Physiology Lessons
for use with the
Biopac Student Lab

PC under Windows® 98SE, Me, 2000 Pro
or Macintosh® 8.6 – 9.1

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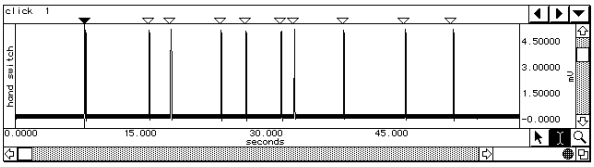
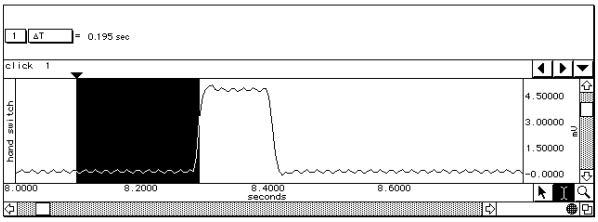
Lesson 11 Data Report
Reaction Time I





Lesson 11

REACTION TIME

DATA REPORT

Student's Name: _____

Lab Section: _____

Date: _____

I. Data and Calculations

Subject Profile

Name_____ Height_____

Age_____ Weight_____

Gender: Male / Female

A. Manual calculation of reaction time

Calculate the reaction time for the first click in Segment 1: **ΔT =** _____

B. Summary of Subject's Results (copy from the software Journal)

Table 11.1

STIMULUS NUMBER	REACTION TIMES (ms) Pseudo Random Segment 1 (1st trial)	Pseudo Random Segment 2 (2nd trial)	Fixed Interval Segment 3 (1st trial)	Fixed Interval Segment 4 (2nd trial)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Mean				

C. Comparison of reaction time to number of presentations

Complete Table 11.2 with data from the first fixed-interval trial (data Segment 3) and calculate the mean for each presentation to determine if reaction times vary as the Subjects progress through the series of stimulus events.

Table 11.2 Comparison of Reaction Times

Student's Name	Pseudo-random Trial 1 Data (Segment 1)			Fixed Interval Trial 1 Data (Segment 3)		
	Stimulus 1	**Stimulus 5**	**Stimulus 10**	**Stimulus 1**	**Stimulus 5**	**Stimulus 10**
1.						
2.						
3.						
4.						
5.						
Calculate the Means:						

D. Group Summary

Complete Table 11.3 with the mean for 5 students and calculate the group mean.

Table 11.3

Class Data Student Means	*Pseudo-random trials*		*Fixed-interval trials*	
	First	**Second**	**First**	**Second**
1.				
2.				
3.				
4.				
5.				
Calculate the Group Means:				

E. Variance and Standard Deviation

$$\text{Variance} = \frac{1}{n-1}\sum_{j=1}^{n}(x_j - \bar{x})^2$$

$$\text{Standard Deviation} = \sqrt{\text{Variance}}$$

Where

n = number of students

Xj = mean reaction time for each student

$\bar{X}$ = Group mean (constant for all students)

$\sum_{j=1}^{n}$ = Sum of all student data

Calculate the variance and standard deviation for 5 students with data from ***Segment 2: Pseudo-random Trial 2*** (Table 11.4) and from ***Segment 4: Fixed Interval Trial 2*** (Table 11.5).

Table 11.4 ***Segment 2: Pseudo-random Trial 2 Data***

	ENTER	ENTER	CALCULATE	CALCULATE
Student	**Mean Reaction time for Student** (X_j)	**Group Mean** $(\overline{X})$	**Deviation** $(X_j - \overline{X})$	**Deviation^2** $(X_j - \overline{X})^2$
1				
2				
3				
4				
5				

	Sum the data for all students = $\sum_{j=1}^{n} (x_j - \overline{x})^2$	=
Variance (σ^2) =	Multiply by 0.25 = $\frac{1}{n-1}$	=
Standard Deviation =	Take the square root of the variance = $\sqrt{\text{Variance}}$	=

Table 11.5 ***Segment 4: Fixed Interval Trial 2 Data***

	ENTER	ENTER	CALCULATE	CALCULATE
Student	**Mean Reaction time for Student** (X_j)	**Group Mean** $(\overline{X})$	**Deviation** $(X_j - \overline{X})$	**Deviation^2** $(X_j - \overline{X})^2$
1				
2				
3				
4				
5				

	Sum the data for all students = $\sum_{j=1}^{n} (x_j - \overline{x})^2$	=
Variance (σ^2) =	Multiply by 0.25 = $\frac{1}{n-1}$	=
Standard Deviation =	Square root of Variance = $\sqrt{\text{Variance}}$	=

II. Questions

F. Describe the changes that occurred in the mean reaction time between the 1st and 10th stimuli presentation:

For Segment 1:_____

_____

For Segment 2:_____

_____

Which segment showed the greatest change in mean reaction time? Segment 1 Segment 2

G. Refer to Table 11.2 and Table 11.3:

Estimate the minimal reaction time when reaction time becomes constant: _____sec

What physiological processes occur between stimuli presentation and pressing the hand switch?_____

_____

H. Refer to Table 11.2:

Which presentation schedule had a lower group mean? Pseudo-random Fixed-interval

I. Refer to Table 11.2 and Table 11.3:

Which of the presentation schedules seems to have less variation (lower variance and lower standard deviation)? Pseudo-random Fixed-interval

J. Refer to Table 11.2 and Table 11.3:

State a plausible relationship between the difficulty of a task and the reaction time statistics: mean, variance, and standard deviation.

_____

_____

_____

K. What differences would you predict in reaction times and learning between your right and left hands?_____

_____

_____

End of Lesson 11 Data Report