CHAPTER IV

DESIGN AND METHODOLOGY

The consumption of alcohol in small amounts is generally accepted even in the Indian society while excessive consumption, especially when it becomes compulsive, is frowned at.

The present investigation has been designed to study whether a single injection of alcohol or successive administration for 6 days, would have any effect on learning.

DESIGN:

A multi group design, with four groups, was employed to investigate the effect of pre-training administration of a single or repeated i.p. injections of alcohol.

The experiment was designed in the following manner:
<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Retention Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>I.p. administration of alcohol (0.72 ml/animal) for 6 days.</td>
<td>Animal to be trained 48 hours later, on an active avoidance task.</td>
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<td></td>
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<td>Retention tests to be taken 1, 2 and 7 days after training.</td>
</tr>
<tr>
<td>II</td>
<td>Single i.p. administration of alcohol (0.72 ml/animal)</td>
<td>Animal to be trained 15 minutes later, on an active avoidance task.</td>
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<td>Retention tests to be taken 1, 2 and 7 days after training.</td>
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<tr>
<td>III</td>
<td>I.p. administration of saline (0.72 ml/animal) for 6 days.</td>
<td>Animal to be trained 48 hours later, on an active avoidance task.</td>
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<td></td>
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<td>Retention tests to be taken 1, 2 and 7 days after training.</td>
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<td>IV</td>
<td>Single i.p. administration of saline (0.72 ml/animal)</td>
<td>Animal to be trained 15 minutes later, on an active avoidance task.</td>
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</tr>
</tbody>
</table>
Sample I

A sample of 40 albino rats, weighing 115-10 gms, were randomly selected from the rat population of the animal house of the Department of Psychology, M.D. University, Rohtak. All the animals were marked with ink for the purpose of identification and they were kept in small cages (5 animals, per cage). They were randomly assigned to the four groups.

INSTRUMENTATION:

The apparatus used in the present investigation was a step through active-passive avoidance apparatus (photographic plate-I). The animals were trained in it on an active avoidance task. It was a trough shaped alley having the following dimensions.

Length = 91 cms.
Width = 20 cms. at the top and 6 cms. at the bottom.
Height = 31 cms.

The alley was divided into two compartments separated by a wooden partition. One compartment was larger than the other. The length of larger compartment was 60 cms; while the smaller one was 30 cms long. There was a circular hole in the wooden partition dividing these two compartments, through which the animal could cross over from one to the other compartment. The hole was fitted with a wooden door, which could be moved upwards to open the door and dropped down to close it. An external source of light was used to illuminate
the larger compartment. Both the compartments were covered with transparent glass covers so that the behaviour of the animal, placed in the apparatus, could be observed. The outer surface of the alley was covered with white sumiica sheet. The inner walls of the apparatus were made of aluminium sheet. There was left a gap of 1 cm. at the base of the apparatus, so that the faces of the animal could drop out of the apparatus.

The inner linings of both the compartments were connected to the two pairs of terminals on the outer surface of the apparatus, such that either of the compartments could be connected to a shock generator. For the present study the larger compartment was connected with the shock generator and the shock generator was set in order to deliver a shock of .75 mA. Duration of shock was manually controlled. The smaller compartment was the safe compartment.

ELECTRIC SHOCK GENERATOR:

A 50-C electric shock generator, purchased from Techno Electronics, Lucknow, was used to regulate the intensity and duration of the electric shock. It has the following specifications.

Input: 220 Volts AC±5%

Output: 0 to 4 mA (calibrated in short circuit current from .05 to 10 mA in 20 steps).

The shock generator was connected through a servo controlled voltage stabilizer (Helco Type No. TAW 2010) which had the following specifications:—
Input: 180-250 Volts AC
Output: 230 Volts ± 1% AC

The stabilizer was put into the circuit to ensure that the intensity of the shock did not vary due to fluctuations in the input voltage.

Time range: 0 to 4 MA continuously adjustable.

White noises:

To control for the external sounds, screening technique was employed, so that the results might not be contaminated by the external noises. These external sounds were masked by playing white noise.

The white noise is a combination of different noises, mixed together in such a way that the resultant sound has a fixed amount of energy. It is a very ambiguous sound which resembles the noise obtained from the exhaust of the airjet (chapman, 1960). It sounds like a hiss. In the present investigation, a C-90 cassette, recorded from the electronic white noise generator, obtained from the comparative psychology laboratory of the Department was used, whenever the rats were trained or tested. Any possible effect of white noise on the behaviour of animals was neutralised by playing the white noise for all the groups of the animals.

Alcohol:

Alcohol was used in this investigation. Alcohol beverages have been used since the dawn of history. The oldest alcoholic drinks were fermented beverages of
relatively low alcohol contents, that is, the beers and wines. The Arabs introduced the technique of distillation into Europe in the middle ages. The alchemists believed that the alcohol was the long sought elixir of life. Alcohol was held to be a remedy for practically all diseases as indicated by the term 'Whisky' (mf Water of life) It is now recognised that the therapeutic value of alcohol is much more limited than its social value.

Aliphatic alcohols are hydroxy (OH) derivatives of the aliphatic hydrocarbons. They may contain one or two or more OH group.

The alcohol is a colorless volatile and inflammable liquid. Local actions of alcohol depend on alcohol concentration and the tissue to which it is applied. Because it evaporates quickly, it has a cooling and refreshing effect and is used for reducing the temperature in fevers. Higher concentrations denature proteins by partial precipitation and dehydration, acts as an astringent and an irritant. Concentrated alcohol if injected, produces tissue destructions. It depresses the C.N.S. in descending order. It can cause nausea, drowsiness, headache, cramps, fatiguability etc.

The alcohol used in this investigation is available under the trade name of organic solvent in injectable (water base) form in dilution of 1000 ml.
40 male albino rats were randomly selected from the rat population of the animal house of the Department of Psychology, M.D. University, Rohtak. All the selected animals were placed in the small cages (5 animals per cage) and were marked with ink for the purpose of identification. Each rat was handled daily for five minutes for four days, so that the rapport could be established. The animals were kept on a free feeding schedule.

All the animals were given injections of alcohol (.72 ml per animal) or saline (.72 ml per animal) according to the group to which they belong before training. Chronic alcohol or saline groups were injected i.p. for 6 days and acute alcohol or saline groups were given a single i.p. injection of alcohol or saline before training.

One day before the actual experiment, each animal was given orientation trials in the active-passive avoidance apparatus. The purpose of the orientation trials was to make the animals familiar with the apparatus. The apparatus was swabbed thoroughly with 50% spirit solution and dried with the help of Wolf 300B air blower in order to remove any possible odour traces left by the earlier run animals in the apparatus. Rats leave differential odours depending upon their experience in a training session and they influence the behaviour of subsequent rats, thus contaminating the results. This procedure was repeated before putting a fresh rat in the apparatus either for the orientation.
training or testing trials. During orientation all the overhead lights and the lights in the apparatus were put on, white noise was played and a rat was placed in the larger compartment and allowed to explore the apparatus for 5 minutes. The same procedure was repeated for all the animals.

The actual training of the animals started from the next day. The training was given in a completely dark laboratory, excepting for an adjustable lamp which was illuminating the larger compartment of the apparatus. There was absolutely no other source of light in the laboratory. Taped white noise was played whenever the animals were being run, for masking the effect of an external noise, which could distract animal.

The shock generator was set in order to deliver a shock of .75 mA in the larger compartment. Duration of the shock was manipulated manually.

After making these arrangements a rat of group I (which had earlier received 6 injections of 1.72 ml/animal) alcohol on 6 consecutive days, the last injection had been given 48 hours before training was placed in the larger compartment, facing the door, simultaneously the first stop watch was started and the door was opened. If the rat failed to go into the safe compartment within 10 seconds, the shock was put on. As soon as the animal crossed over to the smaller compartment the shock and first stop-watch were switched off and a second stop-watch was started.
The animal was retained in the smaller compartment for 30 seconds. Latency period was recorded from the first stop-watch. The second stop-watch was used to monitor the confinement period.

In case, the rat failed to enter the safe dark compartment within 40 seconds from the beginning of the trial, the shock was terminated. The first stop watch was stopped and the second one was started consecutively. The animal was manually placed in the safe compartment and was kept there for 30 seconds. In such a case, a latency period of 40\textdegree was recorded. The same procedure was repeated until the animal reached the criterion of two consecutive avoidances. Minimum 8 and maximum 20 trials were given.

All the rats were trained in the above manner after receiving the respective drug treatment depending upon the groups to which they belonged.

After completing the training session, three retention tests were given to all the groups. These tests were given 1, 4 and 7 days after training. During testing, 8 retention trials/day were given. The procedure for retention testing was the same as during training except that no shock was administered.

The results obtained were analysed statistically and have been discussed in the next chapter.