Two-way Between Subjects ANOVA Homework

The purpose of this study was to consider the effects of scent markings from other animals on the exploratory behavior of kangaroo rats. It is known that many rodents depend on scent markings in the wild to establish territory and to identify friend or foe. Kangaroo rats are ideally suited for study, because they spend a great deal of time depositing smelly secretions on objects in their environment, and seem to be greatly influenced by odors or smells in their everyday behavior. The general plan of the experiment would be to place a rat in an artificial burrow system made of Plexiglas tubing and measure the amount of time the rat spends exploring the new surroundings. Kangaroo rats were allowed to explore an artificial burrow in which different scents had been placed, including a control condition (no scent introduced), an unfamiliar condition (in which the odor of a stranger was introduced), and familiar condition (in which the odor from a kangaroo rat that had successfully defeated the subject in a territorial battle). The other independent variable was age of the kangaroo rat: young versus adult. Seven kangaroo rats were run in each of the two conditions of the 3 X 2 between subjects experiment. Rats were given a total of 60 minutes to explore the environment.

The question of interest was whether the two age groups would show the same or different amounts of time engaged in exploratory behavior in the three scent conditions. The authors wanted to test two competing hypotheses: (1) *The hard-wired hypothesis.* One possibility is that rats have evolutionarily adapted an avoidance strategy, and will therefore engage in limited exploration when they expect to encounter another rat (i.e., in the presence of another rat’s scent). If this hypothesis is true, then both young and old rats should engage in limited exploration in the scent conditions than the control conditions. (2) *The learned hypothesis.* If rats learn to avoid potentially hostile rats by the use of scent, then younger rats should be relatively insensitive to scent condition in their exploration behavior, but older rats should be more cautious in the presence of the scent of another rat, and especially the scent of another rat who had previously defeated them in a territorial battle. The data to test these hypotheses were as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Young Rats | | | Adult Rats | | |
| *Control*  *(No sent)* | *Unfamiliar Odor* | *Familiar*  *Odor* | *Control*  *(No sent)* | *Unfamiliar Odor* | *Familiar*  *Odor* |
| 46 | 41 | 34 | 33 | 32 | 6 |
| 40 | 44 | 32 | 31 | 19 | 0 |
| 27 | 31 | 48 | 33 | 36 | 0 |
| 34 | 29 | 37 | 38 | 20 | 10 |
| 39 | 47 | 45 | 47 | 20 | 8 |
| 37 | 28 | 48 | 42 | 22 | 12 |
| 26 | 43 | 30 | 37 | 24 | 5 |

Write-up your conclusions adhering to the basics of APA-style. Short intro, methods, and results (like in the paper example).

* 1. Introduction: Remind the reader what the study’s goals or central questions are in words before plunging into the details of analysis.
  2. Tell the reader what kind of analysis was conducted: be sure to implicitly identify both the independent and dependent variables when describing analyses.
  3. Method: In the methods section carefully explain which follow up tests you will be doing:
     + 1. State which you are doing (planned, unplanned, simple effects, etc) and for which factors (main effects, interaction).
          1. Justify if you are correcting alpha/pvalue in anyway (you are free to correct or not but you must defend your choice).
       2. Don’t forget to reference all r packages you are using and version numbers.
  4. Present the statistical results, using full sentences, reporting the test statistic, and using the correct formatting for an F-test. (*Effect size required for Main effects and interactions*)
  5. Report the follow up tests (*Effect sizes optional if struggle with the code*)
  6. Explain in plain english the direction of differences between significantly different groups --in other words, do not merely use the word “different,” instead be sure to use words such as “was higher than,” or “was lower than,” “less,” or “more”.
  7. Single-space *[APA is double, lets save the trees].*
  8. Create a figure and reference it in text.

1. Give us the complete R script you used to generate the results.