



Simulation does not just inform choice, it changes choice

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Abstract

Simulation – imagining future events – plays a role in decision-making. In Conviction Narrative Theory, people's emotional responses to their simulations inform their choices. Yet imagining one possible future also increases its plausibility and accessibility relative to other futures. We propose that the act of simulation, in addition to affective evaluation, drives people to choose in accordance with their simulations.

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According to Conviction Narrative Theory (CNT), simulating imagined futures allows people to assess how they feel about those futures. These feelings, in turn, inform people's decisions about which future to ultimately pursue. In this account, people simulate by extending the most plausible narrative account of the present into the imagined future. They then use their emotional response – the output of the simulation process – to decide whether to approach or avoid that future (target article). The key here is that the affective evaluation of the simulation drives people's actions: people choose to act in line with imagined futures they feel good about. While we agree that this is one way simulation can affect decision-making, we propose that simulation does more than just give people information about how they feel about their possible choices. We extend the CNT account by considering how the act of simulation itself can *change* choice.

A growing body of experimental literature finds that simulating a specific event amplifies the perceived likelihood of that event. For example, after a person simulates contracting a disease, they think it is more likely they will get that disease in the future (Sherman, Cialdini, Schwartzman, & Reynolds, 1985); the easier the symptoms are to imagine, the more people perceive the disease as likely. The effects of simulation also accumulate with repetition. For example, as people imagine a social interaction over and over, the event seems more and more plausible (Schacter, Benoit, De Brigard, & Szpunar, 2015; Szpunar & Schacter, 2013). This amplification of plausibility occurs after simulating both good and bad interactions, suggesting that one's affective readout of a simulation may occur independently of these consequences. Simulation even has the power to change people's perceptions of the past, convincing them that they experienced imagined past events (Garry, Manning, Loftus, & Sherman, 1996). Together, these findings suggest that simulation increases the plausibility of simulated events, even when it doesn't make the event feel more affectively palatable. It is as if simulating an event paves the way for people to think about the event as real, whether or not they want it to happen.

Simulating one possible future can also block the path to alternative futures. Research on memory has shown that recalling one piece of information can make people forget related information – a phenomenon known as retrieval-induced forgetting (Anderson, Bjork, & Bjork, 1994). For example, if a person studies a list of fruits and then selectively practices apples and grapes, they become less likely to remember oranges or pears later. This suppression can occur during decision-making as well: if people generate detailed evidence supporting one option, it later becomes harder to come up with support for alternative options (Iglesias-Parro & Gómez-Ariza, 2006; Ting & Wallsten, 2011; Weber & Johnson, 2011). Like remembering, mental imagery can induce forgetting (Saunders, Fernandes, & Kosnes, 2009). Simulation may inadvertently narrow people's options by inhibiting the accessibility of non-simulated futures.

Simulation is clearly more than just a passive way to read out affective responses to choice options. By making the imagined future more concrete and blocking the path to other options, simulation paves the way for a person to walk down the simulated path. Indeed, simulation has the power to shift actual behavior such that people become more likely to enact the simulated future: After people simulate helping another person, they become more likely to *actually* engage in prosocial behavior (Gaesser, Shimura, & Cikara, 2020). After people simulate making one choice among several, they become more likely to *actually* pursue that choice (Enz & Tamir, in prep). For example, in controlled lab scenarios, when presented with two snacks to eat, people are more likely to choose the snack that they were randomly assigned to simulate; when presented with two videos to watch, people are more likely to choose the video that they were randomly assigned to simulate. This shift in choice behavior occurs even when people initially like both options equally. This finding translates to consequential decisions outside of the lab, as well. After people simulate an option for an upcoming decision from their own life, they become more likely to choose the option they simulated and less likely to choose any options they did not simulate.

The choice-promoting influence of simulation feeds a positive feedback loop, since people are more likely to simulate options they are initially more likely to choose (Enz & Tamir, in prep). Several lines of work have shown that people begin a decision-making process by considering the most plausible options. For example, people often start with options that reflect the status quo (Weber & Johnson, 2011); options that are valued, moral, or practical (Morris, Phillips, Huang, & Cushman, 2021; Phillips, Morris, & Cushman, 2019); or options that have worked for them in the past (Klein, 1993, 2005). Simulating these already promising options makes them seem even more attractive, further increasing their likelihood of being simulated, and ultimately chosen. This simulation-induced cognitive feedback loop could help to explain how people become more convinced of their narratives and corresponding imagined futures over time.

Rather than merely providing a route to affective evaluation, we propose that the act of simulation has the power to change one's choices. Importantly, simulation can change choices *independent* of affect. The cognitive effects of simulation increase the likelihood that a person will choose the future they simulate not only because they feel good about that imagined future, but because it becomes the easiest future to imagine and pursue.

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Competing interest

None.

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