CHAPTER III

STATEMENT OF THE PROBLEM

Hypotheses - Working Memory - Semantic Memory - Verbal Memory - Pictorial Memory - Remote Memory - On Demographic And Psychological Variables.
STATEMENT OF THE PROBLEM AND HYPOTHESES

Though it is widely believed that memory declines with age, the review of studies show that age decrement occurs for most, but not for all persons and in different facets of memory. For eg., age differences were mostly found for free and cued recall but were less frequently found for picture recognition, implicit memory and measures of verbal ability. One of the challenges before Cognitive Researchers is to understand the conditions under which age differences occur and the conditions under which they do not occur equally across the different memory facets. It is likely that these processes may be influenced by socio-cultural factors as well.

Much of the work on memory and aging was carried out in the west. Few studies on memory changes pertaining to the elderly in the Indian culture are available (Ramamurti & Jamuna, 1995). It is important to understand how cognitive change occurs in a cultural context.

An attempt is made here to study how changes occur in different facets of memory across the age groups (in later years of life) in the Indian culture. There is a dearth of studies not only on cognitive aging but specifically on memory in later years. It is clear from the periodical reviews on Gerontology and Geropsychology (Ramamurti & Jamuna, 1984, 1993, 1995, 1999) that few studies are available on memory and ageing in India. Although several recent studies (refer Chapter II) have examined the influence of certain variables on the recall performance of adults, this area of research remains, for the most part, unexplored in India.

Memory is a comprehensive aspect where there are many facets and processes involved. Performance in each of these facets may vary. Based on the review of studies on memory and aging, in the present investigation certain memory facets were selected. They were Working Memory, Semantic Memory,
Verbal Memory, Pictorial Memory and Remote Memory. It appears that there are multiple factors interacting to influence age-related differences in memory performance in various facets. Some of the factors like education, economic status, self reported physical and psychological health, stressful life events, social supports etc., may influence the memory performance of subjects with advancing age. Therefore, these factors were included in the present study as psycho-social correlates of memory. Hence the present investigation was undertaken with the objectives as stated below.

3.0. OBJECTIVES:

1. To assess the performance in certain facets of memory viz., Working memory, Semantic memory, Verbal memory, Pictorial memory and Remote memory in Indian elderly men and women.

2. To compare different socio-demographic groups such as age, gender, locality, education, economic status and marital status with regard to memory performance in elderly men and women.

3. To examine the association of different facets of memory with psychological variables viz., self rated memory, self reported physical health, self reported psychological health, self perception of social supports, life stress, self esteem and I-E locus of control in elderly men and women.

4. To test the efficacy of intervention in improving memory performance in a select sample of elderly.

3.1. FORMULATION OF HYPOTHESES:

The amount of memory loss with advancing age depends upon the type of material used and the kind of learning and memory involved. Measuring
memory by using a single test, such as memory for digits or paired associates, it cannot be concluded therefrom that there is a loss or no loss of memory as one grows older. In the present study it is assumed that if diverse tests are given to a group of individuals and performance is assessed, the performance pattern in different facets of memory would become more evident. Therefore an attempt was made in this study to test different facets of memory viz., Working memory, Semantic memory, Verbal memory, Pictorial memory and Remote memory. In accordance with these objectives, a set of main hypotheses and sub hypotheses were formulated and reported in this chapter.

Different Facets of Memory and Demographic Variables:

3.1.1. Working Memory and Demographic Variables

Firstly the status of working memory in terms of demographic variables was tested. Some studies indicated that there is a decline in working memory with age, while some others did not (refer Chapter II). There is no conclusive evidence on how working memory varies with age, gender, education, locality, marital status, and economic status. If the holding function of working memory does not decline, then age differences in working memory may not be found (refer Chapter II). In view of this, the following null hypothesis and sub hypotheses were formulated.

Hypothesis -1. There are no significant differences between age groups; gender groups; rural-urban localities; educational levels; economic and marital status groups in working memory status.

Since working memory was assessed through three different sub facets viz., Logical memory, Memory for digit span and letter span (Non-sense syllables), performance on these facets of working memory in different sub groups were tested separately through the following sub hypotheses.
Sub-hypotheses Related to Age:

1.1 There are no age differences in memory for logical information
1.2 There are no age differences in memory for digit span
1.3 There are no age differences in memory for letter span (non-sense syllables)

Sub-hypotheses Related to Gender:

1.4 There are no gender differences in memory for logical information
1.5 There are no gender differences in memory for digit span
1.6 There are no gender differences in memory for letter span (non-sense syllables).

Sub-hypotheses Related to Locality:

1.7 There are no locality differences in memory for logical information
1.8 There are no locality differences in memory for digit span
1.9 There are no locality differences in memory for letter span (non-sense syllables)

Sub-hypotheses Related to Educational Level:

1.10 There are no educational level differences in memory for logical information
1.11 There are no educational level differences in memory for digit span
1.12 There are no educational level differences in memory for letter span (non-sense syllables)

Sub-hypotheses Related to Marital Status:

1.13 There are no differences between the widowed and the non-widowed in memory for logical information
1.14 There are no differences between the widowed and the non-widowed in memory for digit span.
1.15 There are no differences between the widowed and the non-widowed in memory for letter span (non-sense syllables)
3.1.2. Semantic Memory and Demographic Variables:

Studies on Semantic Memory (refer Chapter II) indicate that there is a decline of semantic memory with age. Since the memory system retains old information as it adds new ones, most older people have larger knowledge bases than they once did. In many situations, older adults may be able to compensate for declines in the memory system's efficiency by relying on their stored knowledge. No clear evidence is available with regard to the influence of gender, education, locality, marital status, and economic status on semantic memory performance. In order to test this, the following null hypotheses and sub hypotheses were set up:

**Hypothesis -2. There are no significant differences between age groups; gender groups; educational levels; rural-urban localities; marital status in performance of semantic memory.**

Semantic memory was assessed through performance in four different sub facets viz., Personal and Current information; Orientation; Mental control and Free word association. They were tested through the following Sub-hypotheses:

**Sub-hypotheses Related to Age:**

2.1 There are no age differences in memory for personal and current information.

2.2 There are no age differences in orientation.

2.3 There are no age differences in mental control performance.

2.4 There are no age differences in free word association.

**Sub-hypotheses Related to Gender:**

2.5 There are no gender differences in memory for personal and current information.
2.6 There are no gender differences in orientation.
2.7 There are no gender differences in mental control performance
2.8 There are no gender differences in free word association

Sub-hypotheses Related to Locality:
2.9 The rural and urban groups do not differ significantly in memory for personal and current information
2.10 The rural and urban groups do not differ significantly in orientation.
2.11 The rural and urban groups do not differ significantly in mental control performance
2.12 The rural and urban groups do not differ significantly in memory for free word association

Sub-hypotheses Related to Education Level:
2.13 There are no educational level differences in memory for personal and current information
2.14 There are no educational level differences in orientation
2.15 There are no educational level differences in mental control performance
2.16 There are no educational status differences in free word association

Sub-hypotheses Related to Marital Status:
2.17 The widowed and non-widowed do not differ significantly in memory for personal and current information
2.18 The widowed and non-widowed do not differ significantly in orientation
2.19 The widowed and non-widowed do not differ significantly in mental control performance
2.20 The widowed and non-widowed do not differ significantly in free word association.

3.1.3. Verbal Memory and Demographic Variables:

Some studies show that older adults tend to perform as good as young adults when they are asked to manipulate words. When the material is presented to
elderly and they are allowed to proceed at their own pace, they do better than when the information is disorganised or scrambled (refer Chapter. II). The review suggests that recall of verbal material in the elderly will be as good as younger adults. Therefore, it was decided to test this by formulating the following null hypotheses.

3.1.1. Verbal Memory and Demographic Variables:

3.1.1.1. There are no age differences in verbal memory performance
3.1.1.2. There are no gender differences in verbal memory performance
3.1.1.3. The rural and urban groups do not differ significantly on verbal memory performance
3.1.1.4. There are no educational level differences in verbal memory performance
3.1.1.5. The widowed and non-widowed do not differ significantly on verbal memory.

3.1.4. Pictorial Memory and Demographic Variables:

Older adults perform less efficiently than younger adults in remembering many types of pictorial stimuli (See Chapter II). It is assumed that gender, locality, education, marital status and economic status may not influence pictorial memory. To test this, the following null hypotheses were formulated.

3.1.4.1. There are no age differences in memory for pictures
3.1.4.2. There are no gender differences in memory for pictures
3.1.4.3. The rural and urban groups do not differ significantly in memory for pictures.
3.1.4.4. There are no educational level differences in memory for pictures.
3.1.4.5. The widowed and non-widowed do not differ significantly in memory for pictures.

3.1.5. Remote Memory and Demographic Variables:

Generally remote memory deals with how well people remember things over the course of their lives (refer Chapter. II). Remote memory includes episodic and
autobiographical memories. Some studies on this indicate that there is no change in the remote memory with age. But information is not available in the review which clearly explains the influence of gender, education, locality, marital status and economic status on remote memory (refer Chapter II). Thus, the following null hypotheses were formulated to test these in the present study.

1. There are no age differences in remote memory.
2. There are no gender differences in remote memory.
3. The rural and urban groups do not differ significantly on remote memory.
4. There is no educational level difference in remote memory.
5. The widowed and non-widowed do not differ significantly in remote memory.

II: The Association Between Different Facets of Memory viz., Working Memory; Semantic Memory; Verbal Memory; Pictorial Memory, Remote Memory and Some Psychological Variables was tested by formulating a set of hypotheses as follows.

3.2.1. Working Memory and Psychological Variables:

The review in Chapter-II highlights the effect of some psychological variables viz., self rated memory, self reported physical health, self reported psychological health, self perception of social supports, life stress (in life events), self esteem and I-E locus of control on working memory. Therefore, the following hypotheses were formulated for testing.

Hypothesis-6. There is a significant relationship between working memory status and self-rated memory; self reported physical health; self reported psychological health; self perception of social supports; life stress; self esteem and I-E locus of control among elderly.
Memory performance in different sub facets of working memory in terms of some psychological variables was examined.

The following sub hypotheses were formulated to test the association between various facets of memory and psychological variables.

**Sub-hypotheses Relating Performance in Working Memory to Self Rated Memory:**

6.1 There is a significant association between self rated memory and memory for logical information.

6.2 There is a significant association between self rated memory and memory for digit span (forward and backward).

6.3 There is a significant association between self rated memory and memory for letter span (non-sense syllables).

**Sub-hypotheses Relating Performance in Working Memory to Self Reported Physical Health:**

6.4 There is a significant association between self reported physical health and memory for logical information.

6.5 There is a significant association between self reported physical health and memory for digit span (forward and backward).

6.6 There is a significant association between self reported physical health and memory for letter span (non-sense syllables).

**Sub-hypotheses Relating Performance in Working Memory to Psychological Health:**

6.7 There is a significant association between self reported psychological health and memory for logical information.

6.8 There is a significant association between self reported psychological health and memory for digit span (forward and backward).

6.9 There is a significant association between self reported psychological health and memory for letter span (non-sense syllables).
Sub-hypotheses Relating Performance in Working Memory to Social Supports:

6.10 There is a significant association between self perception of social supports and memory for logical information

6.11 There is a significant association between self perception of social supports and memory for digit span (forward and backward)

6.12 There is a significant association between self perception of social supports and memory for letter span (non-sense syllables)

Sub-hypotheses Relating Performance in Working Memory to Life stress (life events):

6.13 There is a significant association between life stress and memory for logical information

6.14 There is a significant association between life stress and memory for digit span (forward and backward)

6.15 There is a significant association between life stress and memory for letter span (non-sense syllables)

Sub-hypotheses Relating Performance in Working Memory to I-E Locus of Control:

6.16 There is a significant association between locus of control and memory for logical information

6.17 There is a significant association between locus of control and memory for digit span (forward and backward)

6.18 There is a significant association between locus of control and memory for letter span (non-sense syllables)

3.2.2. Semantic Memory and Psychological Variables:

Hypothesis -7. There is a significant relationship between the semantic memory status and self-rated memory; self reported physical health; self reported psychological health; self perception of social supports; stressful life events; self esteem and I-E locus of control on semantic memory in elderly.
Sub hypotheses Relating Performance in Semantic Memory Tests to Self Rated Memory:

7.1 There is a significant association between self rated memory and memory for personal and current information.

7.2 There is a significant association between self rated memory and orientation.

7.3 There is a significant association between self rated memory and mental control.

7.4 There is a significant association between self rated memory and free word association.

Sub hypotheses Related to Performance in Semantic Memory Tests and Self Reported Physical Health:

7.5 There is a significant association between self reported physical health and memory for personal and current information.

7.6 There is a significant association between self reported physical health and orientation.

7.7 There is a significant association between self reported physical health and mental control.

7.8 There is a significant association between self reported physical health and free word association.

Sub hypotheses Related to Performance in Semantic Memory Tests and Self Reported Psychological Health:

7.9 There is a significant association between self reported psychological health and memory for personal and current information.

7.10 There is a significant association between self reported psychological health and orientation.

7.11 There is a significant association between self reported psychological health and mental control.

7.12 There is a significant association between self reported psychological health and free word association.
Sub hypotheses Related to Performance in Semantic Memory Tests and Social Supports:

7.13 There is a significant association between self perception of social supports and memory for personal and current information.

7.14 There is a significant association between self perception of social supports and orientation.

7.15 There is a significant association between self perception of social supports and mental control.

7.16 There is a significant association between self perception of social supports and free word association.

Sub hypotheses Related to Performance in Semantic Memory Tests and Life Stress (life events):

7.17 There is a significant association between life stress and memory for personal and current information.

7.18 There is a significant association between life stress and orientation.

7.19 There is a significant association between life stress and mental control.

7.20 There is a significant association between life stress and free word association.

Sub hypotheses Related to Performance in Semantic Memory Tests and Self Esteem:

7.21 There is a significant association between self esteem and memory for personal and current information.

7.22 There is a significant association between self esteem and orientation.

7.23 There is a significant association between self esteem and mental control.

7.24 There is a significant association between self esteem and free word association.

Sub hypotheses Related to Performance in Semantic Memory Tests and I-E Locus of Control:

7.25 There is a significant association between locus of control and memory for personal and current information.
There is a significant association between locus of control and memory for orientation.

There is a significant association between locus of control and mental control.

There is a significant association between locus of control and free word association.

### 3.2.3. Verbal Memory and Psychological Variables:

It is evident from Chapter-II that some psychological variables play a significant role in verbal memory performance. To assess the relationship of psychological variables with verbal memory the following positive hypotheses were set up:

**Hypotheses - 8:**

8 1. There is a significant association between self rated memory and verbal memory performance.

8 2. There is a significant association between self reported physical health and verbal memory performance.

8 3. There is a significant association between self reported psychological health and verbal memory performance.

8 4. There is a significant association between self perception of social supports and verbal memory performance.

8 5. There is a significant association between life stress and verbal memory performance.

8 6. There is a significant association between self esteem and verbal memory performance.

8 7. There is a significant association between locus of control and verbal memory performance.

### 3.2.4. Pictorial Memory and Psychological Variables:

The studies in Chapter II suggest that older adults' immediate memory for pictures was about as good as that young adults. Age differences were observed only when delayed tests were given, and only at certain time delay intervals. No evidence is available to explain effect of certain psychological
variables on pictorial memory performance. Thus the following positive hypotheses were formulated

**Hypotheses - 9:**

9.1 There is a significant association between self rated memory and pictorial memory performance.

9.2 There is a significant association between self reported physical health and pictorial memory performance.

9.3 There is a significant association between self reported psychological health and pictorial memory performance.

9.4 There is a significant association between self perception of social supports and pictorial memory performance.

9.5 There is a significant association between life stress and pictorial memory performance.

9.6 There is a significant association between self esteem and pictorial memory performance.

9.7 There is a significant association between locus of control and pictorial memory performance.

**3.2.5. Remote Memory and Psychological Variables:**

The review (Chapter - II) shows that recollections of past events provide with a personal history and help to define oneself. Very few studies have looked at how well people remember things over the course of their lives and the factors associated with them. On the one hand, studies concluded that events do not always have to be personally traumatic to be highly memorable and on the other hand, it was also found that very unusual or novel events that are highly emotional are remembered very well. Keeping this in view the following positive hypotheses were formulated for testing.

**Hypotheses – 10.**

10.1. There is a significant association between self rated memory and remote memory performance.
10.2 There is a significant association between self reported physical health and remote memory performance

10.3 There is a significant association between self reported psychological health and remote memory performance

10.4 There is a significant association between self perception of social supports and remote memory performance

10.5 There is a significant association between life stress and remote memory performance

10.6 There is a significant association between self esteem and remote memory performance

10.7 There is a significant association between locus control and remote memory performance

3.3. Contribution of Demographic and Psychological Variables to Memory:

Another objective of the present study was to find out the contribution of several variables to memory status of elderly persons. For purposes of parsimony some typical tests representative of different facets of memory were selected. The contribution of several socio-demographic, social and psychological variables to the selected facets of memory was assessed through Multiple Regression Analysis (Step wise)

The contribution of a set of socio-demographic variables viz., gender, age, location, education, economic status and marital status to the memory performance in the elderly persons was reported in some studies (Refer Chapter II) Keeping this in view, the following Hypotheses were formulated for testing

Hypothesis - 4: Age, gender, locality, education, economic status and marital status significantly contribute to memory for logical information in the elderly persons.
Hypothesis-5: Age, gender, locality, education, economic status and marital status significantly contribute to working memory (memory for digit span) performance in the elderly persons.

Hypothesis-6: Age, gender, locality, education, economic status and marital status significantly contribute to semantic memory (mental control) performance in elderly persons.

Hypothesis-7: Age, gender, locality, education, economic status and marital status significantly contribute to verbal memory in the elderly persons.

Hypothesis-8: Age, gender, locality, education, economic status and marital status significantly contribute to remote memory performance in the elderly persons.

Also it was expected that certain psychological variables viz., self rated memory, self-reported physical health, self reported psychological health, self perception of social supports, life stress, self -esteem and I-E locus of control influence the outcome variable i.e., performance facets of memory in the elderly persons. It was therefore decided to test the effect of these variables by formulating the following hypotheses.

Hypothesis-9: Self rated memory, self-reported physical health, self reported psychological health, self perception of social supports, self -esteem, life stress and I-E locus of control significantly contribute to working memory (logical information) performance in the elderly persons.

Hypothesis-10: Self rated memory, self-reported physical health, self reported psychological health, self perception of social supports, self -esteem, life stress and I-E locus of control significantly contribute to working memory (memory for digit span) performance in the elderly persons.
Hypothesis-11: Self rated memory, self-reported physical health, self-reported psychological health, self perception of social supports, self-esteem, life stress and locus of control significantly contribute to semantic memory (mental control) performance in the elderly persons.

Hypothesis-12: Self rated memory, self-reported physical health, self-reported psychological health, self perception of social supports, self-esteem, life stress and I-E locus of control significantly contribute to verbal memory performance in the elderly persons.

Hypothesis-13: Self rated memory, self-reported physical health, self-reported psychological health, self perception of social supports, self-esteem, life stress and I-E locus of control significantly contribute to remote memory performance in the elderly persons.

3.4. Testing the Efficacy of Interventions in the Improvement of Memory Performance of Elderly.

There are several studies which were of an interventional nature that showed the effect of training on memory performance (refer Chapter II). These interventions did bring about some positive effect on the memory of the individual. In view of this it was decided to try out an interventional training on a select sample and assess its effect. For the present purposes it was hypothesised that interventional training would create a significant difference between the pre and post test scores on memory tasks. It is evident from the literature that practice or training significantly helps in improving one's memory. Keeping the aforementioned in view the following hypothesis was formulated and tested in the present study.

Hypothesis - 14: There is a significant difference in the memory performance (memory for digit span and verbal memory) between pre-intervention and post-intervention scores among the elderly.
3.5. STATISTICAL ANALYSES:

The hypotheses were tested by employing different statistical tests. Mean differences were tested with simple t-tests. Interactional effects among the classificatory variables were estimated with Analysis of Variance (ANOVA). Correlations were calculated to measure the relationships between dependent variables and other variables under consideration. The contribution of different variables to the dependent variable was analysed through Multiple Regression Analysis (Step-wise). This helps to identify a set of variables, from among many, which can best predict the scores on the outcome variable or criterion and to evaluate the relative importance of these selected independent variables or predictor variables.