3.7 Method of Experiment

3.7.1 Design :

The counterbalancing design was used as shown in table No.-1

Table No. – 1

Design

Conditions	A(SRT)	B(DRT)	C(CRT)	C(CRT)	B(DRT)	A(SRT)
No. of trials	10	10	10	10	10	10
Condition	G. Light	G. Light	G. Light	G. Light	G. Light	G. Light
Condition	2 Secs.	2 Secs.	2 Secs.	2 Secs.	2 Secs.	2 Secs.

3.7.2 Planning :

The planning was done to conduct the experiment in three conditions– ABC and a counter balancing design was made -ABCCBA. Each condition will have 10 trials, thus total 60 trials will be taken. A foreperiod of 2 seconds was to be given in each trial and stimulus will be green light. The no. of oscillations of subject's pendulum was to be counted. In the end of experiment an introspective report will be taken from the subject.

3.7.3 Arrangement of apparatus and other materials :

The Vernier Chronoscope was taken as apparatus for this experiment. Before the actual conduction of experiment certain arrangements were made, like the experimenter checked the no. of oscillations of subject's and experimenter's pendulum which had to oscillate 77 and 75 times per minute respectively. He also checked whether the stimulus light was functioning or not. Then a Stop Watch was kept ready to make account of the foreperiod of 2 seconds. A screen was placed between the 'S' and the 'E' so that subject may not see her responses. A raw data table was prepared and kept ready before hand so that after counting the number of oscillations of S's pendulum the E can take it down in their respective trial space.

3.7.4 Instruction :

The instructions for separate conditions were given in the following ways –

Instructions for Condition 'A' :

" You have to press the button on the right side by your right index finger when you see the

green bulb lighted. In each trial before the green bulb is lighted a ready singal will be given to you. On hearing this you get alert because soon after this you will get the green stimulus light to which you have to show reaction by pressing the key. This will be repeated several times and you will have to do the same task again and again."

Condition 'B' :

"This time also you will have to press the button with you right index finger on seeing the green bulb on. The difference is only that this tine besides green light many other bulbs will be lighted. Your task is to remember that you have to press the button only when you see the green light. Again I will give you a ready signal and after that stimulus light will come together with other lights but you will press your button only on green light.

Condition 'C' :

"This time your task will be a bit difficult. On getting the signal of ready you become alert. Here you have to remember that when green light is on then you have to press the left key with your left finger and when red light is on you have to press the right key with your right index finger. Do you understand ? You have to make two responses to two stimulus. I hope you have understood everything."

3.7.5 Conducting Actual Experiments :

The subject was seated comfortably on a tool left to the experimenter and a screen was placed in between the E and S to hide the proceedings of the experiment from the subject. According to the design in condition 'A' which was of simple RT few practice trials were given. The S was instructed to be ready and after 2 secs. E pressed the button of his side. Due to this the big pendulum started moving to and fro. When the S saw the green light glowing she pressed the button other side which released the shorter pendulum and it also started to move to and fro. The experimenter counted the number of oscillations till both the pendulums became parallel. The no. of oscillations was noted down in trial no 1 of raw data table. Likewise, 9 more trials were taken.

After this condition 'B' was started which was of Discrimination RT. In this condition besides the green light, several other lights like yellow, blue, red glowed in random way. But with the ready signal 'S' had to press the button only on seeing the green light. This was repeated for another 9 trials. Here the S had to discriminate among different lights.

In the condition C, which was of choice RT, the S had to press the right button with right index finger when red light was on and with left hand index finger the left button when green light was on. In this way 10 trials were carried on. The same CBA trials were repeated again as the design is ABCCBA. Again 10 trials in each condition was taken. So altogether 60 trials were taken from the S. After this the S gave her introspective report.

3.8 Data Collection

The objective data is given as Raw Data in table no. 2 and subjective data is given as intros pective report after the raw data table.

Table No. – 2
Raw Data

A (SRT)		B (DRT)		C (CRT)		C (CRT)		B (DRT)		A (SRT)	
Trials	No.of Qscill.	Trials	No.of Qscill.	Trials	No.of Qscill.	Trials	No.of Qscill.	Trials	No.of Qscill.	Trials	No.of Qscill.
1	15	11	27	21	30	31	29	41	26	51	16
2	15	12	28	22	29	32	24	42	22	52	14
3	11	13	28	23	30	33	28	43	21	53	14
4	14	14	26	24	24	34	32	44	24	54	15
5	16	15	28	25	33	35	22	45	20	55	17
6	11	16	20	26	30	36	30	46	21	56	15
7	14	17	22	27	32	37	30	47	29	57	14
8	9	18	24	28	25	38	25	48	24	58	14
9	9	19	24	29	30	39	31	49	20	59	11
10	11	20	24	30	32	40	21	50	22	60	14

Introspective Report : "In the first situation the task appeared to be quite easy. But in the next situation when I was asked to press my key only on green light and not on other lights, then sometimes I took time to react. It was very difficult to decide when to press the right key with right hand on seeing one bulb and left key with left hand on seeing another bulb. It really made me delay my response and thus in third situation I took more time than before to react."

## 3.9 Treatment of Data

Table No. – 3
Result

	Mean in ms	SD in ms.	t-ratio	Level of Sig.
A	269	45	A–B 11.50	0.01
B	480	57.8	B-C 4.19	0.01
C	567	69.4	AC 15.71	0.01

3.10 Interpretation, Discussion and Conclusion

The mean RT of condition A is the shortest and that of condition C is the longest. This is 50 because SRT is easiest and CRT is the most difficult. The mean RT of condition B will be more than condition A and less than condition C. This is so because DRT falls in between the SRT and CRT.

The SD shows the internal variations in the response of the subject. If SD is less than mean then it will show the reliability of the result. It will prove that S has not changed her reaction every now and then. So there is a type of consistency in S's response.

The t-ratio shows whether the difference of mean in AB, BC, AC conditions are significant or not. This is judged by finding out its level of significance at 0.01 level and 0.05 level of significance.

Simple vs Complex RT
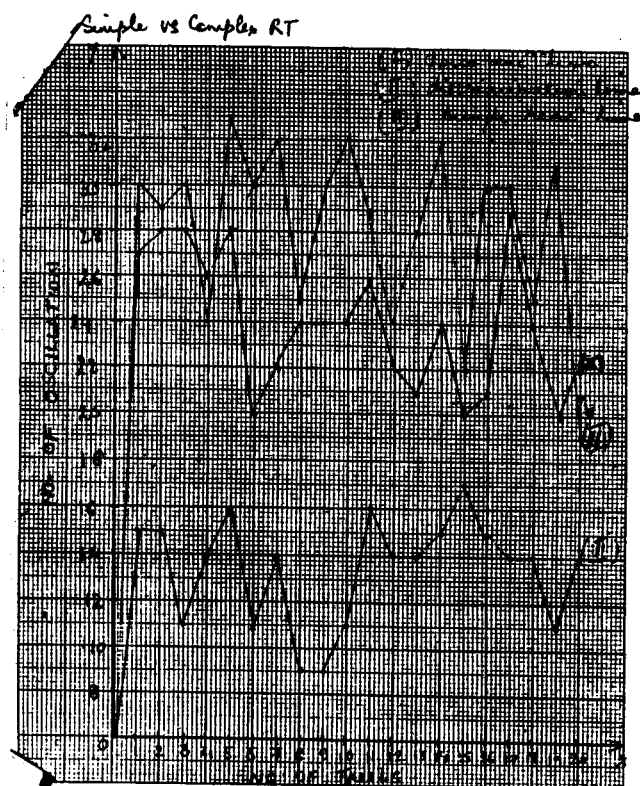
From the raw data table and result table it becomes clear that SRT is the easiest because in condition A which is of SRT the total number of oscillations in 269 which is less when compared to the condition B and C where the total no. of oscillations are 480 and 567 respectively. This proves that simple reaction time is easier than discrimination and choice reaction time. In condition C as we notice the total no. of oscillation is more (567) when compared to condition A (269) and B (480). Thus

it proves that choice RT is the most difficult one. The number of oscillations in discrimination RT is more when compared to simple RT but it is less than that of choice RT which means that discrimination RT falls between the two. Thus the least RT of SRT and maximum RT of CRT proves the fact that SRT is the easiest as the subject can quickly give the response whereas in CRT the subject had to choose whether to press the right key or left key so RT increased.

The SD of condition A is 45 ms, condition B is 57.8 ms and of condition C is 69.4 ms. All the SD's are very less as compared to their mean so it can be said that mean is quite reliable. But one thing is noticeable here that SD of condition A is most consistent or showing the least variability is subject's response whereas SD of condition C is showing the maximum variability (69.4) as compared to condition A and B. The SD of condition B (57.8) falls in between these two. Thus our hypothesis is being supported by SD also. The obtained value of t for condition A-B is 11.50, for condition A-C it is 15.71 and for condition B–C it is 4.19. All these values are significant at .01 level. Thus it can be said that the difference obtained between simple, discrimination and choice RT are not accidental or by chance but they are real. So the result is quite reliable.

The introspective report of the subject also proves the hypothesis because the S felt Maximum difficulty in condition C as she said.

From the graph we can say that SRT is the easiest as it has last number of oscillations and the fluctuations in the graph are not much. The graph of DRT lies in between the two, i.e. SRT and CRT. The choice RT has the maximum number of oscillations and also the variability is quite obvious in subject's response.

Thus it can be concluded that SRT is the easiest choice RT is the most difficult and DRT lies between the two.

3.11 Questions for Exercise

(A) Questions for Oral Examination :

1. What is Reaction Time ? Discuss its types with suitable examples.

2. What is a foreperiod ? What is the optimal foreperiod and why ?

3. Who was the first to make experimental studies on Reaction Time ? When ?

4. Before conducting studies on RT in human being which organism was selected for its study ?

5. Which apparatus was first used to make experimental study of RT on human beings ?

6. Which apparatus in RT is most popularly used these days and why ?

7. Make a detailed description of Vernier's Chronoscope.

8. What do you mean by vernier constant ?

9. Why is RT measured in milliseconds? Learn the formula with which RT is found or measured.

10. Make a distinction between sensorial RT and Muscular Rt. Which or these is longer and why ?

11. What is the difference between simple and complex RT ?

12. What is the difference between discriminative RT and choice RT? Which one is longer and why ?

13. How can fatigue and practice influence RT ?

14. What is the physiological bases of RT ?

15. How does the mental set and attention set effects reaction time and why ?

16. To measure complex RT is practically more useful. Why ?

(B) Questions for Experimental Problems :

1. Conduct an experiment to show that RT differs with difference in the type of stimulus.

2. Design and conduct an experiment to prove RT as a function of effector versus receptor preparedness.

3. Determine experimentally the difference between the simple and complex RT of your subject.

4. Test experimentally the effect of set on the simple reaction time of your subject.

5. Experimentally determine whether choice RT is longer than the discrimination RT.

6. Conduct an experiment to study the effect of long and short foreperiods on the RT of your subject.

7. Conduct an experiment to find out whether instructions has got any effect on the RT of your subject.

8. Conduct an experiment to determine the effect of knowledge of result on your subject's RT.

9. Conduct an experiment to test the hypothesis that more complex the task, longer will be the RT.

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Perception of Time

Lesson Structure

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4.2 Problem

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    4.7.1 Design

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4.9 Treatment of Data

4.10 Interpretation of Data, Discussion and Conclusion

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    (A) Questions for Oral Examination

    (B) Question for Conduction of Experiments

4.0 Objective

The main objective of this lesson is to make the students aware of what is perception and how it can be measured in respect of time. In this context some oral problems questions will be given, the answer of which can be found in the suggested readings. If the students can answer all the oral questions given in this lesson, then surely they will not have any problem in their viva-voce examination.

4.1 Introduction

Perception is the knowledge of an object that is 'here' and 'now'. But one does not perceive all that is here and now. At any moment he is influenced by a mass of stimuli that impinges upon his external and internal sense organs. All these are 'here' and 'now' to him. But he perceives only a small part of the total stimulus field, this part is segregated from the rest. It stands out against the rest and constitutes the object that is perceived. Thus, the mere segregation of a part of the stimulus field is the simplest act of perception. This part appears to have a form or shape, it is a figure. The rest of the stimulus field has no form, it gets at the moment into the background. In short, it can be said that the simplest act of perception involves the setting of the stimulus field into figure-ground relationship. The figure stands out against the ground. It has got some characteristics that make it different from the ground. For example, figure has form which the ground does not have, it has clear outlines which the ground does not have etc.

The Gestalt psychologists have pointed out a set of factors outside and inside the organism that favours the grouping or organisation of the stimulus field in one way rather than another. The external factors consist of similarity proximity or nearness, common fate, good continuation and closure. Past experience, a momentary set, needs, values and attitudes constitute the organismic factors. Different experiments have been done to demonstrate as to how these factors operate in perception.

Experiments have also been conducted on perception of form, perception of space, perception of movement and perception of time. Here in this lesson our emphasis will be upon perception of time.

Time is perceived by becoming directly aware of time in which events take place and objects exist. So we perceive time as we perceive space. We know whether an object lasted long or short, whether it happened before or after another event, just as we know whether an object is large or small, whether it is to the right or left of another object. The measured time provides an indirect knowledge of time. We actually infer time from the perception of relative positions of the hands of a clock or watch; we perceive space and estimate time on this basis. We perceive time when we discriminate long or short time, or note the difference between any two interval of time, without consulting a time measuring device.

Different methods have been used for collection and treatment of data on perception of time. Some of the important ones are as follows:

1. **Method of Reproduction :** In this method the subject (s) is required to reproduce a constant time interval produced by E (called as stimulus time interval). The mean difference between the magnitude of the stimulus interval and those of the reproduced intervals gives an estimate of S's error of time perception. If the mean reproduced interval is longer than the stimulus interval, the error is of overestimation and if shorter, the error is of underestimation.

2. **Method of Comparison :** In this method the E presents a constant stimulus interval and

a set of variable comparison intervals, one after the other in a random sequence. S has to judge about the second interval whether it is longer or shorter than the first interval or are they equal.

3. **Method of Estimation :** In this method the subject (S) is asked to indicate the passage of a given time interval by pressing and releasing a telegraphic key alternately.

In the next section, i.e. 4.2 an experiment on perception of time is demonstrated.

An Experiment on Perception of Time :

4.2 Problem

Determination of the extent and direction of error in the subject's perception of time interval by the method of reproduction.

4.3 Introduction to Experiment

Awareness of any stimulus by sense organ for a fixed duration on mental level is called the perception of time. Time is acknowledged either by using some physical instrument or key mental estimation. We perceive time when we discriminate long or short time or note the difference between any two intervals of time without consulting a time measuring device. The perceived time may be either overestimated or underestimated. Among the various methods adopted for the study of time perception, the method of reproduction is used widely. In this the subject is required to reproduce a time interval produced by the E, called as stimulus time interval. The mean difference over a number of trials between the STI and RTI gives an estimate of S's perception of time interval by the method of reproduction.

4.4 Hypothesis

If the mean of reproduced time interval (RTI) is longer than the mean of stimulus time interval (STI), then error is of overestimation and if it is shorter, than error is of underestimation.

4.5 Subject

A female student of B.A. volunteered as S for this experiment.

4.6 Apparatus and other Materials

Kymograph
Timer Marker
Smoking Drum
Glazed Paper
Telegraphic Key
Varnishing Tray with Varnish

Stop Watch

Chronometer

Kerosine Oil

Screen

Drying Stand

Stylus

Blade, cellotape, match box, burner etc.

4.7 Method or Procedure of the Experiment

4.7.1 Design :

Given in Table No. –1

Table No. – 1

Design

Standard Stimulus internal (STI)	Nature of Task	Method	No. of Trials
10 seconds	To press and release the key after every 10 secs.	Method of Reproduction	20 trials

4.7.2 Planning :

The plan was made to ask subject reproduce an interval of 10 seconds. She had to press the telegraphic key for 10 secs. and release the telegraphic key for 10 seconds. For this Kymograph was used and by the method of reproduction continuous 20 trials were taken.

4.7.3 Arrangement of Apparatus and Other Materials :

The subject was made to sit in front of the Kymograph. Preliminary adjustments were made, like, glazed paper was fixed on the drum of the Kymograph by cellotape and was smoked by rotating it on the burner. Stylus and time marker were adjusted on the smoked paper. Kymograph and Chronometer were connected by electric wire with the +ve and -ve poles of the battery. This was done so that when the subject pressed the telegraphic key an electric circuit was made and the stylus was pulled down and when the key was released the circuit was broken and demagnatised and the stylus moved up. This graph represented the +ve and –ve phases. The S was required to press the telegraphic key for the stimulus time interval of 10 secs. and reproduce the 10 secs. by pressing and releasing the telegraphic key respectively. A screen was placed in between the experimenter and the subject so that the S could not see the formation of any curve.

4.7.4 Instructions :

The following instructions were given to the S by the E—

"This is a telegraphic key. Put your forefinger on it and when I say 'start press the key and keep on pressing until you feel 10 sec. time has passed. Then release it and keep it released till you think 10 secs. duration has passed. The all thing you have to do is to press and release the key at the interval of 10-10 seconds. This you will do for several trials and when I say 'stop' you stop your work. You can estimate the time of 10 secs. by looking into your wrist watch before the trials begin. But as soon as you will start the trials you will not be allowed to look at your watch. Be alert and feel free to ask any release the key after 10-10 seconds. A graph was made on the smoked paper like this ⎍⎍⎍. The Subject did the same task twenty times, i.e. for 20 trials.

Questions if you have any doubt."

4.7.5 Actual Experiment :

After the instructions actual experiment started. A rapport was established and the S was asked to press and the data was collected on the rotating drum. When the data was collected it was dipped in the varnish and put on a stand to dry up. When it got dried the E with the help of a divider noted the time of each trial. This was done by putting the divider on the time graph line made by the subject and then estimating the time by putting the divider on the time marked by Chronometer. This was written in raw data table in all 20 trials.

4.8 Collection of Data

The objective data is given as raw data in table No. - 2. The subjective data is givne as introspective report in the subject's own words.

Table No. – 2

Raw Data

No. of Trials	Time in Seconds
1	10
2	13
3	14
4	13
5	13
6	14
7	14

No. of Trials	Time in Seconds
8	13
9	15
10	15
11	16
12	16
13	16
14	16
15	15
16	16
17	16
18	16
19	14
20	10

Introspective Report : "In the whole experiment I worked according to the instructions given by the E. Many times I felt that I was pressing the key a little bit earlier and sometime I thought. I was late. In such confusion I don't know whether I have managed to reproduce the 10 seconds time interval or not.

4.9 Treatment of Data

1. Mean of all 20 trials

2. Mean of 1st 10 and last 10 trials

3. SD of all 20 trials

4. SD of first 10 and last 10 trials

5. Constant error (STI-RTI)

6. Difference of 1st 10 trials and last 10 trials

7. Time graph with no. of trials on X-axis and time in secs. on Y-axis.

All these findings were noted down in result table.

Table No. – 3

Result

	20 trials	1st 10 trials	Last 10 trials
Mean	14.25 secs.	13.4 secs.	15.1 secs
SD	1.81	1.35	1.81
Constant Error	4.25 secs.		
Difference	– 1.7 secs.		
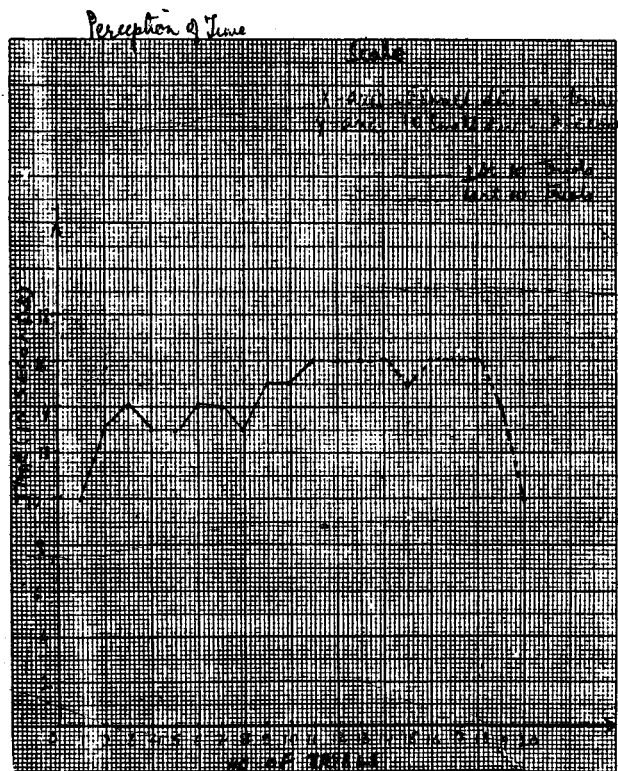
4.10 Interpretation of Data, Discussion and Conclusion

From the result table it is clear that subject has overestimated the standard time interval (STI). In all 20 trials the mean of time is 14.25 sec. which means RTI is 14.25 and STI is 10 seconds. This shows that the subject assumes 14.25 secs. equal to 10 seconds. Since RTI is greater then STI there is an error of overestimation. The constant error is 4.25 secs. which means that subject is all the time making error of 4.25 secs. in perceiving an interval of time of 10 seconds.

The mean of first 10 trials is 13.4 secs. and the mean of last 10 trials is 15-1 seconds. When the mean of second half is greater than first half then it is said that effect of fatigue has influenced the response of the subject. Here the difference of two halves is 1.7 seconds which means that due to fatigue the subject has taken 1.7 secs. more in pressing the key. But this difference is very small so it is almost negligible and we can say that it has not affected the result much and the effect is fatigue is not too much. The S has made the error of overestimation in both halves of the trials. SD of all 20 trials is 1.81 which shows that the internal variability of the obtained score is not much. Hence the obtained result is more reliable and more consistent. SD of first 10 trials in 1.35 secs. and SD of last 10 trials in 1.81 secs. So for last 10 trials is more but it is quite negligible so the consistency in response is found in both halves of the trials.

The graph represents the perception of time. In the 1st trial the S perceived 10 secs. as 10 secs. but after that her perception of time became irregular. Later from 11th to 14th trials the perception of time is constant, i.e., of 16 secs.. In the 15th trial the S perceives the time as 15 sec. In 16th to 18th trials perception of time is again constant, i.e., of 16 seconds. In the last 2 trials the subject perceives the time as 14 and 10 seconds respectively. The graph as a whole represents that there is overestimation of time perceived by the subject as the line in above 13 secs. in every trial except the first and last trials which is perceived as 10 secs.

From the above discussion it can be concluded that the hypothesis is proved. The problem was to find out the direction and extent of error in perception of time. The error of overestimation shows the direction and constant error of 4.25 shows the extent of error. As RTI is greater than STI SD error of overestimation. The obtained result supports our hypothesis.

4.11 Questions for Exercise

(A) Questions for Oral Examination :

1. What is perception? What do you mean by temporal perception ?

2. What is the meaning of selective nature of perception ?

3. Distinguish between perception of space, and perception of time.

4. Describe the different methods that are commonly used in the study of time perception ?

5. What are the factors that influence the errors caused in temporal perception ?

6. Can you tell the effect of task monotony on time perception ?

7. Distinguish between stimulus time interval and reproduced time interval.

8. Give a brief description of the apparatus used to measure temporal perception.

9. What precautions are needed in conducting experiments on time perception?

10. What is filled and unfilled time interval ?

11. What are the uses of experiments conducted on time perception ?

12. What do you mean by perception of long and short time ? Can you make a design for the conduction of experiment on perception of varying lengths of time ?

13. Throw light on the concept of reversible figure in perception.

14. Make a distinction between illusion and hallucination in perception. How does the mental set influences it ?

15. Distinguish figure from ground with an example.

(B) Questions for Conduction of Experiment :

1. Conduct an experiment to show the result on perception of varying lengths of time interval.

2. Design an experiment to find out the difference in the accuracy of perception of filled and unfilled time.

3. Make an experimental attempt to determine the effect of engagement in a repetitive, dull, monotony producing task on S's perception of time.

Hypothesis— Time engaged in a monotonous task with be over estimated.

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Effect of Fatigue and Rest Pause on Mental Work

5.0 Objective

The objective of this lesson is to throw light on different types of fatigue. It will also explain what is mental and physical work. Two experimental demonstrations will show how an experiment can be conducted on effect of rest pause in mental work as well as effect of fatigue in mental work. Finally, few questions will be given to make the readers get themselves ready for viva-voice examination.

5.1 Introduction

Every work involves both bodily activities and mental functions. When it involves bodily activities, then proficiency of the worker depends upon the capacities of his body for example, either carrying or pulling a load. But when it involves mental functions, then the efficiency of the worker depends upon the ability to compare, judge, discriminate, reason etc. The former is called motor work and the latter is called as mental work. In motor work, performance mainly depends upon the involvement of muscles but in mental work it depends upon the higher mental processes.

The basic difference between concept of work and practice which is no more susceptible to improvement by repetition. And practice is that kind of performance which shows improvement by successive repetitions. It is however difficult to find any work that is altogether uninfluenced by practice. To be more precise, practice curve will show progressive increment in output or improvement in the quality of performance. But the curve of work shows no such progressive increment. On the other hand, if the work continues without break, the curve shows progressive decrement after certain period of time. This progressive deterioration in performance has been described as the effect of fatigue. Thus, it can be mentioned that both practice and fatigue effects depend upon the repetition of performance over a period of time. Fatigue effect is marked by deterioration and practice effect by improvement in performance. Hence the two are opposite to each other. Since both depend upon performance over a period of time, the two effects may get mixed up, each one counteracting the other.

A distinction can be made in terms of the influence of rest on performance. While rest dissipates fatigue and thus produces recovery from fatigue, rest consolidates the practice effect. Performance effected by fatigue, shows considerable improvement after rest.

Now we shall discuss the effect of fatigue and rest pause in mental work. Fatigue means a condition of lowered efficiency of the worker as a result of work. The feeling of fatigue or boredom accompanies, generally, the more simple, repetitive, routine type of work that offer no change to the special skills or capacities of the worker. It may, however, also occur when the worker lacks the skill to meet the challenge. There is one remarkable difference between physical fatigue and mental fatigue. Rest produces recovery from physical fatigue; it may have no effect on mental fatigue.

The mental work, unlike, motor work, does not show progressive deterioration unless the work period is very long. If the work period is long then there is progressive deterioration, which may accompany the symptoms of restlessness, irritation, putting more effort to concentrate on the work and many other similar symptoms.

5.2 Problem

As said earlier this lesson will give experimental report on both effect of fatigue and effect of

rest pause on mental work. The two problems demonstrated are as follows—.

(a) To demonstrate experimentally the effect of fatigue on mental work.

(b) To conduct an experiment to study the effect of rest pause on the efficiency of doing a mental work by the subject.

(A) Effect of fatigue on mental work = An Experement.

5.2 Problem

To demonstrate experimentally the effect of fatigue on mental work.

5.3 Introduction to the Experiment

The relationship between work and fatigue is direct. Fatigue is that condition in which there is lack of motivation in an individual to continue working. Psychologists have studied the influence of fatigue on two types of work—mental and muscular. Mental work is that type of work in which mental energies are taxed more than the muscular energies, like reading, solving mathematical problems. Any work, either mental or muscular, if done continuously produces fatigue in an individual. Fatigue is generally of three types— (1) Industrial fatigue (2) Physiological fatigue and (3) Psychological fatigue. The type of fatigue which is studied in mental work mostly refer to psychological fatigue which produces boredom and monotony and results in symptoms like restlessness, irritation etc. This is also known as subjective fatigue. Different studies have proved that due to psychological fatigue, time taken in a mental work increases and even the quality of work suffers.

5.4 Hypothesis

The quality and quantity of mental work decrease due to fatigue.

5.5 Preliminaries or Subject

An undergraduate B. A. Psychology student of normal health volunteered as subject.

5.6 Apparatus and Material

1. 30 Cancellation Sheets
2. Stop Watch
3. Paper and Pen
4. Screen

5.7 Method of Experiment

5.7.1 Design :

Given in table no.−1

Table No. – 1

Design

Material	Nature of task	No. of trials
30 Concellation Sheets	Cancellation of 5 letters from each cancellation sheet	30 trials

5.7.2 Planning :

The experimenter planned to do the experiment in only one condition. For this cancellation sheets were taken as material of experiment and was decided to take 30 trials. One sheet stands for one trial so 30 cancellation sheets were taken. It was planned that the subject will cancel 5 letters from each sheet. The time to complete one trial was to be measured by a stop watch.

5.7.3 Arrangement of Apparatus and other Materials :

Before starting the experiment the experimenter made few preparations. First of all each cancellation sheet was numbered from 1 to 30. On the top of each cancellation sheet 5 alphabets were written in random order which the subject had to cancel. The raw data chart was prepared and kept on experimenter's side to note down the time taken and error made in each trial. A stop watch was kept ready to measure the time. A screen was placed in between the subject and the experimenter.

5.7.4 Instructions :

"Here you see 30 cancellation sheets. On the top of each 5 letters are written. What you have to do is to find these letters and cancel them with pencil from the Sheet, Remember, if you leave out or cancel any other letters besides those five then it will be counted as an error. You will start with the ready signal and when you finish then say stop and return the paper to me. Try to finish cancelling the required letter as soon as possible."

Introspective report— Give in the words of S.

Result— 1. Mean and SD of first ten and last ten trials of time and error separately.

2. t-ratio

All these calculations or findings are put in table No.-3.

5.7.5 Actual Experiment :

In this experiment total 30 trials were used. The sheets consisted of English alphabets typed in random order and one sheet was used as one trial. On the top of each sheet 5 letters of different set were written which the subject had to cancil. If the subject cancelled any wrong letter or left the letter to be cancelled then both were counted as error. As soon as ready signal was given the S

started to cancel the letters and E put on the stop signal after which the experimenter switched off the stop watch. When the whole sheet was over then the subject gave a stop watch and noted the time taken in that trial. In the same manner all remaining 29 cancellation sheets were worked and then the experiment stopped. An introspective report was taken from the subject.

5.8 Collection of Data

Two types of data were collected–objective data and subjective data. Objective data consists of time taken and errors made by the subject and subjective data consists of introspective report taken from the subject.

Table No. – II

Raw Data

No. of trials	Time taken in secs.	Errors
1	300	6
2	300	4
3	310	11
4	300	8
5	325	6
6	350	8
7	360	15
8	360	12
9	380	9
10	375	10
11	390	20
12	410	16
13	400	18
14	400	14
15	425	12
16	410	12
17	415	19
18	420	22
19	400	22
20	440	12
21	400	11

No. of trials	Time taken in secs.	Errors
22	415	31
23	440	16
24	410	29
25	430	18
26	435	10
27	420	53
28	440	23
29	430	18.
30	450	36

Introspective report— The subject gave the following :

Introspective report— "It was very boring experience. In the starting I enjoyed a little bit but later my eyes got strained and I had no interest in doing the work.

5.9 Treatment of Data

For the treatment of data following statistical calculations were made—

1. Mean and SD of first ten trials and last ten trials of time and error separately.

2. t-ratio of time and error of first ten and last ten trials.

All these findings were noted down in a table called as result table :

Table No. – 3

Result

	Mean (time)	Mean (error)	SD (error)	SD (error)	t (time)	t (error)	level of significance
1st ten trials	336 sec.	8.9	30.80	3.08			significant at both 0.01 and 0.05 level
last ten trials	427 sec	24.5	14.77	12.48	12.123	4.176	
Difference	91 sec	15.6	16.03	9.4			

5.10 Interpretation of Data, Discussion and Conclusion

From the result table it is clear that the subject took less time and committed less number of errors in first ten trials compared to last ten trials. The mean time of first 10 trials is 336 secs. and of last 10 trials it is 427 secs. Thus there is a difference of 91 secs, which means subject took 91 secs. more in the last 10 trials. In similar way mean of error in first 10 trials in 8.9 and that of last 10 trials in 24.5 thus the subject has committed 15.6 errors more in the last 10 trials. This proves that as the work progressed the subject felt fatigued and bored and so proficiency of work decreased. The subject took more time and committed more errors due to the effect of fatigue.

Standard deviation of time in first 10 trials is 30.80 secs. and that of last ten trials is 14.77. The subject's responses varies more in the first 10 trials whereas this variability should have been more in the last 10 trials when the subject got bored and was doing the work unwillingly. But the result is just reverse. When she was fresh she showed more variations in her response. The SD of error of first 10 trials is 3.08 and that of last 10 trials in 12.48. This supports the hypothesis because variability of response is greater in the last ten trials which may be explained as due to the effect of fatigue. So it cannot be said with full confidence that the obtained mean is 100% reliable.

The t-ratio of time is 12.123 which is significant at both 0.05 and 0.01 levels of significance. The t-ratio of error is 4.176 which is also significant at both levels. This means that the difference between the mean of first 10 trials and last 10 trials, for both time and error is reliable and consistent and not due to any chance factor.

Effect of fatigue on mental work
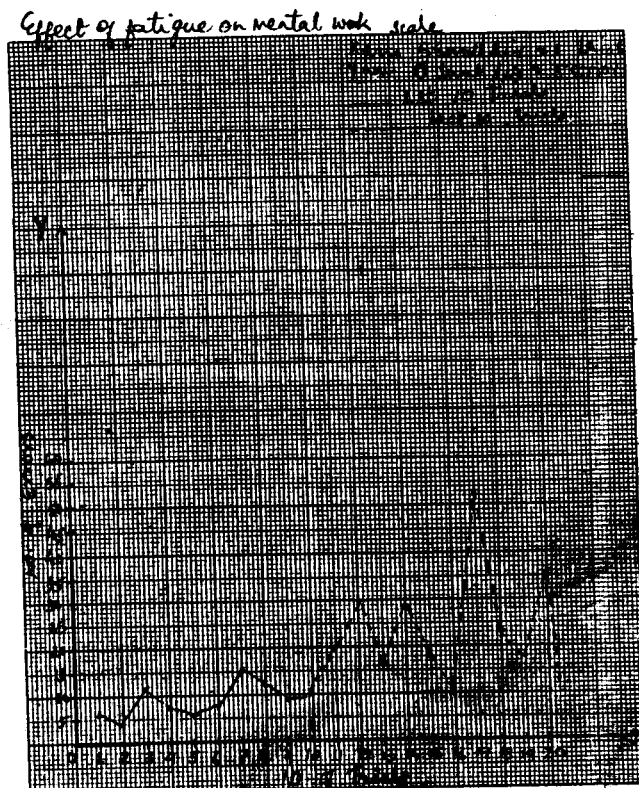
The graphs represent time taken and errors committed which clearly proves the effect of fatigue. For both the graphs straight line denotes first 10 trials and broken line denotes the last 10 trials. The graphs have upward trend which means that in the beginning when the subject was fresh she took less time and committed less errors. But in the last few trials when she got fatigued she made more errors and also took more time to complete the trials, hence the graph goes upward in the last 10 trials. Thus, the graph also proves the hypothesis.

On the basis of above discussion it can be concluded that result obtained is consistent with the hypothesis. Due to continuous mental work a person gets fatigued so the quality and quantity of work decrease as the trials increase.

(B) Effect of Rest Pause in Mental Work– An Experiment :

5.2 Problem

To conduct an experiment to study the effect of rest pause on the efficiency of doing a mental work by the subject.

5.3 Introduction

Fatigue is a condition of lowered efficiency of a worker due to work. The works may be either physical or mental. Mental work is that type of work in which mental energies are used more in comparison to muscular energies. The work when done continuously produces fatigue in the worker. So the relationship between work and fatigue is direct. It is also harmful because it may hamper the output of any work. It has been proved experimentally that rest pause given in between any work leads to dissipation of fatigue and results in the increase of output of work. There are, however, certain criteria that when and for how long rest pause should be given, whether it must be massed or distributed, Mayers 1938 found that when there was 46 hours of work, the production was 42 gross and when after every 40 minutes of work a rest pause of 20 minutes was given, the production increased to 49 gross. The purpose of this experiment is to verify the fact whether rest pause in performance dissipates fatigue or not.

5.4 Hypothesis

The efficiency of work increases when rest pause is given in doing the task.

5.5 Subject

Name	–	Prerna,
Sex	–	Female,
Age	–	19 years,
Qualification	–	A student of B.A.,
Health	–	Normal

5.6 Apparatus and Materials

1. 20 Cancellation Sheets
2. Stop Watch
3. Paper and Pen
4. Screen

5.7 Method of Experiment

5.7.1 Design :

Given in table No. - 1

Table No. - 1

Design

Condition	Material	Nature of Task	No. of trials	Self evaluation
I	10 cancellation sheets	To cancel 5 letters from the cancellation sheets	10 trials	1. Very fresh 2. Fresh 3. Neither fresh nor fatigued 4. Fatigued 5. Very much fatigued
Rest pause for 10 minutes				
II	10 cancellation sheets	To cancel 5 letters from the cancellation sheets	5 trials/10 minnutes rest 5 trials	1. Very fresh 2. Fresh 3. Neither fresh nor fatigued 4. Fatigued 5. Very much fatigued

5.7.2 Planning :

The E planned to conduct the experiment in two conditions. In one condition continuous 10 trials will be taken and in the other condition 10 trials with rest pause between the trials was to be taken. The nature of job was similar to that of experiment on effect of fatigue. The cancellations sheets were to be used as material and at the end of every trial self evaluation on five points will be taken from the subject i.e. the subject will make her condition. It was also decided to give a rest pause after completion of first condition for ten minutes and then the second condition will start.

5.7.3 Arrangement of Apparatus and Other Materials :

Before starting the experiment the experimenter made few preparations. First of all he numbered each cancellation sheet from 1 to 20. On the top of each cancellation sheet he wrote five alphabets which the subject was supposed to cancel. A stop watch was kept ready to note the time taken by the S in completing each cancellation sheet. The E prepared a raw data sheet in which he will write the time and errors in each trial. A screen was placed between the S and E so that S may not see the proceedings of the experiment.

5.7.4 Instruction :

In this experiment you will be provided with certain cancellation sheets. On the top of each sheet 5 letters are written in random order. Your task will be to cancel those letters from the sheet. After ready signal you start to cancel the letters written on top from the sheet and return it to me after you finish it. Though there is no time limit still you try to do the work fastly. But at the same time be careful that you don't miss any letter to cancel nor you must cancel the letter which are not written on the top by me. If you do so then it will be counted as error made by you.

5.7.5 Conducting Actual Experiment :

After the instructions E seated the subject to his left and established a friendly rapport with her. Then cancellion sheets were taken out which was numbered from 1 to 10 (each meant for a single trial). The E gave the first sheet to the subject and with the start signal stop watch was put on. The subject started cancelling each of the five letters that was written on the top of the sheet. As soon as she finished the task she gave the signal and the E switched off the stop watch and noted down the time taken in the trial. Similarly other nine trials were taken and time were noted down. Thereafter, the number of errors committed were counted and noted down in the raw data table in their respective trials. After completion of each trial self evaluation was taken in which the subject was asked how she felt at that time. Self evaluation included very fresh, fresh, neither fresh nor fatigued, fatigued and very much fatigued. Thus the subject stated her condition.

After a rest pause of 10 minutes condition II was administered. The same procedure was repeated with a slight difference in trials. In this condition the subject first performed the five trials (i.e. 11-15) and then she was given 10 minutes rest after which she performed the most five trials (i.e. 16-20). In this also time taken and errors committed were noted, the self evaluation of the subject was also noted down.

5.8 Collection of Data

The experimenter collected objective as well as subjective data. The objective data constitutes the raw data in which time data is the introspective report as well as the self evaluation by the subject.

Table No. – 2
Raw Data
Condition I

No. of trials	Line of secs.	Erros	Self Evaluation
1	240	10	Very Fresh
2	255	5	Fresh
3	290	13	N-fresh nor fatigued
4	270	2	N-fresh nor fatigued
5	265	5	Fatigued
6	280	20	Fatigued
7	300	14	Fatigued
8	295	18	Fatigued
9	310	17	Very much fatigued
10	350	26	Very much fatigued

Effect of rest pause on mental work
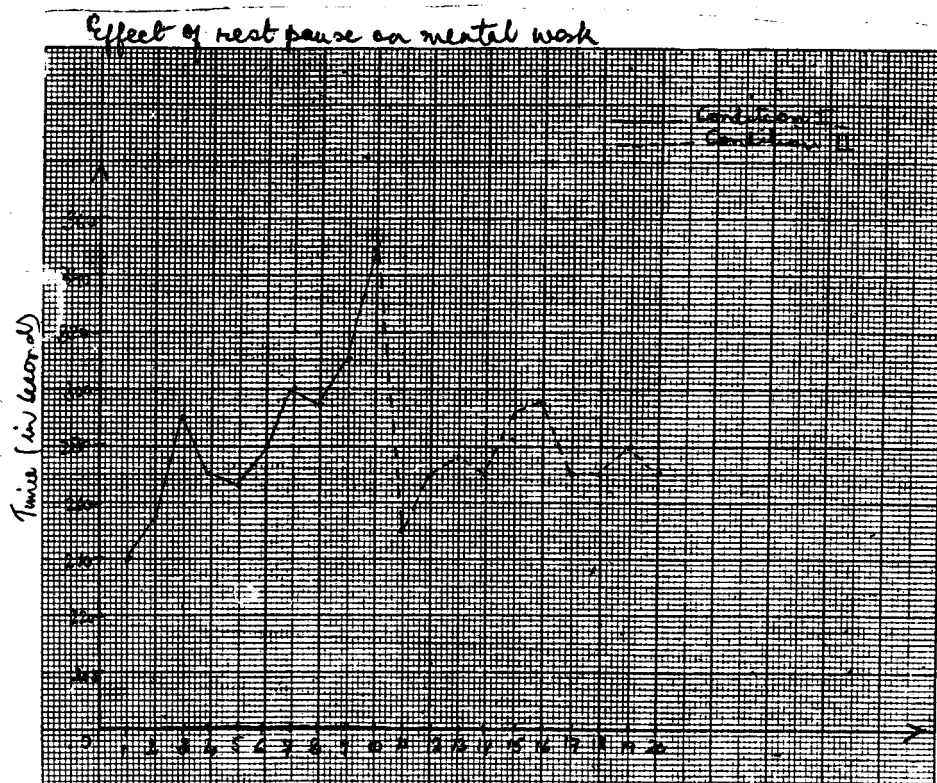
Condition II

No. of trials	Time of secs.	Erros	Self.Evaluation
1	250	5	Very fresh
2	270	6	Fresh
3	255	5	N. fresh nor fatigued
4	250	7	N. fresh nor fatigued
5	290	2	N. fresh nor fatigued
6	275	2	Very fresh
7	250	3	Fresh
8	250	8	N. fresh nor fatigued
9	260	2	N. fresh nor fatigued
10	250	3	Fatigued

Introspective report : the subject gave the following report— "the experiment was quite boring for me. In condition I in the starting enjoyed but later on due to continuous work, I felt bored and tired. In condition II I felt fresh as some rest was given which improved my performance. Although I knew the nature of job before hand still I could not concentrate on it."

5.9 Treatment of Data

The treatment of data was done in the following ways—

1. Mean and SD of time of condition I and II

2. Mean and SD of time of first five trials of Condition I+II.

3. Mean and SD of time of last five trials of condition I+II.

4. Mean and SD of error of condition I and II

5. Mean and SD of error of first five trials of condition I+II.

6. Mean and SD of error of last five trials of condition I+II.

7. t-ratio—

(a)   of condition I and II

(b)   of first five trials of condition I and II.

8.   Self evaluation score

9.   Graph of time and error.

All these findings were quoted in result table that is given in table no.3 and table no. 4.

Table No. – 3

Result

Condition	Mean of time	Mean of error	SD of time	SD of error	t-ratio (time)	level of significance
I	285.5	13	9.366	7.197	3.341	df = 9 0.01 and 0.05 signifi-cant at both level
II	260	4.3	13.288	2.1		
1st five trials of condi. - I	264	7	16.522	3.949	0.088	df = 4 0.05 & 0.01 = in significant
1st five trials of condi. - II	263	5	15.362	1.673		
last 5 trials of condition I	307	19	23.579	4	3.927	df = 4 0.01 significant
last 5 trials of condition II	257	3.6	9.797	2.244		

Table No. – 4

Self Evaluation Score

Condition	No. of trials	Self Evaluation	Scores assigned	Total Score obtained
Condition – I	1	V. Fresh	5	25
	2	Fresh	4	
	3	Neither fresh nor fatigued	3	
	4	Neither fresh nor fatigued	3	
	5	Fatigued	2	
	6	Fatigued	2	
	7	Fatigued	2	
	8	Fatigued	2	
	9	Very much fatigued	1	
	10	Very much fatigued	1	
REST PAUSE FOR TEN MINUTES				
Condition – I	1	Very Fresh	5	35
	2	Fresh	4	
	3	Neither fresh nor fatigued	3	
	4	Neither fresh nor fatigued	3	
	5	Neither fresh nor fatigued	3	
	6	Very Fresh	5	
	7	Fresh	4	
	8	Neither fresh nor fatigued	3	
	9	Neither fresh nor fatigued	3	
	10	Fatigied	2	

Effect of rest pause on mental work
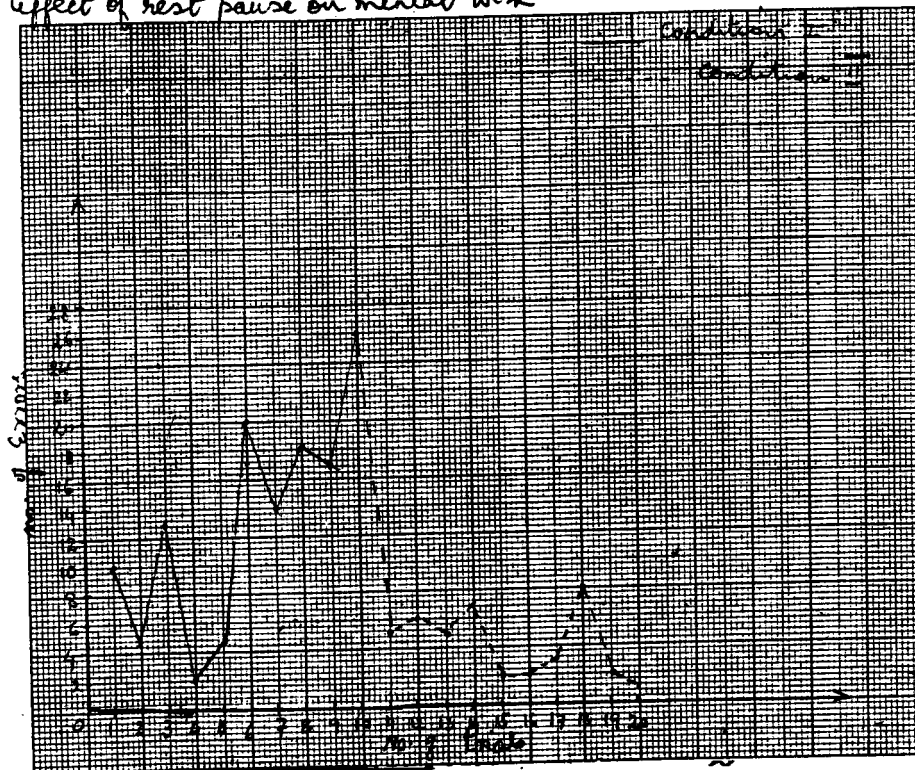
5.10 Interpretation of Data, Discussion and Conclusion

The obtained result proves our hypothesis. The mean of time in condition I (no response) in 285.5 secs. whereas in condition II (where rest pause was given) it is 260 secs. There is a difference of 25.5 secs. and it is certainly due to rest pause. The subject worked with greater speed, as she felt fresh due to rest, so she took less time in completing the trials. The mean of error in condition I is 13 and in condition II is 4.3. There is a difference of 8.7. This shows that the subject committed less number of errors in condition II and it is surely due to the effect of rest pause. SD of time in condition I is 9.366 and in condition I I it is 13.288. This shows that variability in response is very less. The SD of error in condition I is 7.197 and in condition II it is 2.1. This also shows less variability in subject's response. Hence the obtained result is much reliable. The t-ratio of time is 3.341 which is significant at both the levels. So the difference between two means is real and has not occurred by chance.

The hypothesis is also proved when we compare the mean of time and error of first five trials

of condition I and condition II. Mean of time of first five trials of condition I is 264 secs. and that of condition I I is 263 secs. The difference is of one second. This shows that the rate of work output is somewhat high in condition II as time taken is less. But this difference is too small, so on this basis we cannot say surely that rest pause has influenced the S's performance. The difference is quite negligible. The mean of error of fist five trials of condition I is 7 and that of condition II is 5. The difference is of 2. This proves the hypothesis that when rest pause is given the performance improves and subject commits less error. The SD of time of first five trials is 16.522 and that of condition II is 15.362 secs. The difference is of 1.16 secs. which shows that subject's response was more or less consistent in both conditions as the variability is very less. The SD of error in condition I is 3.949 and that of condition II is 1.673. The difference is of 2.276 which proves less variability in response, hence the result is dependable. t-ratio of time of first five trials of condition I and condition II is 0.088 which is insignificant at both the levels. So the difference of 1 second might have been due to chance factor.

The mean of time of last five trials of condition I is 307 secs. and of condition II it is 257 secs. This decrease in time proves that rest pause has positive effect on the performance of the subject. The mean of error of last five trials of condition I is 19 and that of condition II is 3.6. thus subject has committed 15.4 errors less in condition II and it may be surely due to rest pause. The SD of time and error (last five trials in condition I) is 23.579 and 4 respectively and the SD of time and error (last five trials in condition II) is 9.797 and 2.244 respectively. All these are very less than their respective means, hence the result is quite reliable. The t-ratio (time) of last 5 trials of condition I and II is 3.927 which is significant at 0.01 level. This means that difference in mean is reliable and consistent and the result is dependable.

The total self evaluation score in condition I is 25 which is 5 points more than the midpoint which is 20. The mid point is found out by the formula . $\dfrac{H-L}{2}$ $\dfrac{50-10}{2}=\dfrac{40}{2}=20$. If the score is below the mid point then it denotes fatigue. Here the score is 25 which is above mid point, thus the subject was having feeling of freshness in condition I. The self evaluation score in condition II is 35 and this is also above the mid point. Thus in condition II also subject had the feeling of freshness. But when we compare the self evaluation score of both conditions then we find that subject was more fresh in condition II. Hence the effect of rest pause has occurred in condition II. So on this basis also our hypothesis gets support.

The graph on previous page also represents that subject took more time and committed more error in condition I as compared to the condition II. In condition I subjects took 350 seconds at the highest level whereas in condition II she took only 290 seconds. This is due to the rest pause in between the trials. All these findings clearly prove that by the end of the trials of condition I subject was completely exhausted but when rest pause was given in condition II she got refreshed and thus the quality and quantity of work improved in condition II.

In conclusion it can be said that the result of the experiment proves the hypothesis that "efficiency of work increase when rest pause is given in between the task."

5.11 Questions for Exercise

(A) Question for Oral Examination :

1. State the difference between mental and physical work.

2. What is the difference between physical fatigue and mental fatigue ?

3. What is the nature of decrement in output due to mental fatigue and physical fatigue respectively ?

4. State the differential effect of massed rest pause and distributed rest pause.

5. Make a distinction between :

    (a) Industrial fatigue

    (b) Physiological fatigue

    (c) Psychological fatigue

6. How do we measure a person's mutual fatigue ?

7. What other material can be used to measure mental fatigue besides the cancellation sheets?

8. Explain the following :

    (a) Work and practice

    (b) Work and play

9. Describe the physiological changes caused due to physical fatigue.

10. What are the symptoms of mental fatigue ? Do physiological changes take place is this ?

(B) Questions for Experimental Problems :

1. Demonstrate experimentally that fatigue is the result of continuous mental work.

2. Design and conduct an experiment to show the effect of short and long rest pauses on the performance of mental work by your subject.

3. To conduct an experiment to determine the optimum length of the rest period for the subject in order to do a mental work in the best manner.

4. Design and conduct an experiment on the subject to determine the best location of the rest pause for properly doing a mental work.

❖ ❖ ❖ ❖

4. Determine the rate of fluctuation of attention of your subject by an experiment.

5. Design and conduct an experiment to determine the rate of positive and negative phases of fluctuation or shifting of attention.

6.12 Suggested Readings

1. Mohsin, S. M.   :   Experiments in Psychology

2. Sulaimen, M.   :   Manovaigyanik Prayog Aur Parikshan.

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Colour Preference by the Method of Paired Comparison

7.0 Objective

The objective of this lesson is to prepare the readers to conduct experiment on colour preference by the method of paired comparison. For this a detailed study will be made on colour preference, its factors and how to design the colours to show them in pair. Finally, oral questions will help them to learn the types of questions that can be asked in viva examination.

7.1 Introduction

The experimental study on colour preference is related with feeling and emotion. The feeling and emotions are two things because feelings are the state of pleasantness and unpleasantness whereas emotions are the disturbed bodily conditions. To be more clear it can be explained in this way— feeling is a state of pleasantness or unpleasantness accompanying any mental process. Sometimes it is marked by the absence of either of these pleasantness or unpleasantness. This may be called as a state of neutral feeling. So far emotion is concerned we can say that this is disturbed bodily conditions accompanied by a great variety of conscious states, like anger, fear, disgust, excitement, happiness, sorrow etc.

The aesthetic properties of objects and situations, the fact of their being agreeable or disagreeable are the matters of feeling. When an object, for example, is judged as beautiful or ugly, then the person actually expressing his feelings with regard to that object.

Experiments on feeling values of stimuli can be done by using the method of paired comparison. It means the things or stimulus will be presented in pairs, and the subject will give his preference for either of the stimuli among the two. For determining the number of pairs to be selected a simple formula of $N\left(\dfrac{N-1}{2}\right)$ is used.

Here N stands for the total number of stimuli.

In the other section of this lesson an experiment on colour preference by the method of period comparison will be demonstrated.

An Experiment on Colour Preference :

7.2 Problem

To demonstrate experimentally the subjects preference among six colours by the method of passed comparison.

7.3 Introduction to the Experiment

The experiment on colour preference by the method of paired comparison was first conducted by Cohn in 1894. The subject was shown a pair of any colour and he was to state his preference by comparing both the colours. The same colour is to be shown from both right and left side in order to avoid space error. On the basis of different experiments it is clear that colour preference depends upon three main characteristics of colours :–

1. **Hue :** It refers to different kind of colours. It has been found that red and blue colours are mostly preferred by the subjects. Thus a person has more liking for some colour and less for others.

2. **Saturation :** It means lightness or darkness of colour. Generally dark colours are more preferred than the dull ones.

3. Brightness : The bright colours arrests the attention of person, i.e., generally individual gets attracted towards bright colour.

Besides these characteristics the factors like age, sex and other personal factors also determines the choice of colours. The experiment conducted here is considered to be suitable and important in the study of aesthetic feeling.

7.4 Hypothesis

1. There will be difference in the preference of six different colours.

2. There will be consistency in judgement for the most preferred and least preferred colour.

7.5 Subject

An undergraduate student of normal health.

7.6 Apparatus and other Materials

1. Colour Wheel
2. Screen
3. Paper and Pencil

7.7 Method of Experiment

7.7.1 Design :

Given in Table No. – 1

Table No. –1

Design

	G	O	Y	DB	SB	R	P
G	X	GO	GY	GDB	GSB	GR	GP
O	OG	X	OY	ODB	OSB	OR	OP
Y	YG	YO	X	YDB	YSB	YR	YP
DB	DBG	DBO	DBY	X	DBSB	DBR	DBP
SB	SRG	SBO	SBY	SBDB	X	SBR	SBP
R	RG	RO	RY	RDB	RSB	X	RP
P	PG	PO	PY	PDB	PSB	PR	X

7.7.2 Planning :

The E planned that in this experiment 7 colours will be used and by the method of paired comparison the frequency of colour preference of the subject will be noted down. He also planned that each colour will be shown from both sides–right and left and each colour will be paired with each colour. For this he decided the pairs before hand by the formula– $N\left(\frac{N-1}{2}\right)$ i.e. $7\left(\frac{7-1}{2}\right) = \frac{7 \times 6}{2} = 21$ pairs. The planning for the pairs to be shown to the subject can be seen in design table.

7.7.3 Arrangement of Apparatus and other Materials :

The colours in the colour wheel was written on paper both columnwise and row wise. Then one colour from right and one from left was paired as shown in the design table. It was decided before hand how many pairs of colour are to be made. Twenty one pairs were made on the basis of seven colours by the formula $N\left(\frac{N-1}{2}\right)$. Here N means number of colour . Here number of colours is 7, hence the pairs was – $7\left(\frac{7-1}{2}\right) = 7\left(\frac{6}{2}\right) = \frac{42}{2} = 21$ pairs.

Thus twenty one pairs were made. In order to remove the space error, each pair was shown twice, once from the right side and then from the left side. A total of trials were taken. In order to decide which of the pairs will be shown in which trial, the pairs in the design table was numbered as 1, 2, 3, to 42. The subject was shown each pair through an apparatus known as Colour Wheel apparatus and was asked to tell which colour he liked most among the two. Then the preferred colour was noted down in the data collection table prepared before hand by the E.

7.7.4 Instructions :

The subject was given the following instructions by the experimenter—

"You have liking for colours but you may not like all of them equally. Some colours you may like more whereas some colours may not appeal you much. In this experiment I will show you pairs of colours one by one through a window of the colour wheel box. In each trial I will show you two colours, one on the left side and another on the right side. Your task will be to report which of them you prefer more. From the pair you have to choose one colour of your choice or liking. I hope you have come to understand everything well.

7.7.5 Conducting Actual Experiment :

After giving the instructions the E started the actual experiment. From the design table (where plan was done already for the presentation of colours) he picked the pairs in random order and showed them to the subject one by one. The subject on seeing the colours soon reported which one of the colour she liked most. The experimenter noted down his preference in the respective space of the raw data table. In this way altogether 42 preferences of colour were taken from the subject. After all the trials were over the S was asked to give his introspective report, i.e., how he felt during the experiment.

7.8 Collection of Data

The data includes both objective and subjective data. The objective data is constituted by noting the preference for different colours in the raw data table and subjective data in the introspective report given by the subject to the experimenter.

Table No. – 2

Raw Data

	(G) Green	(O) Orange	(Y) Yellow	(DB) Dark Blue	(SB) Sky Blue	(R) Red	(P) Pink	Frequency
(G) Green	X	G	G	DB	G	R	G	4
(O) Orange	G	X	O	DB	O	R	O	3
(Y) Yellow	G	O	X	DB	Y	R	Y	2
(DB) Dark Blue	DB	DB	DB	X	DB	R	DB	5
(SB) Sky Blue	G	O	Y	DB	X	R	P	0
(R) Red	R	R	R	R	R	X	R	6
(P) Pink	G	O	Y	DB	P	R	X	1
Frequency	4	3	2	5	0	6	1	21

Introspective Report : "The experiment was quite interesting and I enjoyed doing it. The red colour is my favourite colour and sky blue I preferred the least because I have no liking for that colour.

7.9 Treatment of Data

The treatment of data involves the following—

1. Counting the total no. of preference for different colours separately from both right and left sides. This will give two sets of frequency as shown in table no. 2 (raw data).

2. TPS— This is total preference score found out by adding the frequencies of each colour from both sides. eg. Red— 6 + 6 = 12, so for red colour TPS is 12.

3. APS— This actual preference score found out by the formula $\dfrac{TPS}{2}$. Since the actual

number of pairs is only 21, therefore, each TPS is divided by 2 to get the APS (the colours were to be shown from both left and right sides, hence the pairs were doubled and the total no. of pairs came as 42.

4. Proportion — The formula for this is $\dfrac{APS}{N-1}$

5. Graph on X axis name of colours and on Y axis proportion.

All these calculations were noted down in table no. 3 which is the result table.

Table No. – 3

Result

Colours	TPS	APS	Proportion
Green	8	4	0.6
Orange	6	3	0.5
Yellow	4	2	0.3
Dark Blue	10	5	0.8
Sky Blue	0	0	0
Red	12	6	1
Pink	2	1	0.1

7.10 Interpretation of Data, Discussion & Conclusion

The result table shows that there is difference in preference for different colours. First of all the frequency of each colour was calculated separately for both the sets. Then the TPS was calculated by adding the total frequencies of each colours. In the 42 trials the preferred red colour 12 times, dark blue 10 times, green colour 8 times, orange colour 6 times, yellow 4 times, pink 2 times and sky blue was not preferred even once. Thus the first hypothesis that there will be difference in preference for different colours is proved.

The most preferred colour is red as its TPS is highest and last preferred colour is sky blue because its frequency or TPS is zero. The second hypothesis that there is consistency judgement for most preferred and least preferred colour is also proved. As we see that red colour is preferred most irrespective of the side from which it was presented or with which colour it was presented. In the same way sky blue colour was least preferred whether it was presented from left or right side or paired with any colour. One thing is noticeable here that subject's response for any colour was
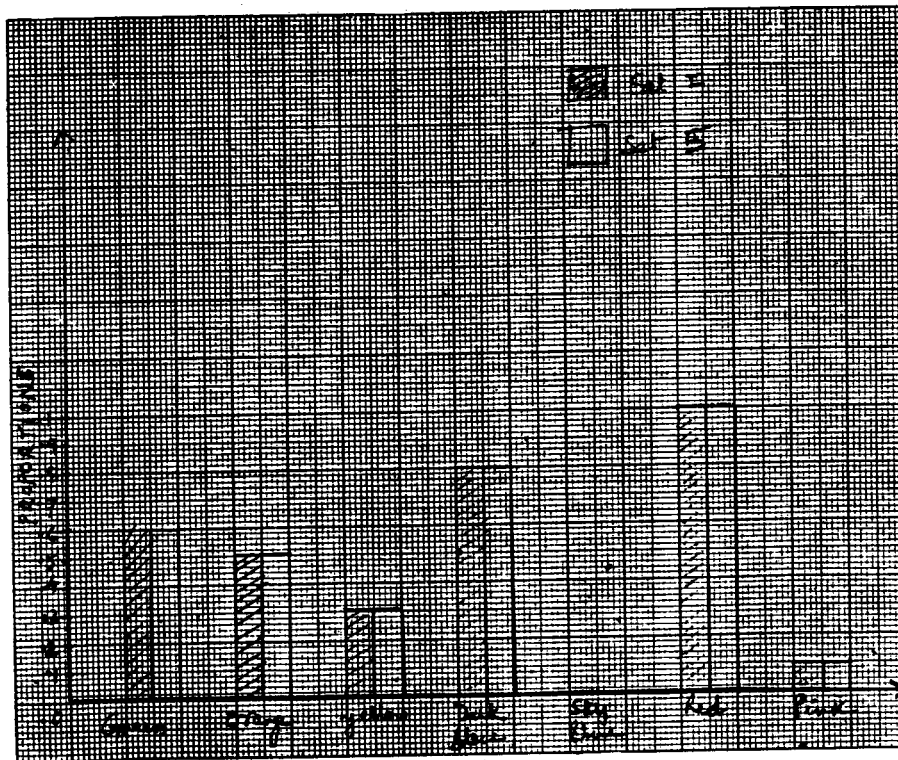
consistent irrespective of the space from which side it was shown. So the subject is not only sure about her last and most preferred colours but she is quite sure about her preference for any colour.

As the actual pair of colour was 21, every total preference score was divided by 2 to get actual preference score. The APS for different colours is like this— red – 6, dark blue – 5, green –4, orange-3, yellow – 2, pink– 1 and sky blue is zero.

Then the actual preference score was converted into proportion according to which green colour is 0.6, orange 0.5, yellow 0.3, dark blue 0.8, sky blue 0 and red 1 as well as of pink proportion is 1.

On the basis of proportion a bar diagram was plotted. This graphic representation clearly shows the preference of colours in both sets. And at a glance it becomes clear that the subject has preferred the red colour most as its proportion is highest in both the sets and lowest proportion is of sky blue colour. The graph also represents that there is consistency in judgement for every colours.

Thus in conclusion it can be very well said that our both hypothesis has been proved adequately.

7.11 Questions for Exercise

(A) Oral Questions for Viva–voce Examination :

1. What is the feeling tone ? Describe its characteristics.

2. What is the difference between feeling and emotion ?

3. What is the method of paired comparison ? Who was the first to use this method for studying the colour preference of a person.

4. How do we get the sensation of colour ? Is colour zone fixed in retina or not ?

5. Explain the following :

    (i) Primary colours

    (ii) Secondary colours.

    (iii) Complementary colours

    (iv) Non-complementary colours

6. What is the difference between primary and secondary colours?

7. What is the psychological aspect of preference in colour?

8. Make an experimental design to determine the frequency of preference for six nations, six fruits, six cold drinks separately by the method of paired comparison.

9. In the course experiment on colour preference by the method of paired comparison, why the actual number of pairs of colours are just doubled ?

10. What is the use of making histogram in colour preference experiment ?

(B) Questions for Experimental Problems :

1. Using the method of paired comparison, find out your subject's relative preference for any six political parties of your country.

2. Using the method of paired comparison determine your subject's order of preference for any six colours.

3. In a range of six colours to be chosen by you determine with the help of the method of paired comparison your subject's most and least preferred colours.

4. What are the essential features of the paired comparison experiment ? Using this method of comparison find out your S's most and least preferred nationalities out of American, the English, the Italian, the German, the Chinese and the Russian.

7.12 Suggested Readings

1. Mohsin, S.M. : **Experiments in Psychology**

2. Singh, A. K. : **Monovigyan Mein Prayog Evam Parikshan.**

3. Sinha and Mishra : **Manovaigyanik Prayog Aur Manovigyan Mein Prayog, Parkishan Evam Sankhyiki.**

4. Sulaiman, M. : **Monovaigyanik Prayog Aur Parkishan.**

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