubled by thoughts of what might have been.

INCLUSION/EXCLUSION FEATURES

This section examines contextual features that promote inclusion and exclusion and thereby instigate reflection and evaluation. The variables described in this section are not meant to be an exhaustive list of all potential features. Rather, we have chosen several variables to focus on that offer suggestive evidence of the operation of reflective and evaluative modes of mental simulation.

Attentional Focus

The most straightforward inclusion/exclusion feature we have identified is attentional focus. According to the REM, focusing attention solely on the comparison standard itself should encourage inclusion of the counterfactual standard in self-construals, thereby instigating reflective processing that produces assimilation effects, whereas focusing attention on the explicit comparison between one's

present standing and the comparison standard should encourage the exclusion of the counterfactual standard from self-construals, thereby instigating evaluative processing that produces contrast effects.

Empirical Evidence McMullen (1997, Study 1) instructed participants to recall a somewhat negative event in their own lives and imagine how the event could have turned out better or worse than it actually did. In order to manipulate simulation mode, participants in the reflection condition were then instructed to “vividly imagine what might have happened instead,” whereas those in the evaluation condition were instructed to “evaluate what happened in comparison to what could have happened.” Participants in both conditions then described their thoughts in writing and reported their mood. Content analyses performed on the written responses indicated that participants in the evaluation condition did indeed show more evidence of evaluative comparison in their responses, whereas those in the reflection condition showed more evidence of reflective experiencing. Furthermore, participants in the reflection condition reported more positive affect after making upward counterfactuals and negative affect after making downward counterfactuals (assimilation), whereas in the evaluation condition participants reported more negative affect after making upward counterfactuals and positive affect after making downward counterfactuals (contrast).

These results indicate that contrast is neither the only nor necessarily the most likely consequence of counterfactual thinking. That prior research had reported a preponderance of contrast effects was probably due to the nature of the scenarios employed. In previous research, participants read about an individual who experienced a particularly striking negative outcome and were then made aware that the outcome could have been avoided if the normal routine had been followed. In such a situation, what is salient is not the counterfactual, but the factual event, and thus attention is likely focused upon it. The critical point, however, is that salient occurrences such as violations of expectancies and changes in the status quo may occur in either the factual *or* the counterfactual world, and where they occur determines attentional focus. Consider, then, the distinction between “*he could have been killed*” but was not” versus “*he was killed*” but it could have been avoided.” In the former, attention is focused upon what could have happened, and thus assimilation is more likely, whereas in the latter, attention is focused upon what actually happened, and thus contrast is more likely.

Temporal Perspective

The previously described studies by Medvec and her colleagues that demonstrated affective contrast in response to close-call counterfactuals focused exclusively on final outcomes—Medvec and Savitsky (1997) examined students’ perceptions of their final semester grades, and Medvec et al. (1995) examined reactions to medals awarded to athletes after the competition was over. Yet, relatively few of the outcomes people experience in their lives are actually final. Rather, students receive individual grades throughout the semester, and athletes spend a great deal of time training in preparation for final events. From the perspective of the

REM, close upward counterfactuals following repeatable outcomes suggest that better possibilities are easily attainable (e.g., “I almost did it; I will do it next time”), whereas close downward counterfactuals suggest a vulnerability to worse possibilities (e.g., “I nearly failed; I could fail next time”).

McMullen and Markman (2002) hypothesized that reflective thinking would more likely be elicited by the presence of clear future possibilities, as when a student has received feedback on a midterm exam and is thinking about future exams, whereas evaluative thinking would be more likely when future possibilities are absent, as when a student has received a final grade in a course, or when an athlete has competed in the final event of a competition. In their study, participants read descriptions of a basketball game from the perspective of a fan of one of the two teams. Participants either read an account of the first half of the basketball game (*future outcome* condition) or the second half of the game (*final outcome* condition), after which they reported their affect regarding the outcome of the game. Affective contrast effects were obtained in the *final outcome* condition: Being a fan of the losing team felt better if the second half was a blowout (15-point difference) compared to a close game (1-point difference), and being a fan of the winning team felt better if the second half was close compared to a blowout. On the other hand, however, the *future outcome* condition yielded an affective assimilation effect: At halftime, fans of the team that was down by 1 point actually felt *better* than fans of the team that was up by 1 point.

Feedback Dynamics

Recent work conducted in our lab (Markman, Elizaga, Ratcliff, & McMullen, in press) has explored a variable termed “feedback dynamics.” At times, individuals receive outcome feedback in a vacuum. For instance, a student may receive an “89” on an exam without having previously received grades on any of the other exams in that course. This feedback experience is “static” in the sense that it does not occur within the context of other feedback experiences. Alternatively, a student may receive an “89” on an exam in a course after having received outcome feedback on two previous exams (e.g., an “85” and an “87”). This feedback experience is “dynamic” in the sense that it is preceded by a prior series of outcomes that may provide additional context for evaluating the most recent feedback (cf. Rose & Olson, 1995). In this case, the experience of receiving three increasingly higher scores may imbue one with a sense of “momentum”—that one is on a trajectory toward receiving higher exam scores in the future.

According to Kahneman and Varey (1990), propensities “indicate advance toward the focal outcome, or regression away from it” (p. 1105), and it is this perception of dynamic and accelerating movement toward a win or loss that may trigger counterfactuals such as, “We almost won,” or “We nearly blew it” (see also Hsee, Salovey, & Abelson, 1994). According to the REM, to the extent that individuals perceive themselves to be on a trajectory toward either a desired or undesired end-state, assimilation should occur as a direct consequence of reflection (via inclusion of the comparison standard). Thus, comparisons to an upward counterfactual outcome should elicit positive affect and cognitions, whereas

comparisons to a downward counterfactual outcome should elicit negative affect and cognitions. On the other hand, outcomes that are perceived as static should evoke contrast as a direct consequence of evaluation (via exclusion of the comparison standard). Thus, upward counterfactuals should elicit negative affect and cognitions, whereas downward counterfactuals should elicit positive affect and cognitions.

Recent work on stereotyping and social comparison (e.g., Biernat & Manis, 1994; Biernat et al., 1997; Mussweiler & Strack, 2000) has noted distinctions between making judgments along either subjective or objective response scales. These studies suggest that subjective scales can produce contrast effects if judges use salient standards to anchor the response scale. Objective scales, conversely, sometimes produce assimilation effects if the underlying response scale requires no interpretation by the judge. In such cases, judgments may be based on the implications of accessible self-knowledge (Mussweiler & Strack, 2000). Markman et al. (in press) hypothesized that feedback dynamics would affect the processing of counterfactuals such that dynamic feedback would evoke reflection upon the counterfactual whereas static feedback would evoke evaluation of the counterfactual in light of the actual outcome, and that these effects would be moderated by judgment type—whether the judgment in question was made along a subjective versus objective response scale.

Empirical Evidence Participants in the Markman et al. (in press) study engaged in an analogy-solving task that purported to be a measure of verbal intelligence. After learning that they needed to attain a particular target score in order to be eligible for a prize, participants completed the task and experienced one of four types of feedback. Participants in the upward condition learned that they just barely missed the target score, whereas those in the downward condition learned that they just barely attained the target score. Furthermore, participants in the static condition received this feedback in the absence of any prior feedback, whereas participants in the dynamic condition received this feedback after having received feedback on five previous occasions that conformed to either an ascending (upward) or descending (downward) pattern. After receiving feedback, participants were instructed to write down any “if only” or “what if” thoughts that came to mind about their performance. Finally, participants provided perceptions of their own levels of verbal intelligence on both a subjective (“How verbally intelligent do you take yourself to be?”) and objective (“If you were given 30 analogies to solve like the ones you just completed, how many could you correctly answer in 15 minutes?”) measure (Mussweiler & Strack, 2000).

Based on the results of social judgment studies that have indicated that objective measures can sometimes elicit assimilation effects (e.g., Mussweiler & Strack, 2000), a main effect of counterfactual direction was predicted—upward counterfactuals should elicit higher self-perceptions of verbal intelligence than should downward counterfactuals. In turn, although social judgment work has indicated that subjective measures will sometimes elicit contrast effects, other findings have indicated that counterfactuals generated following outcomes that convey a sense of trajectory will tend to elicit assimilation effects (Kahneman & Varey, 1990).

Markman & Tetlock, 2000). For instance, employing a computer simulation in which monthly stock investment outcomes were slowly revealed in a manner that evoked perceptions of “nearly winning” and “nearly losing,” Markman and Tetlock (2000) observed abundant evidence for assimilation effects and little evidence for contrast effects. On subjective ratings, then, it was predicted that the dynamic conditions should elicit assimilative judgments (i.e., higher ratings in the upward relative to the downward conditions), whereas the static conditions should elicit contrastive judgments (i.e., lower ratings in the upward relative to the downward conditions).

The results conformed to predictions. First, the objective measure yielded the predicted direction main effect—participants in the upward conditions predicted that they would answer more items correctly than did those in the downward conditions.

The subjective measure, on the other hand, yielded the predicted Direction \times Feedback dynamic interaction. Whereas participants in the upward/dynamic condition perceived themselves as being higher in verbal intelligence than did those in the downward/dynamic condition, participants in the upward/static condition perceived themselves as being lower in verbal intelligence than did those in the downward/static condition (see Figure 8.2).

Dissociations Between Affect and Expectations One of the more intriguing findings in the Markman et al. (in press) study concerns the assimilative effect of comparison direction on expectations regarding future performance (i.e., the objective measure). Building on this result, we speculate that even in

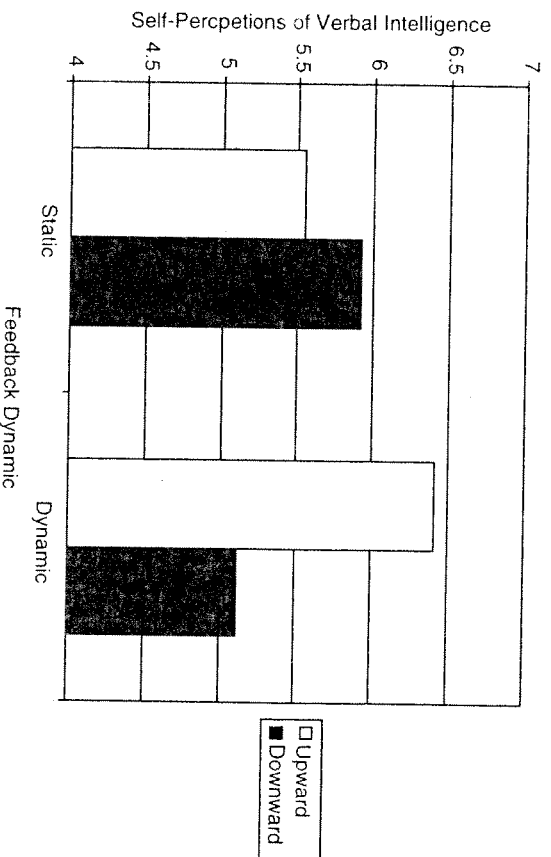


FIGURE 8.2 Self-perceptions of verbal intelligence as a function of direction and feedback dynamics.

cases where counterfactuals elicit affective contrast, the set of expectations regarding future performance and outcomes that also derive from the counterfactual (cf. Roese, 1997) may nevertheless assimilate to the standard. Essentially, counterfactual generation may *change the standard* by which future performance and outcomes are evaluated (cf. Biernat, 2003). Thus, although upward counterfactual thinking (e.g., "I got a B . . . if only I had gotten an A") may engender negative affect via contrast, the standard, simultaneously, may also be raised—via cognitive assimilation, the individual has become a potential A student. Similarly, although downward counterfactual thinking (e.g., "At least I didn't get a C") may engender positive affect via contrast, the standard may also be lowered—the individual has become a C student who was lucky to have obtained a B.

Anecdotaly, we have made note of the generation of these types of counterfactual comparisons in television and newspaper media during discussions of the recent Abu Ghraib prison scandal involving American soldiers accused of torturing Iraqi prisoners. Some commentators have noted that although the torture that occurred at Abu Ghraib was certainly heinous, the prisoners who were tortured there would nevertheless have had it much worse if (former Iraqi president) Saddam Hussein had imprisoned them instead. This type of (downward) comparison has the odd effect of both mitigating the perceived cruelty of the American soldiers' actions (via affective contrast), while at the same time lowering the standards by which the United States and its allies are expected to behave toward prisoners of war in the future (via cognitive assimilation). Research is presently underway to examine possible dissociative effects of counterfactual generation on affect and expectations.

MENTAL SIMULATION-BASED COMPARISON PROCESSES

REM Versus SAM

Mussweiler (2003; Mussweiler et al., 2004; Mussweiler & Strack, 2000) has advanced a theoretical framework that specifies how assimilation and contrast effects arise in comparisons. According to the Selective Accessibility Model (SAM), testing the hypothesis "I am similar to the standard" heightens the accessibility of standard-consistent knowledge such that self-evaluations will be assimilated toward the standard. Conversely, testing the hypothesis "I am different from the standard" heightens the accessibility of standard-inconsistent knowledge such that self-evaluations will be contrasted away from the standard.

Although empirical evidence for the SAM has been garnered within the domain of social comparisons, Mussweiler (2003) has also suggested that the similarity-testing mechanism should account for assimilation and contrast effects in all types of comparisons. However, although similarity testing may indeed account for some social comparison phenomena, we believe that this mechanism is substantially less useful for explaining how assimilation and contrast effects arise in counterfactual thinking. To illustrate, consider the student who just misses receiving a final grade of "A" in a class by a tenth of a percentage point. If the

similarity-testing mechanism were applied, then the student would presumably arrive at the conclusion that her 89.4 was very similar to the 89.5 that she could have received and thus given her an A for the semester. According to the SAM, testing for similarity in this case should engender assimilation, thereby leading the student to feel good about her 89.4. Our intuitions, however, suggest that the very opposite would occur: The student would probably feel quite frustrated, bemoaning the fact that she "just missed" getting an A. In fact, we would argue that the similarity of the real grade to the imagined grade has actually played a role in giving rise to the student's feelings of frustration (i.e., via affective contrast).

In our view, similarity testing has a difficult time accounting for both the assimilative *and* contrastive consequences of close-call counterfactuals; by definition, closeness evokes counterfactual thinking by virtue of the proximity (i.e., similarity) of the actual outcome to the counterfactual standard. Although similarity may play a critical role in the *activation* of counterfactual thinking (Roese & Olson, 1995, 1997), other contextual features, such as attentional focus, temporal perspective, or feedback dynamics, may be more crucial determinants of whether the reaction to any given counterfactual will be assimilative versus contrastive in nature, as such variables instigate reflective and evaluative processing. Moreover, the results of the Markman et al. (in press) analogy-solving study provide empirical support for the notion that reflective and evaluative modes of mental simulation directly influence the elicitation of assimilation and contrast effects. The key distinction between the SAM and the REM, then, centers on the mechanism that each model specifies to be underlying assimilation and contrast effects. Whereas the SAM champions similarity testing as the critical underlying mechanism, the REM focuses instead on the role of mental simulation.

We further question the generality of the similarity-testing mechanism because some social comparison phenomena are not easily amenable to a similarity-as-mediator account. A particularly illustrative example is Lockwood and Kunda's (1997) work on role models. In Study 2, these researchers exposed first-year and fourth-year accounting students to a description of a spectacular graduating student who had majored in accounting. Lockwood and Kunda reasoned that because the achievements of the graduating superstar would seem attainable to first-year students whose university careers still lay ahead and for whom any level of accomplishment would seem within reach, these students would be inspired by comparisons to the star and thus evaluate themselves more positively relative to a no-target control group. Conversely, because the achievements of the superstar would seem unattainable to fourth-year students for whom it was already too late to achieve a similar level of success, it was predicted that these students would be discouraged by comparisons with the star and thus evaluate themselves more negatively relative to a control group. The data conformed to predictions. Moreover and, importantly, *subsequent* to providing their self-evaluations, participants rated the extent to which the star was relevant to them for the purpose of comparison. The results revealed that fourth-year students rated the target as less relevant than did the first-year students.

Based, in part, on these relevance ratings, Mussweiler (2003) asserted that the

similarity-testing mechanism accounts for Lockwood and Kunda's (1997) effects. Thus, assimilation was engendered by similarity testing (i.e., first-year students believed that the star was a relevant comparison target), whereas contrast was engendered by dissimilarity testing (i.e., fourth-year students did not believe that the star was a relevant comparison target). Arguably, however, the relevance ratings did not reflect participants' *initial* perceptions of similarity to the target. Rather, because the relevance ratings were made *after* participants had already evaluated themselves, it is likely that these ratings were reflective of a *defensive* reaction to the deflating comparison. Simply put, we find it implausible that fourth-year students could have perceived themselves to be less similar to the superstar than did first-year students and would argue instead that they perceived themselves to be as similar, if not more similar, than did the first-year students. If this were the case, then a similarity-testing mechanism would have predicted assimilation, and not contrast, for fourth-year students. From our perspective, alternatively, the deflating consequences of comparison to the superstar derived from initial perceptions of similarity to the target ("I am at the same stage of my career as this student"), coupled with subsequent perceptions of unattainability ("I cannot see myself succeeding at the level of this student"). According to Lockwood and Kunda, attainability

illustrates the wonderful heights of accomplishment one can hope to achieve, encourages and motivates one to strive for this now all the more palpable success, indicates particular goals to aim for along the way, points to the road one should follow to achieve them, and makes one feel more competent and capable of such achievement. (p. 93)

Attainability, then, clearly involves some form of mental simulation. Moreover, we argue that it was the ease of engaging in mental simulation (Sherman et al., 1985), as opposed to similarity testing, that accounted for the obtained effects; perceptions of attainability encouraged inclusion and instigated reflective processing among first-year students, thereby eliciting assimilation effects, whereas perceptions of unattainability encouraged exclusion and instigated evaluative processing among fourth-year students, thereby eliciting contrast effects.

As a final illustration, consider Nike's "Be Like Mike" (i.e., NBA former player Michael Jordan) advertising campaign from a few years ago. Following the logic of similarity testing, most people should conclude that they are dissimilar to Jordan, thereby engendering contrast. However, the observation that children and adults alike pretend that they are "being like Mike" when they get on the basketball court indicates clearly that this is not what is happening. Instead, we argue that it is the act of reflecting on *what it would be like* to experience the success of Michael Jordan that enhances the accessibility of standard-consistent thoughts about the self—it is hardly necessary to test for similarity between the self and Michael Jordan in order to produce assimilation. In fact, testing the hypothesis that one is similar to Michael Jordan would simply highlight how dissimilar one is to him. Thus, the reflection process provides a better account of the "Be Like Mike" effect than does the similarity-testing mechanism.

Directive and Projective Social Comparisons We believe that it is useful to draw a distinction between two types of social comparisons—*directive* and *projective*—that are primarily distinguishable by the specific mechanism that accounts for the assimilative versus contrastive consequences of each comparison type. Directive comparisons serve to diagnose one's present standing and abilities (Festinger, 1954) and can be further subdivided into global directive comparisons that require the matching of shared and unique features across multiple dimensions (e.g., "How much am I like him?"—see Hodges, Bruininks, & Ivy, 2002; Holyoak & Gordon, 1983; Tversky, 1977). Specific directive comparisons test for similarity along one dimension (e.g., "How intelligent am I in comparison to him?"). Such comparisons are fairly static, do not typically involve mental simulation processes, and exert only modest effects on emotional and motivational responses. In contrast, projective comparisons also serve a diagnostic function, but they do so through a process of mental simulation (e.g., "Could I ever be as good as her?", "What would it be like to be him for a day?") that heightens emotional responses and motivational concerns. The consequences of projective comparisons involving imagined alternatives to reality (e.g., Karniol & Ross, 1996; Klingler, 1990; Markman et al., 1993), past selves (e.g., Suls, Marco, & Tobin, 1991; Wilson & Ross, 2000, 2001), possible selves (e.g., Markus & Nurius, 1986; Oettingen, 1996; Taylor & Pham, 1996), positive and negative role models (e.g., Evans, 2003; Lockwood, Jordan, & Kunda, 2002; Marx, Stapel, & Muller, 2005), and a proxy's related attributes (e.g., Martin, Suls, & Wheeler, 2002) are all driven, at least to some degree, by mental simulation processes of one form or another. Overall, we speculate that the assimilative versus contrastive consequences of directive social comparisons are more likely mediated by similarity testing, whereas the consequences of projective social comparisons are more likely mediated by the extent to which reflective versus evaluative processing has been instigated.

Ease of Simulation as a Determinant of Responses to Projective Social Comparisons

An important direction for future work will be to examine the role of ease of simulation as a determinant of assimilative and contrastive responses to projective social comparisons. The role of simulation ease has been implicated in other types of social judgments. For instance, Sherman et al. (1985) found that the imaginability of a set of disease symptoms increased participants' ratings of the likelihood that they might contract the disease (see also Anderson, 1983; Carroll, 1978; Ross, Lepper, Strack, & Steimetz, 1977). Hirt and Markman (1995) found that generating a plausible counterexplanation for an initial explanation of a future outcome effectively lowered participants' ratings of the likelihood of the initially explained future outcome, whereas generating an implausible counterexplanation failed to lower likelihood ratings of the initially explained outcome (see also Hirt, Kardes, & Markman, 2004; Koehler, 1991). A critical factor determining the nature of responses to projective social comparisons, then, should be the individual's perception that it was relatively easy versus difficult to construct a particular mental simulation (cf. Schwarz et al., 1991). Simulations perceived as easy to generate

* should encourage inclusion of comparison information in self-construals, whereas simulations perceived as difficult to generate should encourage exclusion.

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The REM can be differentiated from other models of comparison processes by virtue of its guiding spirit—it focuses on the power of the imagination to alter our perceptions of present reality and our present selves, for better or for worse. The nature and vividness of the mental simulations we construct, as well as the ease with which we can conjure up these mental simulations, imbue counterfactual, social, and temporal comparisons with an emotional intensity that has consequences for motivation and behavior later on (see Markman & McMullen, 2005, for a more extensive discussion of the downstream consequences of mental simulation). We hope that the ideas presented in this chapter will stimulate further inquiries into how comparisons, and responses to comparisons, are impacted by thoughts of what was, what is, what could have been, and what yet could be.

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Set/Reset and Self-Regulation: Do Contrast Processes Play a Role in the Breakdown of Self-Control?

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A number of years ago, the first author began studying the processes underlying certain types of assimilation and contrast effects (e.g., Martin, 1986; Martin & Achee, 1992; Martin, Seta, & Crelia, 1990). More recently, in collaboration with the second author, he began studying the processes underlying certain types of self-regulation (e.g., Martin, 1999; Martin, Campbell, & Henry, 2004). In this chapter, we speculate on some connections between the two lines of research.

We begin with the observation that certain forms of self-regulation require individuals to behave in ways that are contrary to some of their authentic feelings. If individuals are to be successful at dieting, for example, then they must ignore, suppress, discount, or otherwise put out of play their genuine hunger and their continued desire to eat high caloric foods. Not surprisingly, this can be difficult to do. It can also be counterproductive. In fact, under some circumstances, attempts at self-control can facilitate breakdowns in self-control. For example, after struggling to lose weight but seeming to make no progress, individuals may rebound into self-defeating overindulgence (Cochran & Tesser, 1996; Heatherton & Baumeister, 1991; Polivy, 1998; Tice & Bratslavsky, 2000). They not only terminate their dieting, but they actually engage in behavior that works against their dieting (e.g., binging on high caloric foods).

On the surface, this kind of breakdown in self-control has some features in common with the kind of contrast effects we have studied. Both reflect a shift from one extreme to the other. In what we have termed reset contrast, individuals attempt to partial out from their judgment of the target stimulus any reactions they perceive to be coming from nontarget sources (e.g., contextual stimuli, their mood). This partialing can be difficult to calibrate precisely, so individuals sometimes overcorrect. Specifically, they partial out aspects of their genuine reaction to the target and turn what would have been a judgment biased toward the implications