Chapter - 1
INTRODUCTION

Over the years, the study of implicit and explicit memory has achieved special prominence in experimental psychology. Psychological studies on human memory have traditionally been dependent on standard memory tests such as free recall, cued-recall, and recognition. These memory tests have their own characteristics. They require subjects to recall earlier learned items in a conscious or deliberate manner. However, memory can also be expressed by facilitated performance on tests that do not require conscious recollection of the informations encoded in a specific learning episode.

Instead of being asked to try to remember recently presented informations, subjects simply require to performe a task such as word fragment completion (e.g. Warrington & Wieskrantz, 1974; Graf, Mandler, & Haden, 1982), Word identification (e.g. Jacoby & Dallas, 1981, Feustel, Shifrin & Salasoo, 1983; Jacoby 1983), lexical decision (e.g. Mckoon & Ratcliff, 1979; Scarborough, Gerared, & Cortese, 1979), free association (e.g. Shimamura & Squire, 1984; Schacter. 1985 ), and reading of mirror inverted script (e.g. Kolers. 1975. 1976). The former type of memory is called explicit memory while later type of memory is called implicit memory. (Graf & Schacter, 1985, 1987; Schacter & Graf, 1986a, 1986b). Thus explicit memory refers to conscious recollection of recently presented information, as expressed on traditional tests of free-recall, cued-recall, and recognition whereas implicit memory refers to expression of recently presented information without conscious or deliberate recollection on certain priming tests.
The dissociation between priming tests like word completion and standard memory tests such as recall and recognition, is attributed to different informational requirements (Graf, Mandler, & Haden, 1982). In a word completion test, for instance, subject receives first three letters of a word studied in a learning episode and he is required to write the first word that comes to mind which produces an acceptable completion. The partial presentation of the word activates schema component of all relevant words, this activation spreads more rapidly to the missing component of the target word. A standard memory test such as recall and recognition, on the other hand, requires retrieval of the words that have recently been presented. Recall is determined by the success of the search process which depends on the available paths to the target words (Graf & Mandler, 1984). Cued recall is closely related to word completion test. Both tests present some cues to the subjects which facilitate their performance. However, these tests are sensitive to different aspects of memorial representation. Word completion is concerned with integrative process that makes word more accessible, whereas cued recall is sensitive to elaborative process that helps retrievability (Graf & Mandler, 1984). In their study, Graff & Mandler (1984) and Nelson et. al (1987) compared the performance in word completion Vs free recall; word completion Vs recognition; and word completion Vs cued recall, under semantic and non-semantic processing. They hypothesized that semantic processing of the task would help the recall performance since subjects would be encouraged in their attempt of retrieval in addition to sheer reproduction of highly accessible words, and on the other hand, non-semantic processing would have detrimental effect on recall performance. Results of their study confirmed their
hypothesis. This pattern of findings elucidate that word completion (priming test), and recall and recognition (standard memory test) are the measures of two different kinds of memory. It would be worthwhile to have a glance here at historical background of implicit memory.

Descartes, the author of "the passions of the soul" (1649), was the first man who made a clear reference of implicit memory. He observed that a frightening or aversive childhood experience may "remain imprinted on his brain to the end of his life" without "any memory remaining of it afterwards" (Haldane & Ross, 1967 p. 391). Descartes did not, however, elaborate on the philosophical consequences of this phenomenon. A systematic doctrine of implicit memory was developed by Leibniz (1704). He emphasized the importance of "insensible" or "unconscious" perception: ideas of which we are not consciously aware but which do influence behaviour (Leibniz 1916).

Following Leibniz, Maine de Biran (1929), a French philosopher, discussed systematically the phenomena of implicit memory. Maine de Biran studied human behaviour and thoughts through analysis of habit and highlighted the unconscious acts of human behaviour. According to him, a repeated activity can execute a habit automatically without awareness of the act itself and without awareness of the previous episode in which the habit was learned. The most striking feature of Maine de Biran system, however, was coining of a taxonomy of memory system. He classified memory system under three categories: mechanical, sensitive, and representative. The first two types of memory refers to the unconscious or implicit expression of repeated movement (mechanical) and feelings (sensitive), the third type (representative) is involved in conscious recollection.
of ideas and events (pp. 150-157). Thus according to Maine de Biran:

"If signs (in Maine de Biran system a sign is motor response code) are absolutely empty of ideas or separated from every representative effect, from whatever cause this isolation may arise, recall is only a simply repetition of movements. I shall call this faculty for it mechanical memory. When the ... recall of the sign is accompanied or immediately followed by the clear appearance of a well circumscribed idea, I shall attribute to it representative memory. If the sign expresses an affective modification, a feeling or even a fantastic image whatsoever, a vague uncertain concept which can not be brought back to sense impression ... the recall of the sign ... will belong to sensitive memory (p. 156)".

Various 19th century thinkers were mainly concerned with the problem of unconscious mental processing (Cf. Ellenberger, 1970; Perry & Laurence, 1984). Carpenter (1874) delineated the concept of unconscious cerebration to refer the mental activities that occurs outside the awareness: "The ideas which have passed out of the conscious memory, sometime express themselves in involuntary muscular movements, to the greater surprise of the individuals executing them..." (1874 pp. 524-525).

Ewald Hering, in 1870, introduced the idea of organic and unconscious memory (Hering 1920), he criticised the writers who restricted their analysis to conscious or explicit memory. Memory refers to the capacity of intentional reproduction of ideas or series of ideas. Hering emphasized on the necessity to consider the unconscious memory which is involved in involuntary recall, the development of automatic and unconscious habitual actions and even in the process of autogenetic development and heredity.
By the end of 19th century, systematic empirical and theoretical analysis of implicit memory developed in five different areas: "Psychical" research, neurology, psychiatry, philosophy, and experimental psychology.

**Psychical Research:**

Psychical researchers of late 19th century were the first to document implicit memory in the light of controlled empirical observations. Crystal ballgazing and automatic writing were employed as two tests of implicit memory. These tests did not require subjects to make explicit reference; they simply had to perform a task: either to report what they "saw" in the crystal or wrote whatever came to mind (Binet, 1890; Barkworth, 1891; Prince, 1914).

**Neurology:**

Dunn (1845) described a case of amnesic women who learned how to make dress, even though she apparently did not explicitly remember that she had made any dress. The observed phenomena was similar to implicit memory, although Dunn did not discuss the theoretical implications of his observations. The first theoretical implication of implicit memory in neurological case was given by Sergei Korsokoff (1889). He described amnesic syndrome in one of his two classic papers. He observed that ... "although the patient was not aware that he preserved, traces of
impressions that he received, those traces however probably existed and had an influence in one way or another on the course of ideas, at least in unconscious intellectual activity" (1889 p. 512). Memory traces of amnesic patients, according to Korsokoff, are not strong enough to enter the conscious memory but they can affect behaviour unconsciously. Korsokoff emphasized that his observations had important implications for psychologists. Over twenty years later Claparede (1911/1951) reported observations that were similar to Korsokoff's. He interpreted implicit expression of memory in terms of a disconnection between The ego and memory trace.

Psychiatry:

In late 1880s and early 1890s, P. Janet and S. Freud observed and reported the phenomena of implicit memory in patients suffering from hysterical amnesia as a result of emotional trauma.

In the light of studies of several cases of amnesic patients, Janet (1904) concluded that hysterical amnesia consists of two key factors: (1) "the inability of the subject to evoke memories consciously and voluntarily and (2) the automatic, compelling, and untimely activations of these same memories" (p. 24), like Janet, Freud also emphasized the importance of unconsciousness. He argued that unconscious memories exert powerful influence on behaviour. His concept of unconscious memories played an important role in psychopathology. Like Janet and Freud, an American Psychiatrist Morton Prince (1914) also recognized the importance of implicit
memory for normal cognitive functions. On the basis of his observations of implicit memory from work on hysterical patients, hypnosis, dreams, and automatic writing, Prince concluded that "... a conscious experience that has passed out of mind may not only recur again as conscious memory, but may recur subconsciously below the threshold of awareness" (p. 8).

**Philosophy:**

Henri Bergson (1911) made a substantial contribution to the analysis of implicit memory in early 20th century. His views are consistent with Main de Biran, although he did not discussed about him in his writings. Henri Bergson (1911) argued that "the past survive under distinct forms: first in motor mechanisms; secondly, in independent recollection" (Matter and memory p. 87). According to him the motor mechanisms make no explicit reference to any specific past event that influence the habit and skills of individual while the second form of memory, i.e. independent recollections, refer to the explicit remembering of past events.

**Experimental Psychology:**

In late 19th and early 20th centuries, the phenomena of implicit memory was not elucidated by experimental psychologists. Though almost all experimental psychologists made no attempt to distinguish between implicit and explicit memory; however, some exceptions can be found. For instance, Ebbinghaus (1885) acknowledged that not all effects of memory are expressed in conscious awareness (1885, p. 2). He observed a saving over 24 hours retention interval for items that were not consciously remembered having studied before.
Ebbinghaus's saving paradigm, in which memory is tested by relearning previously studied list, can be viewed more generally as an implicit memory test: explicit recollection of prior episode or list is not called for during relearning (Slamecka, 1985b). Ebbinghaus pointed out that one advantage of saving method was that it could provide the evidence for the existence in memory of information that could not be recollected consciously (1885, p. 8). Consequently a large number of subsequent investigators used saving method to analyze learning and transfer of training and their work can be perceived as the study of implicit memory (Slamecka, 1985b).

After Ebbinghaus, it was W. McDougall (1924) who became the first investigator to use the term implicit and explicit with reference to the different ways in which memory can be expressed. He distinguished between explicit recognition and implicit recognition. According to him the former involves conscious recollection of a past event whereas the later involves change in behaviour that is attributable to a recent event yet contains no conscious recollection of it. Later on, other investigators like Thorndike & Rock (1934) and Hull, (1933) also recognized the existence and importance of implicit memory. Thorndike & Rock demonstrated that subject could learn various rules without conscious awareness of them or explicit memory for them. Hull, on the other hand, provided numerous demonstrations of implicit memory for skills, condition responses, and facts acquired during hypnosis.

Recent experimental and neuropsychological researches have documented a variety of striking dissociation between implicit and explicit memory.
which have demonstrated that under certain conditions, implicit and explicit memory can be entirely independent of one another. It has been observed by numerous investigators that implicit and explicit memory are affected differentially by several experimental variables such as sub-liminal perception, amnesia, type of study processing, modality-change, duration of retention interval, retroactive and proactive interference and age.

Subliminally encoded stimuli have revealed the phenomena of implicit memory without explicit reference of them. Although early studies have severely been criticized (Eriksen, 1960), recent researches purporting to elucidate implicit memory, using a variety of new experimental techniques, have demonstrated that stimuli that are not represented in subjective awareness are nevertheless processed to high levels by the perceptual system (e.g. Fowler, Wolford, Slade, & Tassinary, 1981; Dixon, 1981; Marcel, 1983; Cheesman & Merkle, 1986). Holender (1986) criticized these studies on the ground of methodological deficiencies. However, several other studies relevant to the present concern, have also demonstrated that the stimuli that are perceived without awareness, can not be explicitly remembered, but have influence on subsequent behaviour and performance on task that do not require conscious recollection such as free association (Haber & Erdelyi, 1967; Shevrin & Fritzler, 1968; Shimamura & Squire, 1984) and imaginative story and fantasy productions (Giddan, 1967; Pine, 1960). Kunst-Wilson & Zajonc (1980); Scamon et al. (1983); and Wilson (1979) also emphasized that subliminal encoding of stimuli have detrimental effect on explicit memory but little or no effect on implicit memory.

Bargh, Bond, Lombardi & Tota (1986) presented subliminally various other type of words and observed similar implicit effect. Lewicki (1985) found
that after subliminal exposure to adjective noun pairs (e.g., old tree) subjects tended to choose the previously exposed adjectives in response to the question concerning how they "felt" about the noun (e.g., is a tree big or old?).

Somewhat recently, Eich (1984) measured implicit memory in a different way. Attenuating conscious perception of target words, through a specific device, Eich yielded data consistent with the foregoing results.

Results from the studies of amnesia also seem to provide the evidences for the fundamental differences between implicit and explicit memory. Amnesic patients are unable to remember explicitly new informations (Rozen, 1976; Moscovitch, 1982; Weiskrantz, 1985; Squire, 1986). Amnesic patients are found to be severely impaired on explicit recall and recognition tests and are usually disabled in their daily lives to the point of needing supervisory care. Despite these disabilities, amnesic patients preserve some form of learning and memory without awareness of the sources of information. Amnesic patients can acquire and maintain in a normal fashion the skill of reading words from a mirror reversed display, without remembering either the particular words that were read or the fact that the skill had been practiced on previous occasions (Cohen & Squire 1980). Similar kind of memory in amnesic patients was observed by Cohen & Squire (1982a) Moscovitch (1982); and Squire (1982b). Some other kinds of skills in amnesic patients like puzzle solving (Brook & Baddeley, 1976), rule learning (Kinsbourne & Wood, 1975) and serial pattern learning (Nissen & Bullemer, 1987), was observed.
Studies of amnesic patients have documented a large amount of evidences about the dissociation between implicit and explicit memory. Repetition priming effect is another major area of research in amnesia which have confirmed the existence of implicit memory in amnesic patients as well as in normals, which is entirely different from explicit recall and recognition. Warrington & Weiskrantz (1968; 1970; 1974; 1978) conducted a series of studies to observe the phenomena of implicit memory in amnesic patients. These authors found that amnesic patients could show normal retention of a list of familiar words when tested with word-stem or fragment cues, whereas some patients were profoundly impaired on free recall and recognition tests. Warrington and Weiskrantz (1968) noted that patients often did not remember that they had been shown any study list items and treated the fragment test as a kind of "guessing game". In subsequent research, using the fragment cuing procedure, amnesic patients performance was found to be more impaired than those of control subjects (e.g. Squire, Wetzel, & Slater, 1978).

Similarly, numerous investigators have found that amnesic patients show impaired explicit memory but their implicit memory remain intact. They have, therefore, argued that different processes operate in explicit and implicit memory (Graf, Mandler, & Haden, 1982; Jacoby & Weitherspoon, 1982; Graf, Squire & Mandler, 1984; Cermac, Talboot, Candler, & Walborst, 1985; Graf & Schactor, 1985).

Studies of repetition priming effect, discussed so far in amnesic patients, have their own limitations regarding the study material that consisted items with integrated or unitized pre-existing memory representation.
such as common words, linguistic idioms, or highly related paired associates. Recent several studies purporting to demonstrate whether or not amnesic patients will show normal priming for novel information, that does not have any pre-existing representation as a unit in memory, such as nonwords or unrelated paired associates, have not obtained the results consistent with each other. A group of investigators have demonstrated that amnesic patients do not show priming of nonwords (e.g. Cermak et. al, 1985; Diomond & Rozen, 1984) Graf & Schacter, 1985; and Schacter & Graf, 1986b), whereas another group of psychologists obtained normal implicit memory in amnesic patients for unrelated words (e.g. Moscovitch et. al, 1986).

Results from the studies of amnesic patients are strong enough to provide evidence for the dissociation between implicit and explicit memory. However, studies using other experimental variables have also demonstrated a distinction between implicit and explicit memory. For instance, Murrel & Morton (1974), Osgood & Hoosain (1974) reported a differential effect of morphologically and visually or phonologically similar words on implicit and explicit memory. They have reported that morphologically similar words facilitate implicit memory while visually or phonologically similar words have detrimental effect on implicit and explicit memory. Similarly Sandra (1990) observed that morphologically similar words have facilitative effect on implicit memory under certain condition. On a lexical decision task, he found that morphems might only be accessed if no other lexical representation match the orthographic description of the parsed stimulus part. Khan (1990) also examined the effect of phonemic and semantic
Similarity of the task on implicit and explicit memory. Results clearly revealed a dissociable implicit and explicit memory performance. Phonemic similarity had greater detrimental effect on implicit memory than semantic similarity of the task, whereas semantic similarity had more pronounced adverse effect on explicit memory than phonemic similarity. Greene (1990) found that explicit memory decreases as a function of spacing between synonyms while implicit memory remain unaffected by such manipulation.

Variation in level or type of study processing has been extensively used as an experimental variable in the studies of implicit and explicit memory. These studies have established beyond doubt that variation in level or type of processing have differential effect on implicit and explicit memory. More specifically it has been demonstrated that elaborative study processing facilitate explicit memory whereas implicit memory remain unaffected (Winnick & Daniel, 1970; Craik & Tulving, 1975; Jacoby & Dallas, 1981; Graf et. al, 1982; Graf & Mandler, 1983; Schacter & Graf, 1986; Schacter & McGlynn, 1987; Parkin, Reid & Russa, 1990).

The dissociation between implicit and explicit memory may also be demonstrated by the effect of study-test change in modality of presentation and other type of surface information. Modality change from study (auditory) to test (visual) has a detrimental effect on implicit memory whereas the explicit memory remains unaffected (e.g. Kirsner & Smith, 1974; Kolers, 1975, 1976; Scarborough et. al, 1979; Jacoby & Dallas, 1981; Clark & Morton, 1983; Kirsner et. al., 1983; Graf, Shimamura & Squire, 1985; Roedger & Blaxton, 1987; Roedger & Weldon, 1987).
Most of the studies using duration of retention interval as experimental variable, also provide evidence for dissociation between implicit and explicit memory. A large number of investigators have found that delays of days and weeks have no effect on implicit memory while explicit memory is inversely related with the duration of retention interval (e.g. Jacoby & Dallas, 1981; Tulving et. al, 1982; Forster & Davis, 1984; Graf & Mandler. 1984; Graf et. al, 1984; Komatsu & Ohta, 1984; Shimamura & Squire, 1984).

Graf & Schacter (1987) examined the effect of interference manipulation on implicit and explicit memory for normatively unrelated words. Their findings showed that interference affected explicit memory, as indexed by performance on cued recall, pair matching and modified free recall test, but it did not affect implicit memory, as indexed by performance on a word completion test. This pattern of result complements several previous findings on performance dissociation between implicit and explicit memory for new associations.

Age differences have also been considered as the powerful factor to affect the memory. Gilbert (1941) found a decline in performance with age on a variety of learning and memory tasks. Burke & light (1981); Craik (1977, 1983) Craik & Rabnowitz (1984) observed a decrement in memory for new informations across the adult years. Those studies were restricted to the domain of explicit memory measures. The age related deficit in memory was obtained through the traditional memory tests such as recall & recognition. In a recent study light & Singh (1987), Khan & Saedduzzafar (in press) examined implicit and explicit memory in young and older adults. They observed a significant age related decrement in performance on the traditional measures of memory, while
implicit memory was unaffected across the age.

Further evidence in favour of dissociation between explicit and implicit memories has been provided by recent studies using new experimental variables. Graf & Ryan (1990), for instance, demonstrated a dissociable performance on implicit and explicit memory tests by displaying words for study and testing in two visually distinct formats. The results showed larger priming effects when the study and test formats were the same rather than different. Most recently Richards & French (1991) examined the effect of trait anxiety on implicit and explicit memory. No effect of trait anxiety was found on explicit memory while different pattern of results was obtained for the high and low trait subjects on implicit memory measures.

The above discussion provides impressive evidence in favour of dissociation between implicit and explicit memory. However some researchers have advocated in favour of similarities between implicit and explicit memory. For instance, Jacoby (1983a); Schacter & Graf (1986a); and Sloman et. al, (in press) have argued that under certain conditions manipulation of retention interval have parallel effects on implicit and explicit memory. Moreover, Jacoby (1983a) has shown that manipulating list context at the time of test has no differential effect on these two forms of memory. Further evidence in favour of similarities between implicit and explicit memory came from the studies of Graf & Schacter (1985, 1987); Schacter & Graf (1986a, 1986b); McKoon & Ratcliff (1979, 1986); Moscovitch et. al, (1986) who have demonstrated that both implicit and explicit memory are influenced by newly acquired associations between
unrelated word pairs. Graf & Schacter (1985) and Schacter & McGlynn (1987) further pointed out that implicit memory for new associations resembles explicit remembering of new associations in so far as it depends on some degree of elaborative processing at the time of study. Johnston, Dark, & Jacoby (1985) demonstrated that processes subserving implicit memory can also affect performance on an explicit memory task. Most recently Rappold & Hashtroudi (1991) observed a parallel effect of organization of study material on implicit and explicit memory which suggests that performance in implicit and explicit memory measures is similarly affected by organizational processes.

As mentioned earlier several studies have demonstrated that priming of words identification performance occurs for morphologically similar words (Murrel & Morton, 1974) but not for the visually similar words (Osgood & Hoosain, 1974) or phonologically similar words (Neisser, 1954). Most recently in a pilot study, Khan (1990) reported that phonemic similarity of the task impairs implicit memory and explicit memory remains unaffected whereas semantic similarity has no effect on implicit memory but has detrimental effect on explicit memory. However, a careful scrutiny of the data reveals that mean implicit and explicit memory scores under phonemic similar condition are more or less equal whereas mean implicit and explicit memory scores under semantic condition are markedly different i.e. mean implicit memory score is much larger than mean explicit memory score. This observation suggests that phonemic similarity affects implicit and explicit memory in the same fashion whereas semantic similarity has more pronounced adverse effect on explicit memory than on implicit memory. This contradiction between reported findings and the observation based on mean scores under phonemic similar and
semantic similar conditions is simply due to the fact that Khan (1990) analyzed data with the help of analysis of variance, separately for implicit and explicit memory scores. No attempt was made to see the statistical difference between implicit and explicit memory scores under phonemic and semantic similar conditions. In other words no attempt was made to see the differential effect of phonemic and semantic similarity on implicit and explicit memory. Consequently the findings reported by Khan (1990) have become dubious and ambiguous. In order to overcome this ambiguity and in order to get more clear cut results the present study is undertaken. More specifically the present study is designed to explore whether or not phonemic and semantic similarity has differential effect on implicit and explicit memory.

Another consideration that influenced the thinking of present investigator is the substantial body of evidence to suggest that organic amnesia has differential effect on implicit and explicit forms of memory. Rozen (1976); Moscovitch, (1982); Schacter & Tulving, (1982); Squire (1982); found that amnesic patients are severely impaired on standard tests of explicit memory such as recall and recognition. However, these patients showed normal or near normal performance on various tests of implicit memory (e.g. Warrington & Wieskramzt, 1968; 1974; Cohen & Squire, 1980; Jacoby & Witherspoon, 1982; Moscovitch, 1982; Diamond & Rozen, 1984; Graf et. al, 1984; Cermac, Talboot, Chandler, & Wolbarst, 1985; Schacter, 1985a).

Since organic amnesia is a physical disease in which cognitive functioning of the patient become deficient, it is therefore, expected that any condition that make cognitive functioning deficient, should also have differential effect on implicit and explicit forms of memory. It has been observed by several investigators that deprivation of various kinds such as sensory,
muscular, social, parental, cultural and economic etc. results in deficient cognitive functioning (e.g. Dass, 1969; Panda, 1976; Miller, 1963; White, 1970; Tripathi & Misra, 1975). Recently Saeeduzzafar and Alam (1985; 1986); Alam (1986; 1988) found that prolonged-deprivation has adverse effect on retention, indicating that prolonged-deprivation has detrimental effect on cognitive functioning.

Deprivation refers to the loss of privileges, opportunities, material goods; resulting lack or insufficiency of the basic necessities for healthy living. However, the concept of deprivation was re-defined by Misra and Tripathi (1977) in relation to experiences derived from the environment. Misra and Tripathi (1977), thus, proposed the concept of prolonged deprivation that include most of the significant aspects of human life in which deprivation has been recognized as a phenomenon and can be measured.

Thus, the concept of prolonged deprivation was initially used by Tripathi and Misra (1977). According to them, prolonged deprivation is a multi-dimensional psycho-social construct embracing a wide range of environmental and organismic variables and refer to dispossession or loss of privileges, opportunities, material goods and the like relatively for a long period Langmeier et. al., (1969) and Nurcombe (1970) defined prolonged deprivation as a lack of fulfilment of desires or insufficient satisfaction of the basic necessities for a prolonged period. While developing a standardized scale to measure the prolonged deprivation, Misra and Tripathi (1977) have identified 15 components or areas of prolonged deprivat-
Several attempts have been made to study the relationship between various types of deprivation and personality traits. Mohanti (1967), for example, examined the relationship between socio-economic status and anxiety and hostility. He found that socio-economically deprived subjects were more anxious and hostile than their non-deprived counterparts. Tripathi and Misra (1976) examined the effect of prolonged deprivation on some cognitive processes. They observed that deprivation experienced by the individual in various spheres of life restricts the growth of cognitive skill. In view of these observations and also in view of pervasive findings that deficient cognitive functioning have the detrimental effect on retention...
performance (e.g. Jensen, 1968; Cosden, Ellis & Feeney, 1979; Hasher & Zacks, 1979; Tyler, et. al., 1979; Light & Ellis, 1981; Sharma, 1981; Ellis and Franklin, 1983; Misra, 1983; Khan, et. al., 1989; Saeeduzzafar & Alam (1981, 1986); and Alam (1986) examined the effect of prolonged deprivation on retention performance. Results of their studies clearly revealed that prolonged deprivation has detrimental effect on recall performance. These studies, however were confined to the domain of explicit memory and no attempt has been made so far to examine the effect of prolonged deprivation on implicit memory.

However, a sizeable number of researches have demonstrated that deficiency in cognitive functioning has significant adverse effect on explicit memory but has little or no effect on implicit memory, (Warrington & Weiskrantz, 1968, 1974; Cohen & Squire, 1980; Graf & Schacter, 1985; Khan & Alam, 1989; Khan, 1990, Khan & Saeeduzzafar, in press). Since prolonged deprivation is closely associated with deficiency in cognitive functioning (e.g. Tripathi, 1980), it is reasonable to assume that prolonged deprivation should have adverse effect on explicit memory whereas implicit memory should remain unaffected. The present study is also designed to test this assumption. The findings of the study would not only be helpful in resolving the issue whether same or different processes operate in implicit and explicit memory but would also contribute in the development of theoretical accounts of implicit memory.