Notes for Alphas

Line graphs provide a way to map independent and dependent variables that are both quantitative. When both variables are quantitative, the segment that connects every two points on the graph expresses a slope, which can be interpreted visually relative to the slope of other lines or expressed as a precise mathematical formula. Means, error bars, and/or trend line can also be added. Make sure you calculate the mean, standard deviation, and standard error.

Scatter plots are similar to line graphs in that they start with mapping quantitative data points. The difference is that with a scatter plot, the decision is made that the individual points should not be connected directly together with a line but, instead express a trend. This trend can be seen directly through the distribution of points or with the addition of a regression line. Correlation (r) should be used along with a regression line (best fit line).

Bar graphs should be used if you're comparing qualitative categories. Means and error bars can be added. Make sure you calculate the mean, standard deviation, and standard error.

Example 1:

Results

Table 2.1

The Effect of Additives on Daphnia Heart Rate

		Time (min)					
		0	**2**	**4**	**6**	**8**	**10**
Control	**Mean**	245	240	241	248	249	250
	Standard Deviation	0	2	0.6	3.6	2.5	4.7
	Standard Error	0	1.2	0.3	2.1	1.5	2.7
Kava	**Mean**	245	142	136	145	142	142
	Standard Deviation	0	1.5	1	7.5	1.2	2.5
	Standard Error	0	0.9	0.6	4.4	0.7	1.5
Coffee	**Mean**	245	280	281	297	301	301
	Standard Deviation	0	4.5	2.5	3.1	5.1	2.5
	Standard Error	0	2.6	1.5	1.8	3	1.5

Table 2.1 shows the mean, standard deviation and standard error of heart beats per minute over 10 minutes after the additives were added.

Table 2.2

Daphnia Heart Rate - Control Group

Time (min)	**0**	**2**	**4**	**6**	**8**	**10**
Trial 1	245	240	241	252	249	255
Trial 2	245	242	241	247	251	248
Trial 3	245	238	242	245	246	246
Mean	**245**	**240**	**241**	**248**	**249**	**250**
Standard Deviation	**0.0**	**2.0**	**0.6**	**3.6**	**2.5**	**4.7**
Standard Error	**0.0**	**1.2**	**0.3**	**2.1**	**1.5**	**2.7**

Table 2.2 shows 3 trials, the mean, standard deviation and standard error of heart beats per minute over 10 minutes after no additive.

Table 2.3

The Effect of Kava on Daphnia Heart Rate

Time (min)	0	2	4	6	8	10
Trial 1	245	143	135	152	141	140
Trial 2	245	140	137	146	143	145
Trial 3	245	142	136	137	141	142
Mean	**245**	**142**	**136**	**145**	**142**	**142**
Standard Deviation	**0.0**	**1.5**	**1.0**	**7.5**	**1.2**	**2.5**
Standard Error	**0.0**	**0.9**	**0.6**	**4.4**	**0.7**	**1.5**

Table 2.3 shows 3 trials, the mean, standard deviation and standard error of heart beats per minute over 10 minutes after adding kava.

Table 2.4

The Effect of Coffee on Daphnia Heart Rate

Time (min)	0	2	4	6	8	10
Trial 1	245	275	283	300	307	298
Trial 2	245	284	281	296	300	301
Trial 3	245	280	278	294	297	303
Mean	**245**	**280**	**281**	**297**	**301**	**301**
Standard Deviation	**0.0**	**4.5**	**2.5**	**3.1**	**5.1**	**2.5**
Standard Error	**0.0**	**2.6**	**1.5**	**1.8**	**3.0**	**1.5**

Table 2.4 shows 3 trials, the mean, standard deviation and standard error of heart beats per minute over 10 minutes after adding coffee.

*******Note for Alphas**

For most projects, Table 2.1 should be the only table included on your board. Though the other tables are absolutely necessary for calculations, they don't need to be displayed. Only the good stuff. ☺

Figure 2.1

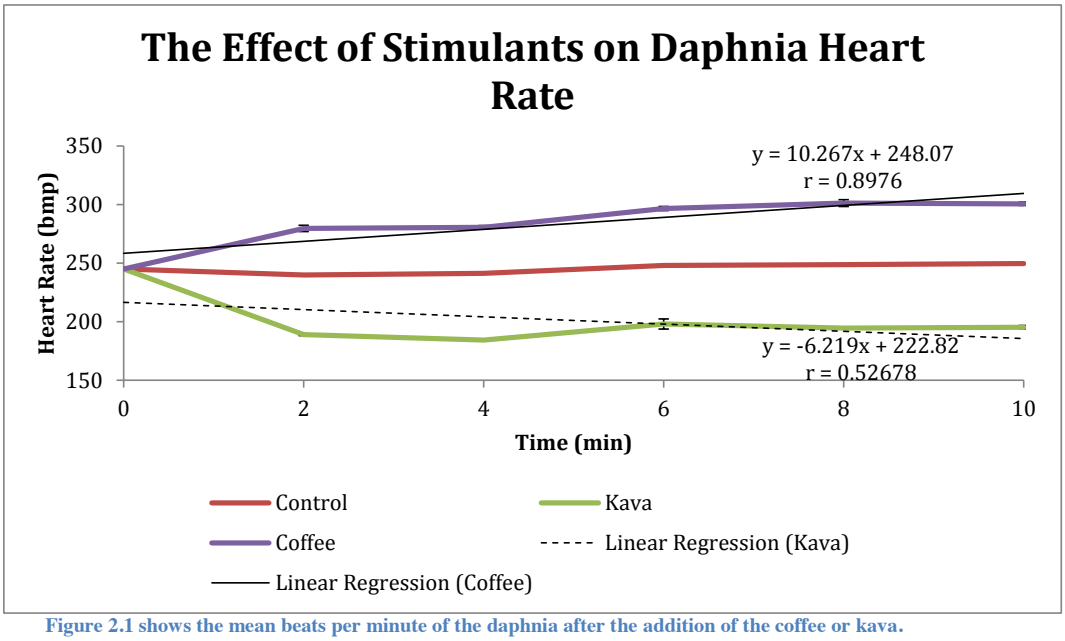

Figure 2.1 shows the mean beats per minute of the daphnia after the addition of the coffee or kava.

Figure 2.2

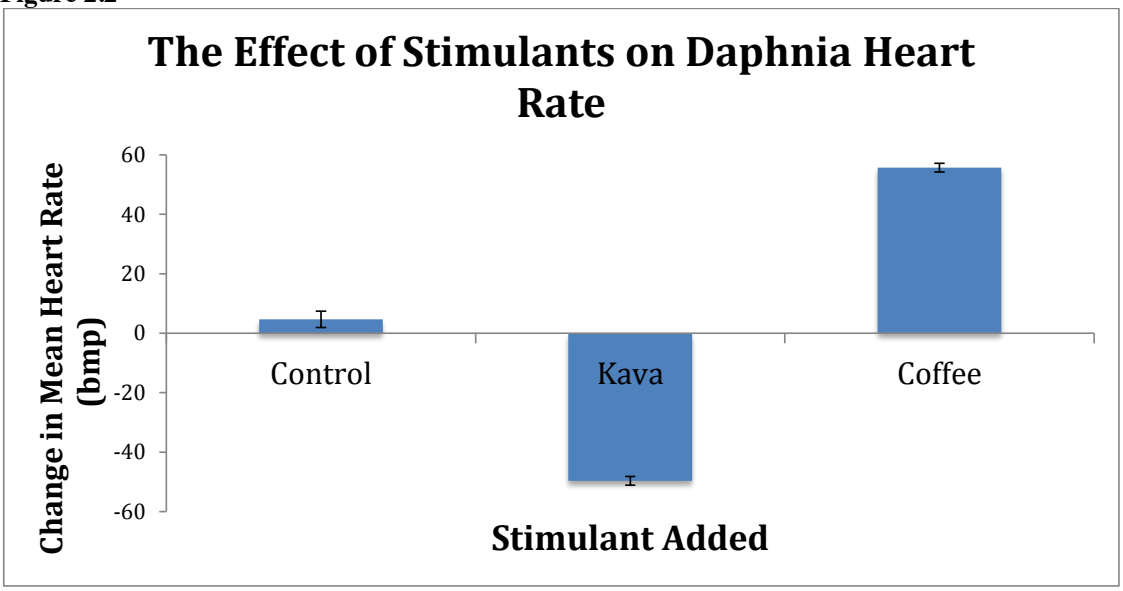

Figure 2.2 shows the mean rate of change in the Daphnia's heartbeats per minute. Error bars are included to display the range of each of these means.

Conclusion

The purpose of this experiment was to see whether the variables being tested would lower the daphnia heartbeat. It was hypothesized that kava would lower the heartbeat while coffee, being a stimulant, would increase the heartbeat. The hypothesis was supported. Kava did lower the heart rate of daphnia. The mean change in heart rate for the control group was 2.3-7.7 beats per minute while the mean change for the kava group was -51.5 - -48.5 beats per minute. The mean increase in heart rate for the group coffee was added to was 54.5-57.5 beats per minute. Although the kava lowered the daphnia's heart rate efficiently, this brought the daphnia to a point of dangerously low blood pressure. If this were a medical study, kava would probably not be a suggested depressant due to its extreme nature.

In the coffee group, the bmp increase by 10 every minute. The correlation is .9, showing a very strong positive correlation between time and bmp. The Kava group decreases 6 bmps for every minute. The correlation is .9, showing a very strong positive correlation between time and bmp.

There was experimental error in the way the number of heartbeats was counted. Also, daphnia are supposed to have an average heart rate of about 180 BPM while the daphnia used in this experiment had BPM rates ranging from 240-250 BPM. This is well over the normal heart rate of daphnia. There was also error in the experiment due to the tremors caused by the pregnant giraffes walking around preparing to give birth. Likely, this excited the daphnia, causing the higher heart rates.

Depressants and stimulants are often used in medical procedures to regulate the body's internal systems. Research such as this can help doctors choose the correct strength of depressant or stimulant. Also, there is a booming market for stimulant drinks and research like this can help manufactures choose safe combinations of stimulants to produce the desired effect without extreme risk to the body.

In the future, I would like to try mixtures of depressants, stimulants, or depressants and stimulants. Also, I would give the daphnia more time to acclimate to their new environment, perhaps decreasing the concentration of stimulant or depressant and increasing the exposure time significantly. I expect these changes to yield more interesting (and significant) results.

Example 2:

Results

Table 1.1

The Effect of Ginseng on E Coli (mm)

	Time (h)				
	0	**24**	**48**	**72**	**96**
Trial 1	7.2	7.3	7.3	7.7	9.2
Trial 2	6.7	6.8	7.0	7.0	7.5
Trial 3	6.6	6.6	6.8	7.0	8.0
Trial 4	7.0	7.0	7.1	7.2	8.1
Mean	**6.9**	**6.9**	**7.1**	**7.2**	**8.2**
Standard Deviation	**0.3**	**0.3**	**0.2**	**0.3**	**0.7**
Standard Error	**0.1**	**0.1**	**0.1**	**0.2**	**0.4**

Table 1.1 shows the mean zone of inhibition over 96 hours after applying ginseng to E coli for four trials. The standard deviation and standard error is also calculated.

Table 1.2

The Effect of Ginseng on E Coli (mm)

	Time (h)				
	0	**24**	**48**	**72**	**96**
Mean	**6.9**	**6.9**	**7.1**	**7.2**	**8.2**
Standard Deviation	**0.3**	**0.3**	**0.2**	**0.3**	**0.7**
Standard Error	**0.1**	**0.1**	**0.1**	**0.2**	**0.4**

Table 1.2 shows the mean zone of inhibition over 96 hours after applying ginseng to E coli for four trials. It also displays the standard deviation and standard error of the trials.

Figure 1.1

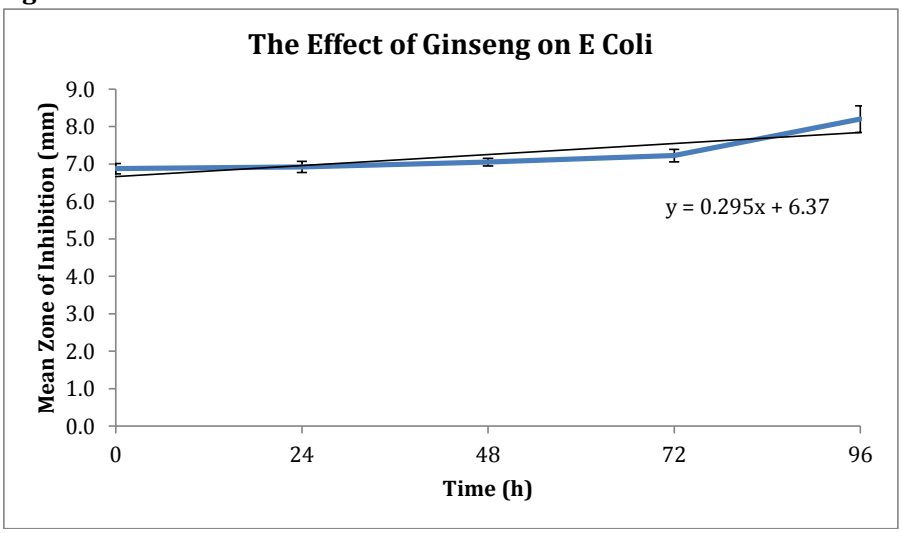

Figure 1.1 shows the mean zone of inhibition with standard error over 96 hours after applying ginseng to E coli. It also displays a trend and its equation.

Conclusion:

Example 3:

Figure 2.3

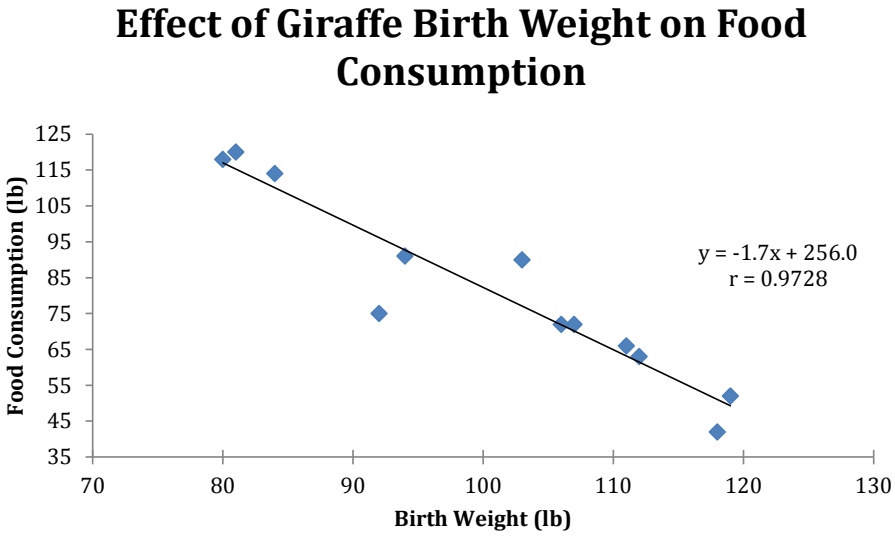

Figure 2.3 shows the effect of giraffe birth weight on food consumption.