Journal of Experimental Psychology:
Learning, Memory, and Cognition
1989, Vol. 15, No. 2, 275–281

0278-7393/89/$00.75

Episodic Effects on Picture Identification: Implications for Theories of Concept Learning and Theories of Memory

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The effects of differences in study processing on free recall of picture names and on generalization in picture identification were investigated. Experience with degraded pictures produced poorer subsequent free recall of picture names than did naming intact pictures. For the test of picture identification, pictures that were identical to a studied picture, pictures that shared a name with a studied picture (same name), and new test pictures were presented, and the amount of clarification required to identify a picture was measured. Experience with degraded pictures produced better subsequent identification of identical test pictures but poorer later identification of same-name test pictures than did naming intact pictures. The importance of these episodic effects for theories of concept learning and theories of memory is discussed. It is argued that distinctions between memory systems (e.g., episodic–semantic) must be couched in terms of a theory of concept learning and that the data are inconsistent with a simple distinction.

When people are asked to name a picture of an everyday object, such as a shoe or a house, they obviously have at least two types of information in memory upon which they can draw. One is memory for specific shoes or houses that they have seen. The other is knowledge of the general characteristics of shoes or houses: usual appearance, characteristic features, and uses. The use of knowledge for general characteristics and that of memory for a specific encounter with an object has defined separate areas of research and has even been treated as relying on anatomically distinct memory systems. The literature on picture identification as well as that on other classification tasks has typically concentrated on the importance of memory for general characteristics in the form of abstract knowledge structures such as prototypes, schemata, and pictogens (e.g., Warren & Morton, 1982). Approaches of this sort rely on analysis of a picture into components that maintain their identity across picture contexts (Biederman, 1987). The notion is that the processing necessary for identification begins with the use of abstract representations and, only if necessary, proceeds to the use of memory for particular episodes.

The claim that picture identification primarily relies on abstract representations has been buttressed by the finding that amnesics who are shown a picture are later able to identify more readily a degraded version of that picture although they are unable to consciously recollect having earlier seen the picture (e.g., Warrington & Weiskrantz, 1968). To explain dissociations of this sort, effects of recent prior experience on identification are said to reflect the priming of abstract knowledge structures (semantic memory) or procedures (procedural memory), whereas conscious recollection of a prior event is said to rely on memory for prior episodes, or episodic memory (e.g., Cohen & Squire, 1980; Tulving, 1983).

Rather than emphasizing the importance of abstract knowledge, we propose that picture identification often relies on memory for prior episodes so that factors influencing encoding and retrieval are as important for supposedly semantic-memory tasks as for performance on recall and recognition tests. Some results from our experiment weigh on accounts of the dissociation between effects on identification and conscious recollection. We discuss such dissociations in terms of theories of picture identification and classification learning. Also, in the Discussion section, we will argue that claims of separate memory systems must be tied to a theory of classification learning if such theories are to be made sufficiently precise to allow them to be tested.

Our emphasis on the importance of memory for prior episodes for picture identification is generally consistent with discussions of exemplar or instances accounts of concept learning advanced by Brooks (1978), Medin (Medin & Schaffer, 1978; reviewed in Medin & Smith, 1984), and Hintzman (1986). Similar to those accounts, generalizing around prior episodes plays a prominent role in our view of effects on picture identification. However, exemplar or instance views have typically assumed that a veridical copy of presented instances is stored in memory. That is, unlike research on episodic-memory tasks (e.g., Tulving & Thomson, 1973), little attention has been paid to "processing specificity" in picture-identification or other classification tasks. Similar to Kolers (e.g., Kolers & Roediger, 1984), we have emphasized variability in the processing of an item and the importance of the match between study and test processing. It is the claim that performance reflects differences in the encoding and retrieval of presented instances that makes our view an *episodic* view of perception and concept learning (e.g., Brooks, 1987; Jacoby & Brooks, 1984; Whittlesea, 1987). We expect that memory for a particular picture can have either a large or a small effect on later identification of pictures from the same category dependent upon the study processing of the picture and the

This research was supported by a grant to Larry L. Jacoby from the National Science and Engineering Research Council of Canada.
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compatibility of that processing with the retrieval conditions offered by the test.

The strategy we used to investigate picture identification is similar to that used by Jacoby in investigations of word identification. In those experiments, an attempt was made to show that the influence of a prior presentation of a word on its later perceptual identification can rely on memory for the prior episode rather than on the temporary priming of an abstract representation of the word such as a logogen (cf. Morton, 1969). First, the effect produced by a prior presentation of a word lasts for at least a week (Jacoby, 1983a), which is much longer than could plausibly be attributed to temporary priming of a logogen. Also, relevant to the picture-identification study that is to be reported in this article, effects of a prior presentation of a word on its later identification are larger when the visual details, such as type case, are held constant between study and test (Jacoby & Hayman, 1987). If word identification were solely dependent on the activation of a general representation of a word, such as a logogen, then matching study and test for such visual details would not be expected to have an effect. Word identification is also strongly influenced by variations in the type of processing that occurs during single prior processing episodes. These variations can produce effects on word identification that are in an opposite direction from those produced on recognition-memory performance. Reading a word out of context does most to aid its later tachistoscopic identification but produces poorest recognition-memory performance as compared with reading the word in the context of an antonym or generating the word from an antonym (Jacoby, 1983b).

The implication of this work is that encoding–retrieval interactions are important for the influence of prior experience on supposedly semantic-memory tasks such as word identification. The same conclusion can be drawn regarding tasks such as judgments of fame (Jacoby & Kelley, 1987), lexical decision (Hayman, 1983), and the word-superiority effect (Hayman & Jacoby, in press; Whittlesea & Cantwell, 1987). In part, our work on picture identification was meant to add one more task to the list of tasks that show effects of memory for prior episodes. More important, pictures potentially hold advantages over verbal materials for showing episodic effects. Pictures are much richer in visual details than are words, and therefore they allow a wider range of variations to investigate the importance of the match in visual details between study and test. Also, investigating effects of memory for prior episodes on picture identification brings us into direct contact with the concept-formation and classification literature.

In an experiment related to the one we will report, Warren and Morton (1982) first presented a set of pictures and then compared the tachistoscopic identification of identical pictures, of pictures that shared only the same name as a previously viewed picture (same name, called "similar" in their report), and of new pictures. They found that identical pictures were more likely to be correctly identified than were same-name pictures, both of which were more accurately identified than were new pictures. Warren and Morton interpreted their results as evidence that perceptual identification of pictures partially relies on an abstract representation of the appearance of objects sharing a name. This abstract representation is termed a *pictogen* and was described as similar to the logogens said to underlie word perception (Morton, 1969, 1979; Morton & Patterson, 1980). The advantage of same-name pictures over new pictures is said to reflect the priming of a pictogen. To account for the advantage in identifying identical pictures over same-name pictures, Warren and Morton suggested that memory for the particular picture that was previously viewed, as well as the threshold of a pictogen, can contribute to later picture identification. This is similar to a model referred to as a strong hybrid model by Posner and Keele (1968); that is, memory for specific prior patterns is used in classification but is given no role in generalization to new patterns.

In contrast to Warren and Morton, we prefer to explain the advantage of identical test pictures in terms of an episodic view of picture identification. An episodic view does not propose that generalization relies on an abstract representation such as a pictogen. Rather, identification of pictures that are similar to a studied picture is explained in terms of generalization from memory for previously studied pictures, predicting an advantage for test pictures that are identical to a studied picture. An episodic view would also account for very long-lasting effects of naming a picture on later picture-naming latency (e.g., Lachman & Lachman, 1980), an effect that is difficult to explain as due to priming. However, it is extremely difficult to reject a strong hybrid model of the sort proposed by Warren and Morton. Rejection of a hybrid model becomes even more difficult if one allows generalization around remembered instances, termed a *weak hybrid model* by Posner and Keele (1968). The effects of an encoding manipulation observed in our experiment could, with some difficulty, be accounted for by using a hybrid model. The major thrust of this article, however, is not so much to test particular theories as to further document episodic effects on picture identification and to argue for the heuristic power of using episodic-memory manipulations in investigations of picture and object identification.

The procedure used in our experiment, which we will refer to as a *clarification* technique, used a digitizer in combination with an Apple computer to vary the degree of degradation of presented pictures. The presentation procedure built a picture by illuminating point locations on a television monitor. To produce degraded pictures, some of the points composing a plot of a picture were intermixed with random "noise" points. By pressing a key on the computer, a subject could clarify the picture by increasing the ratio of points from the picture to noise points. With continued pressing of the key, the picture became sufficiently clear that all subjects could name the object pictured. The proportion of clarification, a function of number of key presses, prior to a correct response was the measure of identification performance. A later version of this procedure is documented in Vokey, Baker, Hayman, and Jacoby (1986).

Two training conditions were used to vary subjects' processing of the visual details of pictures. In the name condition, subjects simply gave basic-level names to intact outline drawings. In the clarify-and-name condition, degraded drawings were presented, and subjects pressed the key until they could name them. After they had correctly named a picture, it appeared fully clarified on the screen. In the test phase, both groups were first given a test of free recall for the names of the presented pictures. Next, they were shown degraded pictures and were asked to clarify them until they could identify the pictured objects. Pictures in the test sequence were either identical to a picture that had been previously presented (identical), shared the name of a previously exposed picture but were not identical to that picture (same name), or were unrelated to any previously presented picture (new).

A lack of memory for the surface information of pictures, predicted by a pictogen model, would result in no difference between the identification of pictures in the identical and same-name conditions. A strong hybrid model of the sort proposed by Warren and Morton (1982) might predict an influence of training condition on identification of identical test pictures but would not easily predict any effects for same-name test pictures. However, we expected the specificity of transfer to interact with the manipulation of training condition. Gollin (1960) found that training with a fragmented picture did more to aid later identification of an extremely degraded version of the picture than did training with an intact version of the picture, and he accounted for his results in terms of differences in similarity between training and test. For the same reasons, we predicted an advantage of clarification training for identical test pictures. Clarifying a picture during study should force greater attention to visual detail and is more similar to the clarification test than is simply naming an intact picture during study. For same-name test pictures, however, clarification training should produce a disadvantage as compared with only naming study pictures. The greater attention to detail and memory for degraded versions of a study picture that is produced by clarification training should decrease the functional similarity between a study picture and a same-name test picture. We expected increased processing of study pictures to narrow the range of transfer because of this reduction in functional similarity.

The manipulation of training was expected to have no effect on free-recall performance or an effect opposite to that on identification of degraded pictures. The clarify-and-name condition requires greater effort to identify presented pictures than does the name condition, and it might be argued that this greater effort would result in a generation effect, an advantage in free recall for the more effort-demanding condition (e.g., Jacoby, 1978; Slamecka & Graf, 1978). However, it is the match between study processing and the requirements of the retention test rather than the overall amount of study processing or effort that we expected to be important for retention performance. The further processing of visual details that is produced by the clarify-and-name study as compared with the name study condition is unlikely to be useful for free recalling the names of the pictures. Weldon and Roediger, (1987, Experiment 2) found that instructing subjects to attend to the visual details of pictures produced poorer later recall of the names of those pictures than did requiring subjects simply to name presented pictures. Also, the requirement to clarify study pictures added to the time it took to go through the study phase, so the retention interval between presentation of a picture and the free-recall test was longer in the clarify-and-name than in the name study condition. This difference between conditions might produce a disadvantage for the clarify-and-name condition in free-recall performance.

We predicted, then, that the manipulation of study condition would interact with free recall of picture names versus picture identification. The form of the interaction was expected to be similar to that observed by Jacoby (1983b) when comparing effects of a study manipulation on recognition memory versus perceptual identification of words; we expected opposite effects on the two tests of retention. To produce an interaction of this form, the ability to free recall the name of a previously presented picture must not substantially aid picture identification. Others have shown that including the name of a pictured object in an earlier presented study list does little if anything to aid later identification of the picture presented tachistoscopically (Warren & Morton, 1982) or as a picture fragment (Weldon & Roediger, 1987). To examine the relation between recall of names and picture identification, we conditionalized picture identification on free recall of the name of the pictured object. We did not expect this conditionalizing to have a significant effect because of differences in the types of prior processing that are important for the two types of test.

Method

Subjects

The subjects were 48 students at the University of Utah who participated in the experiment as part of an introductory psychology course requirement.

Design and Materials

A list of 20 line drawings of common objects was presented in the first phase of the experiment. Subjects in the name condition saw intact versions of the line drawings and had only to name the objects that were pictured. Subjects in the clarify-and-name condition saw degraded versions and, in order to name them, had to clarify the pictures by pressing a key that increased the signal-to-noise ratio. The test list presented in the second phase of the experiment comprised 30 line drawings: 10 drawings that were identical to ones shown in the first phase of the experiment, 10 drawings each of which shared a name with a drawing presented in the first phase, and 10 drawings that were unrelated to any previously presented drawing. All drawings were presented in a degraded form in this test phase, and subjects were required to clarify each drawing until the pictured object could be named. Study condition (name vs. clarify-and-name) was varied between subjects, whereas similarity of study and test drawings (identical, same name, and new) was varied within subjects.

Study and test lists were constructed from a pool of 30 pairs of line drawings of common objects selected from a pool of drawings previously used by Nelson (e.g. Nelson, Reed, & Walling, 1976) and from pictures in children's coloring books: for example, a frog, stairs, a sink, a key, and shoes. Members of a pair of drawings shared the same name but were selected to differ in visual detail. The pool of drawings was broken into three subsets of 10 pairs each to produce identical, same-name and new test items. Six list formats were constructed by rotating subsets of drawings through these similarity conditions and by interchanging the roles played by members of a pair. Across formats, each line drawing represented each of the conditions of study and test similarity equally often. The order of line drawings in study and test lists was randomized with the restriction that drawings representing the different similarity conditions be distributed evenly through the lists. There were two different random orders of study drawings for each format, producing 12 different combinations of format and study order. Each of these combinations was received by 2 subjects in each of the two study conditions.

A digitizer in combination with an Apple computer was used to vary the degree of degradation of presented pictures. The computerized routine was such that random points from a digitized line drawing were intermixed with random noise points. When first presented as a degraded picture, only noise points were displayed. Pressing the return key on the computer produced an increase in the ratio of points from the picture to noise points, thereby clarifying the picture. The routine allowed the number of steps (key presses) required for full clarification of a picture to be varied. Pictures were presented on a 14-in. television set.

Procedure

During the study phase for the naming condition, pictures were fully clarified, and each picture was presented for 7 s. Subjects were instructed to name the pictures aloud as rapidly as possible. Each of the selected pictures had a common name. The common name as well as synonyms of the name were accepted as correct naming of the picture. In the study phase for the clarification condition, there was no fixed presentation rate; subjects pressed the return key until they could name the picture. The picture then appeared fully clarified for 7 s. Only 10 presses of the return key were required to fully clarify degraded pictures in the first phase, in contrast with the 128 presses required during the test phase of the experiment.

After presentation of the study list, subjects in both study conditions were instructed to free recall as many names of studied pictures as they could remember. Next, instructions for the identification test were given. Prior to the test of each picture, the message "press key for next trial" appeared on the screen. Pressing the return key resulted in this message being replaced by random noise dots distributed across the screen. Subjects pressed the return key to decrease the number of noise dots and to increase the number of dots from the picture until they thought they could identify the object being shown. They then pressed the *H* key on the keyboard and informed the experimenter of their hypothesis. If their hypothesis was incorrect, subjects were instructed to continue clarifying the picture and producing hypotheses until they correctly named the picture. When the picture was correctly named, subjects were instructed to press the *Escape* key. Pressing that key resulted in full clarification of the picture. Subjects were then asked to decide if this fully clarified picture was identical to one they had seen earlier in the experiment, shared the name of a picture seen earlier, or was new. This procedure was repeated until all 30 pictures had been presented.

Two measures of ease of picture identification were obtained from the clarification test. The percentage of clarification that subjects required to correctly identify a picture served as one measure (i.e., the percentage of dots on the screen that were plotted from the picture as opposed to the noise mask). A second measure was the average interkeypress interval. This measure of identification time was included to detect any differences in the amount of time that subjects inspected a picture at any one level of degradation prior to pressing the key to further clarify the picture. Hypotheses offered by subjects prior to correctly identifying a test picture were also recorded, but because they provided little useful information, they will not be reported.

The significance level for all statistical tests was set at $p < .05$.

Results

Subjects in the name condition free recalled the names of more pictures (M = 12.33) than did subjects in the clarify-and-name condition (M = 10.38), $F(1, 46) = 9.94$ (MS_e = 4.63).

Mean percentage of clarification required for identification of a picture is displayed in Table 1. A first analysis of those results showed a main effect of similarity and a significant interaction between training condition and similarity, $Fs(2, 92) = 136.99$, 5.28 (MS_e = 21.88). Identical pictures were identified with less clarification than were same-name pictures. This difference was magnified when clarification was required during study. In comparison to the naming condition, requiring clarification during study decreased the amount of clarification necessary to later identify identical pictures, $t(46) = 1.92$, and increased the amount of clarification necessary to later identify same-name pictures, $t(46) =$ 2.90. One-tailed tests, justified by the a priori predictions, showed both effects to be significant. The analysis of interkeypress intervals showed a main effect of similarity, $F(2, 92)$ = 13.38 (MS_e = .004). The mean interkeypress interval to identify new pictures (0.76 s) was longer than that to identify same-name (0.72 s) or identical (0.70 s) test pictures.

If the name of a picture had been free recalled, less clarification of the corresponding test picture might have been required for its later identification. That is, differences in recall of names may be partially responsible for differences in picture-identification performance. To check this possibility, identification performance for identical and same-name test pictures was conditionalized on whether or not the name of the tested picture had been free recalled. Those analyses failed to show any advantage in identification for pictures whose names had been recalled. Neither the main effect, nor any interaction involving recalled versus not recalled names, approached significance in either the analysis of percentage clarification required for identification of a picture or that of interkeypress intervals. The mean percentage clarification required to identify pictures whose names had been recalled was 31.25, whereas that required for pictures whose names had not been recalled was 30.83. The corresponding means for interkeypress intervals were 0.715 and 0.705 s.

Subjects were generally very accurate in judging fully clarified pictures as being identical, same-name, or new pictures, although there was a significant difference across the three picture types, $F(2, 92) = 14.89$, (MS_e = .006). The probability of a correct judgment was higher for new pictures (.998) than for identical (.923) or same-name (.923) pictures. The interaction between study condition and similarity of test pictures did not approach significance. Possibly because of a ceiling

Table 1
Percentage Clarification Required for Identification

Study condition	Type of test item		
	Identical	Same name	New
Name	29.2	31.8	43.2
Clarify & name	26.7	35.6	43.9

effect, effects of training condition observed in the perceptual identification of pictures were not reflected in recognition-memory performance.

Discussion

The detail with which pictures were processed during a single presentation produced an effect on free recall that was opposite to that produced in later perceptual-identification performance. The more complete processing of visual details required by the clarify-and-name condition produced poorer free recall of the names of studied pictures but produced better identification of identical test pictures than did the name-training condition. The effect of training condition on identification of identical test pictures amounts to showing that identification of a degraded picture gains more from prior viewing of a degraded version of the picture than from prior viewing of an intact version of the picture, and it replicates results reported by others (Gollin, 1960; Snodgrass, in press). Also, the ease of identifying test pictures was not significantly dependent on free recall of the names of those pictures. The lack of significant dependence between the ease of identifying a picture and free recall of its name is consistent with the finding that prior presentation of the name of a picture does not aid later identification of the picture presented tachistoscopically (Warren & Morton, 1982) or as a picture fragment (Weldon & Roediger, 1987).

Dissociations such as that between effects on recall of picture names and perceptual identification of pictures have been taken by others as evidence for the existence of separate memory systems (e.g., Cohen & Squire, 1980; Tulving, 1983). For example, Mitchell (1989) found that older as compared with younger adults were at a disadvantage in their recall of picture names and recognition memory for pictures but were not disadvantaged in the magnitude of the decrease in naming latency produced by having previously named a test picture. Mitchell took this pattern of results as evidence that aging produces a deficit in episodic memory (measured by tests of recognition memory and recall) that is not accompanied by a deficit in procedural memory (measured by effects on naming latency). Richardson-Klavehn and Bjork (1988) provided a recent review of experiments showing dissociations between different measures of memory along with a discussion of theoretical accounts of such dissociations.

We argue that to be subject to test, proposals of separate memory systems must be couched in terms of theories of concept learning and utilization. To illustrate possible assumptions, we relate the distinction between semantic and episodic memory to theories of concept learning and use our results along with those from experiments by others to restrict the choice among theories. We conclude that a simple distinction between episodic and semantic memory is not supported and argue for the advantage of further exploring the effects of episodic-memory variables on identification and classification tasks.

The intent of proposing separate memory systems is to explain dissociations between effects of training or subject populations on different measures of memory. Arguments about the existence of separate memory systems have usually been developed without reference to theories of concept learning and utilization. However, the distinction between memory systems would be more clear-cut if one held a theory in which memory for prior episodes plays no role in classification or identification performance. For picture identification, this would amount to a pictogen model of identification performance. The effect of viewing a picture on its later identification would be totally due to the temporary priming of a corresponding pictogen. The common practice of referring to effects of training on identification or fragment-completion performance as "priming" seems to imply acceptance of a model of this sort. For example, Milner (1970) suggested that effects of training on picture naming revealed by amnesics do not reflect new learning but, rather, are due to the priming of information that is already in memory. Work by Biederman (1987) to show that picture identification can be accomplished by means of analysis of component features is also compatible with a pictogen model. He argued that memory for presented pictures plays a minor role in picture identification but suggested that component features can be primed.

For our experiment, a simple pictogen model would predict no difference in identification of identical test pictures as compared with same-name test pictures. Subjects who named intact pictures in the first phase of our experiment did show a relatively small difference in percentage clarification required to identify same-name as compared with identical pictures. However, subjects who had to clarify the pictures in the first phase were able to identify the identical pictures with many fewer clarification responses than the same-name pictures and with even less clarification than the name group used for the identical pictures. Our results join those reported by Warren and Morton (1982) in showing that memory for the particular pictures presented during training does play a role in later picture-identification performance.

Evidence that memory for prior episodes plays any role in picture identification is sufficient to reject a simple pictogen model but could be accommodated by a hybrid model. An episodic–semantic-memory distinction could be maintained by holding that picture identification primarily relies on the use of pictogens but that intentional recall of previously presented pictures or recognition of a picture as one presented earlier allows an alternative means of picture identification. A hybrid model of this sort amounts to claiming that a picture-identification test is not a pure measure of semantic memory (cf. Richardson-Klavehn & Bjork, 1988). If a hybrid model is adopted, an important issue is whether it is assumed that picture identification reflects generalization around remembered episodes. If remembered episodes are allowed to play such a role, the distinction between episodic and semantic memory is largely lost.

If generalization around remembered episodes is said not to play a role in semantic-memory tasks, the resulting model is similar to the strong hybrid model proposed by Warren and Morton (1982). A model of that sort has some difficulty accounting for the results of our experiment. Warren and Morton proposed that picture identification relies on a literal representation formed in memory of studied pictures as well as the threshold of pictogens. A first problem for their model is that memory for studied pictures is not literal but, rather, depends on prior processing. To take into account the effects of the manipulation of training and to explain the better performance of the clarify-and-name group on the identical test pictures, it could be claimed that requiring more attention to the visual detail of a picture resulted in better memory for the particular picture but had no further influence on the threshold of the relevant pictogen. However, requiring further processing of visual detail not only enhanced the identification of identical pictures but also slowed the identification of same-name pictures. This reduction in transfer to same-name pictures is difficult for a pictogen model to explain because there seems to be no reason to believe that further processing of a picture should *raise* the threshold of its corresponding pictogen.

Warren and Morton did discuss an additional factor that could be used to account for the disadvantage of same-name pictures that is produced by further processing of study pictures. They suggested that subjects consciously sort through pictures that they remember from study to find a fit with a fragment that they see at the time of testing. In the terminology of separate memory systems, the suggestion is that people sometimes use episodic memory to accomplish a semantic-memory task. A strategy of this sort could produce a negative response bias for same-name pictures. For example, people might hesitate to accept a fragment as being part of a picture of a dog because the pictured dog was not the same as the one presented during study. However, there are difficulties for this claim that effects of memory for prior episodes are mediated by conscious recollection. In our experiment, ease of identification was not significantly dependent on free recall of picture names. Similarly, Mitchell and Brown (1988) reported effects on the latency of picture naming that are dissociated from effects on recognition-memory performance. The stability of the repetition effect in the face of a decline in recognition-memory performance that they reported and the lack of dependence between free recall and picture-identification performance that we observed are inconsistent with the claim that the effects of memory for prior episodes are mediated by conscious recollection.

In summary, the pattern of results in our experiment cannot be explained by a semantic–episodic distinction that allows no role for memory for prior episodes in picture-identification performance. Even a strong hybrid model encounters some difficulty in accounting for the full pattern of results. This is because the manipulation of training conditions affected the specificity of transfer in later picture identification. Those results can be explained as showing that variations in the processing of a picture influenced generalization to new test pictures. That is, the results can be explained in terms of either a weak hybrid model or in terms of an instances or an exemplar model that allows generalization around memory for a picture as encoded, that is, memory for a prior episode. The difficulty for adopting a weak hybrid model is that generalization to new pictures is overexplained, explained both by appealing to the use of an abstract representation and by appealing to generalization around memory for prior episodes (Hintzman, 1986). Adopting either a weak hybrid model or an episodic model of identification performance weakens the distinction between separate memory systems. By either type of model, identification performance and recognition memory or recall performance can rely on the same memory representation used in a similar way. Consequently, the simplicity of proposing separate memory representations to account for dissociations between effects on the different types of tasks has been lost. Although illustrated with the semantic–episodic distinction, the same concerns apply to the procedural–declarative distinction. For that distinction, memory for procedures is identified with an abstract representation that is separate from the declarative representation that preserves memory for prior episodes. It is the generality of the procedures used to identify a picture that would be brought into question by the results of our experiment.

Most experiments whose results have been used to support the claim that memory for episodes plays little role in picture identification (e.g., Biederman, 1987) have only required subjects to name pictures during study. In contrast, our results show that memory for a presented picture can have either a large or a small effect on later identification performance dependent on training conditions. As discussed, those effects are important for a choice between theories of concept learning. Also, claims about memory deficits suffered by special populations are best investigated with reference to theories of concept learning as well as theories of memory. Most prior investigations that have sought dissociations between effects on different measures of memory have used only identical and new test items, failing to assess any effects on generalization to similar test items (e.g., Mitchell, 1989; Warrington & Weiskrantz, 1968). An advantage in the identification of identical test items could be produced either by the priming of a pictogen or by memory for prior episodes. To separate out effects of memory for prior episodes from any effects that are produced by priming, performance on test items that are similar to study items is critical. Without including similar test items, it is impossible to choose between various theories of concept learning and utilization. The claim that an effect was caused by priming amounts to adopting a particular view of concept learning and should be treated as such.

Rather than proposing separate memory systems, we prefer to interpret dissociations between effects on different measures of memory as showing the importance of the compatibility between study processing and the requirements of the test of retention (e.g., Jacoby, 1983a, 1983b; Jacoby & Brooks, 1984; Kolers, 1979; Weldon & Roediger, 1987). By that view, our results show that memory for the visual details of a picture is important for its later identification but does not aid free recall of the name of the picture. One advantage of our approach is that it encourages the use of episodic manipulations to investigate effects on supposedly semantic-memory tasks. We believe that one of the principle disadvantages in presuming a separate memory-systems interpretation is that it has led to a too-restricted set of experimental designs. Considering an episodic interpretation suggests a wide variety of manipulations during both learning and retrieval phases that has the potential of changing our views of the relations among retrieval tasks and of the nature of neurological deficits.

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Received August 31, 1987
Revision received May 2, 1988
Accepted June 15, 1988 ■