

Mental Simulation, Affect, and Personality: A Conceptual Framework

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Abstract

Recent advances in theory and research on the relations among mental simulation, affect, and personality are summarized and combined. Research has shown that (a) affect and mental simulations can influence each other, (b) mental simulations can serve diverse self-motives, and (c) personality characteristics are related to divergent functions of mental simulations. Findings in these three areas are synthesized into a conceptual framework on the basis of three attributes of mental simulations: (a) time, whether simulations are prospective or retrospective; (b) direction, whether simulations

are upward or downward; and (c) focus, whether simulations are contrasted or assimilated. This integrated framework not only may enable a greater understanding of existing findings, but also suggests novel and unique predictions for future research on understanding personality processes, automaticity in simulations, and coping with life events.

Keywords

mental simulation; affect; self-motives; personality processes

Mentally simulating alternative outcomes, before and after events, is a ubiquitous aspect of people's existence and has broad theoretical

and practical significance. Contemplating an imminent exam in an important college course, preparing for a business meeting with a valued client, and anticipating a tennis match against a vaunted rival are but a few examples of common situations that are likely to evoke mental simulations of alternatives. Mental simulations are imitative cognitive constructions of hypothetical events or reconstructions of real events. They include anticipations about the future (e.g., thinking about what might happen on a date later this evening) and retrospections about the past (e.g., thinking about a disagreement at yesterday's committee meeting).

This review summarizes and synthesizes recent findings in three areas of theory and research: the interaction between mental simulations and affect, how mental simulations can be used in the service of various self-motives, and how personality characteristics are associated with diverse functions of mental simulations. Although these areas have developed separate lit-

eratures, I argue that they are conceptually related. In addition to summarizing advances, I combine findings within a framework that organizes them and affords new insights. Viewing the research in this way makes it possible to make novel and unique predictions for future research.

RELATIONS BETWEEN MENTAL SIMULATION AND AFFECT

Initial research demonstrated that mental simulations can influence affect. However, recent research now indicates that the influence can also work in the opposite direction: Affect or moods can influence mental simulations (Sanna, 1996, 1998; Sanna, Meier, & Turley-Ames, 1998; Sanna, Turley-Ames, & Meier, 1999).

Research on *counterfactual* simulations provides an example of how mental simulations can influence affect. Counterfactual simulations are mentally simulated pasts that did not actually happen but that easily could be imagined having happened; they are thoughts of "what might have been" and are typified by "if only," "at least," or similar conceptions. *Upward* counterfactuals simulate better realities (e.g., "If only I studied harder, I might have been admitted to medical school"); *downward* counterfactuals simulate worse realities (e.g., "At least I was wearing my seatbelt, or I might have been more seriously injured"). Counterfactuals can influence affect via contrast: Through a contrast with reality, upward counterfactuals elicit negative affect (e.g., feeling bad about not being admitted to medical school), and downward counterfactuals elicit positive affect (e.g., feeling thankful about not being seriously injured; Markman, Gavanski, Sherman, & McMullen, 1993).

Counterfactuals can also influ-

ence affect via assimilation: If focus is placed solely on the simulated alternative without regard to reality (McMullen, 1997), or if the simulated alternative will or can transpire (Sanna, 1997), upward simulations produce good moods (e.g., imagining actually being admitted to medical school may make you feel happy) and downward simulations produce bad moods (e.g., imagining actually receiving a serious injury may make you feel sad or even fearful).

Affect also influences mental simulations. The strongest evidence comes from direct mood manipulations. My colleagues and I (Sanna et al., 1998, 1999) had participants watch films or listen to music in order to induce happy and sad moods. Bad and good moods induced upward and downward counterfactuals, respectively, mirroring simulation's influences on moods. This pattern is not limited to counterfactuals. Research on *prefactual* thoughts, thoughts of "what may be" (Sanna, 1998), found that bad moods induced upward simulations (e.g., "If only I had more study time, I could do better on tomorrow's exam") and good moods induced downward simulations (e.g., "At least I bought the study guide, or my grade on tomorrow's exam might be worse").² Related evidence comes from research in which people were told that they performed well or poorly after playing a card game (Markman et al., 1993). Being told that one did well produced good moods and downward simulations, and being told that one did poorly produced bad moods and upward simulations. It is possible that the success and failure manipulations influenced mental simulations through moods, just as has been found when moods have been manipulated directly via films and music.

Like counterfactuals, prefactuals may influence affect via assimila-

tion and contrast, although there are few studies that have examined this possibility. People who contrast upward prefactuals with reality may feel bad, whereas people who contrast downward prefactuals may feel good. People who assimilate upward prefactuals may feel good, but those who assimilate downward prefactuals may feel bad.

SELF-MOTIVES AND SIMULATION DIRECTION

Although several motives conceivably are relevant to mental simulation, research has centered on *self-improvement* and *self-enhancement* (Taylor & Schneider, 1989). Self-improvement emphasizes problem solving and people's desire to better themselves or their current lives; self-enhancement emphasizes regulation of affect and people's desire to repair, maintain, or protect a favorable self-concept.

It was initially assumed that self-improvement (or preparative) motives were served by upward simulations, and self-enhancement (or affective) motives were served by downward simulations. However, recent evidence suggests the linkages are more varied (see Table 1). Upward simulations can indeed be used for self-improvement. Thinking about how things might be better can be a first step in planning to obtain superior outcomes. Moreover, if bad moods signal trouble, upward simulations can suggest routes for alleviating problems. Self-enhancement motives may be more complex, however.

There are at least three varieties of self-enhancement (Sedikides & Strube, 1997): People can *repair*, *maintain*, or *protect* a positive self-concept. Past research focused only on the restorative role of mental simulations. Although negative affect can lead to upward simulations, there are times when it can lead to downward simulations.

Table 1. Summary of research evidence on linkages between self-motives and direction of mental simulations

Self-motive	Simulation direction	Functional uses
Self-improvement	Upward	Thinking about how things might be better can be a first step in realizing those outcomes; self-improvement can result from needed preparation or finding routes for alleviating problems.
Self-enhancement Mood repair	Downward	Thinking about how things might be worse can help to restore a positive sense of self; mood repair can occur in response to negative events or when one is in a bad mood.
Mood maintenance	Downward	Thinking about things worse than actuality can help to maintain or prolong positive affective states; mood maintenance can occur in response to positive events or when one is in a good mood.
Self-protection	Upward	Thinking about how the worst may transpire can brace one for potential failure; self-protection can occur in anticipation of negative outcomes or when tests of important self-attributes are close at hand.

When people are in bad moods, or have experienced negative events, thinking about how things might be worse (i.e., downward simulations) allows them to feel good by comparison, or serves the function of mood repair (Sanna et al., 1998, 1999). However, people often want to prolong their pleasant affective states, and other research now indicates that mood maintenance can also be achieved by downward simulations (Sanna, Meier, & Wegner, in press). Self-enhancement may be accomplished further by protecting the self from threats. Meier and I recently showed that people can use upward simulations to "buffer" or "brace" for the worst (Sanna & Meier, 2000). Upward simulations allow one to think, "I knew it all along," lessening the blow if the worst does transpire.

PERSONALITY AND A CONCEPTUAL FRAMEWORK

Knowledge about relations between mental simulations and affect, and between self-motives and simulation direction, can be combined with advances in knowledge about personality and mental simulations. Although studies exist

in isolation, I propose a framework that is built upon three attributes of mental simulations: (a) *time*, whether simulations are prospective (prefactual) or retrospective (counterfactual); (b) *direction*, whether simulations are upward or downward; and (c) *focus*, whether simulations are contrasted with reality or expectations or are assimilated (see Table 2). This framework not only organizes recent advances, but affords new insights by suggesting when mental simulations are contrasted or assimilated, and what self-motives are served.

The framework also suggests possibilities for future research.

Fit of Existing Findings

Defensive pessimism and *optimism*, which are opposite ends of a personality continuum, present a contrast in the use of prospective and retrospective mental simulations (Sanna, 1996, 1998): Defensive pessimists mainly use simulations prospectively, whereas optimists mainly use simulations retrospectively. Defensive pessimists enter

Table 2. A conceptual framework of individual differences in mental simulations

Simulation direction and focus	Time of simulation	
	Prospective (prefactual)	Retrospective (counterfactual)
Upward		
Contrast	Defensive pessimism Low self-esteem	Low self-efficacy
Assimilate	High self-esteem	High self-efficacy
Downward		
Contrast	<i>Naive optimism(?)</i>	Optimism High self-esteem
Assimilate	<i>True pessimism(?)</i>	

Note. For upward simulations, contrast is associated with negative affect and assimilation with positive affect; for downward simulations, contrast is associated with positive affect and assimilation with negative affect. Characteristics whose fit in the framework is speculative appear in italics.

performance situations (e.g., academic settings) “expecting the worst,” even though they have a history of success. They use prospective strategies. Their negative outlook serves two purposes: It cushions them in the event of failure (self-protection), and it motivates them to ensure that they will do well (self-improvement). Upward prospective simulations serve both self-protection and self-improvement functions for defensive pessimists. In contrast, optimists use retrospective strategies. They reinterpret outcomes positively after the fact, especially following poor outcomes. One way optimists do this is by downward counterfactual thinking, a self-enhancing mood-repair strategy used after negative outcomes. These patterns have been obtained in recent research (Sanna, 1996, 1998), and can be fit into Table 2.

Although differing in timing and direction, both defensive pessimists’ and optimists’ strategies are based on contrasting mental simulations with reality. Defensive pessimists contrast upward prefactuals with current perceptions of themselves, and they experience negative moods and anxiety; optimists contrast downward counterfactuals with current perceptions of themselves, and they experience positive moods and emotions.

Self-esteem has also been related to both prospective and retrospective mental simulations. Self-esteem refers to people’s perceptions of self-worth. Individuals with low self-esteem are governed by self-protective motives; individuals with high self-esteem are governed by self-enhancing motives. Much like optimists, people with high self-esteem use downward counterfactuals to self-enhance (repair mood) when negative outcomes, such as bad moods, occur (Sanna et al., 1998, 1999). People with low self-esteem do not use mental simulations this way.

People with high and low self-esteem also differ in their prefactual simulations. People with low self-esteem contrast upward prefactuals with their most-expected outcome in a self-protective fashion (Sanna & Meier, 2000), as do defensive pessimists. That is, they might expect to fail, but upward prefactuals present alternatives (e.g., “If only I had more study time, I could do better on tomorrow’s exam”), suggesting ways to avoid failure. In the event that failure does occur, this strategy may be self-protective in at least two ways: They have thought about the possibility of failure beforehand so that it is not unexpected, and they have already thought about ways in which they might do better next time. In contrast, people with high self-esteem assimilate upward prefactuals, resulting in consistently positive affect and high confidence before performing.

Research on *self-efficacy* (Sanna, 1997) has tested only retrospective (counterfactual) simulations. Nonetheless, these findings also fit the present framework. Self-efficacy refers to people’s expectations about whether they will complete a task successfully. People with high self-efficacy interpret upward counterfactuals as achievable standards, assimilating them (e.g., “that could be me”), whereas people with low self-efficacy contrast upward counterfactuals with reality, resulting in negative affect. It is possible that people with high self-efficacy can better take advantage of the self-improvement function of upward counterfactuals.

Possible Fit of Other Characteristics

The present framework may also inform an understanding of other individual differences. For example, other affect-related characteristics might be similarly conceptualized. These could include

broad traits corresponding to the experience of positive and negative affect (e.g., *affectivity*), specific traits (e.g., *trait anxiety*), and characteristics related to the regulation of emotions (e.g., expectations that one can change one’s moods), among many others (Rusting, 1998). The present framework makes it easy to identify methodological and theoretical gaps. Some examples of people who may tend to use downward prefactuals are listed in italics in Table 2.

Little attention has been paid to downward prefactuals. However, it is possible that *true pessimists* may assimilate downward prefactuals. True pessimists are unlike defensive pessimists; they believe the worst will happen, but their history of failure does not allow them to use simulations strategically.³ Naive or *passive optimists* also may use downward prefactuals. These persons are the opposite of true pessimists. They believe they are in the best of all possible worlds, and everything is as good as it can be. Ironically, they never take action to bring about good things, and their passivity may be a result of contrasting downward prefactuals. Mental simulations thus may be one underlying process that can help researchers to distinguish among a myriad of individual differences.⁴ Future research, however, is necessary to directly test these possibilities, and to continue to link motives with mental simulations.

CONCLUSIONS AND FUTURE DIRECTIONS

In addition to summarizing recent advances and conceptualizing individual differences, the present framework has implications for people’s coping and well-being. Moods and motives may have both automatic and effortful influences on mental simulations. Good and

bad moods may automatically activate downward and upward simulations, respectively (see the white arrows in Fig. 1). Moods inform people's perception of current states (e.g., reality or most-expected reality; Schwarz & Clore, 1996). People in good moods interpret their lives positively (e.g., "I am a success," "Things are fine"); people in bad moods interpret their lives negatively (e.g., "I am a failure," "There is a problem"). These findings can be combined with other research showing that many comparisons (contrasts) are generated spontaneously and unintentionally, but can also be deliberately "undone" subsequently (Gilbert, Giesler, & Morris, 1995).

Although existing research is not complete with regard to mental simulations, it appears that simulations are first spontaneously and automatically contrasted with reality. In the case of positive events or moods, reality is interpreted positively. A contrast with this positive reality is a more negative mentally simulated alternative reality, or a downward simulation. Conversely, reality is interpreted negatively in the case of negative events

or moods, and contrasting alternatives in this instance are more positive, or in an upward direction. This is indicated by the white arrows in Figure 1.

However, certain people, such as those with high self-esteem, can repair their bad moods by effortfully overriding their initial upward simulations with downward simulations (Sanna et al., 1999). The fact that initially and automatically activated mental simulations can be subsequently overridden by self-motives is depicted by the black arrow in Figure 1.

The reciprocal relation between affect and mental simulations can result in vicious cycles of bad moods, which individuals with inept coping skills find difficult to stop. However, those with more efficacious strategies (e.g., high self-esteem, optimism) can break the cycle more easily. More broadly, if self-motives suggest mental simulations that are inconsistent with simulations activated automatically, then greater effort is required to pursue those motives (e.g., counteracting upward with downward simulations to repair mood). However, if self-motives suggest simu-

lations consistent with those activated automatically, then little additional effort is needed (e.g., mood maintenance when a person is in a good mood). The possibility that mental simulations may be automatically and effortfully activated with regard to the full range of self-motives depicted in Figure 1 is a question for future research.

When the present proposals are considered within the general context of coping and well-being, they can augment laboratory findings. In classrooms, mental simulations relate to confidence as exam time approaches (Sanna & Meier, 2000). Simulations also relate to motivation in such diverse domains as weight loss, recovery from illnesses, and romantic and professional success. It is not only the simulations that are important, but how people use them. Positive affect brought about by fantasizing over success can sometimes actually reduce motivation (Oettingen, 1996). In this case, upward (success) simulations may be assimilated prematurely, resulting in complacency. However, using positive fantasies (upward simulations) as a comparison (contrast) facilitates success. The present framework thus makes sense of sometimes counterintuitive findings, explaining, for example, why a person might have reduced motivation when thinking about better—upward—alternatives.

In this review, I have summarized and integrated recent advances in what have been viewed as somewhat separate literatures. It is my hope that this new framework can serve as a basis for moving discussion and research along productive routes. In this regard, although mental simulation, affect, and personality are intricately related, it is useful to explore possible directions of influence more fully. Does personality predispose people to certain mood states, which then influence mental simu-

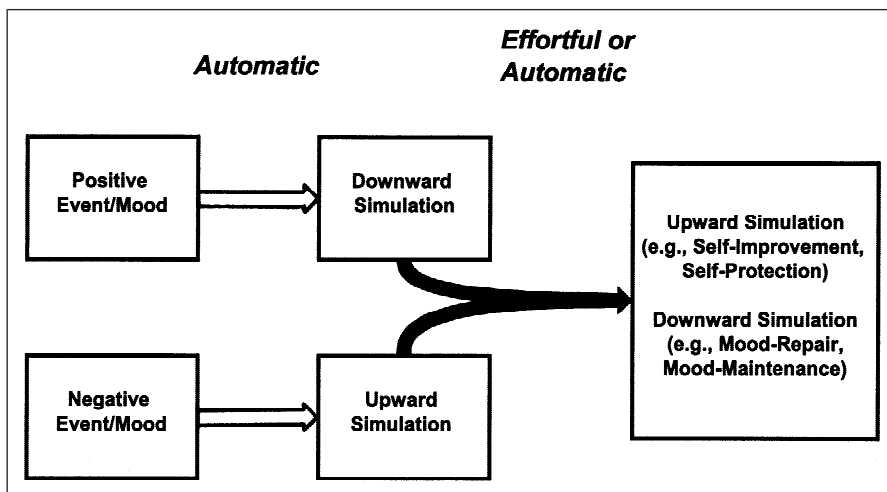


Fig. 1. Possible automatic and effortful influences on mental simulations. The white arrows represent automatically activated mental simulations; the black arrow represents mental simulations that could be effortful (if mental simulations suggested by motives are inconsistent with those automatically activated) or automatic (if mental simulations suggested by motives are consistent with those automatically activated).

lations? Does personality lead to mental simulations, which then produce certain mood states? Or is personality actually the result of particular moods and mental simulations? These are interesting questions, and may provide a basis for further understanding the relations between personality and emotion (Rusting, 1998) more generally. During such research, no doubt the relevance of other self-motives in addition to self-improvement and self-enhancement will become apparent (Sedikides & Strube, 1997), as will the relevance of other types of mental simulations.

Recommended Reading

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Notes

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2. These thoughts are called prefactual because they are mentally simulated alternatives that occur prior to outcomes (e.g., Sanna, 1996), and hence are “before” the “fact.”

3. A related characteristic is depression. Depressives share many commonalities with pessimists, and thus may engage in similar mental simulations. However, it may be that clinically depressed people assimilate downward simulations and contrast upward simulations, and in addition believe they have no control over their outcomes. Assessing patterns of mental simulation associated with individual differences such as pessimism and depression may present a particularly interesting way for future researchers to attempt to disentangle these two characteristics.

4. I do not mean to imply that every individual difference must be associated with a completely unique pattern of mental simulations for the framework to be useful. There is a huge literature that already indicates many personality measures are correlated. However, it is possible to speculate that one fruitful method for uncovering the commonalities and differences among various personality types, which have not always been well differentiated in the existing literature, is assessing particular patterns of mental simulations.

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