Chapter - 5

DISCUSSION
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The major thrust of the study was to know whether memory is a general system/process. If the implicit memory exists, is it distinct from the explicit memory? Whether the measures which are claiming themselves as the tests of implicit memory are represented by singular or unitary system of memory or still there is further possibility of having their separate systems.

One of the requirements of a phenomenon, that is the fact of existence, is its operationalization. Though implicit memory like view points are century old, but the concept has been organized only in 1980's (Schacter, 1987). As a result the proliferation of its measures is still continuing. Some of the prevalent ones are variety of priming effects, the accuracy and latency of correct scores, saving scores, total time, slope-lag effect, errors, consistency score, number of associates, verbal report, behavioral data, neurophysiological responses as GSR, conditioning measures and evaluative responses etc. (Richardson and Klavhen and Bjork 1988). Thus, due to the number of tasks used in the present study, the choice of dependent scores was also a problem. One of the difficulty posed was the scale variability across the tasks (e.g., Mitchell, 1989). This may be one of the reason that correlational approach is avoided to study the relationship among various implicit and explicit tasks. Ultimately, the accuracy and latency appear to be common dependent measures. A proof to implicit memory is that prior exposure to the test stimuli generally increases accuracy and/or
decreases latency. The phenomenon is known as direct or repetition priming. The results support the viewpoint that prior exposure significantly reduced the latency in all the tests except the word identification. The reason that why there was no significant decrement in response latency of targets in comparison to base line words in the word identification may be that by instruction it was speeded perceptual task, moreover, base line as well as target words were already in the semantic and syntactic store of the subject. It was also observed that in the recognition task response latency of old and new items recognized correctly did not differ significantly. Thus, it appears that response latency advantage is a phenomenon typical of implicit memory.

Direct priming in case of accuracy could not be used in the study because the nature of the material was such that accuracy rates were very high in base line as well as in targets owing to the high commonness/familiarity of the material. Such material was intentionally selected because the same subject was to be repeated at number of tasks as the correlational approach was followed in the study. Therefore, memory score was taken as the number of items solved correctly with response common to the study material. Since the nature of response varied from task to task, it was found that performance of subjects varied greatly, e.g., mean of 3.25 out of 10 in word completion task and nearly 100% in lexical decision. However, in lexical decision and word identification, the subject was not required to refer back. Therefore, if the mean performance of implicit score is seen in
all the implicit tasks it was to the tune of about 70%. In those tasks where subjects utilized or generated words/associates, about 50% of the studied material was used. If compared from the performance in recall and recognition, significant differences were observed. However, in comparison to recognition (except lexical decision, word identification) implicit memory performance was poor. On the other hand, when compared with recall, (except word completion from tail end) the performance was better. Recognition performance was also significantly better than recall, a consistent finding in the area (Anderson & Bower, 1972; Gillind & Shiffrin, 1984; Lockhart, Craik and Jacoby, 1976; Ogilive, Tulving, Paskowitz and Jones 1980; Postman, 1963; Ratcliff, 1978). Therefore, it is not always that implicit performance would be poorer than the explicit performance or that is little improvement due to study (Berry & Brodbent 1958).

The critical factor seems to play its role is the intentional/conscious effort put at the acquisition or/at the retrieval. In the present study even the recall & recognition study material was presented incidentally similar to implicit measure. It may be one of the factor that no-directional differences between implicit-explicit tasks could be obtained. Contrary to often repeated finding in the area of implicit memory that the individualistic variabled play little role (Light & Singh, 1987, Raber, Walkenfeld and Ruth 1991). For most of the measures the distribution was not mesokurtic and symmetrical. As a result T Conversions were made for the analysis. But the question is this much is talked about low variability in implicit performance
than why such distributions were obtained. Low variability itself may cause flatness or peakedness of the distributions depending upon the difficulty of the tasks, study conditions, for example, generation (deeper LOP), the mean performance was asymmetrical as well as peaked. If the task demands are high and study conditions are poor, again the distribution would be asymmetrical and flat. The high variability observed in many tasks, may be due to the variability in the preexisting knowledge and semantic store and some other individual characteristics other than conventional variables tried in the area of explicit memory like age, neuroticism, intelligence. (Light & Singh, 1987; Raber & Walkenfeld and Ruth 1991; Russo and Parking 1991;).

The findings of factor analyses reveal a possibility that implicit memory tasks belong to a system or sub-systems distinct from recognition (an explicit memory system). The most significant factor in the factor structure was the recognition factor. The distinctive feature of the task is conscious/intentional reference to the study material at the time of recognizing old and new. Since the subject is visiting the study episode at the time of retrieval, it may be an episodic system (Tulving, Schacter & Stark 1982). A great number of findings are there which show the dissociations between implicit and explicit memory tests over the variables as encoding, presentation modality, retention interval and proactive and retroactive interference (Eich, 1984; Graf etal, 1985; Graf & mandler, 1984; Jacoby & Dallas, 1981; Jacoby & Witherspoon,1982; Roediger & Blaxton,1987). Other studies were also showing the
stochastic independence between the implicit and explicit tasks, 
(Hayman & Tulving 1982; Schacter & Graf 1986a, 1986b). On the 
other hand, many studies report association in recognition and 
various implicit tasks. (Johnson Dark & Jacoby, 1985; Mandler & 

Factor analysis of the implicit score also show that 
implicit tasks did not load on a single factor. but three to 
four factors were observed in the structure. The literature 
offers a dichotomous classification in terms of perceptual-
conceptual or data driven-conceptually driven (Roediger, 
factors were not observed the dichotomous classification to the 
studied eight implicit memory tasks did not describe the 
structure. Therefore, a grouping of more than two categories may 
be considered either as subsystems or simply a group of certain 
processes e.g. Richardson, Klavehn & Bjork, (1988) suggested that 
indirect tests may be categorized as conceptual, factual, lexical 
and perceptual knowledge.

When elementary component processes of the tasks under 
various factors were analyzed, it was found that there were 
certain typical retrieval processes which were important. For 
example, Factor-I of latency advantage analysis was termed as 
activation of associative structures-retrieval processes. Giving 
an associate (response word. to a word stimulus), implicit liking 
of word out of two and solution of anagrams refer to the 
associative structures. The study material helped to activate 
the required associative structures. All the three tasks under
this group were partly data driven and therefore, the retrieval process goes as deep as the associative structures are lying. For example, in all the three tasks of anagram solution, paired association and in implicit liking stimulus words trigger the associative structures. As in the Figure-1 search driving may be in either direction. Therefore, study activates the associative structure and accordingly driving takes the depth and direction (Chumbley & Balota, 1984; Kihlstrom, 1980; Schacter, 1985; Graf, Shimamura & Squire, 1985).

The kind of stimulus or material may be another critical factor which can group the implicit tasks, e.g., some may deal with words, figures, pictures or numerals etc. Thus, implicit tasks could be categorised on the basis of domain to which they are referring. Factor-II tasks were referring to the lexical domain, as the retrieval process search was in the lexical domain. It may be unidirectional, for example, in lexical decision task or it may have converged search processes, for example in word stem completion. It was multidirectional in word fragment completion as the search process diverges in different directions. (Fig.2). Tulving (1984) refers the implicit tasks to the semantic memory. Mitchell (1989) has also obtain a separate semantic factor in the study.

Emergence of the another factor within the lexical domain with word identification and word completion from tail further led to hypothesis a different kind of retrieval process, that is, forward and backward direction. As and when word is to be identified then first it has to be perceived and then pronounced.
When the word is to be completed from the tail-end, search process drives for stem and then retrieves back to tail, if it fits, the word is pronounced. Thus the search process at the time of retrieval may take different direction and depth. Encoded material or study helps the search processes to find the response or by surfacing the stems and tails (words). Thus, there is possibility of grouping between tasks in the lexical domain implying importance of processes.

Another factor analysis with different dependent measure yielded some more groupings. A task specific word fragment completion factor was also obtained, which highlighted its own unique retrieval processes. Though, in other analysis it has loaded with other lexical domain tasks. The divergence of search process in word fragment completion task is typical in the beginning. Although the task is data driven but with every single blank filled becomes more data driven. Fragment itself is a weak cue and with subsequent filling in the blanks in the fragment it becomes stronger and stronger. There is possibility that one may fill all the blanks simultaneously and then decide about its lexicity. If it is a non word then one may return back to the lexical store to fill the blanks into the word. Our findings were also supported by Hayman & Tulving (1989), Witherspoon & Moscowitch (1989), who found in their studies that word fragment completion is such a test that two non overlapping letter sets different processes may underlie. Further it was also found statistically different from the word identification task. Therefore, the role of task specific processes were
highlighted. Hintzman and Hartry (1990) have also discussed the implication of various subsets in fragment completion task.

Associative-perceptual axis driven retrieval processes were also observed in the second factor analysis with lexical decision, paired association and anagram solution. Data driven tasks like word stem completion and word identification were also appeared on a separate factor. Implicit liking & word completion from tail were also paired, separately. Thus, the grouping or pairings of implicit tasks were multiple and inconsistent.

By and large, it appears that process specificity or similarity particularly at the retrieval stage are important for the categorization or relationship of implicit memory tasks. There is a high degree of variability in response requirement in the implicit memory tasks. For example, in lexical decision tasks subject has to say whether it is a word or not. On the other hand, in word fragment completion task subject has to generate a word with the help of a fragment. Obviously retrieval process would be driven differently. Thus, the direction and the depth and domain to which these retrieval processes are addressed become important. If the study process has activated the retrieval process specific code that is in the same domain, at the same depth and in the same direction than matching would occur, consequently the increment in accuracy and decrement in latency advantage would occur. Thus, encoding retrieval interaction is taking place (Miller, 1956; Mandler, 1968; and Tulving 1962). If there is any mismatching then there is no increment in the accuracy & decrement in latency advantage. It
is a phenomenon which has been evidenced in number of studies of memory, (Graf & Mandler, 1984; Jacoby & Dallas, 1981; Schacter and Graf, 1986a; Winnick and Daniel, 1970). Thus, same processes may be applicable in the implicit memory which are hither to known to occur in the explicit memory. For example, level of processing effect also operate in implicit memory (Challis & Brodbeck, 1992; Roediger & Blaxton, 1987). Therefore, a system is of course a set of number of elementary component processes (Tulving, 1985). It is premature to say that the elementary component processes of implicit memory tasks are a different set than the set of explicit memory, and therefore they belong to different systems.

Here, the discussion restricts only on the basis of the similarities and differences of retrieval processes despite the discrepant acquisition processes on LOP dimension. Although in the acquisition process, there were number of similarities across the tasks such as overt behavioral responding, incidentality, exposure time, but the only dis-similarity was of encoding. As in the earlier studies (Stephens, 1990; Roediger, Weldon & Challis, 1989), LOP effect was thought to be independent of implicit memory tasks, that is why our design was such that some type of tasks were of reading type while in other tasks encoding of material was generation type. This difference was manipulated intentionally so as to avoid the monotony as the requirement of the design was repeated conditions on the same subjects. Now enough evidences are empouring in and indicating read/generate conditions effect in the implicit memory tasks
It may be one of the major reason of the variance between the tasks unexplainable in the factor analysis. This may be the reason for the poor correlations also. This gap could be filled in the future research by ensuring perfect similarity in the acquisition phase among implicit memory tasks.

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