The long-term consequences of correctly rejecting and falsely accepting target-related foils in visual recognition memory

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Abstract

People often falsely recognize items that resemble previously encountered items, particularly when the original items are not offered as response options during a recognition test. The present study examined how falsely recognizing versus correctly rejecting target-related foils in an initial recognition test affects target identification in a second, delayed recognition test. In three experiments, subjects first encoded a large set of target images, and then participated in two recognition tests that were separated by 48 h. Experiment 1 revealed that false recognitions of target-related foils in Test 1 did not negatively affect target identifications in Test 2. Surprisingly, however, correct rejections of target-related foils in Test 1 were associated with increased target misses at Test 2. Two follow-up experiments examined possible mechanisms for the increased target misses after correct rejections. Experiment 2 determined that correct rejections in Test 1 did not lead to enhanced foil memory that might have blocked access to memory for target details in Test 2. Experiment 3 showed that target misses persisted when the second recognition test did not involve any comparative judgments and therefore mismatched the format of the first recognition test. Taken together, these findings suggest that subjects can easily recover from false recognitions when provided with the necessary retrieval cues; yet, initial correct rejections bias later memory responses toward rejection, such that over time, rejections generalize to targets.

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1. Introduction

Long-term memory appears to have a seemingly unlimited storage capacity for visual detail (Brady, Konkle, Alvarez, & Oliva, 2008; Konkle, Brady, Alvarez, & Oliva, 2010; Standing, 1973; but see Cunningham, Yassa, & Egeth, 2015). For instance, after viewing 2,500 images, people can differentiate old from new images with high fidelity even when these items represent exemplars of the same basic-level category or when they differ only in state or orientation (Brady et al., 2008). Paradoxically, however, other studies have reported that people often falsely recognize images that are conceptually or perceptually similar to previously encountered images, a phenomenon called gist-based false recognition (e.g., Koutstaal & Schacter, 1997; Koutstaal, 2006). Guerin, Robbins, Gilmore, and Schacter (2012) attempted to resolve this paradox by differentiating the conditions that promote correct recognition from the conditions that foster gist-based false recognition. After encoding 144 target images, subjects were presented with triplets of images and were asked to select the target image (if present) or to
reject all images. In one of the conditions, the triplet consisted of a target image and two foils, one similar to the target (an exemplar from the same category that shared a common verbal label) and one unrelated to it. Replicating Brady et al. (2008), recognition was excellent in this condition. In the critical condition, target images were omitted, and test triplets consisted of foils only, one related and two unrelated to the target. In this condition, related foils were often falsely recognized. Thus, the absence of target images is the critical condition promoting false recognition of target-related foils. Furthermore, Guerin et al. found that it is not attention to detail per se, but specifically the reinstatement of target details that prevents false recognition. These findings suggest that gist-based false recognition does not reflect a failure to encode or store sufficient detail as had been previously posited (Schacter, Norman, & Koutstaal, 1998; Brainerd & Reyna, 2002); rather, people have difficulties accessing the stored details unless they are given strong retrieval cues in the form of the previously encoded target images.

The purpose of the present study was to examine how initial testing, particularly under conditions that foster gist-based false recognition, affects delayed target recognition. We replicated the exact design of Guerin et al.’s (2012) study; that is, subjects encoded a large set of target images and then underwent an initial recognition test, with the critical condition presenting target-related foils without corresponding targets to induce gist-based false recognition. Crucially, we added a second delayed recognition test in which we presented target images alongside new (i.e., not previously presented) target-related foils. With this delayed recognition test we aimed to assess the long-term consequences of correct rejections vs. gist-based false recognitions. If gist-based false recognition during Test 1 reflects retrieval difficulties in accessing the stored visual details of target images (cf., Guerin et al., 2012), then people should be able to “restore” from prior false identifications if a subsequent recognition test re-introduces target images as a response option. This recovery should be particularly easy if the second memory test is not complicated by source discrimination decisions; that is, if the target-related foils from Test 1 are not repeated at Test 2 (modified recognition test, McCloskey & Zaragoza, 1985a).

On the other hand, one could conceptualize target-related foils at Test 1 as misleading post-event information, and a wealth of research has documented the detrimental effects of such misleading information on memory (e.g., Loftus, Miller, & Burns, 1978; for a review see Loftus, 2005). While most research has focused on false recall or recognition of misleading information, other studies have documented misinformation interference: that is, impaired memory for the original information after exposure to misleading post-event information (e.g., Bell, 1989; Chan & LaPaglia, 2013; Tversky & Tuchin, 1989; but see McCloskey & Zaragoza, 1985a, 1985b). For the Guerin et al. (2012) paradigm, these findings could imply that the presentation of target-related foils at Test 1 negatively affects recognition of the corresponding target images at Test 2. However, it is important to note that in studies of the misinformation effect, the misleading nature of post-event details is deliberately concealed, whereas in Guerin et al.’s study, subjects were explicitly warned that some of the foils will resemble targets very closely and were advised to make careful decisions. Therefore, the effect of foil exposure on the later retrieval of corresponding target images might differ depending on whether foils were falsely accepted or correctly rejected in the initial memory test. Target recognition at Test 2 might suffer only if target-related foils were falsely recognized at Test 1. This hypothesis receives some preliminary support from two separate lines of research.

First, in the context of police lineups, it has been shown that pre-lineup exposure to photographs of people resembling the perpetrator can negatively affect lineup accuracy (for a meta-analysis, see Dellenbacker, Bornstein, & Penrod, 2006), unless the perpetrator was among the photographed and was correctly identified (Godfrey & Clark, 2010; Lindsay, Nosworthy, Martin, & Martynuck, 1994). Witnesses who falsely identify an innocent person from a photograph tend to commit to their initial selection (Goodsell, Neuschatz, & Gronlund, 2009; Haw, Dickinson, & Meissner, 2007). This commitment goes as far as causing subjects to miss the perpetrator in a subsequent lineup even when the individual that corresponds to the previously chosen photograph is no longer available as a choice (Goodsell et al., 2009). This scenario conceptually maps onto our critical condition in which target-related foils are presented without corresponding targets in Test 1, similar to the condition in which photographs resembling the perpetrator are presented, but the perpetrator is omitted, and one of these photographs is mistakenly chosen (i.e., gist-based false recognition). In Test 2, targets but not the target-related foils from Test 1 are presented as response alternatives, similar to lineups in which the perpetrator but not the person that was incorrectly identified from the photograph are present. If gist-based false recognition in Guerin et al.’s paradigm induces a “commitment” process similar to that in lineup studies, then we should see increased target misses after gist-based false identifications.

Moreover, it has been shown that the specific retrieval orientation that people adopt in an initial test affects subsequent recognition. In a study by Koutstaal and Cavendish (2006), subjects encoded a large set of images and then participated in an initial old/new recognition test in which they were instructed to adopt a particular retrieval orientation. In the gist-based retrieval orientation, subjects were asked to respond ‘old’ to items that were either identical or conceptually or perceptually similar to encoded items. In the item-specific retrieval orientation, a response of ‘old’ was reserved for items that exactly matched the encoded items. After the initial recognition test, recognition of encoded but previously non-tested items was assessed. The prior adoption of the gist-based in comparison to the item-specific retrieval orientation impaired both item-specific and conceptual recognition. Although Guerin et al. (2012) encouraged an item-specific retrieval orientation, gist-based false recognitions to target-related foils suggest a failure to utilize this orientation. Therefore, false recognitions in Test 1 could have negative consequences for subsequent target recognition.

Taken together, encountering target-related foils could influence subsequent target recognition in various ways. If sufficient perceptual detail is stored in memory (e.g., Brady et al., 2008), and if gist-based false recognition in Test 1 reflects a difficulty retrieving those details (Guerin et al., 2012), then providing the visual details in Test 2 should “restore” target
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