Advanced Psychological Statistics
PSYCH-UA.11
Department of Psychology
Spring 2022

Data Assignment 3

1. Here the frequencies of events in each of five categories

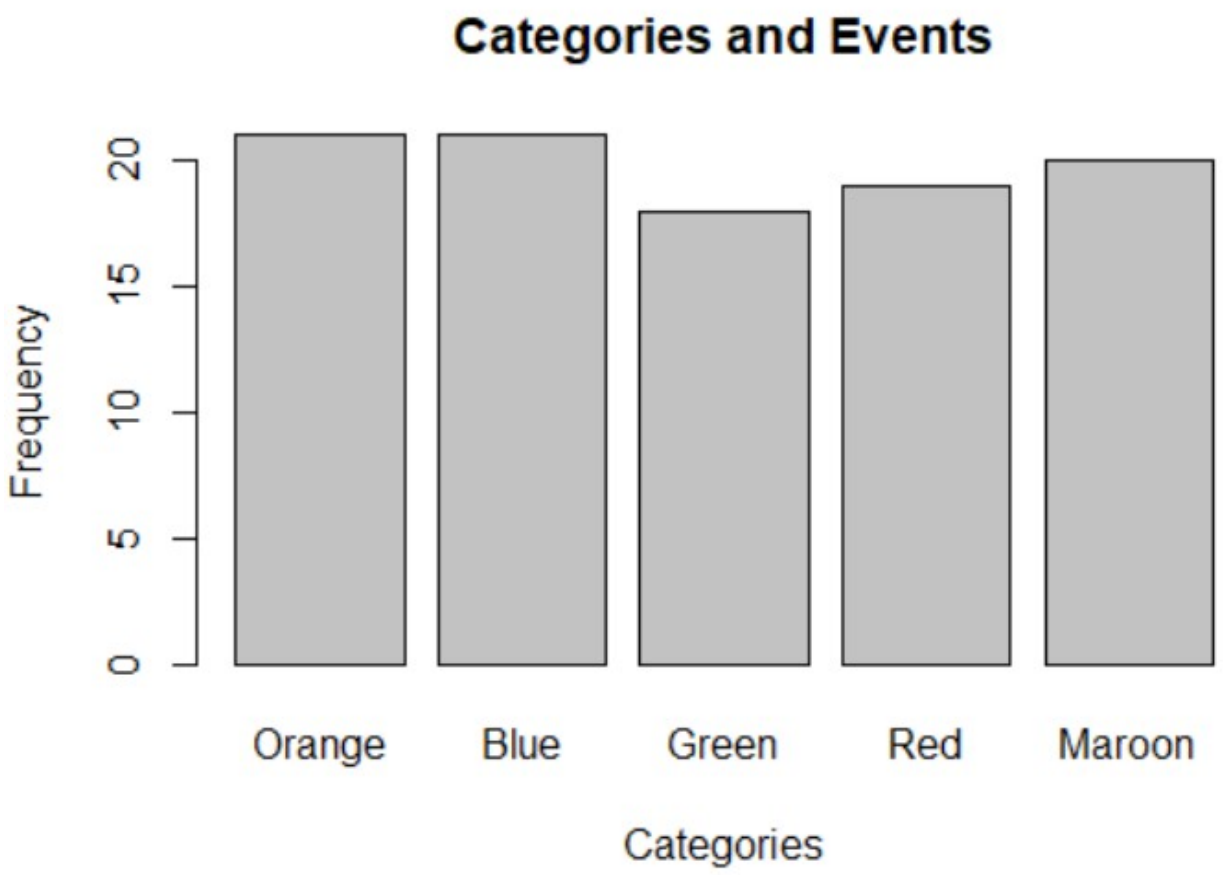
Orange	Blue	Green	Red	Maroon
21	21	18	19	20

Using r, (you must show your code and output – see Handbook for code) find the appropriate measure of central tendency. (**mode = 21)**
(5 pts.)
R code -

```
set1 = c(21,21,18 , 19, 20)
set1_unique = unique(set1)
set1_tabled = tabulate(match(set1, set1_unique)
set1_unique[set1_tabled == max(set1_tabled)]
```

Create a barplot of the distribution. Be sure to label the x and y axes and the names of each team. The title of the graph should be “Categories and Events”.

1. **categories = c(“Orange”, “Blue”, “Green”, “Red”, “Maroon”)**
2. **barplot(d, names.arg = categories, xlab = "Categories", ylab="Frequency", main = "Categories and Events")**



2. A researcher wants to know if there is a correlation between introspection and optimism. Using two questionnaires, the researcher collects the following data

Participant	Introspection	Optimism
1	51	55
2	65	80
3	74	71
4	74	66
5	75	74
6	76	68
7	87	51
8	86	67
9	51	74
10	85	67
11	52	81
12	92	83

13	97	87
14	70	74
15	86	84

Compute the (Pearson's r) correlation for these data r = 0**.17. (2 pts.)** Plot introspection against optimism. **(3 pts.)**

Compute the linear model for the data. What are the slope and intercepts? **Intercept = 63.40**, **slope= 0.12**
(5 pts)

Given the slope, what do you expect the trend of the data to be (e.g. "as x increases, y…")
The slope is barely positive. Almost a flat line, but with a little positive tilt
(10 pts)

If "Introspection" has a value of 75, what would be the predicted value of "Optimism? **72.4**
(5 pts)

3. Assume that you have a set of scores measuring visual imagery ability. You have also slope and intercept of a plot that used visual imagery data as the X values and vivid dreaming (detailed and visually-involved dreams) ratings as the Y values. However, the vivid dreaming data isn't available. Using the data below, recreate the Y values **(10 pts)**, then create the plot and trendline **(15 pts)**. For the data – the intercept= 6.023, slope = 0.004

Participant	Visual Imagery Rating
1	44
2	38
3	40
4	43
5	47
6	31
7	42
8	42
9	48
10	28
11	40
12	41

4. Below is a table of X values, $\hat{Y}$, and residuals. From these, work backwards and determine the Y **(10 pts.)** values. Plot the x, y values. Create a trend line and report the slope and intercept values **(15 pts., plot and trend line)**

X-values	Ŷ	Residuals
16	56.86	-21.86
12	146.38	-66.38
15	79.2415	30.76
13	124	26
11	168.76	31.24

1. Find the y values.
   35, 80, 110, 150, 200

(7 pts.)

2. Create a plot, give the range of the x-axis from 0 to 25 and the y-axis from 0 to 250
   plot(x1, y2, xlim = c(0,25), ylim = c(0, 250))

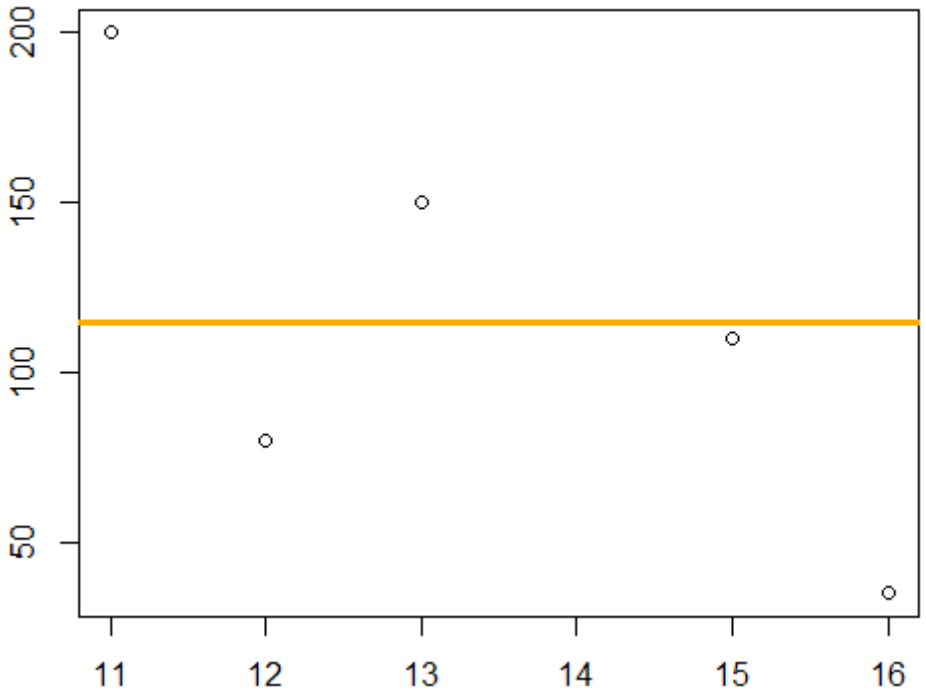
(7 pts.)

3. Create a plot, give the range of the x-axis from 10 to 25 and the y-axis from 0 to 250
   plot(x1, y2, xlim = c(10,25), ylim = c(0, 250))

(7 pts.)

4. Create a trendline based only on the y mean **(mean = 115)**

(4 pts)



5. A developmental psychologist wants to look at the number of different toys a toddler touches in an hour of playing and see if it correlates to language usage (as measured on a scale of 1 to 100). Below is a table of the number toys each toddler plays with

Participant	Number of Toys Used
1	15
2	26
3	27
4	17
5	19

The mean of the speech fluency scores is 61.8. Create a plot that lists place a "best guess" trendline given the information provided. (Hint – the mean of speech fluency is *61.8*).

The x-axis should include at least the range of x-values.

The y-axis should range from 0 to 100

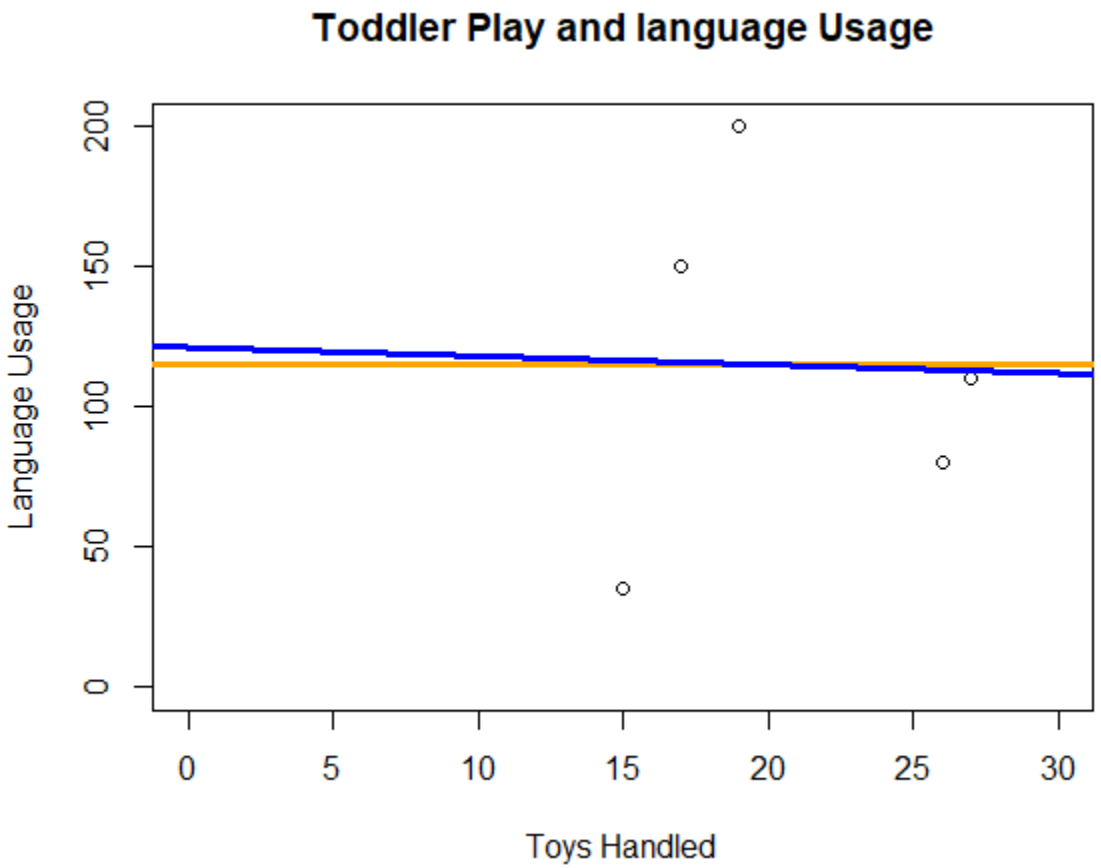
plot(x,y, main = "Toddler Play and language Usage", xlab = "Toys Handled", ylab = "Language Usage", ylim = c(0,100), xlim= c(0, 30))
(10 pts.)

Create a trendline using the lm() command and add it to the figure.
(**7 pts.)**

(In the r-command abline(), the "a" stands for the intercept value and the "b" stands for the slope.)

– an alternative to values for slope and intercept, in abline(), h stands for height (or intercept) so abline(h =<value>) would do what? **(Places a horizontal line on a figure.)**
(4 pts.)

- abline(v = <value>) would do what? **(Places a vertical line on a figure.)**
(4 pts.)


Toddler Play and language Usage
Language Usage
0
50
100
150
200
0
5
10
15
20
25
30
Toys Handled