Demystifying priming
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Throughout the recent controversy surrounding social psychology’s priming literature, critics of these findings have suggested that the effects are ‘magic’ and based on untenable mechanisms. Here, we demonstrate how the Situated Inference Model [1] demystifies priming. Using the model, we describe how surprising and illogical priming effects can actually emerge from a simple mechanism that generally produces adaptive behavior. In addition, we highlight how this mechanism is based on a set of well-established cognitive processes, fundamental psychological principles that have been documented across many of the field’s sub-disciplines. After outlining the model and elaborating on the pervasive role of these core processes, we describe the model’s primary contributions, including its ability to guide paradigm creation. We conclude by describing recent data that supports the model, focusing on a robust within-subjects task that produces highly replicable behavioral priming effects.

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To many people social psychology’s priming literature has felt like a series of clever magic tricks. That participants walked more slowly after being exposed to information about the elderly [2] seemed to some like an interesting effect, but one whose purported mechanism was so untenable that the results simply must have been ‘cooked’ [3]. That these studies garnered so much attention in the media and popular press [4–6] was additional evidence that the effects were more parlor trick than serious science. The purpose of the current work is to join these efforts to remove the magic from social psychology’s priming literature (see also [77]). In doing so, however, we do not seek to disprove the effects. Instead, we hope to show how a routine set of well-established cognitive processes can be used to account for these surprising outcomes. Summarized by the Situated Inference Model, our theoretical perspective helps illustrate how a logical and adaptive set of processes can allow simple changes in accessibility to produce seemingly illogical changes in judgment, behavior, and motivation, and account for the incredible amount of variability in the size and direction of priming effects.

Part I: model overview

According to the Situated Inference Model [1,8], priming occurs through a three-step process (see Figure 1). First, the stimuli to which we are exposed make related information more accessible. This newly accessible content then has the ability to alter our judgment and behavior to the extent that we mistakenly believe it has emerged from our reaction toward some other object [9]. Once this source monitoring error has occurred and the mental content made accessible by priming is incorrectly attributed to another target, it then serves as a source of information for judgment and decision making about that object [10]. Because this is merely one source of information about that target, the cumulative effect of this misattribution error will depend greatly on the situation. This process can cause the exact same accessibility to produce very different effects if misattributed to unique targets [11,12] or if viewed as particularly relevant (or irrelevant) for one’s decisions about that object [13].

As an example, imagine that you are walking down a dark street. If a person emerges in the distance, this begins a sense-making process in which you seek to form an understanding of that person and predict his or her subsequent behavior. This is a constant and obligatory process that operates at both conscious and nonconscious levels [14,15]. If information about hostility and aggression is highly accessible while forming an impression of this person, then you will tend to infer that they are a threat and should be avoided or attacked [16]. In short, the mind uses accessible information as evidence for deciding who the person is and how they might behave.

Critically, there are a number of reasons why this mental content might be accessible. Perhaps the person was engaged in an aggressive action (e.g. brandishing a weapon). Here, the information brought to mind by the individual’s behavior produces a logical and adaptive change in person perception. Alternatively, the same content could be accessible, but it might have been cued by a stimulus less directly related to the individual’s behavior. Perhaps they simply possessed a physical characteristic stereotypically associated with threat and hostility (e.g. African American skin tone and features; [17]). Even though the person has not engaged in any aggressive
actions, the same inference process can create an identical outcome. Finally, the change in accessibility could be caused by a completely unrelated event [18]. If, for example, you had watched a horror movie before stepping outside, information about hostility and aggression would be highly accessible. To the extent that you mistakenly attribute this content to the person in the distance rather than the movie, then the same inference will be made and behavior will change accordingly. Produced by a misattribution error, the end result of this process is a quintessential social psychological priming effect [19]; a stimulus logically unrelated to the target of judgment has changed behavior in a systematically biased manner. Although this outcome might seem like ‘magic,’ the effect actually emerges from a very basic decision-making process. The mind uses highly accessible information to inform judgment and behavior, but can err in identifying what events actually influenced the accessibility of mental content.

Critically, despite the deliberative tone of the above process, the model argues that this attribution-based mechanism can operate both consciously and nonconsciously (cf. [20]). Misattribution errors inherently involve a lack of awareness because the consciously perceived source is different from the true source; that is what makes it a misattribution. In addition, there is substantial evidence that even highly complex attributional inferences can occur outside of conscious awareness [15,21].

**Part II: core principles**

The Situated Inference Model is based on a small set of core principles that apply across areas of psychology. The first, that stimuli in the environment (i.e., primes) make related information more highly accessible, is one of the most basic tenets of the field. This is an automatic memory processes by which our past learning history impacts current behavior [22]. Because we also use accessible information to define the objects of perception, the same object or situation can be construed very differently depending upon one’s currently accessible thoughts and feelings [23–25].

The second key hypothesis of the model is that priming effects emerge because this process of using accessible information to come to decisions about the world is a fallible one. Specifically, because a huge number of stimuli (of both internal and external origin) are constantly changing the accessibility of mental content, it is difficult for the mind to track these cause and effect relationships [26]. This has been well-documented throughout psychology, leading to the implication of source monitoring and misattribution in countless effects. Among others, this includes accounts of short-term associative priming [27], memory illusions [28], emotion formation [29,30], sexual attraction [31], attitude formation [32,33], attitude change [34], free will [35], and schizophrenic symptomology [36]. The Situated Inference Model extends this work to describe how the same misattribution process can cause a prime to mistakenly influence judgment and behavior toward an unrelated target.

The final core component of the model is our proposition that misattributed content is used as information in a decision making processes focused on the target of judgment. Unlike perspectives that argue for some default or
fixed effect of the prime, this suggests that the information made accessible by priming drives an inference process in which it is used as evidence for target-related judgments. Again, this is highly consistent with the inferential processes proposed in other areas, ranging from basic theories of perception [37,38], to social psychological attribution theory [39], to more recent perspectives on judgment and decision making [40–43]. Across these varied domains, it has been shown that people come to understand the world by using accessible cues as evidence for an inference-based decision making process.

**Part III: model contributions**

To date, the Situated Inference Model has made a number of key contributions to the priming literature. First, the model suggests that the influence of primes on judgment, behavior, and motivation can all be accounted for by the same mechanisms. Although researchers have generated separate models for each type of effect, the Situated Inference Model argues that the same prime-induced accessibility can differentially produce these outcomes when used as evidence for different types of decisions (see Figure 1). Thus, according to the model, the disparate literatures surrounding these three priming outcomes can all be understood within one general framework, suggesting that moderators identified in one domain may apply in others as well.

Second, the model parsimoniously accounts for a wide array of moderators identified across these different priming effects. Any variable that affects the degree of confusability between a primed construct and a target of judgment, influences the perceived validity or relevance of accessible content, or alters the target of focus and the basic question it affords will impact the type and size of effect produced by a priming manipulation (for elaboration see [1], pp. 240–247).

Finally, the model offers a formula for building more robust priming paradigms. Recently, we have used these principles to create a behavioral priming task in which participants make bet or pass decisions in a blackjack-inspired card game. After subjects see their hand on each trial, they are primed with a word related to the response options (i.e. bet, gamble, wager, pass, fold, and stay). Critically, the paradigm was designed to tightly control the key variables outlined by the Situated Inference Model. Thus, we constrain the question on which participants focus, directly asking them to decide ‘Do I bet or pass?’ on every trial, ensuring that the primes provide a relevant answer that can be easily misattributed to participants’ thoughts about how to behave.

Unlike most other behavioral priming paradigms [44*], this task repeatedly measures behavior by using 80 individual betting trials. This increases power over designs using traditional ‘single-shot’ dependent measures and allows us to use a within-subjects manipulation, presenting a new prime on every trial. This paradigm links the processes posited by the Situated Inference Model to explain behavior priming with the robust priming effects commonly observed using these within-subjects tasks, such as weapon bias [45] and other sequential priming effects (for review see [46]). Together, these features combine to produce a highly reliable behavioral priming effect, one that has been replicated across multiple samples with approximately 1000 total participants [47]. If primes reliably affect behavior when rigorous methods are used, then it suggests that variability in the outcomes of priming experiments should be explained by looking at the methods, rather than dismissing the phenomenon.

**Conclusion**

Like those who currently question social psychology’s priming literature (cf. [48]), we originally came to this area of research as skeptics. The Situated Inference Model emerged from our efforts to understand how the priming effects that captured so many people’s interest might be produced by a mechanism grounded in well-established, non-controversial, cognitive processes. As highlighted above, this model takes a simple set of core psychological processes that have been documented across areas of psychology and uses them to describe how a logical and adaptive process can go awry and create these surprising and illogical outcomes. To date we have produced empirical evidence for many of the key processes proposed by the model and have recently used the model to design a new, highly replicable within-subjects behavioral priming paradigm that others can use in their own labs to explore the effect. Like any human experience, however, priming is probably multiply determined, and there may well be mechanisms beyond those captured in our model. Nonetheless, we hope that the Situated Inference Model and the robust paradigm it has inspired help to demystify social psychology’s priming literature and can begin moving us beyond arguments about the veracity of the phenomenon and into debates about the processes and boundary conditions of these effects.

**Conflict of interest statement**

Nothing declared.

**References and recommended reading**

Papers of particular interest, published within the period of review, have been highlighted as:

- of special interest
- of outstanding interest


7. Molden DC: Understanding Priming Effects in Social Psychology. • New York, NY: Guildford Publications; 2014. Provides a comprehensive review of priming research. Sixteen chapters detail the many different types of priming effects that have emerged within social psychology’s literature and outline a variety of different models to account for these effects.

8. Loersch C, Payne BK: Situated inferences and the what, who, and where of priming. Soc Cognit 2014, 32:137-151 http://dx.doi.org/10.1521/scoc.2014.32.2_sup1.137 Understanding Priming Effects on Social Psychology. Further describes the Situated Inference Model, discussing how it effectively organizes the many moderators identified in previous priming studies, summarizing research that explicitly tests the model’s proposed mechanisms, and discussing the perspective’s implications for debates regarding the replicability of priming effects.


A meta-analysis of behavioral priming research. Provides an estimate of the average effect size (small but reliable), a thorough analysis of various moderators of the effect, and an examination of the amount of publication bias present in the literature.


Reviews research on judgment and decision making (including priming research) and suggests that all work supporting the operation of non-conscious processes is flawed, either because of improper experimentation or logical errors in argumentation. Interested readers should also examine the articles’ associated commentaries.