# **Two-factor / Two-way ANOVA**

*Use this scenario for Q1 – Q7.*

A researcher was studying the influence of two different types of consequences on how quickly 60 rats learned to run a maze. The rats differed in their ages: 20 rats were 3 months old, and 20 were 18 months old. For each age group, he randomly assigned half the rats to the reinforcement condition, and half to the punishment condition. For each rat, he measured the # of trials they took to learn the maze.

1. How many factors are there?
2. What are the factors?

3. What are the conditions for each factor?

4. How many outcomes/DVs are there, and what are they (what is it)?

1. Which type of factorial design is used?
2. How many cells are in the design?
3. Finally, describe the study design in words using APA style.
4. Testing for the main effect of factor A is essentially testing:
5. whether or not there are differences in the mean scores across conditions of factor A (A1, A2).
6. whether or not there are differences in the mean scores across conditions of both factors.
7. whether or not factor A > factor B.
8. whether or not the means of factor A are equal to the means of factor B.
9. A between-subjects study by Lepper, Greene, and Nisbett had nursery school children color with Magic Markers. Some children expected to be rewarded and some did not expect to be rewarded. In addition, half the children actually received a reward and half did not. Afterward, the children were tested for their interest in coloring with Magic Markers, by measuring how long they played with the markers. How would you describe the design of this study using APA style?
10. The study used a 2 (interest in coloring: high vs. low) x 2 (expectations for reward: yes vs. no) x 2 (received reward: yes vs. no) factorial design.
11. The study used a 2 (expectations of reward: yes vs. no) x 2 (actually received reward: yes vs. no) factorial design.
12. The study used a 2 (interest in coloring with Magic Markers: high vs. low) x 2 (reward for coloring: received vs. didn’t receive) factorial design.
13. The study used a 4-cell design (2-expectations x 2-actual reward).
14. All of these are ways of stating the *interaction* tested in the study described in Q9 **except** for:
15. The effect of receiving a reward for coloring, on interest in coloring, depends on whether children expect a reward.
16. There is an interaction between expectations about rewards and whether or not children actually receive a reward on their interest in coloring.
17. Differences in interest in coloring produced by whether or not children receive a reward depends on whether or not they expected a reward in the first place.
18. The effect of expectations on whether a child receives a reward depends on how interested they are in coloring.

KEY

1. Two factors
2. Age of rat and type of consequence
3. Age of rat has 2 conditions – 3 mo, 18 mo /// Type of consq has 2 conditions: reinforcement and punishment

4. One DV - # trials it took to learn maze

5. 2 x 2

6. 4 cells

7. This study used a 2 (type of consequence: reinforcement vs. punishment) x 2 (age of rat: 3 months old vs. 18 months old) factorial design.

8. A

9. B

10. D . Statement D could be corrected in the following way:

The effect of expectations **(factor A)** on ***interest in coloring (DV)*** depends on how ***whether or not children actually receive a reward for coloring (factor B)***.