韓國心理學會誌
Korean Journal of Psycholgy
1986. Vol. 5, No. 2 : 154－166.

Some Difficulties of Encoding Specificity Principle*

JUNG-HO KIM

KOREA UNIVERSITY

This paper examines the Encoding Specificity Principle (ESP) and the related retrieval model (Synergistic Ecphoric Model of Retrieval) and assumption of the distinction between episodic and semantic memory. With the examination some difficulties with ESP and the related retrieval model and assumption are discussed.

INTRODUCTION

One of the remarkable development in memory research has been accomplished by Tulving and his colleagues (e.g., Tulving, 1979; 1982; 1983; Tulving & Watkins, 1977; Tulving & Wiseman, 1975), who have investigated the mechanism of retrieval emphasizing the role of retrieval in memory phenomena. Especially they proposed a principle of memory, 'Encoding Specificity Principle (ESP)', asserting that "specific retrieval cues facilitate recall if and only if the information about them and about their relation to the to-be-remembered words is stored at the same time as the information about the membership of the to-be-remembered words in a given list" (Tulving & Osler, 1968, p. 599); or, in somewhat more elaborate terms, that "specific encoding operations performed on what is perceived determine what is stored, and what is stored determines what retrieval cues are effective in providing access to what is stored" (Tulving & Thomson, 1973, p. 359).

Such an emphasis on the role of retrieval in memory also has been put by other researchers since the early days of scientific research of memory. Their position was called as reinstatement principle (RP), and expressed in the following terms by Tulving and Thomson (1973) refering to Hollingworth (1928) and Melton (1963): "the success of retrieval depends on the completeness with which stimulating conditions present at input are reinstated at the time of attempted retrieval" (pp. 365-366).

From the above statements, we can hardly find any differences between ESP and RP. In fact, as Tulving (1983, p. 241) said, "sometimes experimenters and theorists who have accepted the concept of encoding specificity talk about it as if it were just a restatement of the old idea that retrieval depends on the extent to which original encoding conditions have been reinstat-

* I thank Dr. Chan-Sup Chung, Dr. Kyung Lin Kim, Dr. Yung Che Kim, Dr. Jung-Mo Lee, and Dr. Mahn-Young Lee for their helpful critiques. I also thank Sun-Joo Kim for her patient and understanding assistance during the completion of this article.

ed." But Tulving (1983) states that such a view is wrong. According to Tulving (1983, p. 242): "The encoding specificity principle is a general assertion that remembering of events always depends on the interaction between encoding and retrieval conditions, or compatibility between the engram and the cue *as encoded;* the reinstatement principle emphasizes the importance of the physical similarity between contents and processes at study and those at retrieval."

In short, Tulving's ESP is different from classical RP in that the former is based on the processing view that the physical entity (e.g., the copy cue) is not the same as the processed (e.g., the encoded cue, or the ecphoric information in Tulving's term). This view is regarded as a tenet of current cognitive psychology and often called as a constructive view. In other words, as Klatzky (1984) puts it; "Not all sensory information that impinged on the organism is retained, and whatever information is retained is colored by the interpretations that were given at the time" (p. 31). Besides Tulving's ESP is colsely related with the assumption of the distinction between episodic and semantic memory and an elaborate mechanism of retrieval called as synergistic ecphory. (These are parts of his recent model of episodic memory which was coined as General Abstract Processing System (GAPS), which will be discussed later.).

One of the merits of ESP over RP is the explanation of the phenomenon of recognition failure of recallable words (See Flexser & Tulving, 1978, 1982; Jones, 1978; Kintsch, 1978; Tulving & Thomson, 1973; Vining & Nelson, 1979; Watkins & Tulving, 1975; Wiseman & Tulving, 1976). The recognition failure phenomenon can be better explained by ESP than by RP because the former suggests that the reinstatement of the physical cue (or copy cue) does not guarantee that the copy cue is encoded to be compatible with or effective to retrieve the engram. ESP's explanation of the recognition failure can be regarded as the one of the most valuable things accomplished by current research. Tulving (1981) even showed that "[under] certain conditions, subjects in a forced-choice recognition task can discriminate between targets and distractors more accurately when the targets are similar than when they are dissimilar" (p. 479). With the results of this experiments, he emphasized the importance of the distinction between two kinds of similarity relations, i.e., ecphoric similarity (similarity between an ecphoric information and the stored information) and perceptual similarity of the physically present test items, in accounting for the phenomena of forced-choice recognition memory. In this regard, ESP has succeeded in broadening the boundary of memory research.

However, it seems that ESP has some difficulties in its definition. It has somewhat strict specification about the effectiveness of retrieval cue. In the definition of ESP cited before, it is important to notice "if and only if". It means that only encoded cues are effective and unencoded cues are ineffective. This strong assertion has caused many controversies among memory students. Besides, Synergistic Ecphory Model of Retrieval and the assumption of the distinction between episodic and semantic memory also seem to have some difficulties in explaining the memory phenomena. It is the main purpose of the present article to examine the difficulties of the definition of ESP and the related retrieval model and assumption.

ENCODING SPECIFICITY PRINCIPLE (ESP)

The Definition of ESP

Arguments around the definition of ESP. Several researchers have presented some data that indicate, contrary to ESP, unencoded cues are effective (e.g., Anderson & Pichert, 1978; Baker

& Santa, 1977; Kochever & Fox, 1980; Light, 1972; Marcel & Steel, 1973). Besides, before the advent of ESP, some researchers (Fox, Blick, & Bilodeau, 1964; Bilodeau & Blick, 1965) demonstrated the effectiveness of extralist cues, strongly related to target words on pre-experimental ground. According to ESP, it is not possible that unencoded cues are effective. The logic to settle down the controversy is simple: "If we assume that the features of cues useful for retrieval were not encoded, the results deny [ESP]; if we assume that they were, the results support [ESP]" (Tulving, 1983, p. 257). Yet the researchers have shown that extralist cues which are not present at encoding are effective to retrieve target words.

However, it seems not easy to prove or disprove ESP because Tulving supposes subjective coding is a covert and unobservable process and need not entail conscious awareness. He says the possibility of the effectiveness of extralist cues as follows: "Certain extralist retrieval cues might be effective, because appropriate coding of to-be-remembered words 'with respect to the cue' can occur at the time of the study even when the experimenter does not attempt to manipulate the coding and is not aware of its nature. The cues may not be present explicitly at the time of study, but because of the coding process they can be assumed to be present implicitly" (Tulving, 1983, p. 213). The problem is well exemplified by Solso (1974): "If a cue was effective in memory retrieval, then one could infer it was encoded; if a cue was not effective, then it was not encoded. The logic of this theorization is "heads I win, tails you lose" and is of dubious worth in the history of psychology. We might ask how long scientists will puzzle over questions with no answers" (p. 28).

For the circularity of reasoning inherent in it, ESP has been criticized by some researchers. The circularity makes ESP untestable and some memory researchers reluctant to accept it. But, as Tulving (1983, pp. 266-267) defends himself, lack of testability may not represent sufficient grounds for reservations about the usefulness of a general principle like ESP. Tulving (1983, p. 267) holds that "many perfectly respectable, and fundamentally significant, scientific ideas have been untestable, at least at the time when they were first proposed" (e.g., Darwin's theory of natural selection and Newton's first law of motion) and that "an 'untestable' principle is not the same thing as a principle for which there is no empirical support." We can agree with Tulving in that point. However, the genuine problem of the definition of ESP is not in the circularity or untestability but in the fact that it does not specify the effectiveness of retrieval cues.

The problem of the definition of ESP. When we are talking about the effectiveness of retrieval cues we mean the cues are something that have physical entities and are identifiable and, if possible, controlable. ESP, however, proposes that remembering of events always depends on compatibility between the engram and the cue 'as encoded' at retireval or, in Tulving's term, the ecphoric information. That is, the matched or compatible amount or/and kind of the ecphoric information determine the retrieval of the engram. This implies that *ESP defines the effectiveness of the ecphoric information, not the effectiveness of the retrieval cue itself.* Namely, ESP does not specify the effectiveness of the retrieval cue nor what determine the effectiveness of the retrieval cue.

To explain the effectiveness of the retrieval cue ESP should explain how the retrieval cue is encoded. If it fails in explaining that, it will be less important as a principle of retrieval. However, Tulving (1976; 1982; 1983) proposes an elaborate mechanism of retrieval, Synergistic Ecphory Model of Retrieval, which can be

thought to explain how the retrieval cue is encoded.

Synergistic Ecphory Model of Retrieval

As we have pointed out, Tulving's ESP is different from RP in that it is based on a constructive view, i.e., retrieval is the joint product of the engram and the retrieval cue. The constructive process of retrieval is called ecphory, or synergistic ecphory by Tulving. As he puts, "Ecphory is the (hypothetical) event-process that converts the relevant information in the retrieval environment and the (original or recoded) engram into ecphoric information" (Tulving, 1983, p. 175).

We should not, however, regard ecphory as retrieval. As Tulving insists, ecphory is "only one of the elements in the process of retrieval" (Tulving, 1983, p. 176). According to him retrieval is composed of two processes, ecphory and conversion. Conversion produces memory performance with ecphoric information and recollective experience caused by ecphoric information. Tulving's retrieval model is well illustrated in Figure 1 which reflects his General Abstract Processing System (GAPS).

It seems relevant here to discuss the nature of ecphory and conversion and especially explain the effectiveness of the retrieval cue. With this, the concept of the compatibility in Tulving will

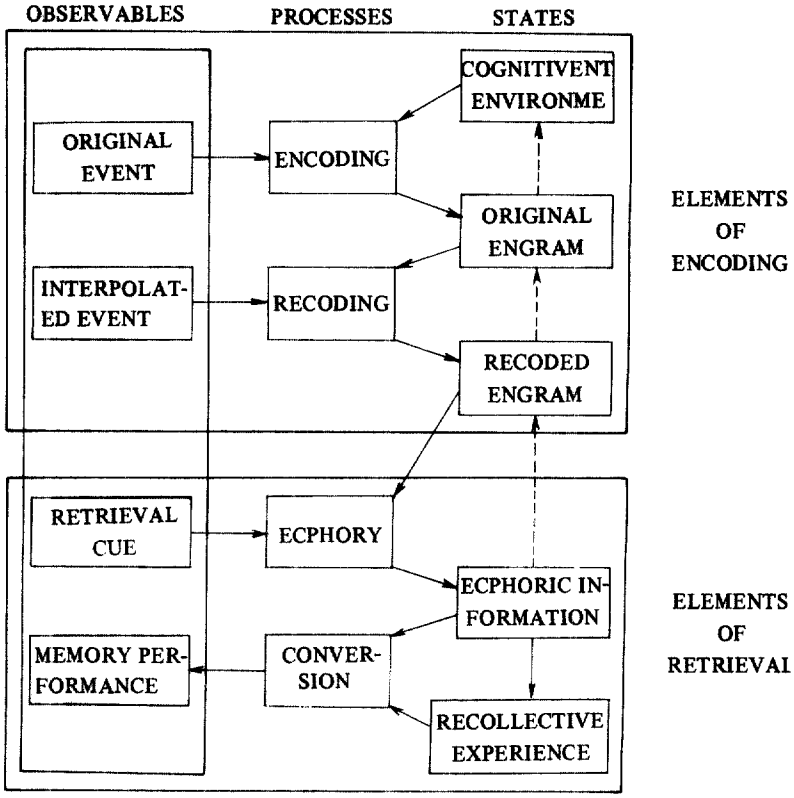

Figure 1. Elements of episodic memory and their relations in GAPS (General Abstract Processing System). Each arrow represents a relation that could be called 'influences', 'has an effect on', or 'brings about'. The broken arrows represent relations of the designated sort that will not affect the outcome of a given act of remembering but may influence the outcome of a subsequent one. Adapted from Tulving (1983).

be discussed because it is related to the retrieval process.

Ecphory. It is well illustrated in the following that Tulving's ecphory is based on the constructive view:

> The idea of ecphory as a synergistic process that *combines* information from two sources, the engram and the cue, is very similar to the ideas about the nature of remembering advocated by Bartlett (1932), Neisser (1967), Bransford and Franks (1971), as well as by some others. According to these ideas, remembering is not an activation of something that exists in the form of a latent disposition, whether this activation is complete or partial, nor is it like locating an object at an unknown location and then deciding that it is the one needed. Rather, it is a *constructive* activity that uses components from episodic memory (the engram) as well as semantic memory (the cue) and that results in a mental experience that the rememberer subjectively identifies as remembering an event. Ecphory is a *re*-constructive activity only in the sense that the rememberer feels the ecphorized event to belong to the past, and in the sense that sometimes psychologists think like rememberers; from the point of view of theory there is nothing *re*-constructive about it. (Tulving, 1983, p. 180)

However, his constructive point of view, at least, about retrieval process is somewhat different from that held by others. As Figure 1 makes it clear, encoding is a constructive process between the original event and the cognitive environment, but ecphory is a constructive process between the retrieval cue and the original or recoded engram. It is not clear why other cognitive environment besides the original or recoded engram and other retrieval events besides the retrieval cue are excluded in the retrieval process.[1)] In short, it seems that he does not include enough variables in the process of construction at retrieval.

In his proposal that "the immediate co-determinants of the characteristics of a particular assembly of ecphoric information include (a) the original or recoded engram, (b) the retrieval cue, or more generally, the retrieval information, and (c) the process of ecphory" and that "variations in any one of these three co-determinants can affect the composition of ecphoric information" (Tulving, 1983, p. 183), we can find that not only the engram and the retrieval cue but also the process of ecphory influences the formation of the ecphoric information. However, the process of ecphory is not clearly defined. Tulving (1983) just supposes that it "is 'automatic' in the sense that once the system is in the retrieval mode and the retrieval cue and the engram are given, the rememberer has little control over the product of the ecphoric process" (p. 190). And Tulving expresses that "I will assume [ecphory] entails an interaction between retrieval information (cue) and stored information (engram), but ... no one yet knows the nature of this interaction" (Tulving, 1983, p. 131). It is supposed that his ill-defined nature of ecphory is related to his incomplete constructive view. If he admitted that not only the retrieval cue and the engram but also the whole retrieval environment (or retrieval event) and the whole cognitive environment, he would not say that he as well as others does not know the

1) Tulving also might admit that more than the original or recoded engram and the retrieval cue are involved in the retrieval process but only consider the variables which influence directly the formation of the ecphoric information. Even in this case, however, it is not clear how to discriminate between the ecphory and the other retrieval process (besides the ecphory) which other variables (besides the original or recoded engram and the retrieval cue) influence and how different they are.

process of ecphory.[2)]

Tulving's admission that no one yet knows the nature of the process of ecphory seems too crucial for his ESP to be an effective principle of retrieval. As we might recapitulate, although ESP proposes that the amount or/and kind of match or compatibility between the engram and the ecphoric information determine the retrieval of the engram, ESP does not specify what determines the amount or/and kind because ESP does not clarify the process of ecphory which, ESP asserts, determines the amount or kind.

Conversion. As we mentioned before, Tulving's retrieval process consists of two parts, ecphory and conversion. As Tulving proposes, "conversion of ecphoric information and recollective experience into some other form completes the process of remembering an event" (Tulving, 1983, p. 189). "Such conversion, however, is not an obligatory part of the process of remembering, as are components such as encoding and ecphory" (Tulving, 1983, p. 189).

Tulving's conversion process was designated to explain the differences between recall and recognition. According to his earlier contention (e.g., Tulving, 1976), "recall and recognition differ only with respect to differences in the nature of retrieval information" (Tulving, 1983, p. 321). However, he found that the idea was not appropriate to explain the data from an experiment called the 'direct comparison' experiment and revised the idea with the elaboration of the process of conversion.

The direct comparison experiment is succinctly summarized in Eysenck (1984, p. 152);

> Two groups of subjects were presented with the same list of words under the same conditions, and were then given the same retrieval cues. The only difference between the two groups of subjects concerned the conversion requirements: One group had to produce the list words (recall group) to the retrieval cues, whereas the other group made recognition decisions to the same cues.
>
> According to Tulving (1983), the ecphoric information available to any given kind of retrieval cue should be the same for both groups, since both the encoding conditions and the retrieval cues were held constant. However, when the retrieval cues consisted of actual list words, recognition performance was significantly better than recall performance, suggesting that some process in addition to ecphory was determining performance. This additional process was identified as conversion. More striking evidence was obtained from an analysis of memory performance on retrieval cues that were strong associates of list words. It is plausible to assume that those associative cues that are most successful in leading to recall should be the ones producing the most ecphoric information, and, if so, the same cues should also be most likely to lead to erroneous recognition responses. In fact, the opposite result was obtained, and the implication again is that some process over and above ecphory must be involved.

However, as Eysenck (1984, p. 153) notes, it is not clear why these findings provide strong support for an extra conversion process to the process of ecphory. Tulving (1983) also considered another possibility to explain these findings. That is, "because of differences in task requirements, the nature of the ecphoric process was different for the two groups of subjects in [the] experiment" (p. 307). But he continued, "although such differences may have played a role in the experiment, there is little corroborat-

2) Alternatively, we can suppose; that the retrieval process is the interaction between the whole retrieval environment and the whole cognitive environment; that the retrieval process is not an independent factor influencing the formation of the ecphoric information but something determined only by the cognitive and retrieval environment; and that the formation of the ecphoric information can be explained in consideration of only the cognitive and the retrieval environment.

ing evidence for the hypothesis" (p. 307). And he considered it no more.

Here we can find Tulving's ill-suited application of his conceptualization which might reflects an inconsistency of his conceptualization. Namely, although, as we cited before, he proposed that the ecphoric information was determined by the original or recoded engram, the retrieval information, and the process of ecphory, he also supposed that the two groups of subjects in his direct comparison experiment produced the same ecphoric information only with the fact that the two groups of subjects encoded the same list (hence assuming that they had the same engram) and received the identical cue-sheets (or, the identical retrieval information), without considering the process of ecphory, or without considering the probable differences of the process of ecphory in the two groups.

The compatibility in Tulving: a reflection of his semi-constructive view. As we noted before, Tulving was successful in emphasizing the constructive process of retrieval. His constructive position, however, is not complete and this is especially clear in his notion of compatibility. He assumes compatibility between trace and ecphoric information which is "the product of the process of ecphory" (Tulving, 1983, p. 152). This means that he assumes that the ecphoric information which is constructed during retrieval is one thing and the trace is another or that the trace is not changed during the process of retrieval to be matched with the ecphoric information. This can be thought as a departure from the constructive view. Tulving still sticks to the notion of match and regards the retrieval process as combination of the constructive process and the non-constructive process.

Besides, his conceptualization of compatibility contradicts his other conceptualization. He assumes that "when [an] item occurs for the second time, an engram is formed of that event as of any other events, and that, is addition, the original trace may be recoded" (Tulving, 1983, p. 167). And he rejects the possibility that the second presentation of the item produces a separate engram independent of the original trace. It seems that this is a contradiction to the notion of retrieval that the trace is not changed during retrieval to be matched with the ecphoric information.

Tulving's conceptualization of compatibility is also at odds with his conceptualization of conversion, because he suggests, in his conceptualization of conversion, that "the view of retrieval simply as a matter of informational overlap between cues and traces must be rejected or revisited" (Tulving, 1983, pp. 307-308). This only makes Tulving's Synergistic Ecphory Model of Retrieval more complex and worse.

The difficulties in Tulving's conceptualization of retrieval or compatibility is found also in his failure in explaining the goodness of encoding or the encoding effect (e.g., Craik, 1979; Fisher, 1981; Fsher & Craik, 1977). He escapes from the issue as follows:

> At one point I had a minor controversy with Craik, concerning the problem of whether 'compatibility' of trace and cue information–what I now refer to as ecphoric information–alone is sufficient to describe and understand retrieval as I argued (Tulving 1979), or whether in addition to this compatibility it is also necessary to take into account the 'goodness' of encoding, as Craik and Fisher argued (Craik 1979; Fisher and Craik 1977). Our colleague, Daniel Schacter, was kind enough to point out to us that we were talking past each other and that there was no real disagreement. I was talking about the situation that existed *after* the act of retrieval was completed, in other words, taking as my starting point a particular bundle of ecphoric information. At that point, indeed, the goodness of retrieval cues and memory traces, considered separately, are immaterial; what

> matters is the extent to which the two have matched. Craik and Fisher, on the other hand, were talking about the situation existing *before* the beginning of what in GAPS is called the ecphoric process. At this point, a particular engram exists in the memory store, and whether or not it is going to be successfully retrieved, indeed, de pends on how good, deep, distinctive, or elaborate the engram is, as does its compatibility with potential retrieval cues. (Tulving, 1983, pp. 322-323).

Again, it is not clear what happens before the beginning of the ecphoric process. If he distinguish the retrieval process between before and after the process of ecphory, at least, his ESP and Synergistic Ecphory Model of Retrieval become less important as something explaining retrieval phenomena. All these shortcomings, I think, come from his semiconstructive view of retrieval or/and lack of integration of his notions.

The inconsistencies of Tulving's conceptualization in constructing his Synergistic Ecphory Model of Retrieval and his ill-defined nature of the process of ecphory which is about how the retrieval cue is converted into the encoded cue makes his ESP less important as a retrieval principle. In short, we can say Tulving has succeeded in being a constructivist but failed in being a full-fledged constructivist, which is reflected in his conceptualization of compatibility.

Episodic-Semantic Distinction

Tulving's ESP is closely related to the distinction between episodic and semantic memory. His ESP was formed to explain the effectiveness of the retrieval cue, with the conviction that "specific retrieval cues facilitate recall if and only if the information about them and about their relation to the to-be-remembered words is stored at the same time as the information about the membership of the to-be-remembered words in a given list" (Tulving & Osler, 1968, p. 599). And such information belongs to the episodic memory but not to the semantic memory.

He was right in indicating the differences between "an episodic-memory task" and "an free-association task". In the former, "a person is asked to study and remember an A-B pair of words [(e.g., *eagle*-BIRD)], and his knowledge of the pair subsequently tested by presenting word A as a cue for the recall of word B" (In this case the association between A and B was referred to experimental one by Thomson and Tulving (1970).), and in the latter, "we present to the subject the stimulus word A [(e.g., *eagle*)] and ask him to respond with the first related word that occurs to him [(e.g., BIRD)]" (Tulving, 1983, pp. 21-22) (In this case the association between A and the first related word that occurs to him was referred to pre-experimental one by Thomson and Tulving (1970).). Before Tulving noticed, "the idea that pre-experimental and experimental associations entailing identical terms [(e.g., eagle-BIRD)] are essentially the same across different situations [(i.e., the episodic memory task situation and the free-association task situation)]" (Tulving, 1983, p. 23) was so much a part and parcel of the theoretical thinking of the associative school. The idea was referred to the hypothesis of associative continuity by Thomson and Tulving (1970). And "the assumption that a given item was the same across situations was implicitly held by most theorists. For instance, the 'correct' item implicitly generated by the rememberer to a recall cue was assumed to be identical with the corresponding 'old' test item in recognition memory (e.g., Bahrick, 1969, 1970; kintsh, 1970)" (Tulving, 1983, pp. 23-24). This assumption was referred to as the assumption of transsituational identity by Thomson and Tulving (1970). "It was against this background of thought of associations as continuous between tasks, and items as identical across situations, that [Tulv-

ing] speculated about differences between episodic and semantic memory" (Tulving, 1983, p. 24).

I think it was Tulving's contribution to memory research that the clear differences were identified between the episodic-memory task and the free-association task. Unfortunately, however, I do not think such differences are necessary conditions to persuade memory students to believe in the different systems of memory, i.e., episodic and semantic memory systems. In fact, there have been hot and massive arguments between those who agree (e.g., Herrman & Harwood, 1980; Shoben, Wescourt, & Smith, 1978) and those who do not agree with the distinction (e.g., Anderson & Ross, 1980; Baddeley, 1984; Barsalou, 1982; Hintzman, 1984; McClosky & Santa, 1981; McKoon & Ratcliff, 1979; McKoon, Ratcliff, & Dell, 1985; Roediger, 1984; Schank, 1975).

I do not want to argue whether we have a unitary memory system or two functionally different memory systems. Through a long discussion about it, Tulving (1983) himself acknowledges that: "In the final analysis, whether one prefers an explanation couched in terms of a distinctive class of tasks or a distinctive memory system is a matter of intellectual taste and scientific style. As long as we are limited to psychological methods, the issue cannot be decided on empirical grounds" (p. 98).

What I do want to emphasize is that the distinction between episodic and semantic memory system is neither a necessary condition for ESP nor for explanation of retrieval phenomena. This will become clear with examining the changes in Tulving's conceptualization of episodic and semantic memory. This also can be partially an explanation and partially a reflection of his acknowledgement discribed above.

Particularly, the concept of semantic memory was reformulated. Reflecting the shortcomings of his earlier distinction between episodic and semantic memory (Tulving, 1972), Tulving (1983) confesses as follows:

> It is 'semantic memory' that in retrospect seems to have represented a less happy choice. Its connotations are simply not quite right for the realm of phenomena to which it is supposed to refer. In many ways a better expression would be 'knowledge of the world', which indeed has been used by many writers. (p. 28).

As for episodic memory, he expresses no changes of the concepts, or at least of the term episodic. He (Tulving, 1983) says: "The term 'episodic' seems to have caused relatively little difficulty, at least judging by the reaction to it. It does convey a reasonably accurate description of the kind of information or knowledge to which it refers: not only is 'episode' one of the synonyms of 'occurrence', it is also defined in the dictionary as 'an event that is distinct and separate although part of a larger series'. Thus we can think of a person's life as consisting of successive episodes as readily as we can think of the appearance of words, pictures, or other items in a to-be-remembered list as miniature episodes, embedded within a larger episode of reading or listening to the list" (p. 28).

However, as Tulving (1983) acknowledges, "Perhaps the most serious problem with the 1972 formulation of the distinction had to do with the lack of clear and definite ideas regarding the relation between autobiographical episodes and what might be called their 'contents' " (p. 29). Elsewhere we can also find that Tulving accepts the existance of semantic contents of episodes (Tulving, 1983, pp. 29-31, pp. 64-65, pp. 112-118, pp. 147-149). Nevertheless, he shows some inconsistency in his conceptualization of episodic memory. As one of features that distinguish episodic and semantic memory, Tulving suggests that episodic and semantic

memory have different sources of information; normely, episodic memory's source of information is sensation and semantic memory's is comprehension. However, the source of information of episodic memory need not be restricted to sensation. Episodic memory, or encoded episode should be something which includes anything processed at encoding (e.g., sensory-modality-specific information, associative information, temporal information, contextual information, and so on). If we once accept that the engram can include all possible information, to establish two different memory systems is neither necessary for ESP nor for explanation of retrieval phenomena.

Tulving's acceptance of the semantic contents of episodes also seems to deal a fatal blow on his rejection of the hypothesis of associative continuity and the assumption of transsituational identity. The semantic contents have their pre-experimental relations. Namely, every part of the contents have relations each other according to the pre-experimentally organized structure. Activation of one part of the contents may be helpful to activate certain other part but not the other parts of the contents. In addition, activation of one part rather than other parts of the contents may be more crucial to activate the whole contents. This means that: when an episode contains some semantic contents which have pre-experimental relations, the retrieval of the episode includes the activation of the contents and is affected by the pre-experimental relations. Moreover, if the hypothesis of associative continuity and the assumption of transsituational identity were wrong, there would not be the phenomena of reminding and we would not get anything from the past.

In the context of the above discussion Tulving's rejection of the hypothesis of associative continuity and the assumption of transsituational identity seems to be wrong. Once Tulving accepted the semantic contents of episodes, he should have recovered the hypothesis and the assumption which he rejected before. Because Tulving does not admit the hypothesis and the assumption, he seems to fail to explain or consider in his conceptualization the encoding effect which reflects pre-experimental relations of the contents of episodes.

CONCLUSION

With the above discussion we have come to the following conclusions. Frst, Tulving's ESP succeeded in emphasizing the constructive process of retrieval. That is, the retrieval cue is not the same as the processed cue (or ecphoric information), and what is important for successful retrieval is not the presence of the retrieval cue but how it is processed. That makes the critical difference between ESP and RP which emphasized the degree of physical similarity between the stimulating conditions at study and the stimulating conditions at retrieval for successful retrieval. Second, however, ESP has some difficulties to be an effective principle of retrieval because it (or its definition) does not specify effectiveness of the retrieval cue itself or how the retrieval cue is processed. Third, Tulving's Synergistic Ecphory Model of Retrieval designated to explain how the retrieval cue is processed into the processed cue (or ecphoric information) turned out to have some difficulties because the process of ecphory is not specified. Moreover, the model showed some inconsistencies in explaining memory phenomena. Finally, the assumption of the distinction between episodic and semantic memory as separate memory systems is neither a necessary condition for ESP nor any explanation of memory (or, at least, retrieval) phenomena. Besides, Tulving's rejection of the hypothesis of associative continuity and the assumption of transsituational identity which

were crucial rationale of the distinction between episodic and semantic memory caused the failure of explanation or consideration of the encoding effect in his conceptualization.

REFERENCES

Anderson, R. C. & Pichert, J. W. (1978). Recall of previously unrecallable information following a shift in perspective, *Journal of Verbal Learning and Verbal Behavior*, **17**, 1-12.

Anderson, J. R. & Ross, B. H. (1980). Evidence against a semantic-episodic distinction. *Journal of Experimental Psychology: Human learning and Memory*, 6, 441-65.

Baddeley, A. D. (1984). Neuropsychological evidence and the semantic/episodic distinction. [Commentary on E. Tulving, Precis of *Elements of episodic memory.*] *The Brain and Behavioral Sciences*, 7, 238-239.

Bahrick, H. P. (1969). Measurement of memory by prompted recall, *Journal of Experimental Psychology*, 79, 213-219.

Bahrick, H. P. (1970) Two-phase model for prompted recall. *Psychological Review*, 77, 215-222.

Baker, L. & Santa, J. L. (1977). Context, integration, and retrieval. *Memory and Cognition*, 5, 308-14.

Barsalou, L. W. (1982). Context-independent and context-dependent information in concepts. *Memory & Cognition*, **10**, 82-93.

Bilodeau, E. A. & Blick, K. A. (1965). Courses of misrecall over long-term retention intervals as related to strength of preexperimental habits of word association. *Psychological Reports*, **16** (monogr. Suppl. 6).

Craik, F. I. M. (1979). Human memory. *Annual Review of Psychology*, **30**, 63-102.

Eysenck, M. W. (1984). *A handbook of cognitive psychology*. Hillsdale, N. J.: Erlbaum.

Fisher, R. P. (1981). Interaction between encoding distinctiveness and test conditions. *Journal of Experimental Psychology: Human Learning and Memory*, 7, 306-310.

Fisher, R. P. & Craik, F. I. M. (1977). The interaction between encoding and retrieval operations in cued recall. *Journal of Experimental Psychology: Human Learning and Memory*, 3, 701-711.

Flexser, A. J. & Tulving, E. (1978). Retrieval independence in recognition and recall. *Psychological Review*, 85, 153-171.

Flexser, A. J. & Tulving, E. (1982). Priming and recognition failure. *Journal of Verbal Learning and Verbal Behavior*, 21, 237-248.

Fox, P. W., Blick, K. A., & Bilodeau, E. A. (1964). Stimulation and prediction of verbal recall and misrecall. *Journal of Experimental Psychology*, 68, 321-322.

Herrmann, D. J. & Harwood, J. R. (1980). More evidence for the existence of separate semantic and episodic stores in long-term memory. *Journal of Experimental Psychology: Human Learning and Memory*, 6, 467-78.

Hintzman, D. L. (1984). Episodic versus semantic memory: A distinction whose time has come and gone? [Commentary on E. Tulving, Precis of *Elements of episodic memory.*] *The Brain and Behavioral Sciences*, 7, 240-241.

Hollingworth, H. L. (1928). *Psychology: Its facts and principles*. New York: Appleton.

Jones, G. V. (1978). Recognition failure and dual mechanisms in recall. *Psychological Review*, 85, 464-469.

Kintsch, W. (1970). Models for free recall and recognition. In D. A. Norman (Ed.), *Models of Human Memory*. London: Academic Press.

Kintsch, W. (1978). More on recognition failure of recallable words: Implications for genera-

tion-recognition models. *Psychological Review*, **85**, 470-473.

Klatzky, R. L. (1984). *Memory and awareness.* New York: Freeman.

Kochevar, J. W. & Fox, P. W. (1980). Retrieval variables in the measurement of memory. *American Journal of Psychology*, **93**, 355-366.

Light, L. L. (1972). Homonyms and synonyms as retrieval cues. *Journal of Experimental Psychology*, **96**, 255-262.

McCloskey, M. & Santee, J. (1981). Are semantic memory and episodic memory distinct systems? *Journal of Experimental Psychology: Human Learning and Memory*, **7**, 66-71.

McKoon, G. & Ratcliff, R. (1979). Priming in episodic and semantic memory. *Journal of Verbal Learning and Verbal Behavior*, **18**, 463-80.

McKoon, G., Ratcliff, R., & Dell, G. (1985). A critical examination of the semantic/episodic distinction. *Journal of Experimental Psychology: Learning, Memory, and Cognition.*

Marcel, A. J. & Steel, R. G. (1973). Semantic cueing in recognition and recall. *Quarterly Journal of Experimental Psychology*, **25**, 368-77

Melton, A. W. (1963). Implications of short-term memory for a general theory of memory. *Journal of Verbal Learning and Verbal Behavior*, **2**, 1-21.

Roediger, H. L. III (1984). Does current evidence from dissociation experiments favor the episodic/semantic distinction? [Commentary on E. Tulving, Precis of *Elements of episodic memory.*] *The Behavioral and Brain Science*, **7**, 252-254.

Schank, R. C. (1975). The structure of episodes in memory. In D. G. Bobrow and A. Collins (Eds.), *Representation and Understanding.* London: Academic Press.

Shoben, E. J., Wescourt, K. T., & Smith, E. E. (1978). Sentence verification, sentence recognition, and the semantic-episodic distinction. *Journal of Experimental Psychology: Human Learning and Memory* **4**, 304-17.

Solso, R. L. (1974). Theories of retrieval. In R. L. Solso (Ed.), *Theories in Cognitive Psychology*. Potomac, Md.: Lawrence Erlbaum Associates Inc.

Thomson, D. M. & Turlving, E. (1970). Associative encoding and retrieval: Weak and strong cues. *Journal of Experimental Psychology*, **86**, 255-262.

Tulving, E. (1972). Episodic and semantic memory. In E. Tulving and W. Donaldson (Eds.), *Organization of Memory.* London: Academic Press.

Tulving, E. (1976). Ecphoric processes in recall and recognition. In J. Brown (Ed.), *Recall and recognition.* New York: Wiley.

Tulving, E. (1979). Relation between encoding specificity and levels of processing. In. L. S. Cermak and F. I. M. Craik (Eds.), *Levles of processing in human memory.* Hillsdale, N. J.: Erlbaum.

Tulving, E. (1981). Similarity relations in recognition. *Journal of Verbal Learning and Verbal behavior*, **20**, 479-496.

Tulving, E. (1982). Synergistic ecphory in recall and recognition. *Canadian Journal of Psychology*, **36**, 130-147.

Tulving, E. (1983). *Elements of episodic memory.* Oxford University Press.

Tulving, E. & Osler, S. (1968). Effectiveness of retrieval cues in memory for words. *Journal of Experimental Psychology*, **77**, 593-601.

Tulving, E. & Thomson, D. M. (1973). Encoding specificity and retrieval processes in episodic memory. *Psychological Review*, **80**, 353-373.

Tulving, E. & Watkins, O. C. (1977). Recognition

failure of words with a single meaning. *Memory and Cognition*, **5**, 513-22.

Tulving, E. & Wiseman, S. (1975). Relation between recognition and recognition failure of recallable words. *Bulletin of the Psychonomic Society*, **6**, 79-82.

Vining, S. K. & Nelson, T. O. (1979). Some constraints on the generality and interpretation of the recognition failure of recallable words. *American Journal of Psychology*, **92**, 257-276.

Watkins, M. J. & Tulving, E. (1975). Episodic memory: When recognition fails. *Journal of Experimental Psychology: General*, **104**, 5-29.

Wiseman, S. & Tulving, E. (1976). Encoding Specificity: Relation between recall superiority and recognition failure. *Journal of Experimental Psychology: Human Learning and Memory*, 2, 349-361.

(수정된 최종 원고 접수 : **1986. 6. 10**)