Problem Set #8: One-way ANOVA

1. Researchers conduct an experiment to examine if physical contact reduces perceived pain. Subjects are exposed to a repeated mild shock and are randomly assigned to one of three conditions. In one condition they are alone while the shock is administered (Alone condition). In a second condition a stranger is present in the room while the shock is administered (Physical presence condition). In a third condition, a stranger is present in the room and holds the participant’s hand while the shock is administered (Physical contact condition). Participants rate their subjective feeling of pain on a 1 to 10 scale with higher scores indicating more perceived pain. Conduct a one-way ANOVA to determine if condition influences perceived pain (set alpha to .05). Be sure to report the results of your F-test correctly and to conduct post-hoc tests if warranted; note that the critical value for q for this problem is 3.95. Based on the results of your test, what recommendation would we make to hospital staff working with patients undergoing painful procedures? Why?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Alone | | Physical Presence | | Physical Contact | |
| x | x2 | x | x2 | x | x2 |
| 10 |  | 7 |  | 4 |  |
| 8 |  | 8 |  | 5 |  |
| 9 |  | 7 |  | 3 |  |
| 6 |  | 9 |  | 5 |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

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. A psychologist was interested in how children learn. She conducted an experiment in which 2 year-old children learned where an object was hidden by watching a video. The children either watched the video passively (we’ll call this the Watch group), or had the opportunity to advance the video by touching the screen anywhere (General Touch group) or in specific, ‘logical’ locations; that is a location that made sense given the way the video had played out up to that point (Specific touch). Learning was assessed by determining whether the children could find the object shown in the video in a real-world version of the video scene; there were 15 trials. Twenty children participated in each group. The data were analyzed and the group means and ANOVA table appear below. Again, the dependent measure was the number of times the child found the hidden object, so higher scores indicate better learning. Interpret the results and make a conclusion about the ANOVA test; conduct post-hoc tests if appropriate (critical value for q = 3.40). Provide a final write-up of the results using proper statistical notation and report of the means. Set alpha to .05

|  |  |  |
| --- | --- | --- |
| General Touch Mean (n = 20) | Watch Group (n = 20) | Specific Touch Mean (n = 20) |
| 8.70 | 5.90 | 11.20 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | SS | df | MS | F | p |
| Between Treatment    Within Treatment (Error)    Total | 281.20  273.20  554.40 | 2  57  59 | 140.60  4.793 | 29.34 | .001 |