

KARNATAKA STATE

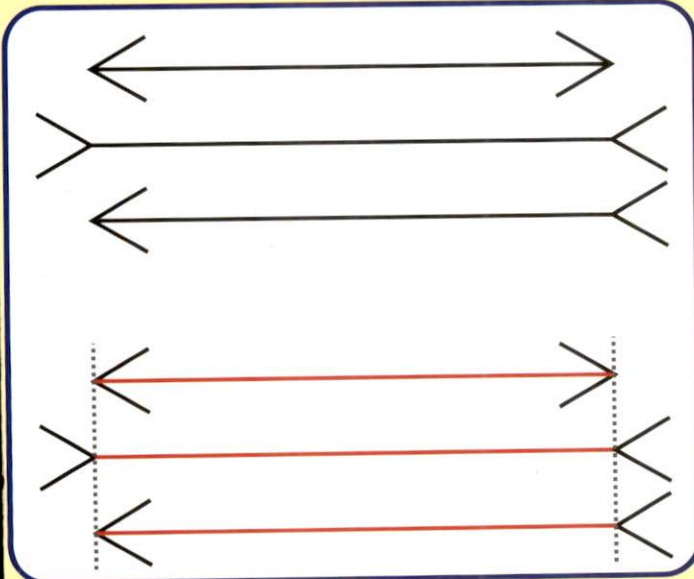
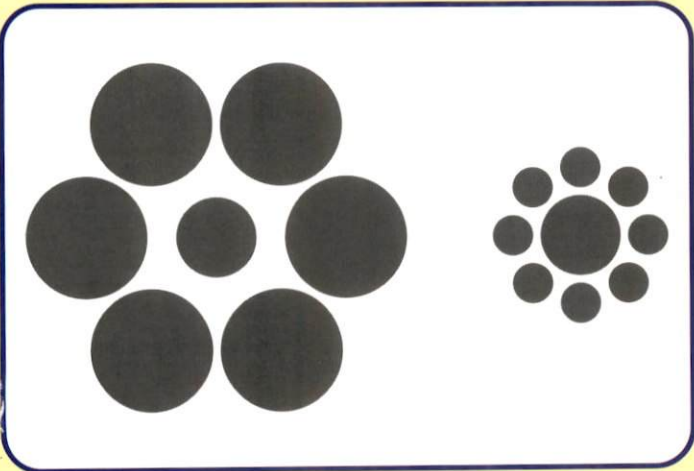


OPEN UNIVERSITY

Mukthagangothri, Mysuru – 570006

PSYCHOLOGY

1st B.A.



COURSE : 1

PRACTICALS : 1-12

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PSYCHOLOGY PRACTICAL MANUAL

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EXPERIMENTAL PSYCHOLOGY

INTRODUCTION

Experimental psychology is the branch of psychology that attempts to apply the rules of the scientific method to study various psychological processes in the laboratory. Wilhelm Wundt is the founder of experimental psychology. He started the first psychological laboratory at Leipzig, Germany, in the year 1879. With the introduction of this laboratory, psychology evolved into a unique, independent science. The experimental method involves procedures of study. In the experimental situation one can verify the hypotheses framed and arrive at specific conclusions based on experimental results.

The experimental method involves certain variables. A variable is defined as an attribute, which can bring some change in the behaviour. There are two types of variables: Independent and Dependent. An independent variable is one, which can be manipulated in an experiment. A dependent variable is one that is measured and is expected to change as a result of experimenter manipulation.

In a psychological experiment, the subject and the experimenter are necessary. A subject is one who undergoes the experiment. The experimenter is one who conducts/administers the experiment.

OBJECTIVES

The Objectives of the experimental psychology are:

1. To apply the scientific techniques to study the various processes of psychology
2. To acquaint the students with various psychological experiments and tests.
3. To expose the students to methods of administration and analysis/screening of psychological experiments and tests.
4. To study the individual differences.

STEPS TO FOLLOW WHILE WRITING THE RECORD

TITLE OF THE EXPERIMENT

INTRODUCTION

PURPOSE

MATERIALS REQUIRED

PLAN

PROCEDURE

PRECAUTIONS

RESULTS

ANALYSIS OF RESULTS

TABLES

THEORETICAL NOTE

INDIVIDUAL RESULT

CONCLUSION

APPLICATION VALUE

QUESTIONS :

1. Define experimental psychology ?
2. What is an experiment ?
3. Who is an experimenter ?
4. Who is a subject ?
5. What is a variable ?
6. Mention two types of variables.
7. Define independent variable.
8. Define dependent variable.
9. Mention the objectives of practical psychology.
10. What steps do you follow while writing the class record ?

EXPERIMENT NO. 1

EXPERIMENTER:

DATE:

SUBJECT :

1. DIRECTED OBSERVATION AND ACCURACY OF REPORT

INTRODUCTION:

Observation is an act, which helps us to acquire knowledge of the environment. Knowledge gained by observation is essential to be able to deal effectively with the environment.

In scientific observation, the observer is aware of the aspects of a experience he is about to observe i.e., scientific observation is organised and there is a definite goal. But in general observation, the observation is casual and the observer is not aware of what he is supposed to observe, there is no definite aim goal and has nothing in particular to observe. Hence his report would suffer from inadequacy and inaccuracy. When there is direction of some kind to observe the various aspects of an experience, the accuracy of report increases. But when the observation is given direction, the observer gains awareness, therefore it leads to accuracy in his report.

Observation and accuracy of report depends on a number of factors like age, sex, attitude, physical and mental conditions at the time of observation, intelligence, attention, concentration, memory etc., All the above factors contribute in enhancing the capacity to observe accurately. Observation and accuracy of report differ from individual to individual and from time to time.

PURPOSE:

To examine the effect of directed observation on the accuracy of report.

To prove that directed observation does increases the accuracy of report.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Observation Board: A picture with many details pasted on a cardboard with a flap covering the picture.
2. A list of 20 question based on the picture.
3. Answers key.

4. A Stop Clock.
5. Writing materials.

PLAN:

The experiment is conducted in two series i.e., General observation and Directed observation or before the knowledge of questions and after the knowledge of questions. The answers obtained in the 2 series are compared.

PROCEDURE:

The subject is seated comfortably on a chair in front of the table. The observation board is placed before the subject. With the above arrangements, the experiment is conducted in two series.

I Series: GENERAL OBSERVATION – Before The Knowledge Of Questions:

In this series, the following instructions are given to the subject. “With the signal Ready, I am going to show a picture to you. Observe the picture carefully”. With these instructions the signal ready is given to the subject. The flap of the observation board is opened and the stop-clock is also started simultaneously. The picture is exposed to the subject for a duration of 60 seconds. At the end of 60 seconds, the signal ‘stop’ is given to the subject and the flap of the observation board is closed simultaneously. A list of 20 questions and writing material is then placed before the subject. The following instructions are then given to the subject. “Here is a list of 20 questions related to the picture that you observed just now. Try to answer these questions as briefly and as accurately as possible. There is no time limit, but answer them quickly”. With these instructions, the subject is allowed to answer the questions. The list of questions and answer sheet is collected together at the end.

II Series; DIRECTIONAL OBSERVATION – After The Knowledge Of Questions:

In this series, the same procedure as that of the first series is followed. The picture exposed and the list of questions used is also the same. However, this is not informed to the subject before hand.

The answers written by the subject in both the series are corrected together at the end of second series. The number of correct answers of both the series are noted down as scores.

PRECAUTIONS:

The following precautionary measures are to be followed while conducting this experiment.

1. The same picture should be exposed in both the series.
2. The duration of exposure should be same in both the series.
3. The subject should be instructed to answer the questions very briefly.
4. The subject should not be informed that he/she would have to answer the same set of questions twice.
5. The subject should not be allowed to look into the answers of first series while answering the same set of questions in the second series.
6. Distractions should be avoided as far possible.

RESULTS:

Analysis of Results :

1. The total number of correct answers given by the subject in both the series are noted down separately.
2. The difference between the two sets of scores is compared.

Tables:**Tables No. I – Format of Response Sheet (To be used separately for both the series)**

Question Number	Answer
1	
2	
3	
4	
5	
6	
7	
8	

9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Table No. II – Showing the number of questions correctly answered in with the without direction series by the subject.

Subject	Number of questions correctly answered in		Difference
	Without Direction series	With Direction series	

Theoretical Note:

1. Direction facilitates observation and accuracy of report.
2. The accuracy of report when observation is directed is more. Knowledge of questions in the second series directs the observation of the subject to the items he/she has answered in the first series. The accuracy of report depends upon the nature of the material, clarity of observation, attention, concentration and suggestibility of the subject.

3. Generally, accuracy of report is more in the second series than in the first series.
4. There are individual differences in the accuracy of observation and report.

Guideline for Discussion:

1. In which series of the experiment is observation directed and in what manner?
2. Compare the performance of the first and the second series.

Explain the trend in accuracy of report as indicated by the results i.e., whether the results are according to the theory or not.

3. List the factors that are likely to influence the accuracy of report.

Conclusion:

1. Has directed observation influenced the accuracy of report ?
2. Does your result agree with the theory ?

APPLICATION VALUE:

This experiment helps the individual to improve one's observational skills. This in turn facilitates the individual to improve his/her attention and concentration.

QUESTIONS:

1. What is observation ?
2. List the materials that are required to conduct this experiment.
3. What instructions would you give the subject in this experiment ?
4. How long would you expose the picture ?
5. How many times would you expose the picture ?
6. In which series do you expect better accuracy of report and why ?
7. Does direction facilitate your observation and the accuracy of report ?
8. What precautions do you have to follow while conducting this experiment ?
9. List the factors that could influence an individual's observation and accuracy of report.
10. What is the application value of this experiment ?

EXPERIMENT NO. 2

EXPERIMENTER:

DATE:

SUBJECT :

2. VISUAL SPAN OF ATTENTION

INTRODUCTION:

The span of attention is also known as the range of attention. It refers to the number of objects or stimuli that one can attend to in a single act of attention. A single act of attention means a brief exposure of a given object i.e., within $1/10^{\text{th}}$ of a second, which makes the eye movement. Miller, on the basis of his experimental studies, concluded that span of attention varies within the limit of 7 ± 2 . However, there are individual differences in span of attention. Practice has been found to increase the average span of attention. It was Hamilton who first experimented with span of attention. The apparatus called Tachistoscope is used to measure span of attention.

PURPOSE:

To determine experimentally the effect of varying the nature of material on Visual Span of Attention (Using non-sense syllable letters and digits-random combination)

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Tachistoscope: This is an apparatus that has a window or a camera slit through which a card can be exposed for $1/10^{\text{th}}$ of a second.

2. 2 set of cards –

Set A : 20 cards containing nonsense combination of consonant ranging from 3 to 7 letters – 4 cards from each category.

Set B : 20 cards containing 3 to 7 digits – 4 from each category.

3. Writing Materials.

PLAN:

The experiment is conducted in two series i.e., the first series is of non-sense syllable and the second series is of digits. The span for nonsense syllable and digits are determined separately and the same is compared.

PROCEDURE:

The subject is seated comfortably in front of the tachistoscope. The cards of non-sense syllable and digits are kept ready. The writing material is given to the subject. With the above arrangements, the experiment is conducted in two series.

I Series: Non sense syllables:

In this series the cards with the letters i.e., non-sense syllables are used. The following instructions are given to the subject. "Here is an apparatus called Tachistoscope. This is the window of the tachistoscope. (Show the window of the Tachistoscope by finger). Fix your eye on the window of this apparatus. After the 'ready' signal, some letters will be exposed to you through this window for a brief period. You have to (note) write down immediately what you see through this window in the same order".

With the above instructions, 4 cards with three letters are exposed one after the other. After exposing all 4 cards of three letters, the responses of the subject are checked up. The pattern used to score the responses is as follows

- One mark for each correct letter placed in its order.
- 0.5 marks for correct letter in wrong place i.e., in case the letters are only inter changed.
- No marks are given for wrong letters.

Then the total score obtained for letters correctly written in each subset is found out. The scores are converted into percentage. The cards of four letters and the rest were exposed following the same procedure as above. The experiment is stopped when the subject fails to obtain 75% in two successive subsets. The Span for letters is thus determined.

II Series : Digits:

In this series, the same procedure as that of the first series is followed. However, the Digit cards are used in this series. The span for digits is obtained. The span for letters and digits is compared.

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. A Ready signal is given before the presentation of each card to the subject.
2. The distance between the subject and the Tachistoscope should be held constant. A distance of at least thirty inches should be there between the subject and the Tachistoscope.

3. The Tachistoscope should be placed in such a way, that the light falls on the window of Tachistoscope.
4. Before lifting the door up of the Tachistoscope, it would be ensured that the card is taken off to avoid confusion and also to avoid exposing the same card twice.
5. Distractions ought to be avoided as far as possible.

RESULTS :

Analysis of Results:

1. The number of letters/digits correctly written by the subject is corrected with the specific scoring pattern mentioned in the procedure.
2. The percentage is calculated for each subset separately with the help of the following formula: Total number of correct responses for letters/digits of a particular subset is divided by total number of actual letters/digits in the series and is multiplied by 100.
3. The Span for the individual is determined by taking the maximum 75% of total scores of the respective subsets of cards.
4. The determined span for letters and the span digits for is compared.

Tables:

Table No. I –Response Sheet for First series – Non-sense syllable

Answers (To be written by the subject)	Score and Percentage (to be calculated by the experimenter)
I SET (Three Letters)	
II Set (Four Letters)	

III Set (Five Letters)	
IV Set (Six Letters)	
V Set (Seven Letters)	

Table No. II Response Sheet for Second series – Digits

Answers (To be written by the subject)	Score and percentage (To be calculated by the experimenter)
I SET (Three Digits)	
II SET (Four Digits)	
III SET (Five Digits)	

IV SET (Six Digits)	
V SET (Seven Digits)	

Table No. III – Showing the span obtained by the subject for letters and digits.

Subject	Span for		Difference
	Letters	Digits	

Theoretical Note:

Several stimuli would be competing for our attention most of the time. Our sense organs, however, are able to respond to only a limited number of them at the same time. This is technically known as span of attention. The span varies from individual to individual.

Normally, the following factors influences a person's span of attention.

- Speed of reading
- Size of the stimulus
- Colour of the stimulus
- Visual field
- Duration of exposure
- Nature of material
- Pre-exposure and post exposure field
- Practice
- Ready signal etc.
- Mental set and age of a person

Organised and meaningful material has a longer span than the disorganized and nonsense material. In the case of digits, the span is higher than the span for nonsense syllabus. However, by and large, the total number of digits or letters that an adult can attend in a single act of attention is about 5 to 7 digits or letters in the average. Children usually have a lower range of attention than adults do. Practice has been found to increase the average span of attention.

Guideline for Discussion:

1. In which series of the experiment is the attention span more ?
2. Compare the performance of the first and the second series.

Explain the trend in the span of attention as indicated by the results. i.e., whether the results are according to the theory or not.

3. List the factors that are likely to influence the span of attention.

Conclusion:

1. Is the span more in the digits series than in non-sense syllable series ?
2. Does your result agree with the theory ?

APPLICATION VALUE:

This experiment helps the individual to know his span for digits and non-sense syllables. This experiment is also found to be very helpful in the selection of traffic police.

QUESTIONS:

1. What is attention ?
2. What is span of attention ?
3. List the factors that influence our span of attention ?
4. Name the apparatus used to measure span of attention ?
5. How do you fix the span ?
6. How many subsets do you find in each series of this experiment ?
7. What are non-sense syllables ?
8. How much distance is to be maintained between the subject's eye and visual span of Tachistoscope in the experiment on attention ?
9. In which series do you expect better span and why ?
10. What is the application value of this experiment ?

EXPERIMENT NO. 2

EXPERIMENTER:

DATE:

SUBJECT :

3. SET ON ATTENTION

INTRODUCTION:

The span of attention is also influenced by set. Set refers to readiness of individuals. Mental set is an essential prerequisite for attention, which in turn prepares an individual for observation. A definite set includes a number of sets that promote attention and add to the performance.

PURPOSE:

To determine experimentally the effect of direction the attention in a specific or definite mental set of performance.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Two list of 15 anagrams were –
List A – consists of General articles
List B – consists of Household articles
2. Stop clock
3. Answer key
4. Writing Materials

PLAN :

The experiment is conducted in two series i.e., the first series is General set and second series is directional set. The number of anagrams correctly transformed by the subject in both the series are noted down separately. The scores obtained are compared.

PROCEDURE:

The subject is seated comfortably in front of the table. The materials of the experiment are kept ready. With the above arrangements, the experiment is conducted in two series.

I Series : General Set:

In this series List-A i.e., List of anagrams of General articles is used. The following instructions are given to the subject. "At the signal 'Start you will be given a list of anagrams. An anagram is a set of jumbled letters, which can be transformed into meaningful words by rearranging the letters. You have to transform the anagrams given in the list into a meaningful word. For example, as 'IRBNA' is anagram. You can transform this into a meaningful word as 'BRAIN' by rearranging the letters. While transforming the anagrams do not add or leave any letter, do not repeat letters and do not use any letter other than the letters given."

With the above instructions the list of anagrams and writing materials are given to the subject along with the signal "Start". The stop clock is started simultaneously. The subject is allowed five minutes to complete the work. At the end of this time duration the 'Stop' signal is given and the list is withdrawn.

II Series: Directional Set:

In this series, the same procedure as that of the first series is followed. However, the List B i.e., list of household articles is used in this series.

The number of anagrams correctly transformed by the subject under the general set series and directional set series are noted separately by correction the answers with the help of the respective answer key. However, this is completed only at the end of the second series. The number of correct answers of both the series is noted down as raw scores. The reaction time is calculated for both the series separately.

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. Before giving the experiment the meaning of the term anagram should be made clear to the subject.
2. The number of letters used in each anagram should be kept constant in both List A and List B.
3. The subject should be asked not to include, omit or repeat any of the letters in the given anagrams while transforming it into a meaningful word.
4. The duration given for transforming the anagrams into words should be kept constant in both the series.
5. Distractions are to be avoided as far as possible.

RESULTS:

Analysis of Results:

1. The number of anagrams correctly transformed by the subject in both the series are recorded separately.
2. The reaction time is calculated for both the series separately. The formula used to calculate reaction time is the Total time (300 seconds) divided by number of anagrams correctly transformed by the subject.
3. The performance of the subject in the first series is compared with that of the second series.

Tables:**Table No. I – Response Sheet for List-A –Anagrams of General Articles**

Anagram	Answer (Word)

Table No. II – Response Sheet for List-B –Anagrams of Household Articles

Anagram	Answer (Word)

Table No. III- Showing the number of anagrams correctly transformed, the reaction time and their difference for general and directional set by the subject.

Subject	Number of anagrams Correctly transformed in		Difference	Reaction time for		Difference
	General set	Directional set		General set	Directional set	

Theoretical Note:

The time taken for general set is usually two to five times longer than that of the time taken for definite set. The number of anagrams transformed will be more under directional set than under general set. Individual differences and set differences are quite natural.

Guideline for Discussion:

1. In which series of the experiment is attention set ? Explain ?
2. Compare the performance of the first and the second series.

Explain the trend in set on attention as indicated by the results i.e., whether the results are according to the theory or not.

3. List the factors that are likely to influence the set on attention.

Conclusion:

1. Has directional set influenced the performance of the subject ?
2. Does your result agree with the theory ?

APPLICAITON VALUE :

This experiment helps on individual to improve his/her attention and concentration. It also helps one to attend to the environment with a specific direction.

QUESTIONS :

1. What is set ?
2. Is there any difference between neutral and mental set ?
3. What is attention ?
4. Expand R.T.
5. What is reaction time ?
6. What is an anagram ?
7. How much time is given to transform the anagrams into words ?
8. Do you think the time limit should be the same in both the series ? If so why ?
9. List the precautions to be followed while conducting this experiment.
10. What is the application value of this experiment ?

EXPERIMENT NO. 4

EXPERIMENTER:

DATE:

SUBJECT :

4. INSIGHT ON MOTOR LEARNING

INTRODUCTION:

Learning is a developmental technique, which brings change in behaviour. There are different types of learning. They are, learning by trail and error, insight, conditioning, imitation, etc., Generally, motor leaning takes place by insight. Insight is nothing but sudden flash of an idea that brings change in the behaviour pattern. Wolfgang Kohler has conducted a number of experiments in this field.

PURPOSE:

To demonstrate the role of insight in motor learning.

MATERIALS REQUIRED:

Following materials are required in order to conduct this experiment.

1. Miles step maze with random and systematic paths, with built in error counter.
2. A stylus.
3. A stop-clock.
4. Writing materials

PLAN :

The experiment is conducted in two paths i.e., Random and Systematic. Six trails are given in both the paths. Altogether 12 trails are given. The performance of the subject in the random method is compared with that of the systematic method.

PROCEDURE :

The step maze is connected with the necessary electrical outlet. The subject is seated comfortably in front of the step maze. With these arrangements, the experiment is conducted in two paths.

PATH I: RANDOM:

In this path, the following instructions are given to the subject. "Here is a maze, in which as you can see there are grooves all over, it is also divided into two parts, your task here is to use the stylus (point to it) and trace the path form the starting point to the

goal (point out the goal as you say this) in this part here. The rule here is that you should try to achieve this as quickly as possible, but if you tap a wrong groove, a click would inform you of the error committed which would be recorded by the error counter too. Upon the commission of an error you have to immediately get back to the previous groove, and then start from there, you can either proceed to the groove in front, the groove behind or to the ones on the left or the right side, but you cannot make any diagonal movement. You also should not skip any groove.”

After checking whether the subject has understood the instructions given, the signal ‘start’ is given. The stop-clock is started simultaneously. The number of errors committed and the time taken by the subject to trace the part are noted down separately. Following the same procedure, five more trials are given to the subject in the same path.

PATH – II SYSTEMATIC:

In this path the following instructions are given to the subject. “With the signal ready you have to start tracing the path from the start to the goal in this side of the maze now (point to the side)”

With the above instructions, the signal ‘start’ and the stop clock is started simultaneously, the first of the five trails is begun. The errors committed and the time taken is noted down. Following the same procedure five more trails are given.

The subject is then given the following instructions: “Now, you have to write an introspective report with respect to your experiences while doing the experiment.” The subject is allowed to write the report and the same is collected at the end.

PRECAUTIONS:

The following precautionary measure are followed while conducting this experiment.

1. The subject is instructed to trace the maze pattern as quickly as possible.
2. The subject is also instructed to avoid diagonal movements and also not to skip over any step.
3. The introspective report is obtained only at the end.
4. Distractions are avoided as far as possible.

RESULTS :

Analysis of Results:

1. The average time taken and errors committed by the subject for each path is calculated separately.
2. The index of learning for each path is calculated with the help of the following formula.

$$\text{Index of learning (for time)} = \frac{\text{Time taken at the last trail}}{\text{Time taken as the first trail}}$$

$$\text{Index of learning (for error)} = \frac{\text{No. of errors committed at the last trail}}{\text{No. of errors committed at the first trail}}$$

3. Learning curves for time and error scores of the subject need to be drawn separately.

Tables :

Table Number I showing time and error scores of both random and systematic paths of subject.

TRIAL	RANDOM PATH		SYSTEMATIC PATH	
	TIME TAKEN	ERRORS	TIME TAKEN	ERRORS
1				
2				
3				
4				
5				
6				

Table II showing the Index of Learning for time & errors scores of the subject under random & systematic paths

SUBJECT	RANDOM PATH	SYSTEMATIC PATH

Theoretical Note:

Motor learning takes place by insight. Insight is nothing but a sudden flash of an idea. This sudden flash in turn brings change in the behaviour pattern. In this experiment, the random path has no definite pattern where as the systematic path has a definite pattern. Hence, the subject is unable to arrive at a definite conclusion with the respect to the route from the starting point to the goal in random path. However, in the systematic path, there is scope for the subject to grasp the principle involved or arrive at an insight. The learning is therefore better in the systematic path than the random path. The grasping principle depends upon the intelligence, sex, age etc., of the subject.

Guideline for Discussion:

1. Is the performance of your subject better in the systematic series or the random series? Does your subject's result support of the theory or not ?
2. Is the index of learning positive or negative. State reasons for the same.

CONCLUSION:

1. What is your subject's index of learning ?
 2. Does the results of your subject agree with the theory ?
-

QUESTIONS:

1. Define learning.
2. What is insight ?
3. Who gave the term insight ?
4. What is random path ?
5. What is systematic path ?
6. List the materials required to conduct this experiment ?
7. What precautions are to be followed while conducting this experiment ?
8. How do you calculate index of learning ?

EXPERIMENT NO. 5

EXPERIMENTER:

DATE:

SUBJECT :

5. DISTRIBUTION OF LEARNING PERDIOS

INTRODUCTION:

Learning is acquisition of skills with practice. Speed and efficiency of learning depends on two factors. They are a) The nature of the activity in relation with the subject's motivation and b) A subject's work methods or modes of attack on the given problem. The work methods may vary from situation to situation and from individual to individual. However, when the material to be learned consists of a series of items, it may be practiced either as a whole or in separate parts. Similarly, the learning time for a given material may either be spent continuously or spaced out over period of varying length. In other word, practice may be massed or distributed in time.

Massed practice means utilizing the given entire time duration for one continuous learning session. Distributed or spaced practice means utilising the allotted item duration for leaning as well as for rest. Time is distributed between learning and rest. Rest is any activity that is unrelated to the learning material.

PURPOSE:

To test the effect of distribution of learning by spaced and non-spaced (massed and spaced) methods on retention.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. 2 list of three-letter non-sense syllables: List 'A' and List 'B'-Each consist of 12 nonsense syllables
2. Stop clock
 1. Addition blank
 2. Writing materials

PLAN :

The experiment is conducted in two series i.e., massed practice and spaced practice. 12 printed card of 3 letters non-sense syllable of list A is used for massed practice and the List B is used for spaced practice. Each card is presented manually to the subject in each series. The number of letters correctly learnt under each series is compared.

PROCEDURE:

The subject is seated comfortably on a stool before a table. Writing materials are placed in front of him. With these arrangements the experiment is conducted in two series.

I Series – Massed practice:

In this series 12 cards of three – letter non-sense syllables of List ‘A’ are presented manually at the rate of 2 seconds per card to the subject. The List is presented a total of five times an interval of 6 seconds between each reading/trial. The following instructions are given to the subject “With the signal ready, I am going to present a few cards with some syllables to you one by one. Please observe carefully and try to learn the syllable”.

With the above instructions the ready signal is given to the subject & the list is presented manually. The stop-clock is also started simultaneously to maintain the time-duration. Thus the list is presented five times and the subject is asked to reproduce the list at the end of the fifth presentation. The number of non-sense syllable correctly reproduced by the subject is noted down.

II Series-Spaced practice :

In this series, List B. containing 12 cards of three-letter nonsense syllables used. Like in the earlier series here each word is manually presented to the subject at the rate of 2 seconds per card. The number of trails given is five. However, a rest interval of 2 minutes is introduced in between the presentations. The following instructions are given to the subject “With the signal ready. I am going to present a few cards of syllables to you one by one. Observe them & try to learn the syllable carefully”.

The stop-clock is started simultaneously with the ready signal. At the end of the second presentation, an addition blank is handed to the subject with the following instruction. “with the signal ready start adding the units in the addition blank and keep doing till you hear stop signal.” With these instructions, the signal ‘ready’ is given & the stop clock is started simultaneously. The subject is allowed to add the units for a

period of 23 minutes. At the end of 2 minutes, signal 'stop' is given. Following the same procedure the cards of list 'B' is presented to the subject twice after the second time a rest-period of two minutes is given. The subject is asked to continue adding from the unit last left off. Following the same procedure, the list B is presented to the subject once more, a total of 5 presentation. However, at the end of the fifth presentation, the subject is not given any rest period. Instead, he is asked to reproduce the list immediately.

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. The rate & time of presentation of cards should be kept constant throughout.
2. In the second series, during rest-period the subject ought to be engaged in unrelated activity.
3. The number of words correctly reproduced under each series should be examined only at the end of second series.

RESULTS:

Analysis of Results:

1. The number of words reproduced correctly under each series is noted down separately.
2. The rate of learning under massed and spaced practice is compared.
3. The graph is plotted for massed & spaced practice scores.

Table :

Table showing the number of non-sense syllable correctly reproduced by the subject under massed and spaced practice and their difference.

Subject	No. of non-sense syllable correctly reproduced under		Difference
	Masses practice	Speed practice	

Theoretical Note:

The experimental evidence shows unequivocally that distribution of practice leads to faster learning and better retention. This finding has been confirmed again and again with a large variety of learning materials and under many different experimental conditions. Distribution of practice may owe part of its effect to improvement in the subject's motivation. Rest periods prevent the learning task from becoming too tedious & irritating. Hence distribution practice is superior to massed practice.

Guideline for Discussion:

1. Compare the rate of learning under the massed and the distributed practice.
2. Which practice is advantageous in your case ?
3. Discuss the results with reference to your graph.

Conclusion:

1. Has distributed practice influenced the performance of the subject ?
2. Does your result agree with the theory ?

APPLICATION VALUE:

This experiment helps the individual to improve one's learning skills and memory.

QUESTIONS:

1. Define learning.
2. What are the economical methods of memorizing ?
3. What is massed method ?
4. What is distributed or spaced method ?
5. Does proportion of the work and rest unit influence the performance or learning ?
6. How would you present the learning material to the subject ?
7. List the precautions that you ought to follow while conducting this experiment.
8. What is the application value of this experiment ?

EXPERIMENT NO. 6

EXPERIMENTER:

DATE:

SUBJECT :

6. BILATERAL TRANSFER OF TRAINING

INTRODUCTION:

Learning means acquisition of skills. When previous training or knowledge influences the acquisition of subsequent leaning it is called transfer of training. Thorndike proposed the theory of transfer of training. In collaboration with Woodworth he conducted an experimental study which actually proved and shaped the theory of transfer of training. This study presupposes that transfer of training or knowledge or ideas depend upon the presence of identical elements between the earlier and subsequent training.

There are three types of Transfer of training they are – Positive, Negative and Zero. In positive transfer of training, acquisition of a skill in one situation facilities the training or learning in subsequent situation because of similarity of content, similarity of technique and similarity of principle. In negative transfer of training, the acquisitions of skill in one situation inhibits the acquisition of skill in the subsequent situation. The negative transfer of training is also know as habit interference. In zero transfer of training the acquisition of skill in one task neither facilitates nor inhibits learning in a subsequent task. It is said to occur when the effect of transfer is nil. The zero transfer of training is also called as neutral transfer.

The positive transfer of training can be either unilateral or bilateral. In unilateral transfer, acquisition of skill form one side of the body is transferred to similar or same side of the body. For example, transfer from right hand to right leg. In bilateral transfer the skill is transferred from one part of the body to the opposite part of body i.e., from right hand to the left hand or from right leg to left leg. Ewert using Mirror Drawing Apparatus conducted experiment on bilateral transfer of training.

PURPOSE:

To demonstrate experimentally the effect of positive transfer of training with the help of the Mirror Drawing Apparatus.

MATERIALS REQUIRED :

The following materials are required in order to conduct this experiment.

1. Mirror Drawing Apparatus with star pattern, mirror, stylus and built in error counter.

2. A stop clock
3. Response sheet
4. Writing materials

PLAN:

This experiment is conducted in three series i.e., I Series-Neutral, II Series-Training, III Series-After Training. The subject is asked to trace the star pattern by looking into the mirror in all three series. However, the performance of the subject in the first series is compared with that of the performance in third series.

PROCEDURE:

The subject is seated comfortably on a stool before the mirror drawing apparatus. The other experimental materials are kept ready. With these arrangements, the experiment is conducted in three series.

I Series – Neutral:

In this series, the following instructions are given to the subject. "Here is the mirror drawing apparatus. You see a star pattern and a mirror. The image of the star pattern is seen in the mirror. Here is a stylus. With the signal start, you have to trace the star pattern from the starting to the end point with the help of the stylus by looking at its image in the mirror. If you touch the edge of the star pattern, you will hear a click sound and the error counter will note down the errors. There is no time limit, but work as quickly as you can. You have to trace the star pattern in left hand (if you are right handed, or else instructions, the error counter of the mirror drawing apparatus is set to zero. The signal start is given to the subject and the stop clock is started simultaneously. The time taken by the subject to trace the star pattern and the errors committed by the subject are noted down separately. Only one trail is given in this series.

II Series – Training:

In this series, the following instructions are given to the subject. "Now, with the signal start, you have to start tracing the star pattern following the same procedure as that of the first series using the opposite hand, right if you used the left in the first series and the left hand if being left handed, you used the right in the first series. Here also there is no time limit, but work as quickly as you can." With these instructions, the signal start is given to the subject simultaneously once again resetting the error counter to zero. The stop clock is also started simultaneously. The errors committed and the time taken by the subject is noted down in the response sheet. Following the same procedure five more trails are given to right hand. Altogether, six trails are given.

III Series – After Training :

In this series, the following instructions are given to the subject. “Now, with the signal start, you have to start tracing the star pattern following the same procedure as that of the previous series but the hand to be used here is the one used in the first series. Here also there is no time limit, but work as quickly as you can.” With these instructions, the signal star is given to the subject simultaneously. Once again resetting the error counter to zero. The Stop Clock is also started simultaneously. The errors committed and the time taken by the subject are noted down in the response sheet. The trails given here is just one like in the first series.

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. the subject should be instructed to trace the star pattern by looking at it image in the mirror.
2. The subject should be instructed to trace the star pattern as quickly as possible.
3. Distractions are to be avoided as far as possible.

RESULTS:

Analysis of Results:

1. The time taken & errors committed by the subject in all three series are noted down separately.
2. The index of learning for right hand training is calculated with help of the following formula:

$$\text{Index of learning (for time)} = \frac{\text{Time taken at the last trail}}{\text{Time taken at the first trail}}$$

$$\text{Index of learning (for error)} = \frac{\text{No. of errors committed at the last trail}}{\text{No. of errors committed at the first trail}}$$

3. The index of transfer of training is calculated with the help of the following formula:

PROCEDURES

$$\text{Index of transfer of training (for time)} = \frac{\text{Time taken in the third series}}{\text{Time taken in the first series}}$$

$$\text{Index of learning (for error)} = \frac{\text{No. of errors committed in the second series}}{\text{No. of errors committed in the first series}}$$

Tables:

Table Number I showing time and error scores of all three series.

TRAIL	Raw date	
	TIME TAKEN	ERRORS
Left Hand - I Series		
Right Hand - II		
Right Hand - III		
Right Hand - IV		
Right Hand - V		
Right Hand - VI		
Left Hand - III Series		

Table II showing the index of Learning for time & error scores of the subject under the Right hand training (II Series)

SUBJECT	INDEX OF LEARNING FOR TIME	INDEX OF LEARNING FOR ERROR

Table III showing the index of Transfer of training for time & errors scores of the subject under left hand trail (I & III Series)

SUBJECT	INDEX OF TRANSFER OF TRAINING FOR TIME	INDEX OF TRANSFER OF TRAINING FOR ERROR

Theoretical Note:

Learning means acquisition of skills. When previous training or knowledge influences the acquisition of subsequent learning it is called transfer of training. If the acquisition of skill in one situation facilitates the training or learning in some subsequent situation because of similarity of counter, similarity of technique or similarity of principle, it is known as positive transfer of training. In this experiment, training given to the right hand for right handed persons facilitates better performance in left hand in the after training trail. Hence, we expect better performance in the this series when compared to the first series. If the obtained index of transfer of training is positive, it means bilateral transfer has taken place. If the obtained index of transfer of training is negative, it means there is no transfer of training.

Guideline for Discussion:

1. Is the performance of your subject in the right hand (for right handed persons) better after training or not ?
2. Does your subject's result support the theory or not ?
3. Is the index of learning positive or negative. Give reasons.
4. Is the transfer of training positive or negative. Give reasons.

CONCLUSION:

1. What is the index of transfer of training in your subject ?
2. Do the results of your subject agree with the theory ?

QUESTIONS:

1. Define learning.
2. What is transfer of training ?
3. Who is the founder of the theory for transfer of training ?
4. What is positive transfer of training ?
5. What is negative transfer of training ?
6. What is zero transfer of training ?
7. List the materials required to conduct this experiment ?
8. Give a description of the Mirror drawing board.
9. What are the precautions that are to be followed while conducting this experiment?
10. How do you calculate the index of transfer of training ?

EXPERIMENT NO. 7

EXPERIMENTER:

DATE:

SUBJECT :

7. EFFECT OF MEANING ON RETENTION

INTRODUCTION:

Memory includes remembering and forgetting, both of which depend on retention. Retention causes remembering and absence of retention is forgetting. Retention can be tested through the methods of recall, recognition, relearning and reconstruction. The learning and memory of subject may be influenced by several factors out of which one important factor is the type of material to be remembered. Meaningful and familiar materials are quickly learnt and better remembered than the nonsense syllables because of their high associative value, close familiarity and effect of transfer. Trying to be proficient in a skill without understanding its meaning and value has little usefulness in future acquisition of knowledge. Logical, concrete and meaningful leaning is more efficient and useful because of their associative value. Rote memory is more time consuming than learning with understanding. In the latter case the individual is already familiar with the meaningful words and can associate it easily to some concrete items while the nonsense items are not familiar to him/her, as they would not be used in one's day-to-day life.

Even if the nonsense syllables do get memorized/learned after a lot of effort and time they would be forgotten quickly when compared to the meaningful words as they posses low association value. They would be abstract concepts for the individual unused probably in any situation other than the one where he put effort and learnt them!

PURPOSE:

To demonstrate experimentally that other things being equal the memory of an individual for meaningful words would be better nonsense syllables. To show that meaningful words are quickly learnt and better remembered than the nonsense syllable.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. A list of 20 nonsense syllables
2. A list of 20 unconnected but meaningful words

3. A list of 20 connected and meaningful words
4. A Stop clock
5. Writing Materials

PLAN:

The experiment is conducted in three series that is, first with the nonsense syllables, second with the meaningful but unconnected words and third with the connected and meaningful words. Each list ought to be presented orally thrice, after which the total number of words correctly reproduced under each list/series would be compared in the end.

PROCEDURE:

The subject is seated comfortably before a table. The materials of the experiment are kept ready. The experiment is then conducted in three series.

I Series (Nonsense Syllables):

The following instructions are to be given to the subject "A list of words would be read out to you, listen carefully". With this said, the stopwatch is started simultaneous with the 'ready' signal, and the list A is read out at the rate of 2 seconds per word in an even tone. The list is presented thrice with an interval of 5 seconds between each reading out. After the third presentation, one minute of distraction is introduced, in the form of multiplication, addition sums. The aim of this is to prevent the subject from recalling the words just read out. After this minute is over the subject is asked to write down the list that was just read out to him from memory.

II Series (Meaningful but Unconnected words):

In this series, list B is used. However all other procedure remain to be the same as that of the first series.

III Series (Meaningful and connected words);

In this series, list C is used. However all other procedure remain to be the same as that of the first series.

PRECAUTIONS:

The following precautionary measures are followed while conducting the experiment.

1. The rate of presentation and the tone to be kept constant throughout the experiment.
2. The time spent in all the three series/conditions must be equal.
3. During the distraction (where he is made to do some unconnected work) period, the subject must not be allowed to recall the list of words just read out to him.
4. Distractions are to be avoided as far as possible.

RESULTS:

Analysis of Results:

1. Once the experiment is done with, the number of correct words reproduced in each of the three series is noted down individually.
2. The difference between list A and list B and list C and list A and list C in the number of words reproduced is calculated.
3. The average number of words reproduced under the three series is calculated.

Table:

Table showing the total number of non-sense syllable, meaningful unconnected and meaningful connected words correctly reproduced by the subject.

Subject	Number of correct response			Difference		
	List A	List B	List C	A-B	A-C	B-C

Theoretical Note:

Studies and experiments have shown that meaningful material would be retained more than nonsense syllables. A logical sequence to the material to be learned would be remember better. The reasons for this better performance are

- a) Meaningful material makes stronger impression/memory trace.
- b) There is interest on the part of the individual to learn the material.
- c) There would be a resistance to learn the nonsense syllables.

Therefore, in the present experiment, the maximum number of correct reproduced words is expected in the third series (the meaningful and connected words) followed by the second series (meaningful yet unconnected words). The least number of correct reproduced words is expected in the first series (the nonsense syllables).

Retention also depends on the individual's age, nature, interest, state of mind, mood, and nature of the presented material.

Guideline for Discussion:

1. Does the individual go in accordance with the theory, of having the most correct answers in the third series, followed by the second and the first series?
2. Is the subject an exception to the theory? If so what are the probable reasons for this?

CONCLUSION:

1. Is the results of your subject according to the theory?

APPLICATION VALUE:

This experiment demonstrates the importance of finding meaning in whatsoever an individual engages in, any task at all. The more meaning, association found the better would the learning be, this could be in relation to material to be learned, tasks to be worked thought even.

QUESTIONS:

1. What is remembering?
2. What is retention?
3. List the methods used to measure retention.
4. What are non-sense syllables?
5. In how many series do you conduct this experiment?
6. List the materials required to conduct this experiment?
7. What precautions are to be followed while conducting this experiment?
8. What is the application value of this experiment?

EXPERIMENT NO. 8

EXPERIMENTER:

DATE:

SUBJECT:

8. PROACTIVE INHIBITION

INTRODUCTION:

The major cause for forgetting is interference. Experimental evidence points to the same conclusion. The effect of other learning on retention is studied by two classes of operations i.e., retroactive and proactive inhibitions. Proactive means forward action. Proactive inhibition means the forgetting caused by the forward action of an activity on the memory of the old or previous learning. When the newly learnt material is disturbed by the old or previously learnt material, the proactive inhibition is said to have operated on the individual. Proactive inhibition has been defined by Underwood, as the decrement in retention of a task as a consequence of other learning coming prior to the learning of the task on which the retention test is made.

PURPOSE:

To demonstrate the phenomenon of Proactive inhibition as a function of interpolated activity.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Three list of nonsense syllables
 - List-A consisting 10 nonsense syllables which are to be printed on individual cards.
 - List-B consisting 10 nonsense syllables which are to be printed on individual cards.
 - List-C consisting 10 nonsense syllables which are to be printed on individual cards.
2. A Stop clock
3. Writing Materials.

PLAN:

The experiment is conducted in two series that is without interpolation and with interpolation. The total number of words correctly reproduced by the subject at the last trial of each series is noted down separately. The same is compared in the end.

PROCEDURE:

The subject is seated comfortably before a table. The materials of the experiment is kept ready. The experiment is then conducted in two series.

I Series : Without Interpolation:

In this series, 10 Cards of three lettered non-sense syllables of List-A are used. The following instructions are given to the subject "At the signal Ready, the cards consisting of groups of syllables will be presented to you manually one by one. Observe them carefully and try to learn them" . With these instructions, the signal ready is given to the subject and the stop clock is started simultaneously. Each card is presented to the subject at the rate of 2 seconds per card. At the end of the presentation of the tenth card, the subject is asked to reproduce the list. The number of correct responses given by the subject is noted down. The same procedure is followed till the subject reproduces all the ten syllables without any mistake. Thus, there is no trail limit. After the subject reproduces all ten syllables correctly, the retention interval of 10 minutes is introduced. During this time interval, the subject is engaged in light conversation by the experimenter. At the end 10 minutes, the subject is asked to reproduce the list. The number of correct responses given by the subject is noted down.

II Series: With Interpolation:

In this series, 10 Cards of three lettered non-sense syllable of List-C are first used. Here, the following instruction are given to the subject. "With the signal ready, I am going to present another set of cards consisting of syllables. Observe and try to learn these letters". With these instruction, the 10 cards of non-sense syllables of List C are presented to the subject at the rate of 6 seconds per card. The total time taken to present all 10 cards is 60 seconds. Following the same procedure, the same cards are presented nine more times to the subject. Thus, the total number of presentation is 10 and the total time used is 10 minutes i.e., 600 seconds.

At the end of 10 minutes, the set of 10 cards of non-sense syllable of List-B is presented to the subject. The subject is given the following instruction. "Now, I am going to present another set of cards of non-sense syllables. Try to learn these letters also". The cards of list B are presented to the subject at the rate of 2 seconds per card. After all the ten cards are presented to the subject, he/she is asked to reproduce the list. The number of correct responses given by the subject is noted down. The same procedure is followed till the subject reproduces all the ten non-sense syllables correctly. Here also, there is no limit to learn the list completely. After the subject reproduces all the ten non-sense syllables correctly, a retention interval of 10 minutes is introduced. During this time interval, the subject is engaged in some unconnected work. At the end of this time duration, he is asked to reproduce the list B. The number of

correct responses given by the subject is noted down. The introspective report is obtained from the subject about his feelings and experiences, at the end.

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. The rate of presentation is kept constant for list A & B.
2. The retention interval same in both the series.
3. Distractions are avoided as far as possible.

RESULTS:

Analysis of Results:

1. The number of trails taken by the subject to learn each list is noted down separately.
2. The number of correct reproductions after the retention interval is noted down separately for both the series.
3. The percentage of reproduction and forgetting is calculated separately for both the series.

Percentage of retrieval is calculated with the help of the following formula:

$$\text{Percentage of R} = \frac{\text{Number of correct reproduction after the retention interval}}{\text{Number of words given for retention}} \times 100$$

Percentage of forgetting is calculated with the help of the following formula:

$$\text{Percentage of F} = \frac{\text{Number of incorrect reproduction after the retention interval}}{\text{Number of words given for retention}} \times 100$$

4. The line graph is drawn to show the progress of the original learning.
5. The bar diagram is drawn to show the percentage of reproduction and forgetting.

Table:**Table No. I Response sheet for List-A: Without Interpolation series**

Sl.No.	LIST-A	LEARNING TRAILS							No. of correct reproduction after the retention interval
		1	2	3	4	5	6	SO ON	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
Raw Score									
Percentage									

Table No. II Response sheet for List-B: With Interpolation series

Sl.No.	LIST-B	LEARNING TRAILS							No. of correct reproduction after the retention interval
		1	2	3	4	5	6	SO ON	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
Raw Score									
Percentage									

Table No. III showing raw data, percentage of reproductions and forgetting obtained by the subject in proactive inhibition.

SERIES	LEARNING TRAILS							No. of correct reproduction after the retention interval	Percentage of	
	1	2	3	4	5	6	SO ON		R	F
First										
Second										

Note: R = Retrieval and F=Forgetting

Theoretical Note:

Proactive inhibition is said to operate when the learning of a previous material interferes with the retention of some newly learnt material. The interpolated activity goes forward and disrupts, thereby interfering with one's memory by disorganizing one's present learning.

Proactive means forward action. Proactive inhibition means forgetting caused by the forward action of an activity on the memory of the old or previous learning. When the newly learnt material is disturbed by the old or previously learnt material, the proactive inhibition is said to have operated on the individual. In this experiment, therefore, the performance of the subject is expected to reduce in List B because of the earlier interference of List C.

Several factors like the nature, intensity, temporal location, length, emotional quality of the interpolated activity, degree of original learning and use of same sense modality influence the phenomenon of proactive inhibition.

Guideline for Discussion:

1. Is your subject affected by proactive inhibition? If so, what is the extent of forgetting?
2. What are the reasons for proactive inhibition, in the case of your subject?

CONCLUSION:

1. What is the extent of forgetting experienced by your subject ?
2. Does the results of your subject agree with theory ?

QUESTIONS:

1. What is memory ?
2. What is forgetting ?
3. What is proactive inhibition ?
4. List the materials that are required to conduct this experiment ?
5. What type of work would you assign to the subject during the distraction period ?
6. What precautions are to be followed while conducting this experiment ?
7. Does proactive inhibition influence the work performance of the individual ?
8. List the factors that could influence proactive inhibition.

EXPERIMENT NO. 9

EXPERIMENTER:

DATE:

SUBJECT :

9. RETROACTIVE INHIBITION

INTRODUCTION:

According to Ebbinghaus and associates, remembering is possible simply due to the use of traces formed out of original learning. Hence, forgetting takes place as memory becomes fainter due to disuse with passage of time. However, the critics argue that simple passage of time or disuse alone cannot lead to forgetting. The various experiments on the phenomenon of retroactive inhibition have proved this point.

Retroactive inhibition comes from the term 'retroaction', which means 'an action that goes back' and 'inhibition' means 'check or block'. According to Jenkins and Dallenbach interpolated activities after original learning and during the retention interval interact with the original learning. This interaction produces confusion and brings down the amount of material learnt. This interference and confusion is called 'Retroactive inhibition'.

PURPOSE:

To demonstrate the phenomenon of Retroactive inhibition as a function of interpolated activity.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Three list of nonsense syllables
 - List-A consisting of 10 nonsense syllables which are to be printed on individual cards
 - List-B consisting 10 nonsense syllable which are to be printed on individual cards
 - List-C consisting 15 nonsense syllable which are to be printed on individual cards
2. A Stop clock
3. Writing Materials

PLAN:

The experiment is conducted in two series that is without interpolation and with interpolation. The total number of words correctly reproduced by the subject at the last trial of each series is noted down separately. The same is compared in the end.

PROCEDURE:

The subject is seated comfortably before a table. The materials of the experiment are kept ready. The experiment is then conducted in two series.

I Series: Neutral:

In this series, 10 Cards of three lettered non-sense syllable of List-A are used. The following instructions are given to the subject "At the signal Ready, the cards consisting of certain groups of syllables will be present to you manually one by one. Observe them carefully and try to learn the letters". With these instructions, the signal ready is given to the subject and the stop clock is started simultaneously. Each card is presented to the subject at the rate of 2 seconds per card. At the end of the presentation of the tenth card, the subject is asked to reproduce the list. The number of correct responses given by the subject is noted down. The same procedure is followed till the subject reproduces the all ten non-sense syllables without any mistake. Thus, there is no trail limit. After the subject reproduces all ten non-sense syllables correctly, the retention interval of 10 minutes is introduced. During this time interval the subject is engaged in light conversation by the experimenter. At the end 10 minutes, the subject is asked to reproduce the list. The number of correct responses given by the subject is noted down.

II Series: Interpolation:

In this series, 10 Cards of three lettered non-sense syllable of List-B are used. The same procedure as that of the first series is used till the subject reproduced all ten non-sense syllables correctly. Here also, there is no trail limit to learn the list completely. After the subject reproduces all ten non-sense syllables correctly, the retention interval of 10 minutes is introduced. During this time interval, the subject is made to learn 15 non-sense syllables of List-C. the following instructions are given to the subject. "with the signal ready, I am going to present another set of cards consisting of syllables. Observe and try to learn these letters". With these instructions, the 15 cards of non-sense syllables are presented to the subject at the rate of 4 seconds per card. The total time taken to present all fifteen cards is 60 seconds. Following the same procedure, the same cards are presented nine more times to the subject. Thus, the total number of presentation is 10 and the total time used is 10 minutes

i.e., 600 seconds. At the end 10 minutes, the subject is asked to reproduce the ten non-sense syllables of list B. The number of correct responses given by the subject is noted down.

The subject is then asked to write an introspective report explaining the difficulties faced by him while learning and recalling both the lists.

PRECAUTIONS:

The following precautionary measure are followed while conducting this experiment.

1. The rate of presentation is to be kept constant throughout the experiment.
2. The retention interval should be same in both the series.
3. Distractions are to be avoided as far as possible.

RESULTS:

Analysis of Results:

1. The number of trails taken by the subject to learn each list is noted down separately.
2. The number of correct reproductions after the retention interval is noted down separately for both the series.
3. The percentage of reproductions and forgetting is calculated separately for both the series.

Percentage of retrieval is calculated with the help of the following formula:

$$\text{Percentage of F} = \frac{\text{Number of incorrect reproduction after the retention interval}}{\text{Number of words given for retention}} \times 100$$

4. The line graph is drawn to show the progress of the original learning.
5. The bar diagram is drawn to show the percentage of reproduction and forgetting.

Table:

Table No. I Response sheet for List-A: Neutral series

Sl.No.	LIST-A	LEARNING TRAILS							No. of correct reproduction after the retention interval
		1	2	3	4	5	6	SO ON	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
Raw Score									
Percentage									

Table No. II Response sheet for List-B: With Interpolation series

Sl.No.	LIST-B	LEARNING TRAILS							No. of correct reproduction after the retention interval
		1	2	3	4	5	6	SO ON	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
Raw Score									
Percentage									

Table No. III showing raw data, percentage of reproductions and forgetting obtained by the subject in Retroactive inhibition.

SERIES	LEARNING TRAILS							No. of correct reproduction after the retention interval	Percentage of	
	1	2	3	4	5	6	SO ON		R	F
First										
Second										

Note: R = Retrieval and F=Forgetting

Theoretical Note:

Retroactive inhibition is said to operate when the learning of a new material interferes with the retention of previously learnt material. The interpolated activities go backward and disrupt, thereby interfering with one's memory by disorganising one's previous learning.

According to Muller and Pilzecker, the time which lapses between the original learning and subsequent recall, better known as the retention interval is not important for forgetting. But, the activities with which the individual is engaged during the retention interval are more important in explaining forgetting. Thus, the interpolated activity i.e., the activity during the retention interval and not the disuse is the cause of forgetting. Therefore, they define retroactive inhibition as a decrement in retention due to an interpolated activity introduced between the original learning and subsequent recall. In other words, the interpolated activity introduced during the retention interval determines forgetting to a large extent.

Several factors like the nature, intensity, temporal location, length, emotional quality of the interpolated activity, degree of original learning and use of same sense modality influence the phenomenon of retroactive inhibition.

Guideline for Discussion:

1. Is your subject influenced by retroactive inhibition? If so, what is the extent of forgetting?
2. What are the reasons for retroactive inhibition, in the case of your subject?

CONCLUSION:

1. What is the extent of forgetting experienced by your subject ?
2. Does the results of your subject agree with the theory ?

QUESTIONS:

1. What is memory ?
2. What is forgetting ?
3. What is retroactive inhibition ?
4. List the materials that are required to conduct this experiment ?
5. What type of work would you assign to the subject during the distraction period ?
6. What are the precautions to be followed while conducting this experiment ?
7. Does retroactive inhibition influence the work performance of the individual ?
8. List the factors that could influence retroactive inhibition

EXPERIMENT NO. 10

EXPERIMENTER:

DATE:

SUBJECT :

10. MULLER-LYER ILLUSION

INTRODUCTION:

Illusion is a normal and universal phenomena. Illusions are special perpetual experiences in which information arising from real external stimuli leads to an incorrect perception or false impression of the subject or even from where the stimulation occurs. Illusions occur due to two important phenomena. They are retinal image & eye movement, and mental processes & objective factors. One can classify illusions based on the nature of sense organs involved. For example, optical illusions, tactual illusions, etc., Another way of classifying illusions is physical and psychological. The horizontal-vertical illusions and Muller-Lyer illusion are best examples of geometrical illusions Frana-Muller devised the Muller-Lyer illusion test in 1889. It is the most familiar and extensively studied geometric illusion.

PURPOSE:

To study demonstrate perceptual illusion with the aid of Muller-Lyer illusion.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Muller-Lyer illusion test board: The test board has two straight lines side by side. One has arrowheads on both the ends and the other line has feather-heads on either end. The line between the two arrowheads is the standard line and its length remains constant. The line between the feather-heads is the variable line and its length is varied by manipulation.
2. Measuring scale, a measuring scale is attached behind the Muller-Lyer illusion test board.
3. Writing materials.

PLAN:

This experiment is conducted in two series: i.e., ascending series and descending series. The extent of illusion is calculated and found out the end of it.

PROCEDURE:

The subject is seated comfortably in front of the table. The Muller-Lyer illusion test board is placed parallel to the subject's eye at a distance of two feet. With the above arrangements, the experiment is conducted in two series.

I Series: Ascending :

In this series, the length of the variable line is kept definitely shorter than the standard line. The following instructions are given to the subject. "Look at this board where you will find two line. Line one is the with the arrow-head is the standard line the line that remains constant. The second is with a feather head, the variable line that can be moved. At the signal start, you have to begin to adjust the variable line, (which is at the moment is shorter than the standard line) to that of the standard line, in a way that both the lines look approximately equal". With the above instructions the subject is allowed to adjust the length of the variable line with that of standard line is measured with the help of the measuring scale and the same is noted down separately. Three trails are given.

II Series: Descending:

In this series, unlike the I series the length of the variable line is kept definitely longer than the stands ARD line. The following instructions are given to the subject. "Look at this board again, at the signal start you have to adjust the variable line, (which is at the moment longer than the standard line) to that of the standard line in a way that both the lines look approximately equal". With the above instructions the subject is allowed to adjust the length of variable line with that of standard line. The length of the variable line adjusted to the standard line is then measured with the help of the measuring scale and the same is noted down separately. Three trials are given here too. However, the trails of ascending and descending series are given alternatively.

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. The test is conducted in broad daylight.
2. It is ascertained that the subject has understood the instruction clearly.
3. The trails of both the series are given alternately.

RESULTS:

Analysis of Results:

1. The length of the variable line, adjusted equal to the standard by the subject is noted down separately for both the series.
2. The average of the three trails are calculated separately for each series.
3. The extent of perceptual error experience by the subject is calculated by deducting the average length of the variable line adjusted equal to the standard with that of the length of the standard line.

Tables:**Table No. I – showing the judgement given by the subject under the ascending and descending series of the Muller-Lyer illusion test.**

TRAIL	ASCENDING SERIES	DESCENDING SERIES
1		
2		
3		
TOTAL		
AVERAGE		

Extent of Illusion = Length of the standard line – The adjusted length of the variable line.

Theoretical Note:

Illusion means wrong perception. It is an error in the perceptual functioning which is a normal and universal phenomenon. In the Muller-Lyer illusion, there is a tendency to underestimate the standard line and to overestimate the variable line. The illusion is the error, which is the difference in length between the standard and the variable adjusted equal to the standard. In the ascending method since the variable line is kept shorter than the standard, the subject is expected to underestimate the standard line, whereas in the descending method, since the variable line is kept longer than the standard, the subject is expected to overestimate method than the ascending method. A number of factors like unanalysed total impression the gap at the juncture, accommodation, expectancy, thickness of the line, colour, age of the subject etc. influence illusion.

Guideline for Discussion:

1. Is there any perceptual illusion in your subject ?
2. Where is the magnitude of illusion more, in the ascending or descending series ?
3. What could be reasons for such differences ?

CONCLUSION:

1. Where is the magnitude of illusion more, in the ascending or descending series ?

QUESTIONS:

1. What is perception ?
2. What is illusion ?
3. Name the errors of perception ?
4. Name any two optical illusions.
5. What is Muller-lyer illusion.
6. Define ascending method.
7. Define descending method.
8. List the possible factors that could influence illusion.
9. How is the extent of illusion calculated ?
10. Describe the Muller-lyer illusion board.

EXPERIMENT NO. 11

EXPERIMENTER:

DATE:

SUBJECT :

11. PROCESSES INVOLVED IN CONCEPT FORMATION

INTRODUCTION:

Concept formation or concept learning is used to refer to the development of the ability to respond to common features of categories of objects or events. Concepts are mental categories for objects, events, or ideas that have a common set of features. They allow us to classify objects and events. A concept is a generalization that helps to organise information into categories. For example, the concept "square" is used to describe those things that have four equal sides and four right angles. Thus, a concept categories things whose properties meet the set requirements.

Sometimes it's hard to identify the dimension to which a property belongs or to identify the set of necessary and sufficient features that identify a concept. At times the best we can do is to identify whether an example is an exemplar of a concept probabilistically. That is whether the object in front possesses the characteristics, properties of the dimension that we are using (even in an abstract sense) as the standard to classify it as either a part or not a part of. There would even be times when we may not be able to identify the dimensions or he features that define a concept with accuracy.

Concepts permit inferences, in other words they allow reasoning about new things. They also support communication, as in adding new information about things, ideas, and even leading to economy of communication. They generally are arbitrary, set by culture but not necessarily so always, they can be subjective or individualist too, for example, in biology, peanuts are considered a bean, not a nut. However, for medical doctors, people who are allergic to peanuts are often allergic to nuts, and are rarely allergic to beans. Therefore, the plant taxonomist's classification scheme is useless for a medical researcher.

PURPOSE:

To study the processes involved in concept formation.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Seven sets of cards – each set containing seven cards ($7 \times 7 = 49$ total cards)

representing one concept. A common nonsense syllable and common geometrical figures representing each concept.

2. The Manual consisting details of that non-sense syllables and geometrical figures of each concept.
3. Writing Material.

PLAN:

The experiment is conducted in one series, the objective being to examine the processes involved in concept formation, with an introspective report from the subject to understand how she/he arrived at the concepts that she/he did.

PROCEDURE:

The subject is seated comfortably in front of the table. A set of 49 cards are placed before him/her. With the above arrangements, the following instructions are given. "This experiment is about concept formation. Concepts are mental categories for objects, events, or ideas that have a common set of features. For example when we see a chair, table, door, tree, what would be the concept formed? The answer is wood, which is the common factor in the four items mentioned above. In the same way you are supposed to observe the seven sets of forty-nine cards placed before you. In each card there is a geometrical figure and some syllables, your job here is to observe each card carefully and to find the meaning of the syllables of the card. While you do this use logic for making the choice of concepts, since you would have to give an introspective report to me upon completion".

After confirming that the subject has understood the instructions given he is allowed to observe all the 49 cards one by one. There is no time limit for this experiment. However, the subject is allowed to observe the cards till he finds out the meaning of the syllables. After the subject has arrived at the concept, he/she is given the following instructions'. "Now, you have to write an introspective report regarding how you arrived at the concepts."

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. The cards 'have' to be random, in other words they have to be thoroughly shuffled and re-shuffled prior to being given to the subject.
2. The instructions ought to be very clear to the subject, in other words he should understand what is expected of him, he should understand what a concept means.

3. The experimenter whose not given any clue about either the figures or the syllables.
4. There is no time/trial limit for the observation of the cards to arrive at the concept/s.
5. Distractions ought to be avoided as far as possible.

RESULTS:

Analysis of Results:

1. The number of concepts correctly formed by the subject is found out.
2. The introspective report of the subject is taken to determine how she/he developed the concepts that he/she did, if he/she was successful.

Tables :

Table No. I –Showing the concepts correctly developed by the subject

Subject	DEG	BIK	NAL	ZAB	MUR	CEV	HOR	Total

Theoretical Note:

Studies have revealed that the formation or development of concepts passes through several stages:

- a) Observation of the situation or event.
- b) Analysis of the same after breaking it up into its components.
- c) Abstraction of the common features in the otherwise diverse objects, events
- d) Formation of a tentative idea or hypothesis taking the commonness/similarity into account.
- e) Verification of the hypothesis
- f) Generalization of the hypothesis if it stands the test of verification.
- g) Naming of the concept.

All these stages may be reduced to abstraction and generalization.

Guide While forming concepts the individual could either make use of the spectator or the participant approach/behaviour. In the former case he would not use any hypothesis, instead he would make random guesses in other words he would display an open-minded approach, he could examine parts of the situation only as parts of the whole, leading to concept formation in this manner. In the latter case the individual adopts the participant approach where he analysed the entire situation/event into its components, disregarding the entire while forming his concept.

Factors that could facilitate or hinder information or concepts are:

- a) Nature of material
- b) Prejudicial approach, prejudged attitudes
- c) Flexibility in approach, sense of awareness and alertness
- d) Lack of imagination/creativity
- e) Lack of proper perspective

Guideline for Discussion:

1. Was the subject/s successfully in forming the concept/s? If so, how many were formed ?
2. In case of no success with regard to concept-formation, what could the reasons for this be ?
3. Which were the most commonly formed concepts ? Why ? The why would be answered on the basis of the introspective reports.

Conclusion:

1. How many concepts does the subject form ?
2. Does the introspective report support the results of the subject ?

APPLICAITON VALUE:

This experiment would help individuals/students

- a) Understand how much we classify in our regular lives, and how there are different rationales for different classifications.
- b) This could even make individuals sharper in their observation and classification skills. Their critical and creative thinking, communication, and independent learning could also improve.

QUESTIONS:

1. Define thinking ?
2. What are concepts ?
3. How are concepts formed ?
4. List the steps involved in concept formation
5. What is an introspective report ?
6. What is an a hypothesis ?
7. Do you find geometrical figures behind each group of syllables ?
8. How does not learn the concept in this experiment ?
9. List the precautions to be followed in this experiment
10. What is the application value of this experiment ?

EXPERIMENT NO. 12

EXPERIMENTER:

DATE:

SUBJECT :

12. CONCEPT-FORMATION IN A MULTIPLE-CHOICE SITUATION

INTRODUCTION:

Thinking, the most complex of human activity, comes about upon being confronted with problems that require solution. Thinking has been defined as the sequential arousal of symbols, arranging and re-arranging and re-arranging of symbols implicitly within the range of the individual's experiences and abilities. Thinking involves concepts, which also includes precepts, in turn requiring the use of logic, reasoning and judgment.

Upon being confronted with a problem we are also presented with a number of inferences, hypotheses, arising from past dealings, experiments, solutions. Which actually means that problems in general do have more than one solution, they have options and alternatives, it is up to the concerned individual to weigh the pros and cons and adopt the best that he/she feels for the situation in front confronting him. This solution would in all probability be based on the one that would be at the least cost to himself, this would depend once again on how best he understood the concepts underlying the problem situation and how best had he/she successfully handled the same in the past.

This experiment is based on the principle that there are multiple choices open to the individual. One has to use his/her power of thinking, logic and reasoning to arrive at the correct concept through the trial and error method.

PURPOSE:

To study experimentally the process of concept-formation in a multiple-choice situation.

MATERIALS REQUIRED:

The following materials are required in order to conduct this experiment.

1. Yerkes Multiple-choice Apparatus : This has a screen dividing the apparatus into two parts, one being the subject's side and the second being the experimenter's side. The screen also prevents the subject from seeing the schedule of switch presses by the experimenter. There is a side-switch on the experimenter's side that is attached to a

buzzer. There are sequences of 11 switches on the experimenter's side, that correspond to 11 such switches on the subject's side too. The difference being that the experimenter's switches control the switches on the subject's side. When the 'e' side switches are switched on, only then would the 's' side switches light up upon being pressed.

2. A Schedule of stimulus/Switch Presentation.
3. Writing Materials.

PLAN:

This experiment is conducted in one series, the objective being to examine the processes involved when a concept has to be formed in a multiple-choice situation. The schedule of switch presses is decided before hand by the experimenter, in accordance with a concept. During every trial the regulator of the buzzer is set to the appropriate switch number (usually 2 from left of 5 lights which are on) so that upon the correct press by the subject there would be buzzer sound indicating the switch press was correct.

PROCEDURE:

The subject is seated comfortably on the subject's side of the multiple-choice apparatus. The following instructions are then given to him. At the signal 'start' I will switch on five lights out of which one switch is associated with buzzer sound. Your job is to identify the light with buzzer sound. You can identify this by pressing the switches that are corresponding to the light at your end. You have to logically explain how you identified the correct key at the end."

With the above instructions the experiment is begun. Trails are given as per the schedule prepared by the experimenter. The experiment is continued till the subject correctly identifies the switch associated with the buzzer sound in three continuous trails. This shows that the subject has understood the logic behind the experiment. However, in case if the subject fails to understand the logic behind the experiment, a maximum of 25 trails are to be given. After 25 trails irrespective of whether he has comprehended the concept/principle or not the experiment is terminated.

PRECAUTIONS:

The following precautionary measures are followed while conducting this experiment.

1. Though the combinations could vary, the buzzer sound must be associated with a single principle/concept throughout the experiment, it should not be changed after some trails.

2. The given instructions should be very clear, to make it so, one or two demonstration could be conducted on the subject.
3. Distractions are to be avoided as far as possible.

RESULTS:

Analysis of Results :

1. The number of trails taken by the subject/s to learn the principle/concept is noted down.
2. The number of errors committed in each trail is also made note of.

Tables: Table showing the number of errors committed and trails taken by the subject to arrive at the concept.

S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Number of Trails taken by the Subject to arrive at the concept = (the number of trails are to be noted here)

Theoretical Note:

In this experiment the subject has to learn the principle or concept behind the experiment. This means that a particular aspect of the situation is associated with success, which brings into it a part of the problem-solving behaviour. Since the solution is not in the perceptual field of the subject the learning here is of the trial-error kinds. At the start, the subject could make a lot of errors and take a lot of trials/time, but as the trials increase the errors must decrease as the logic of the correct switch or the concept underling it should occur to the subject.

Guideline for Discussion:

1. Was the individual/group able to grasp the concept/principle behind the correct switches ?
2. If so how many trails did he/she take, how many errors were committed while doing so ?

3. If not, what was, could be the reason for the same ?

Conclusion:

1. How many trials has the subject taken to arrive at the concept ?

APPLCAITON VALUE:

Experiments/Exercises like these keep our minds sharp with regard to dealing with an meeting unexpected situations. In addition it could teach an individual to make the best of any given situation.

QUESTIONS:

1. Define thinking ?
2. What are concepts ?
3. How concepts are formed ?
4. List the steps involved in concept formation
5. What is hypothesis ?
6. What is an introspective report ?
7. How could you learn the concept in this experiment ?
8. Give the description of multiple choice apparatus.
9. List the precautions needed to be taken in this experiment.
10. What is the application value of this experiment ?

INTRODUCTION:

Psychologists use different methods to collect the data. The large quantity of data collected thus, would be difficult to understand. Since the data collected would be in the form of raw scores. These raw scores would be meaningless and would have no significance unless they were statistically treated. In psychology, to examine any hypothesis made or to decide on the validity, statistics is used. The credit for introducing statistics in psychology goes to Sir Francis Galton.

Some of the statistical measures we often adopt in psychology are:

1. Frequency Distribution.
2. Graphic Representation
3. Measures of Central Tendency – Mean, Median & Mode

1. FREQUENCY DISTRIBUTION :

In order to avoid the problems we face in collection, analysis and interpretation of the data in statistical investigations, the planning and organisation of the data is required. When the collected data is too large, the data needs to be classified through statistical methods. The frequency distribution is none such method of classification of data in which the scores are classified under different subheads.

Steps to be followed for frequency distribution:

1. Find out the highest score (Maximum score) from the given data.
2. Find out the lowest score (Minimum score) from the given data.
3. Determine the range or gap between the highest and the lowest scores.
4. Determine the size and length of the class interval. The size of the class interval usually used in frequency distribution is 3,5,7,10. This would again depend upon the size of the sample. The number of class intervals that a given range would yield can be determine approximately by dividing the range by tentatively chosen class interval.
5. Fix the lower and upper limits of the class interval. The lower limit of the class interval is always below the lowest score of the given sample. The upper limit of the class interval is always above the highest score of the given sample.
6. Tally each score in the proper class interval by putting a vertical mark.
7. Tabulate the total number of tallies in each class interval and enter the same under the frequency column. The sum of the frequency column is called 'N'.

Example for frequency distribution :

A group of 40 students have obtained the following marks in an Arithmetic Test, out of 100. Draw a frequency distribution table for the followed scores.

83 50 65 70 77 75 45 48 46 41
56 87 88 90 96 97 94 46 57 64
63 86 42 47 48 50 51 52 54 56
62 44 70 83 85 94 92 47 48 44

Steps followed:

1. The highest score is 97.
2. The lowest score is 41.
3. The range is 56 i.e., $97 - 41 = 56$.
4. The length of the class interval is $56/5=11.2$. This is reduced to a round figure and therefore the number of intervals to be taken is 12.
5. The lowest score in the given sample is 41 and therefore the lower limit of the class interval is 40. The highest score is 97 and therefore the upper limit of the class interval is 99.
6. Tally each score into its respective class interval.
7. The table below shows the tabulation of the above data into a frequency distribution table.

CLASS INTERVAL	TALLY	FREQUENCY
95-99	II	2
90-94	IIII	4
85-89	IIII	4
80-84	II	2
75-79	II	2
70-74	II	2
65-69	I	1

60-64	III	3
55-59	III	3
50-54	IIII	5
45-49	IIII	8
40-44	IIII	4
TOTAL N = 40		

1. GRAPHIC REPRESENTATION OF THE DATA:

Statistical data can be better also understood by graphic representation rather than in its tabular form. Though graph one is able to understand the given data clearly. Graphic representation is a way of summarizing the scores in a visual form. It also provides birds-eye-view of the data.

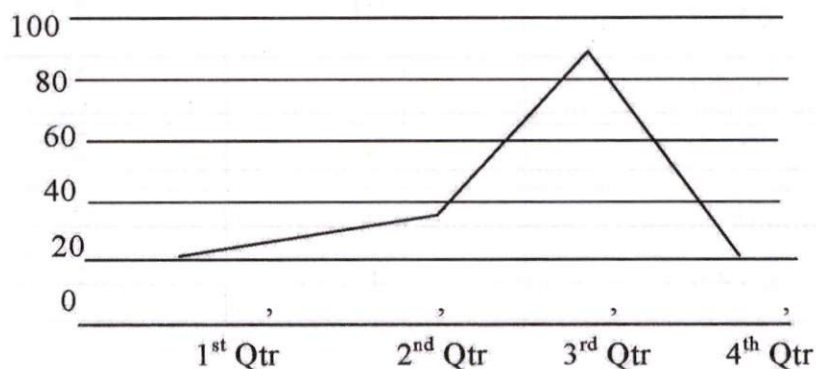
The most commonly used graphical representation of the data are:

1. Frequency polygon
2. Histogram
3. Cumulative frequency graph
4. Cumulative frequency percentage curve or Ogive.

Frequency Polygon:

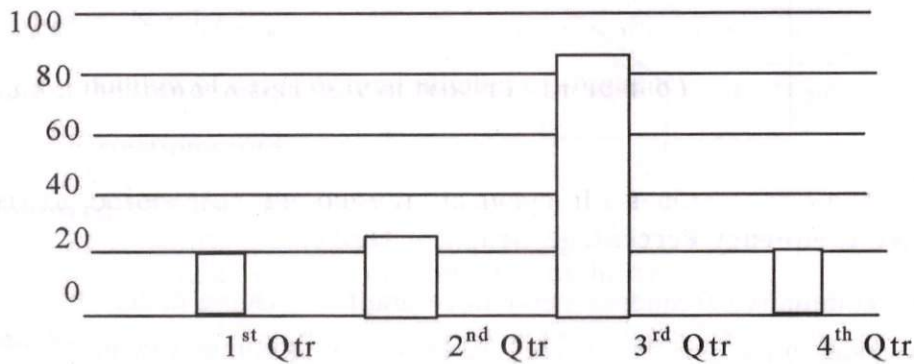
Polygon means a many angled figure. In a frequency polygon, all the score within a given interval are represented by the mid-point of the interval. The frequency polygon enables us to show in a graphic form, how the scores in the group are distributed.

Example of a frequency polygon graph:

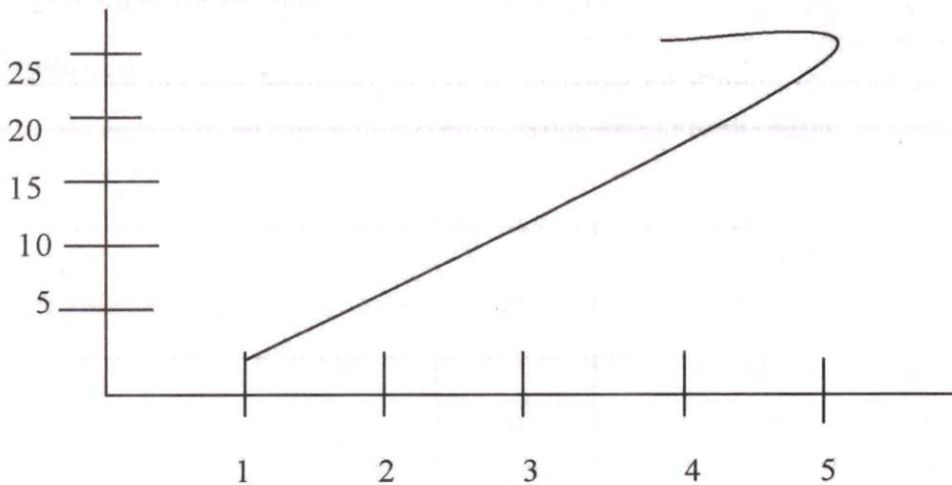


Histogram:

A histogram is a bar graph. In a histogram, the number of people obtaining a given score is represented pictorially. The scores are ordered along one dimension of the graph and the number of people obtaining each score along the other. Histogram is usually available in two forms: vertical and horizontal.



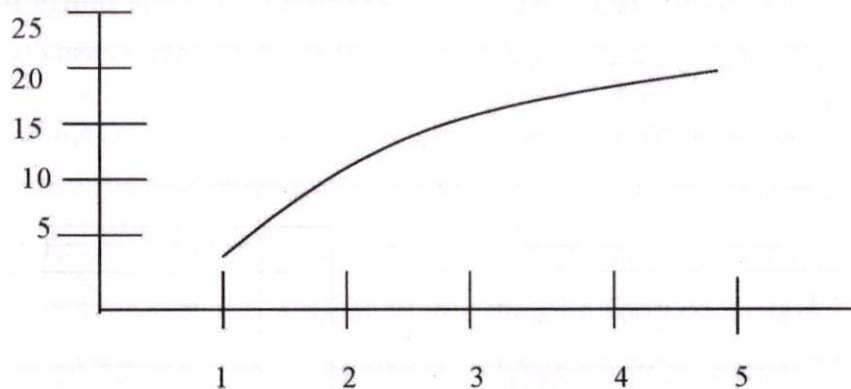
Example of a Histogram :



Cumulative Frequency Graph :

Cumulative frequency graph is another way of representing a frequency distribution by means of a diagram. The scores of the distribution are added serially and the cumulative total is taken into account.

Example of a Cumulative frequency graph:



Cumulative Frequency Percentage Graph or Ogive:

The cumulative frequency percentage graph or Ogive differs from the cumulative frequency graph in that the frequencies are expressed as cumulative percentage of N on the Y-axis instead of cumulative frequency.

Example of Cumulative frequency percentage graph:

3. MEASURES OF CENTRAL TENDENCY:

This is the most commonly used statistical technique. Measures of central tendency include calculation of mean, median and mode.

Mean:

Mean simply means arithmetical average. The sum of the obtained total scores divided by their number gives Mean or arithmetical average. Mean score represents the group.

The formula used to calculate mean from ungrouped data is

$$M = \frac{\Sigma X}{N}$$

Where, M = Average or Mean

X = Score

ΣX = Sum of scores (Total)

N = Total number of subjects

Steps to be followed:

1. Add all scores and obtain the sum
2. Find out the number of subjects
3. The obtained sum is divided by the number of subjects

Example for Mean from ungrouped data :

N	X
1	4
2	6
3	8
4	4
5	9
6 $\Sigma x =$	5 36

$$M = 36/6 = 6$$

Steps followed:

1. The sum of all scores is 36
2. The number of subjects is 6
3. Therefore, the mean is 6.

The formula used to calculate mean from grouped data is

$$M = \frac{\Sigma F X}{N}$$

Where, M = Average or Mean

Σ = Sum of

X = Mid point of the class interval

F = frequency

ΣFX = Sum of FX scores (Total)

N = Total number of subjects

Steps to be followed:

1. Find out the Mid point of the class interval
2. Multiply the mid point value with respective frequencies of the class interval.
3. Add all scores under FX and obtain the sum.
4. The obtained sum of FX is divided by the number of subjects.

CLASS INTERVAL	F	MID POINT (X)	FX
41-45	1	43	43
46-50	2	48	96
51-55	4	53	212
56-60	5	58	290
61-65	8	63	504
66-70	10	68	680
71-75	6	73	438
76-80	4	78	312
81-85	4	83	332
86-90	2	88	176
	$N=46$		$FX = 3083$

Example of Mean from grouped data:

$$M = \frac{3083}{46} = 67.02$$

Steps followed:

1. The Mid point of the class interval is calculated by taking middle values of five scores of the given class interval.
2. The mid point value is multiplied with respective frequencies of the class interval.
3. The scores under FX are added and the sum obtained is 3083.

4. The obtained sum of $\sum FX$ is divided by the number of subjects and therefore the mean is 67.02

Median:

It is the mid-point in the series of scores arranged in the order.

The formula used to calculate median from ungrouped data is

$$\text{Mdn} = \frac{N + 1}{2}$$

Where, N = number of cases or total number of frequency

1 = correction score

Steps to be followed:

1. Arrange the scores in an order (from lowest to highest)
2. Find out N
3. Apply the formula to obtain median

Example for Median from ungrouped data:

Calculate median for the following scores 4,6,8,4,9

Steps followed:

1. The scores are arranged in an order (from lowest to highest)

4
4
5
6
8
9

$$N = 6$$

2. $N = 6$

3. Median is,

$$6 + \frac{1}{2} = \frac{7}{2} = 3.5$$

Therefore, median lies between third and fourth persons score.

The formula used to calculate median from grouped data is

$$\text{Mdn} = \frac{N/2 - fc}{fm} i$$

Where,

Mdn = Mean

l = Exact lower limit of the class interval upon which median lies

N/2 = one half of the total number of scores

fc = Sum of scores on all intervals below lower limit of the class-interval

fn = frequency within the interval upon which median falls

i = Length of the class interval

Steps to be followed:

1. Find out N/2
2. Add frequencies from last class interval up to N/2 score and this is called cumulative frequency.
3. Find out the lower limit of the class interval in which median lies.
4. Find out total number of frequency of all the intervals below the class interval in which median falls.
5. Apply the formula to obtain the median.

Example for Median from grouped data:

CLASS INTERVAL	F	cf
86-90	2	
81-85	4	
76-80	4	
71-75	6	
66-70	10	30
61-65	8	20
56-60	5	12
51-55	4	7
46-50	2	3
41-45	1	1
	N=46	

Steps followed:

1. $N/2$ is $46/2=23$
2. Cumulative frequency up to median is 20.
3. The lower limit of the class interval is 65.5
4. The frequency of the class interval in which median lies is 10.
5. The length of the class interval is 5.
6. When the formula is applied, the median is

$$= 65.5 + \frac{46/2-20}{10} \times 5$$

$$= 65.5 + \frac{23 - 20}{10} \times 5$$

$$= 65.5 + \frac{3}{10} \times 5$$

$$= 65.5 + 0.3 \times 5$$

$$= 65.5 + 1.5$$

$$= 67$$

Mode:

Mode means the most frequently occurring score. There are two kinds of mode. They are Crude mode and true mode.

A crude mode is the single score which occurs most frequently. This is calculated for ungrouped data or raw data.

Example:

2,3,,3,4,4,4,4,5,5,6,7,8

In the above data, the most frequently occurring score is 4 and therefore the crude mode is four.

The true mode is the difference between three medians and two mean. This is calculated when the scores are grouped into a frequency distribution.

The formula used to calculate mode here is $3 \text{ Medians} - 2 \text{ mean}$

Mean

Steps to be followed:

1. Calculate mean for the given data.
2. Calculate median for the given data.
3. Apply the formula to obtain mode.

Example for Mode from grouped data:

In the examples of mean and median for grouped data, we have observed that the mean is 67.05 and the median is 67. The mode is therefore,

$$\begin{aligned} & 3 \times 67 = 2 \times 67.05 \\ = & 201 - 134.1 \\ = & 66.9 \end{aligned}$$

QUESTIONS:

1. What is statistics ?
2. Why do we use statistics in psychology ?
3. How data is classified ?
4. What is frequency distribution ?
5. Define range ?
6. How do you calculate range ?
7. How do you decide the length of the class interval for a given sample ?
8. How do you calculate lower limit and upper limit of a given class interval ?
9. List the steps that are followed while tabulating the scores into frequency table.
10. What is N ?

11. What is a graph ?
12. What do graphs represent ?
13. What is a frequency polygon ?
14. Define histogram.
15. What is a cumulative frequency graph ?
16. What is Ogive ?
17. What are the measures of central tendency ?
18. Define mean ?
19. Write the formula to calculate mean from ungrouped data.
20. Write the formula to calculate mean from the grouped data.
21. List the steps involved in the calculation of mean from grouped data
22. Define median ?
23. Write the formula to calculate median from ungrouped data.
24. Write the formula to calculate median from grouped data.
25. List the steps involved in the calculation of median from grouped data.
26. Define mode ?
27. Mention two types of mode.
28. What is crude mode ?
29. What is true mode ?
30. List the steps involved in the calculation of mode from grouped data.

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ಆದೇಶ ಸಂಖ್ಯೆ : ಕರಾಮವಿ/ಅಸಾವಿ/01-04/2021-22

ಒಳಪುಟ : 70 GSM ಮ್ಯಾಪ್ಲಿಟೋ ಪೇಪರ್ ಮತ್ತು ರಕ್ಷಾಪುಟ : 220 GSM ಆರ್ಟ್ ಕಾರ್ಡ್

ಮುದ್ರಕರು : ಪೂರ್ಣಿಮಾ ಪ್ರಿಂಟರ್ಸ್, ಬೆಂಗಳೂರು - 560040, ಪ್ರತಿಗಳು : 200

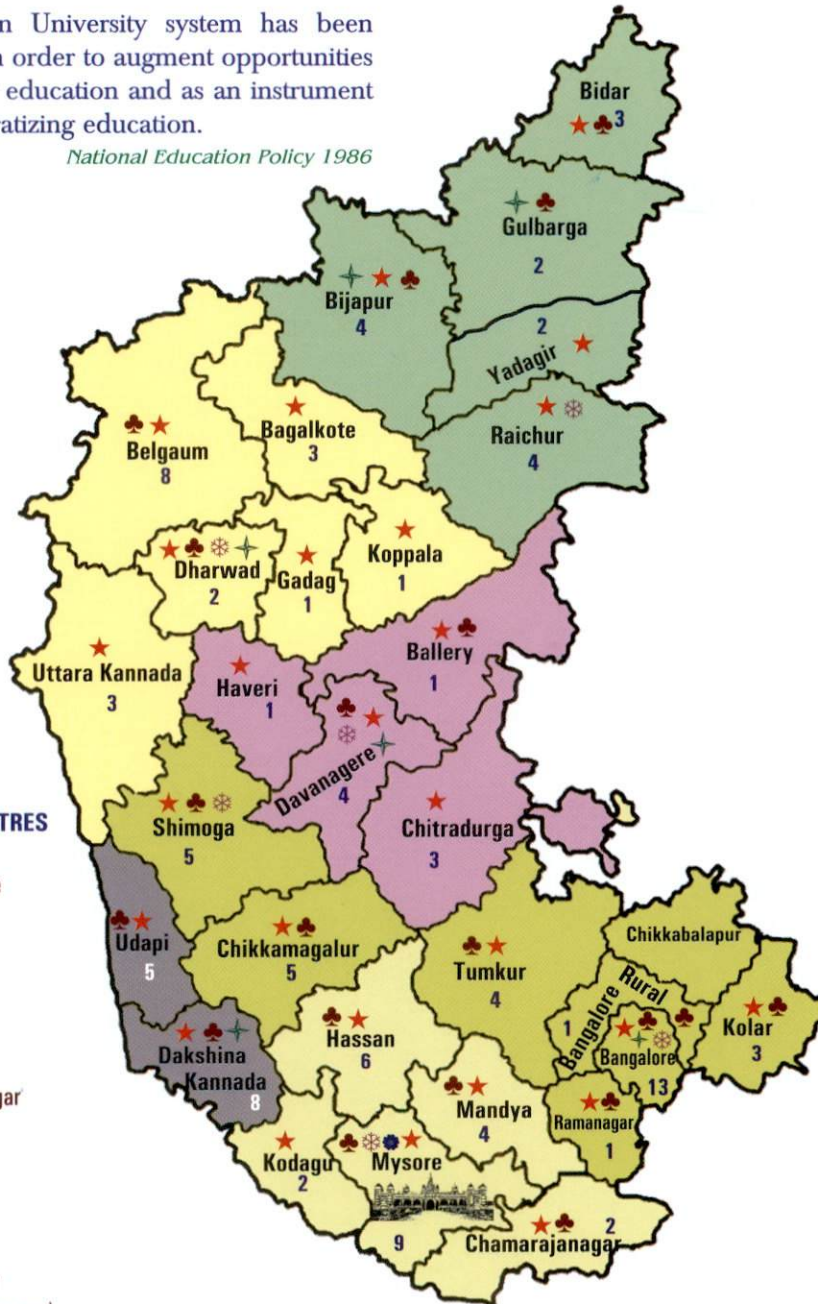


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Manasagangotri Mysore - 570 006

The Open University system has been initiated in order to augment opportunities for higher education and as an instrument of democratizing education.

National Education Policy 1986



REGIONAL CENTRES

- Bangalore
- Davanagere
- Gulbarga
- Dharwad
- Shimoga
- Mangalore
- Tumkur
- Hassan
- Chamarajanagar
- Bellary
- Mandya
- Kolar
- Bijapur
- Belagaum
- Ramanagar
- Bangalore (another one)
- Chikmagalur
- Udupi
- Karwar
- Bidar
- Mysore

HEAD QUARTERS

- ★ Total Study Centres : 123
- ♣ Regional Centres : 21
- ❄ B.Ed Study Centres : 10
- ✦ M.Ed Study Centres : 06

