



Veridical and false memory for text: A multiprocess analysis [☆]

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Abstract

People report recognizing discourse inferences at rates that approach target acceptance. Brainerd et al. [Brainerd, C. J., Wright, R., Reyna, V. F., & Mojardin, A. H. (2001). Conjoint recognition and phantom recollection. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 27, 307–329] proposed that memory retrieval in contexts associated with very high levels of false memory involve a process of illusory recollection which complements the impact of recollection and familiarity [Jacoby, L. L. (1991). A process dissociation framework: Separating automatic from intentional uses of memory. *Journal of Memory and Language*, 30, 513–541]. Experiments were conducted to compare three multiprocess models of text retrieval: A three-process “phantom recollection” model; and two dual-process models, respectively lacking mechanisms of veridical recollection and phantom recollection. Participants read lists of brief texts and then evaluated explicit, implicit, and foil memory probes. Different participant groups were instructed to use verbatim, verbatim plus gist, or gist-only memory-criteria. Multinomial processing tree analysis indicated that both immediate and delayed testing require the involvement of phantom recollection (Experiments 1 and 2, respectively). When the participant’s extraction of text meaning is impaired, a dual-process model is adequate to fit the data (Experiment 3).

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Introduction

It is well-established that people report recognizing discourse inferences at rates that approach target acceptance (Johnson, Bransford, & Solomon, 1973; Singer, 1979). These observations promoted programmatic

research concerning the processing and representation of inferences in language comprehension (see Singer, 2007b, for a review). Particularly striking have been findings that certain discourse inferences are, according to various measures, indistinguishable from explicit text ideas. These outcomes have characterized both coherence-preserving inferences (e.g., Keenan & Kintsch, 1974; Potts, Keenan, & Golding, 1988; Singer, 1980) and strongly constrained elaborative inferences (e.g., Garrod, O’Brien, Morris, & Rayner, 1990; McKoon & Ratcliff, 1988; O’Brien, Shank, Myers, & Rayner, 1988; Whitney, 1986).

In spite of these similar acceptance rates of explicit and implicit text ideas, there are reasons to expect repre-

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sentational differences between the two. Schmalhofer, McDaniel, and Keefe (2002) proposed that whereas explicit ideas find expression at the surface, propositional (“textbase”), and situational levels of discourse representation, implicit ideas may be constructed predominantly in the situation model (see also van Dijk & Kintsch, 1983). In this regard, investigators have begun to explore the contributions of different memory processes to text retrieval. For example, McDermott and Chan (2006) had younger and older participants study sentences such as *The karate champion hit the cinder block*. The sentences were presented either once or three times. The probability of later falsely recognizing pragmatic inferences such as *The karate champion BROKE the cinder block* decreased in younger participants and increased in older participants with increased repetition of the corresponding study sentences.

McDermott and Chan (2006) interpreted these results within a dual-process framework. This framework holds that memory retrieval is supported by the familiarity of a test probe and by the recollective experience that one has previously encountered the probe (Jacoby, 1991). According to McDermott and Chan, repetition of study material increased both recollection and familiarity of the material. Thus, younger participants were better able to recollect thrice-presented than once-presented sentences upon encountering the associated test inferences, and therefore less likely to falsely recognize the former set of inferences (see also Brainerd, Reyna, & Estrada, 2006). In contrast, older participants were mainly influenced by the familiarity of the inferences, because of deficits in recollection. Familiarity was greater for inferences associated with thrice-presented than once-presented sentences, producing greater false recognition of the former set of inferences.

Thus, familiarity and recollection of studied material associated with implicit test probes appear to contribute to probe recognition. The recollection in question is *veridical*, in that it pertains to the reinstatement of studied material related to a test probe. Brainerd, Reyna, and Mojardin (1999) implemented familiarity and veridical recollection mechanisms in their conjoint recognition model. The model was able to account for people’s recognition of unstudied distractors that were related to studied words.

A remember-know study, in which participants indicate whether recognized probes were distinctly remembered or more vaguely “known,” suggested that another form of recollection might be involved in the recognition of inferences (Chan & McDermott, 2006). The participants studied sentences such as *The new baby stayed awake all night*, and then took a recognition test comprised of studied sentences and pragmatic inferences (e.g., *The new baby CRIED all night*). The proportion of acceptances eliciting remember responses was similar for hits (i.e., correct recognition of studied sentences) and

false alarms (i.e., false recognition of inferences). Chan and McDermott suggested that remember responses accompanying false alarms could be due either to the familiarity or to the *phantom recollection* of pragmatic inferences. Phantom recollection refers to a process of illusory recollection, distinct from recollection and familiarity, that contributes to the retrieval of distractors closely related in meaning to studied stimuli (Brainerd, Wright, Reyna, and Mojardin, 2001). Chan and McDermott proposed that it was difficult to determine the relative contributions to remember responses of familiarity versus phantom recollection.

We used the extended process-dissociation model (Buchner, Erdfelder, & Vaterrodt-Plunnecke, 1995) to directly assess the contributions of familiarity and phantom recollection to the recognition of bridging inferences: that is, ones that identify the interrelations among discourse ideas (Singer & Remillard, 2004). Inference recognition was accompanied by significant levels of phantom recollection, but very low levels of familiarity. There were, however, two limitations of our approach. First, the model had zero degrees of freedom. Although it was possible to assess the magnitude of the model parameters and to test hypotheses about them, it was not possible to evaluate the fit of the full model. Second, implicit recognition probes appeared as single words rather than more meaningful phrases, potentially underestimating the influences of familiarity and phantom recollection (Singer, 2007a).

The conjoint recognition model (Brainerd et al., 1999) and the process dissociation inference model (Singer & Remillard, 2004) both implement familiarity mechanisms. However, with regard to implicit test probes, the former posits only a veridical recollection mechanism and the latter posits only a phantom recollection mechanism. In contrast, the phantom recollection model (Brainerd et al., 2001) implemented both recollection mechanisms. The phantom recollection model provided a better fit to recognition data derived using the Deese–Roediger–McDermott (DRM) critical-lure paradigm (Deese, 1959; Roediger & McDermott, 1995) than did the conjoint recognition model. The DRM paradigm produced high levels of phantom recollection for critical lures and so the conjoint recognition model, lacking a phantom recollection mechanism, provided a poor fit to the data.

The present study had three goals. The first was to use the phantom recollection model to extract quantitative assessments of the contributions of recollection, familiarity, and phantom recollection to the recognition of inferences. The second goal was to compare the fits to the data of the phantom recollection model, the conjoint recognition model, and Singer and Remillard (2004) process dissociation inference model. The two limitations of Singer and Remillard (2004) that were noted earlier were overcome here. If recollection is an impor-

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