Author's Response

Episodic and semantic memory: Where should we go from here?

Endel Tulving
Department of Psychology, University of Toronto, Toronto, Ontario, Canada M5S 1A1

The commentators have chosen to deal mainly with the issue of the distinction between episodic and semantic memory rather than with other topics discussed in *Elements of Episodic Memory* (Tulving 1983, henceforth referred to as *Elements*). Both explicit and implicit in their comments are useful suggestions for the improvement of the quality of the ongoing debate. This Response touches on four problem areas related to the episodic/semantic distinction that are discussed by the commentators: (a) classification of learning and memory, (b) systems and tasks, (c) dissociation and other kinds of evidence, and (d) episodic memory and consciousness.

Classification of learning and memory. The distinction between episodic and semantic memory can be considered to be a part of the broader issue of how we should think about classification in learning and memory. Classification is one of the primary activities of science; whole

branches of individual scientific disciplines are devoted to it. Although it has been a part of the broad field of learning and memory, so far it has proceeded on a relatively casual, unsystematic, and intuitive basis. Perhaps the time has come for students of learning and memory to start thinking seriously about the possibility of constructing a classificatory system that would describe and express the relations among the many varieties of learning and memory with which they are familiar.

Kinsbourne sees the distinction between episodic and semantic memory very much in this light, as a step toward what he calls "systematizing cognitive psychology." Implicit in his commentary is the call for the development of *systematics* as a new branch of the science of learning and memory, analogous to systematics in biology. We may imagine that, as in biology, systematics of learning and memory would entail three interrelated problem areas: *classification*, the ordering of varieties of learning and memory into natural groups; *taxonomy*, the study of the rules, principles, and bases of classifying; and *nomenclature*, concerned with the development and application of appropriate names for the varieties of learning and memory that the classification exercise would yield.

I completely agree not only with **Kinsbourne**'s general suggestion, but also with his recommendation that the organizing principle in the classification enterprise should be "the differentiation of neural systems subserving cognition," or what we might refer to as the *neuropsychological criterion*. I have discussed the broader classification problem in learning and memory elsewhere (Tulving 1985c).

Crowder's observation that as students of memory "we have been worrying too little about what it is we have been studying" can also be interpreted as pointing to the need for a natural classificatory system, as does **Spear**'s complaint against too narrow a definition of episodic memory in terms of mature human organisms and conscious experiences. A successful solution of the classification problem in learning and memory would help us understand what it is that we study in learning and memory experiments in a way not quite possible today. It might also illuminate the relation between people's ability to travel back in time in their own minds, and abilities corresponding to such episodic remembering in nonverbal and preverbal organisms, thus helping us to cope with problems raised by Spear.

Systems and tasks. A continuing source of difficulty in debating the distinction between episodic and semantic memory resides in the lack of agreement as to how we should think about the relation between different memory systems and different memory tasks. The problem is exemplified by a number of points raised by both **Crowder** and **Spear**.

In *Elements*, I distinguished between episodic and semantic tasks. Episodic tasks are those whose solution requires utilization of information acquired on a particular occasion, whereas semantic tasks can be solved on the basis of a person's general knowledge of the world alone. This distinction may be useful as a first approximation, but it fails to be a reliable guide to theoretical interpretations of experimental data.

I think it is wrong to identify particular tasks with, or "assign" them to, particular systems. Instead, we should accept the assumption that many typical laboratory tasks entail obligatory or optional component processes of all three major systems – procedural, semantic, and episodic. An important objective of research consists in a componential analysis of learning and memory tasks that would permit the assessment of the extent to which performance of any task depends on the three systems and their processes.

Acceptance of the assumption may lead to a research strategy somewhat different from the one that has been typically used to date. Instead of comparing performances on, and looking for dissociations between, "episodic" and "semantic" tasks, we might be better off comparing performances on tasks that are identical except for a single difference in a component process that we have reason to believe is required for one task and not another. To the extent that the critical component can be identified with a particular memory system, the outcome of the comparison would shed light on the properties of that system. For instance, if Task A calls for a simple judgment about the occurrence of an event in the rememberer's past and Task B calls for an additional judgment of the temporal date of that occurrence, we might want to assume that the episodic-memory requirements are greater in Task B than in Task A. An observed dissociation could then be considered relevant to the episodic/semantic distinction.

In working out the logic of such an enterprise we may have to begin with certain arbitrarily or intuitively derived assumptions, not only regarding the properties of different memory systems but also concerning the nature of the interrelation among systems. Right now I am partial to the idea – changed from the one inadequately formulated in *Elements* – that the relation between episodic, semantic, and procedural systems is "monohierarchical": Episodic memory is a single specialized subsystem of semantic memory, and semantic memory is a single specialized subsystem of procedural memory (Tulving 1984r, 1985a). This idea, like all others, will be modified or replaced when relevant empirical evidence so warrants.

As a single illustration of the problem of the relation between systems and tasks, consider the dissociation between episodic recognition and lexical decision expressed in terms of response latencies (e.g., McKoon & Ratcliff 1979). If response latencies reflect the operation of the procedural system – an idea suggested in *Elements* that **Crowder** is skeptical about – the dissociation implies that the procedural-system component of the episodic recognition task is different from the procedural-system component of the lexical decision task. Does such a state of affairs speak more to the procedural/declarative distinction than to the semantic/episodic distinction, as Crowder suggests? I think not. The fact that the procedural-memory component behaves differently depending on the nature of the required judgment about the "contents" of the memory store informs us of the differences in the judgment, or contents, or both, thereby implicating two kinds of declarative memory. But opinions of this sort leave the issue wide open.

This brief discourse on memory systems and memory tasks also implies an answer to **Crowder**'s question concerning the relation between serial learning and memory systems: Typical serial tasks in the verbal learning labora-

tory entail components of procedural, semantic, and episodic memories. The contribution that different systems make to the performance of different serial learning tasks, however, is unknown at this time, because the problem has not been systematically investigated. I have discussed the issue in a somewhat different context elsewhere (Tulving 1985d) and will not elaborate on it here.

Dissociations and other kinds of evidence. The distinction between episodic and semantic memory has attracted attention from individuals in different fields of research. Perhaps not surprisingly, the representatives of different scientific subcultures do not always see things from the same perspective. The commentators in the present instance nicely illustrate this state of affairs. **Shoben & Ross,** representing mainstream cognitive psychology, think that dissociation experiments play a central role in the task of evaluating the usefulness of the multisystem point of view. They offer constructive ideas as to how the usefulness of the dissociation experiment could be improved: by including more tasks in simultaneous comparisons (cf. Roediger 1984), by distinguishing between central and peripheral processes in tasks that show dissociation, and by combining the dissociation method with the logic of additive factors (Sternberg 1969). These are all welcome ideas from which the ongoing debate can only benefit. But **Shoben & Ross,** differing sharply from **Kinsbourne** and **Lewis,** give short shrift to other kinds of evidence that can be seen as supporting the distinction, mainly on the grounds that this evidence is "either very weak or subject to alternative interpretations." They are particularly skeptical of the usefulness of "studies of the brain and amnesics," although their misgivings are based on what they see as the current picture, rather than on what might happen in the future. I disagree with Shoben & Ross in this respect. I think that neuropsychological evidence will turn out to be crucial.

Lewis not only accepts the episodic/semantic distinction on neurological grounds, at least as a viable hypothesis, but also proceeds to refine the rules by which such evidence is brought to bear upon the issues. He reminds us once more that it is inappropriate to think of amnesia as a unitary disease entity and to base conclusions as to the reality of the episodic/semantic distinction on this assumption. I can only agree with most things that Lewis says. These include his criticism of the report by Zola-Morgan, Cohen, and Squire (1983) which Baddeley (1984) relied on in his own criticism of the episodic/semantic distinction. Just because amnesic patients can talk about their premorbid life events it does not necessarily follow that they are reporting the contents of their episodic recollective experiences. In some cases, at least, it seems rather clear that they do not (Cermak 1984; Cermak & O'Connor 1983). Here, too, our methods require refinement. The hypothesis advanced by Lewis regarding dissociation between the temporal context and the environmental context in amnesia is highly plausible. Since we have no reason to expect that knowledge concerning temporal dating and spatial locating of remembered events is subserved by the same brain mechanisms, selective impairment of these two component processes of episodic memory should be possible.

Episodic memory and consciousness. One of the most distinctive characteristics of "episodic remembering" is the rememberer's conscious awareness of the relation between his present recollective experience and the event from his personal past that the recollection represents. Elsewhere I have referred to the kind of consciousness that is necessary for episodic remembering as "autonoetic" consciousness (Tulving 1985b). Impairment, or loss, of autonoetic consciousness is characteristic of severe forms of amnesia in which patients can neither relive the past nor anticipate the future (Ingvar 1983; Tulving 1985b), although they can acquire some new knowledge.

Spear thinks that I have been "unduly influenced" by this phenomenon of the ability of amnesic patients to acquire new information without any conscious recollection of having done so. Spear's misgivings concerning the importance of the "consciousness criterion," because it is "yet to be analyzed and is not understood," contain a challenge to those, like myself, who think that autonoetic consciousness is the most fascinating phenomenon of the human mind. We must begin to take it seriously. It may be true, as Spear points out, that the "conscious-only" episodic memory constitutes but a small part of what organisms, including human beings, are capable of learning, or in fact do learn during their lifetimes. But what kind of criterion is the prevalence of a phenomenon in determining its value as an object of scientific study? Many important scientific discoveries or conceptual breakthroughs have revolved around phenomena that appear much more rarely in our everyday world than does consciousness.

In this context, I must also register my disagreement with **Shoben & Ross** who think that computers can make use of episodic memories. We know that computers do not possess anything like autonoetic consciousness. We know it with the same certainty with which we know – solipsists notwithstanding – that a real world exists "out there." If so, we also know that computers cannot remember their past.

Summary. The commentators have contributed constructively to the continuing debate concerning the distinction between episodic and semantic memory. They have pinpointed several problem areas in which further thought and study may shed light on the nature of the distinction and shape its future. These include the need for the development of a neuropsychologically meaningful classificatory system of learning and memory, a detailed logical and empirical analysis of the relations between memory systems and memory tasks, the working out of the dissociation logic and the means for evaluating the usefulness of other kinds of evidence, and the study of the relation between memory and consciousness. We have some ideas now about where we should go from here.

A further response. As the commentary by **Šípoš & Plichtová** was received after the others in the present round, it is dealt with separately. I briefly mention two agreements and three disagreements with these authors. Consider the agreements first.

It is indeed possible to think of episodic and semantic memories as constituting an experiential continuum, as I discussed in *Elements* (Tulving 1983 pp. 67–68) although

not in the *Précis* (Tulving 1984). And the revised formulation of the relation between the two systems (Tulving 1985a), which conceptualizes episodic memory as a subsystem of semantic memory, also makes it possible to think of the two as disparate regions on an evolutionary or a developmental scale. Nevertheless the hypothesis cannot be ruled out that the first continuum reflects the combined effects of two different systems and that the two regions on the second continuum are qualitatively different, in the sense that organisms with fully developed episodic systems are capable of memory feats not possible in organisms lacking episodic memory.

The second agreement concerns the issue of interdependence and interaction between episodic and semantic memory. Such interdependence and interaction have never been disputed. My 1972 essay already included a short discussion of the issue under the explicit heading of "Interdependence of the two systems" (Tulving 1972, p. 391). Today we know a bit more about the interdependence than we did in 1972, and we can raise more pertinent questions about it, as **Šípoš & Plichtová** have done.

Now the disagreements. I would not say that people *remember* historical or fictional events, certainly not in the sense in which they remember happenings from their own past. They may *know* these events as they know other things about the world they share with others, but such knowledge exists and can be used independently of episodic memory. When a person's episodic memory system is destroyed, as it is in certain cases of brain damage, the person may not be able to remember a single concrete event that he has personally witnessed or in which he has participated, although his knowledge of historical events is relatively intact (e.g., Cermak & O'Connor 1983; Damasio, Eslinger, Damasio, Van Hoesen & Cornell 1985).

My claim, both in *Elements* and in the *Précis*, that encoding specificity, or observed encoding/retrieval interactions, rules out *absolute* statements of certain kinds – e.g., that some items are remembered better than others, that some encoding operations are more effective than others, and so forth – does *not* imply, as **Šípoš & Plichtová** seem to think, that "all memory traces have equal strength." It implies that recollective experiences and memory performances always depend on synergistic ecphory, that is, on the joint effects of memory traces and retrieval cues. There are no good reasons to believe that the remembering of real-life events obeys different laws in this respect than does the remembering of miniature experimental events in the laboratory. Another comment that Šípoš & Plichtová make with respect to encoding specificity must also be questioned. It is true that strong associations in some situations facilitate recall even if they are presented only at retrieval, but it is equally true that in other situations they do not (Roediger & Payne 1983; Santa & Lamwers 1974; Thomson & Tulving 1970, Expt. 2). The encoding specificity hypothesis accommodates both of these outcomes, whereas some other explicitly stated theoretical ideas do not.

The third disagreement concerns **Šípoš & Plichtová**'s remark about the order of development of episodic and semantic memory. The issue is obviously important. It is also complex, and its resolution is likely to require a great deal of relevant evidence from many sources. The developmental shift from syntagmatic to paradigmatic associations may constitute a part of such evidence, but like many other observations in psychology, it can be interpreted in different ways. Thus, for instance, syntagmatic associations could be derived from children's memory for sentences they have heard, independently of any involvement of the episodic system, analogously with the phenomenon of source amnesia (Schacter, Harbluk & McLachlan 1984). The point is that mere ability to reproduce the contents of a perceptual input can not be regarded as adequate evidence for an intact episodic system, for reasons more fully discussed elsewhere (Schacter & Tulving 1982; Tulving 1983, pp. 29–31, 114).

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