Practice with 2x2 Designs & BG ANOVA

1. The purpose of the study was to test for a joint effect (interaction) of Time of Day and Type of Food upon Painted turtles eating behavior. Thirty-two painted turtles were randomly assigned to receive either dry food (called "Trout Chow" and made by Purina from about the same stuff as "Dog Chow') or live crickets, and whether they would be offered the specific food during the light or dark period of the day.   The DV is the number of "items" then eat (the pellets and crickets are about the same size, weight, etc.).

   a. On the right draw the 2x2 box, label the IVs and label the conditions of each.

   b. What effects will be examined in the factorial ANOVA?

There were three hypotheses – answer the questions about each.

RH1: Turtles will eat more crickets than Trout Chow pellets.

   c. Is this a hypothesis about a main effect or an interaction?

   d. Use <, > and/or = to represent this RH: for the 2x2 box above.

   e. Are the results of this RH: test causally interpretable? Why or why not?

RH2:   During the light, turtles will eat more crickets (because they are attracted by the movement) than trout chow pellets, however during the dark, turtles will eat more pieces of trout chow (because the chow is stinky – they like stinky) than crickets

   f. Is this a hypothesis about a main effect or an interaction?

   g. Use <, > and/or = to represent this RH: for the 2x2 box above.

   h. Tell the set of simple effects that will provide the most direct test of this research hypothesis.

   i. Are the results of this RH: test causally interpretable? Why or why not?

RH3:   Turtles will eat less during the dark than during the light

   j. Is this a hypothesis about a main effect or an interaction?

   k. Use <, > and/or = to represent this RH: for the 2x2 box above.

   l. Are the results of this RH: test causally interpretable? Why or why not?

Here is the SPSS output

m. Use the means to compose the usual 2x2 table – be sure to label everything!

Descriptive

Dependent Variable: number of items

Time of day	Food	Mean	Std. Deviatio	N
day	Crickets	25.125	5.5661	8
	Chow	18.375	4.6885	8
	Total	21.755	7.0757	16
night	Crickets	12.250	5.0638	8
	Chow	12.375	3.8521	8
	Total	12.312	4.3469	16
Total	Crickets	18.687	8.4041	16
	Chow	15.375	4.4253	16
	Total	17.031	7.0447	32

Tests of Between-Subjects Effects

Dependent Variable: number of items eaten

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	884.344[a]	3	294.781	12.618	.000
Intercept	8482.531	1	8482.531	363.097	.000
TIMODAY	504.031	1	504.031	21.575	.000
FOOD	185.281	1	185.281	7.931	.009
TIMODAY * FOOD	195.031	1	195.031	8.348	.007
Error	654.125	28	23.362		
Total	10021.000	32			
Corrected Total	1538.469	31			

a. R Squared = .575 (Adjusted R Squared = .529)

n = _____

Compute LSDmmd _____.

n. Is there an interaction? What tells you so?
o. Indicate in the table above the simple effects that correspond with the phrasing of the interaction RH: (using <, > and/or =)
p. Does the pattern of the interaction fully, partially, or not support the RH"? Why or why not?

q. Describe the pattern of the interaction, including support/nonsupport for the RH:

r. Is there a main effect for Time of Day? What tells you so?
s. Indicate the table above the pattern of the main effect for Time of Day (using <, > and/or =)
t. Indicate the pattern of the corresponding simple effects (using <, > and/or =). Is the main effect descriptive or misleading?
u. Describe the pattern of the main effect for Time of Day, including support/nonsupport for the RH:

v. Is there a main effect for Type of food? What tells you so?
w. Indicate the table above the pattern of the main effect for Type of Food (using <, > and/or =)
x. Indicate the pattern of the corresponding simple effects (using <, > and/or =). Is the main effect descriptive or misleading?
y. Describe the pattern of the main effect for Type of Food, including support/nonsupport for the RH: