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Memory for nonoccurrences: The role of metacognition[☆]

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Abstract

How do we know that an event did not happen? An intuitively appealing account is that individuals use the perceived memorability of an event, in conjunction with failure to retrieve any information about that event, to infer the event's nonoccurrence: If an event is expected to be remembered, yet no memory for it can be identified, then the event must not have happened. Evidence consistent with this proposal was obtained in two experiments. Experiment 1 showed that correct rejection was affected by item salience (i.e., memorability), and that item salience interacted with a retrieval manipulation intended to differentially influence correct rejection of high- versus low-salience items. Experiment 2 extended these findings by showing age differences in the effect of salience, consistent with the hypothesis that the strategic use of event memorability may develop with age.

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Have you had a manuscript rejected for publication in the past two years? Assuming that you have not, how did you determine that the correct answer to that question is “No”? You may, perhaps, have decided that you never had that experience after you conducted a memory search and failed to retrieve any relevant information. It is commonplace, however, to fail to retrieve information from memory, not because of lack of experience, but because of forgetting. Thus, the simple absence of a “positive memory” (i.e., memory that an event was experienced) may not provide a sufficient basis for rejection of an event occurrence.

The importance of inferences, expectations, and, more generally, decision processes for the rejection of nonoccurrences has often been emphasized (e.g., Brown, Lewis, & Monk, 1977; Dodson & Schacter, 2001; Gentner & Collins, 1981; Schacter, Cendan, Dodson, & Clifford, 2001; Thompson, 1982). In the late 1970s, Brown and his colleagues proposed that “negative memory” (i.e., memory that an event was never experienced) is observed when individuals have the expectation that if an event occurred, they would remember it (Brown et al., 1977). Thus, if you expected to remember the rejection of one of your manuscripts, and you fail to remember anything about such an occurrence, you would conclude that this event did not happen.

More recently, Strack and Bless (1994) further developed Brown et al.'s hypothesis. They proposed that individuals implement two inferential strategies (heuristics) to decide whether or not they experienced an event. The first strategy is called the *metacognitive strategy*. This strategy leads to confident rejection of an event experience when two conditions exist: (1) Individuals evaluate an event as memorable; and (2) they fail

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to retrieve any feature of the event from memory. Because the memory search yielded no result, individuals conclude that the event did not occur.

Additionally, Strack and Bless proposed that when an event judged as non-memorable cannot be retrieved from memory, individuals may infer that the event was forgotten, rather than inferring that it did not occur. Strack and Bless called this inferential process the *presuppositional strategy* because, in the absence of a clear recollection of a non-memorable event, individuals are thought to presuppose that the event actually occurred (but was forgotten). Strack and Bless hypothesized that the *presuppositional strategy* is particularly likely to be implemented when non-memorable events that cannot be retrieved were supposedly encoded under conditions that could impair later retention (e.g., encoding in the presence of a noise). The *presuppositional strategy* is also likely to be used when individuals attempt to retrieve a memory under conditions that encourage high endorsement rates (e.g., suggestion from others that the event occurred). In contrast, such encoding and retrieval conditions are not hypothesized by Strack and Bless to affect rejection of highly salient (and memorable) events because, in this case, individuals are believed to rely more heavily on the salience of the event to support their decisions. Thus, information about the encoding and retrieval conditions of memorable events may be disregarded. Overall, then, Strack and Bless imply that memorability judgments may be based on variables that are either intrinsic (i.e., event salience) or extrinsic to the event (i.e., encoding and retrieval conditions), but that, to determine event occurrence, extrinsic variables will play a secondary role when an event is considered intrinsically memorable.

To test their hypotheses, Strack and Bless manipulated event salience, encoding, and retrieval conditions. The authors manipulated event salience by having participants study two types of stimuli: Non-salient (i.e., low-memorability) pictures were over represented (i.e., 25 out of 29), and they all represented tools (e.g., a hammer); Salient (high-memorability) pictures were less numerous (i.e., 4 out of 29) and varied across semantic categories (e.g., a book, a flower). It was hypothesized that during a recognition test individuals would be more likely to reject salient distracters than non-salient distracters (e.g., “Did you see a shoe?”), reflecting the use of the metacognitive strategy.

Encoding and retrieval manipulations were used to investigate the presuppositional strategy in addition to the metacognitive strategy. Encoding was manipulated as follows: Individuals saw pictures either in the presence of loud noise or in a quiet environment (Experiment 1); or they saw pictures for approximately 2 s or for .04 s (Experiment 2). The encoding manipulation allowed Strack and Bless to examine whether studying material under less favorable conditions would dispropor-

tionately increase endorsement of non-memorable distracters compared to memorable distracters.

Retrieval was manipulated by having participants interviewed in an objective manner (e.g., “Did you see *a* hammer?”) or in one that was mildly suggestive (e.g., “Did you see *the* hammer?”). In previous studies, this manipulation typically results in higher numbers of affirmative responses for non-studied material when the definite article is used than when the indefinite article is used (e.g., Loftus, 1975; Loftus, Miller, & Burns, 1978). The aim of the retrieval manipulation was to establish whether individuals would be more likely to be persuaded that non-memorable events occurred if they received information alluding to the occurrence of that event.

Consistent with the use of the metacognitive strategy, Strack and Bless found that the salient (i.e., memorable) distracters were always rejected, and were rejected more confidently than non-salient distracters, regardless of the encoding and retrieval conditions. Less favorable encoding conditions and mildly suggestive questioning produced false alarms only when participants were asked about non-salient distracters. Also, encoding and retrieval conditions interacted with item-type, such that non-salient distracters were endorsed at the highest frequency when the material was studied in the presence of noise and retrieved in response to suggestive questions. Strack and Bless interpreted these findings as the result of implementing the presuppositional strategy: When the lack of memory could not be heuristically attributed to lack of occurrence, individuals were likely to attribute lack of memory to forgetting, thus inferring that they experienced the non-salient distracters.

Despite evidence suggesting that memorability may be used to reject nonoccurrences (Brown et al., 1977; Guttentag & Carroll, 1998; Strack & Bless, 1994; Thompson, 1982), such an account has often been challenged (e.g., Greene & Thapar, 1994; Wixted, 1992). For example, Wixted (1992) conducted a series of experiments to test the memorability account for the typical finding that hit rates are higher and false alarm rates lower to low-frequency compared to high-frequency words (i.e., mirror effect). That is, low-frequency words may be better recognized because they are judged to be more memorable. Participants were asked: (1) to pretend that a series of words differing in frequency had been studied, and then (2) to judge how memorable these words would be if memory for them was tested with a recognition task. Contrary to the memorability hypothesis, high-frequency words were attributed higher memorability scores. Similar findings were obtained even when participants were trained to assess word frequency before evaluating word memorability (Greene & Thapar, 1994).

Although these results seem to challenge the memorability hypothesis, it is important to note that in both

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