Problem Set #9: One-way and Repeated Measures ANOVA

1. Below are the results of a one-way ANOVA with three treatments. In each treatment there were 8 participants (n = 8).
   1. Fill in the missing values below (HINT: start by computing the degrees of freedom):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | SS | df | MS | F |
| Between Treatment    Within Treatment (Error)    Total | 40 |  | 4 |  |

1. The four sources of variability in a repeated measures ANOVA design are described below. Match each definition with the correct source: total variability; between treatments variability; within treatments variability; between subjects variability.
   1. The scores in the data set as a whole are relatively spread apart or relatively bunched together.
   2. The scores in treatment are relatively close to one another or relatively spread apart.
   3. The means are relatively similar to the Grand Mean or are relatively dissimilar from the Grand Mean.
   4. The scores of the participants are relatively similar to one another or are relatively different from one another.
2. If the between participants variability is relatively high, will that increase or decrease the likelihood of rejecting the null hypothesis? Explain your answer.
3. A researcher wants to examine a new social skills treatment to improve friendships in children. She recruits 6 children to participate in the treatment. The number of friends each child has is assessed before treatment begins, 3 months into treatment and 6 months into treatment. She wants to examine if time in treatment influences number of friendships. The data are presented in the table below. Conduct a repeated measures ANOVA by hand to determine if there is a significant effect of duration of treatment on unruly behavior (set alpha = .05). You do not have to run post-hoc tests.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Before | 3 month | 6 months | P |
| Billy | 0 | 4 | 2 |  |
| Bobby | 1 | 5 | 6 |  |
| Bubby | 3 | 3 | 3 |  |
| Benny | 0 | 1 | 5 |  |
| Barry | 0 | 2 | 4 |  |
| Buster | 2 | 3 | 4 |  |
| Mean |  |  |  |  |
| T |  |  |  |  |
| ∑ (X2) |  |  |  |  |