



Figure 1. An anatomically based model of cortical-medial temporal functional organization.

memories with each other and with the context in which they occur (Eichenbaum, 2004). Thus, recollection arises from bidirectional interactions between the hippocampus and parahippocampal areas, and perhaps throughout the entire cortical-hippocampal system.

From this perspective, the hierarchical organization and two-way interactions within the system are fully expected to intermix the contributions of several forms of implicit and explicit processing within everyday memory as well as formal tests of memory. So, in addition to studying the distinctions between these forms of memory processing, it may be as useful or more useful to examine further how they are integrated.

* * *

You can feel it all over: Many signals potentially contribute to feelings of familiarity

Jason R. Taylor and Richard N. Henson

MRC Cognition and Brain Sciences Unit,
Cambridge, UK

E-mail: jason.taylor@mrc-cbu.cam.ac.uk

<http://dx.doi.org/10.1080/17588928.2012.689966>

Abstract: Voss, Lucas, and Paller provide a thought-provoking summary of their recent research showing that neural effects which are often attributed to (explicit) feelings of familiarity can instead be attributed to the (implicit) effects of conceptual priming. Here, we discuss research

that shows effects of priming on (putative) behavioral and neural measures of familiarity, and consider a slightly different interpretation: That multiple neurocognitive processes can serve as signals to prior experience with a test item (i.e., can influence judgments of familiarity), and the set of signals that will be interpreted as familiarity depends on the experimental context.

Voss et al. review recent research showing that behavioral and neural effects that are typically attributed to “familiarity”, an explicit memory judgment, can instead be attributed to conceptual priming, an example of implicit memory. We are sympathetic to the view that the influence of implicit memory on direct tests of memory is often underestimated, particularly in relation to concurrent neuroimaging data. To underscore this point, we discuss some research that uses masked primes to influence the processing fluency of test cues in a recognition memory paradigm. Our interpretation of these effects differs in detail, if not in spirit, from that proposed by Voss et al.

As Voss et al. note, previous exposure to an item increases fluency of processing on subsequent encounters with the same item—a classic implicit memory effect. Although this increase in fluency due to prior exposure can influence participants’ performance without their awareness, such fluency could also contribute to feelings of familiarity and hence influence explicit memory judgments. Jacoby and Whitehouse (1989) found evidence for just this sort of effect: Repetition primes presented briefly immediately before recognition-memory test items increased the likelihood that participants would judge those items as “old”. The increased tendency to judge primed items as “old” occurred even for items that had not been previously

This work was supported by the UK Medical Research Council (MC_A060_5PR10)

© 2012 Medical Research Council

studied, suggesting that processing fluency was being (mis)attributed to memory. Subsequent studies have found that this fluency manipulation selectively increases “Know” and not “Remember” responses, suggesting that fluency is interpreted as familiarity (Rajaram, 1993; Woollams, Taylor, Karayanidis, & Henson, 2008).

The finding that processing fluency can influence familiarity underscores Voss et al.’s warning that the contribution of implicit memory processes must be considered before conclusions about putative measures of explicit memory are drawn. However, not all such measures of explicit memory can be entirely explained by priming: In an ERP version of the Jacoby-Whitehouse paradigm, we found that effects of priming and of familiarity occurred in the same time-window (300–500ms), but had different topographical distributions over sensors, indicating that their neural sources were not identical (Woollams et al., 2008). This dissociation between ERP effects of repetition priming and of familiarity is perhaps unsurprising since, as Voss et al. point out, familiarity is a catch-all category, operationally defined as recognition without retrieval of context. Prior exposure to an item might increase fluency at any level of processing—perceptual, lexical, conceptual, etc.—each subserved by different neural sources (which may be difficult to distinguish with EEG), and each with the potential to serve as a valid signal of familiarity (e.g., conceptual priming has also been claimed to increase familiarity, Rajaram & Geraci, 2000; though see Taylor, Buratto, & Henson, submitted). The short stimulus onset asynchrony (SOA) masked repetition priming used by Woollams et al. likely emphasized perceptual fluency, which may have only been one of multiple neural signals that contributed to familiarity.

A second likely source of differences between ERP effects of priming and familiarity is the fluency-attribution heuristic itself, or in Voss et al.’s terms, the mechanism by which the memory *process* comes to be interpreted as a memory *experience*. This attribution mechanism appears to be under conscious control: Participants are able to discount fluency arising from obvious non-mnemonic sources, such as when repetition primes are clearly visible, resulting in a reversal of the effect of priming on memory (Jacoby & Whitehouse, 1989). Indeed, whether and how any one type of fluency is used as a memory signal may depend on the broader experimental context, such as the type of information emphasized by the explicit memory

instructions (retrieval orientation), or the presence of other sources of fluency. For example, masked conceptual primes increase correct “remember” responses, but only when repetition primes are also present in the experiment (Taylor & Henson, in press).

In summary, we agree with Voss et al.’s general position that a closer look at the memory *experience* of familiarity can reveal the action of underlying implicit memory *processing*. Evidence from a recognition memory paradigm in which test-cue processing fluency is manipulated by priming suggests that fluency at multiple levels of processing can signal that an item has been encountered previously. Future work is needed to identify the circumstances that determine which set of fluency signals will be attributed to memory in any given experimental context.

* * *

On the contribution of unconscious processes to recognition memory

Anne M. Cleary

Colorado State University, Department of Psychology, Fort Collins, CO, USA
E-mail: Anne.Cleary@colostate.edu

<http://dx.doi.org/10.1080/17588928.2012.689965>

Abstract: Voss et al. review work showing unconscious contributions to recognition memory. An electrophysiological effect, the N300, appears to signify an unconscious recognition process. Whether such unconscious recognition requires highly specific experimental circumstances or can occur in typical types of recognition testing situations has remained a question. The fact that the N300 has also been shown to be the sole electrophysiological correlate of the recognition-without-identification effect that occurs with visual word fragments suggests that unconscious processes may contribute to a wider range of recognition testing situations than those originally investigated by Voss and colleagues. Some implications of this possibility are discussed.

Voss, Lucas and Paller review work showing unconscious contributions to recognition memory (e.g., Voss & Paller, 2009a). As they note, the