Recognition with and without identification: Dissociative effects of meaningful encoding

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In a series of four experiments, the effects of levels of processing and generation on the recognition of identified versus unidentified word fragments were examined. After studying a list of words, participants took a word fragment completion test in which half of the fragments came from studied words and half came from nonstudied words. Regardless of whether they could complete a given fragment, the participants were asked to rate the likelihood that it came from a studied word. Recognition of identified fragments was best whenever the focus of the encoding task was on meaning. Recognition of unidentified fragments did not benefit from meaningful encoding in any of the experiments reported here but did benefit from generation. It is suggested that whereas recognition with identification involves the use of meaning, recognition without identification involves the use of abstract orthographic information in memory.

Episodic memory is often described in terms of the distinction between conceptually driven and data-driven processes. Memory for an event is frequently said to be either primarily data driven (driven by a sensory record of the original event) or primarily conceptually driven (driven by preexisting knowledge about the meaning of the event). This conception stems, in part, from the way in which many explicit and implicit measures of memory have been shown to dissociate from one another (e.g., Roediger, Weldon, & Challis, 1989). Memory measured by most explicit tests, such as recall and recognition, generally benefits from having the meaningful aspects of the stimuli emphasized at the time of encoding (e.g., Craik & Tulving, 1975; Slamecka & Graf, 1978). Memory measured by many implicit tests, such as fragment completion or perceptual identification, does not benefit from meaningful encoding; rather, it appears to rely heavily on reinstatement of the perceptual aspects of the study episode (e.g., Jacoby & Dallas, 1981; Roediger & Blaxton, 1987; Weldon, Roediger, Bettel, & Johnston, 1995).

The distinction between data-driven and conceptually driven memory is a useful one, however, to suggest that all forms of episodic memory rely either on the sensory features of an episode or on preexisting knowledge about its meaning would be inaccurate. Although some forms of episodic memory may indeed rely on one or the other of these two types of processing, some forms may rely on other types of preexisting knowledge (not involving meaning), such as knowledge of linguistic structure. Although such a notion is not typically considered when episodic memory processes are discussed, the idea that there are top-down processes involving knowledge of structural information, such as letter information, is an old one. For example, in McClelland and Rumelhart's (1981) model of letter and word identification, top-down processing involving preexisting knowledge of letter location information is used. It is plausible that, just as the activation of preexisting knowledge of a word's meaning may become part of the memory for its occurrence in a study list, so might the activation of preexisting knowledge of its structural characteristics, such as its letter location information (e.g., Kolers, 1975, 1976).

Some studies of episodic memory have, in fact, hinted at the possibility that preexisting knowledge of the structural aspects of a word can play a role in memory for its occurrence in a study list. Weldon (1991) demonstrated that priming on word fragment completion and perceptual identification tasks may result, in part, from the activation of each studied word's lexical unit in memory, rather than solely from the reinstatement of the surface aspects of studied stimuli at the time of test. Specifically, when the participants studied anagrams such as input and were tested on either word fragment completion (e.g., t__ng) or perceptual identification, priming was shown only among those participants who had been instructed to identify the study words by switching the vowels (i.e., identifying input as tuning). More recently, Masson and MacLeod (in press) found evidence that these instances in which generation has been shown to benefit priming (e.g., Masson & MacLeod, 1992; McDermott...
1997) may be due to a process that they term orthographic recoding. That is, as participants are generating a given study item, they may conjure up an image of how the word would look if printed, the involvement of orthographic knowledge in this act may contribute to priming on later word fragment completion and perceptual identification tasks. Furthermore, Malmberg, Steyvers, Stephens, and Shiffrin (2002) recently reported that the distinctiveness of a word’s orthographic features (the frequency with which particular letters occur in specific locations) contributes to the word frequency effect in recognition.

The focus of the present article is on a relatively un-studied form of memory: the recognition of unidentified word fragments. The ability of people to give accurate recognition judgments to word fragments that they cannot identify was first shown by Peynircioğlu (1990). Peynircioğlu gave the participants a list of words to study (e.g., RAINDROP, AMETHYST), followed by a test involving word fragment completion. Half of the four-letter fragments on a given test corresponded to words from the study list (e.g., R_I__R_P), and half came from words that were not studied (e.g., S_Q_E__E). The participants were asked to identify the word corresponding to each fragment. In addition, regardless of whether they could identify a particular fragment, they were asked to rate the likelihood that it came from a studied word, using a scale of zero (definitely not studied) to 10 (definitely studied).

Peynircioğlu found that, for those fragments that people were unable to identify, recognition ratings were significantly higher for fragments of studied words (e.g., M = 4.05 in Experiment 2) than for fragments of nonstudied words (M = 3.30 in Experiment 2). Thus, she demonstrated that the participants had some basis for discriminating between unidentified word fragments that were studied and unidentified word fragments that were not studied.

This finding of recognition without identification may represent an instance in which episodic memory results from the involvement of orthographic knowledge. First, the effect is not dependent on the reinstatement of studied sensory features at the time of test. Cleary and Greene (2000) gave the participants study lists of words that were all presented in capital letters (e.g., RAINDROP, AMETHYST). At test, the letters presented within each four-letter word fragment were presented in lowercase form (e.g., r_i__r_p, a__t_y_t, s_q_e__e). Even under these circumstances, when recognition ratings given to unidentified fragments were examined, ratings were higher for fragments corresponding to studied words (M = 4.31) than for fragments corresponding to nonstudied words (M = 3.28).

Recognition without identification has also been found when the presentation modality is changed from study to test. In one experiment, Peynircioğlu (1990) presented study lists auditorily. Again, when unidentified word fragments were examined, the participants had given significantly higher ratings to those corresponding to studied words (M = 3.99) versus nonstudied words (M = 3.60). Cleary and Greene (2000) replicated this finding, with their means being 4.04 for unidentified studied fragments and 3.60 for nonstudied fragments.

Second, it is unlikely that the recognition-without-identification effect results from meaningful processing of the studied items. Cleary and Greene (2000) found the effect when the participants were asked to identify words from four-letter fragments (e.g., R_I__R_P, A__T_Y_T) at the time of study, rather than at test, and were asked to give recognition ratings to words at test. That is, ratings given to words (e.g., RAINDROP, AMETHYST) whose fragments appeared on the study list and were not completed were higher (M = 5.97) than ratings for words (e.g., SEQUENCE, VERMOUTH) whose fragments did not appear at study (M = 3.78). Because the words in question here were not identified at the time of encoding, it is unlikely that any meaning could have been encoded for use in a recognition decision later on.

Furthermore, the magnitude of the recognition-without-identification effect increased significantly in this reverse situation, which suggests that orthographic knowledge, rather than meaning, may be involved. According to the transfer-appropriate processing framework, memory will be shown to the degree that the mental operations engaged at test overlap those that were engaged during study (e.g., Morris, Bransford, & Franks, 1977). From this perspective, if recognition without identification is related to the use of orthographic information, circumstances at encoding that emphasize the orthographic characteristics of the stimuli should enhance the effect. Presumably, when a person is unable to identify a fragment at the time of study, the only information available for encoding is letter location information. Therefore, all of one’s encoding resources will be devoted to that aspect of the stimulus (as opposed to other characteristics, such as its meaning), and this should increase memory, as measured by a test that taps the use of orthographic information.

Other evidence against a semantic account of recognition without identification comes from studies of semantic priming, wherein a related prime word precedes a quickly flashed, masked target word. Here, the ability to identify a stimulus is not dissociable from the ability to extract meaning from it. Dark (1988) and Dark and Benson (1991) found that, when the perceptibility of a stimulus was degraded to the point of making it non-identifiable, subsequent semantic priming did not occur. Subsequent semantic priming was found only for those items that could be identified.

Although it seems unlikely that meaning is the basis on which people discriminate between studied and nonstudied unidentifiable word fragments, a few studies suggest that an unidentifiable stimulus can sometimes evoke a sense of its meaning, making the issue worth investigating. First, some studies have shown that people are able to make semantic judgments about words that are presented too quickly to detect (e.g., Greenwald, Klinger, & Schuh, 1995; Marcel, 1983). Second, an ERP signature thought to be characteristic of semantic processing was shown to occur during the presentation of words that were presented too quickly for the participants to identify (Sternberg, Lindgren, Johansson, Ols-