CHAPTER 2
DESIGN AND METHODOLOGY
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The aim of this experiment is to study the validity of Deese’s paradigm in explaining false memories across presentation conditions (study and generation) for implicit and explicit memory.

Sample

The hypotheses formulated in the earlier chapter were investigated on a sample of 90 subjects (20-24 years of age) selected from the teaching departments of M.D.U., Rohtak. Total number of females was 42 and number of males was 48. Firstly, a subsample of 20 subjects (selected randomly) was used in the pilot study for the selection of words and lists to be used in the experiment. Rest 70 subjects were used for the final experimental work.

Design

The present experiment was designed to see the effect of presentation condition and type of memory in explaining false memories. For this purpose a 2x2 factorial design repeated on second factor was selected. The two independent variables were task presentation and memory type. The task presentation was in the form of seen and generated task which was a separate group factor. Two types of memory on which testing was done were implicit and explicit memory which was a repeated factor.
The dependent variable was false memory as operationalized by false alarm and false recall and overall error measures.

**Design of the Study**

**2x2 factorial design**

<table>
<thead>
<tr>
<th>Presentation condition (A)</th>
<th>Subjects</th>
<th>Types of memory (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Implicit</td>
</tr>
<tr>
<td>Seen</td>
<td>1 2 35</td>
<td></td>
</tr>
<tr>
<td>Generation</td>
<td>36 37 70</td>
<td></td>
</tr>
</tbody>
</table>

**Material Used**

2. Two recognition lists of 42 words each (6 target word and 36 distractor words) (Appendix-2).
3. Two sets of fill in the blanks used for testing implicit memory (Appendix-3).
4. Multiplication chart used for filling retention interval (Appendix-4).
5. Memory drum.

Procedure

Firstly, procedure involved selecting the 12 lists to be presented to the subjects. These 12 lists were selected from the original lists of 24 critical words each with 15 highly associated words made by McDermott and Roediger (1995). The selection of the list was done on the basis of the familiarity of the words shown to the 20 subjects during the pilot study. These 20 subjects were given the McDermott and Roediger's list of 24 target words each having 15 words arranged in the descending order according to their association with that particular target word. The target word was not shown to the subject. Target word was blackened so that the subjects cannot judge whether the following list was related to that particular target word. The subjects were asked to tick ( ) mark those words either whose meaning was not clear to them or they were unaware of words. Through this procedure, those 12 lists out of 24 were finally selected whose familiarity rate was high, i.e., having less number of new words.

For the purpose of final experiment, the lists were divided into two sets as 6 lists were assigned for implicit memory and other 6 lists for explicit memory. The lists once used for implicit memory under seen condition were used for explicit memory under generation condition and vice versa (being a separate
group factor). Initially, the actual purpose of the experiment was concealed from
the subjects. The subjects were also requested not to discuss the contents of
the task the procedure and the purpose of the experiment after completion with
others. The purpose of the experiment was later debriefed to the subjects once
the experiment was over. The experiment was conducted in the following
sequence:

a) Study phase
b) Distraction phase (4 min)
c) Testing phase for implicit memory
   Recognition phase for explicit memory.

The total number of subjects to be used in the experiment was 70. Half
of the subjects were used for the seen condition and 35 subjects for the
generation condition. Both types of memory tests were done under both the
conditions i.e. the seen and the generation.

At first, the seen condition was performed. For this 35 subjects were so
chosen to have an equal number of males and females. To start with the implicit
memory task under seen condition, the subject was instructed, "This is a
pronunciation test and you have to speak aloud the word that is coming in front
of you through the window of this electric memory drum. This memory drum is
moving at the rate of 4 seconds/word. Like this, all the 6 lists each containing
12 words were shown to all the subjects. This was the study phase. The
target/critical words were not shown to them.

During the distraction phase, the subject filled the multiplication chart for 4 minutes. This distraction task was given so that the subject does not get the time to rehearse the previous material shown to him. And then during the testing phase, the subjects were given 'fill in the blanks' task. It contained 6 sentences with a blank space and the subject was to choose one option for that blank out of the seven options given above the each sentence (Appendix-3). Finally, a free recall was taken from each subject of the words he had pronounced in the study phase however he was never instructed to retain the material during study phase.

For the explicit memory task under the seen condition the following instructions were given, "study each list very carefully as later on recall will be taken after you have read the list". The recall was taken after each list was completed. Under this condition another set of six lists was shown.

Then during the distraction phase, the multiplication chart was filled up for four minutes. In the testing phase of the explicit memory, recognition task was performed. From the list, 6 targets and 36 distractors were spoken aloud for the subject one by one randomly (Appendix-2) and S was to respond in 'Yes' or 'No' manner that whether he had seen the word or not. Out of 42 words, there were 7 words for 6 list each. Out of those 7 words - only 2 words were from the lists studied earlier (old), 3 words from the original lists but not sampled in the lists (remaining 3 words out of 15 - as the experimental list contained only 12
words), 1 unstudied word from other lists which were rejected on account of familiarity by the pilot sample and the critical target word itself. In this way, the seen condition was performed and the results of each subject were noted down.

For the generated condition tests were done for both the implicit and the explicit memory on the sample of 35 subjects. The lists used for implicit memory task under seen condition were now used as lists for explicit memory task under the generation condition and the lists fixed for the explicit memory task under seen condition were now used for implicit memory task. The only alteration done was that the position of one letter was interchanged in each word for each list and the subject's task was to change the position of that letter to create a meaningful word, i.e., the generation during the study phase.

The lists for implicit memory task were shown and the following instructions were given, "We are assessing your vocabulary. You will be shown 6 lists of words one by one in which the position of one letter has been interchanged in each word. Your task is to rearrange the letter to create a meaningful word. The word will be shown to you for 2 seconds and additional 2 seconds will be given to frame the word. During those additional 2 seconds the space in front of you will not show you any word. You have to speak aloud the framed word and if not possible to frame say 'pass'." In this way all the six lists were shown to the subjects.
During the distraction phase, multiplication task was performed for 4 minutes. Then in the testing phase for the implicit memory fill in the blanks task was given as done for the subjects of seen condition. Then they were instructed to recall as many words as they could from the words they generated during the study phase however they were not instructed to retain the generated words earlier. All subjects in the last were asked to recall the words they generated in the beginning.

For explicit memory task under generation condition, subject was instructed as follows, "here also you have to generate words by changing the position of one letter word will be shown to you for 2 seconds and additional seconds will be given to you to frame the words. Read the words carefully as recall will be taken after each list". In this way all the six lists were shown to the subjects and recall was taken. During the distraction, multiplication was performed for 4 minutes. During the testing phase there was a recognition test as done for the seen condition.

**Scoring**

The subjects tested under seen condition yielded the following measures:

1. A free recall out of 72 studied words (under implicit conditions in a single lot).
2. The number of words used in the fill in the blanks task out of 6 target words.
For the explicit memory condition -

3. Free recall score out of 12 words in 6 lists separately.

4. The scores obtained during the recognition task - Hit, correct rejection, false alarm and false rejections.

Analysis

1. To test the hypotheses, the frequency of target words used in the fill in the blanks test (implicit memory) and the target words correctly identified in the recognition test were taken as two measures from each subject. So, 2 way ANOVA was applied for subjects used under seen and generation condition.

2. Since no other measures/scores were comparable between types of memories therefore other analysis were restricted to comparison between seen and generation condition under implicit and explicit memory separately.

   i. Significance of difference between free recall scores under implicit condition of seen and generation groups

   ii. Significance of difference between free recall scores under explicit condition of seen and generation groups.

   iii. Significance of difference between errors in recognition test under seen and generation groups for explicit memory.