Practice MC: ANSWERS

1. In an experiment of the effects of running on stress levels, one group of participants is testing after running on a treadmill for 20 minutes. A week later, the same group of participants is tested after resting on a bed for 30 minutes. This is an example of a _____ design.

a. Single subjects
b. Between subjects
c. Within subjects
d. Matched groups

2. A between subjects experiment comparing 4 treatment conditions produces 20 scores in each treatment condition. How many scores were obtained for each participant?

a. 1
b. 4
c. 20
d. 80

3. If a between subjects experiment produces 50 scores in treatment 1, and 50 scores in treatment 2, then the experiment must have had

a. 50 participants
b. 100 participants
c. 25 participants
d. 200 participants

4. A major concern in a between subjects design is that:

a. Practice may affect individuals' scores
b. Fatigue may affect individuals' scores
c. The different groups may not be as similar as possible
d. Each treatment is administered to only 1 group of participants

5. A researcher is conducting an experiment comparing 3 treatment conditions. If the researcher uses a between-subjects design, there will be ___ score(s) for each participant, but with a within-subjects design, there will be ____ score(s) for each participant.

a. 1, 1
b. 1, 3
c. 3, 1
d. 3, 3

6. In a within subjects experiment, individuals may have extreme scores in the first treatment condition and then have less extreme scores in the second treatment condition even when there is no real difference between the two treatments. In this case, the change in scores is due to:

a. History effects
b. Instrumentation
c. Maturation
d. Regression toward the mean

7. In a within subjects design, the term "participant attrition" refers to the possibility that

a. The scores may differ from one treatment to another because of outside events
b. The scores may differ from one treatment to another because of changes in the measuring instrument
c. The scores may differ from one treatment to another because the participants gain experience in each treatment
d. Some individuals in the study may leave without completing all of the treatment conditions

8. The appropriate statistical test for a within-subjects design with 2 levels of the IV and a ratio or interval scale DV is

a. Independent sample t-test
b. Chi-square test
c. One-way ANOVA
d. Dependent sample t test

9. Although non-experimental and quasi experimental designs resemble true experiments, they contain _____ and cannot _____

a. Threats to internal validity; generalize to other situations
b. Threats to external validity; generalize to other situations
c. Threats to internal validity; establish causal relationships
d. Threats to external validity; establish causal relationships

10. Differential design is classified as:

a. Correlation
b. Experimental
c. Quasi-experimental
d. Non-experimental

11. A one group pretest-posttest design (O X O) design is considered:

a. An experiment
b. A non-experimental design
c. A non-equivalent groups quasi-experimental design
d. A time series quasi-experimental design

12. A problem with longitudinal designs is that results may be distorted by

a. Cohort effects
b. Participant attrition
c. Differential history effects
d. Assignment bias

13. How many independent variables are there in a 2 X 2 X 2 X 2 factorial design

a. 2
b. 4
c. 16
d. 8

14. A prison psychologist measures depression for a group of prisoners each day for 1 week before and 1 week after the psychologist begins a series of group therapy sessions. This is an example of a(n) _____ design

a. Time series
b. Interrupted time series (would accept a or b here)
c. Equivalent time samples
d. One-group pretest-posttest design

15. A research study comparing problem solving ability for girls versus boys under three different levels of temperature could be described as a _____.

a. 2 X 2 design
b. 2 X 3 design
c. 2 X 2 X 3 design
d. None of the above

15. The following data show the means for 4 treatment conditions as well as the overall means for the columns and rows. For these data, what numbers are compared to assess the main effect of Factor A?

	A1	A2	
B1	M = 20	M = 60	M = 40
B2	M = 30	M = 70	M = 50
	M = 25	M = 65	

a. 30; 70
b. 20; 30
c. 40; 50
d. 25; 65

16. The following data represent the means for each treatment condition in a 2-factor experiment with 2 levels of each factor. What pattern of results is shown in the data?

	A1	A2
B1	M = 20	M = 40

B2	M = 30	M = 50

a. Main effects for both factors and an interaction
b. Main effects for both factors and no interaction
c. Main effect for Factor A, no main effect for Factor B and an interaction
d. Main effect for Factor A, no main effect for Factor B, and no interaction

17. A factorial study that measures depression before and after treatment for a treatment group and a control group is an example of a _____

a. Between subjects design
b. Within-subjects design
c. Repeated measures design
d. Mixed design

18. A stable level within a phase is defined as

a. a set of observations that cluster around a horizontal line when graphed
b. a set of observations that cluster around a line sloping up to the right when graphed
c. a set of observations that cluster around a line sloping down to the right when graphed
d. a set of observations that cluster around a vertical line when graphed

19. Typically, the results from a single-subject research study are evaluated using

a. descriptive statistics such as the mean and standard deviation
b. inferential statistics such as those used in hypothesis testing
c. Visual inspection of a graph
d. Consensus among at least three researchers

20. In the ABAB design, a major ethical concern is about

a. Waiting for a series of initial baseline observations before administering treatment
b. Administering the treatment immediately after the initial baseline phase
c. Removing the treatment after it has already shown to be effective
d. Reintroducing the treatment after it has already shown to be effective

Short answer:

Describe what a placebo control condition is. Why would you use one?

A placebo condition is a type of control condition used to make comparisons with some experimental condition. Sometimes, the experimental method itself can become a confounding variable such that it is unclear whether the IV affected change in the DV or if it was the experimental method- this is why you need a placebo control group. For example, if one was interested in the effects of energy drink on memory, any effect observed in the DV could be due to the energy drink itself, or could be due to the

fact that participants drank something (and it doesn't actually matter *what* they drank). Here the experimental method is drinking, and it would be a confounding variable. An adequate placebo condition is necessary and would involve participants (in the placebo control group) consuming a drink that tastes similar to the energy drink but lacks the critical ingredient (caffeine) that makes it an "energy" drink. If results between the 2 groups differ, then it **must** be due the "energy" part of the drink, and cannot be due the mere consumption of a drink (because both groups drank something).

Your research buddy just finished an experiment comparing the effects of caffeinated drinks on memory. Your friend used a within-subjects design and had all participants complete a memory task after taking Redbull (caffeine), and then 1 week later, had the same participants complete a memory test after consuming a placebo drink (no caffeine). Results showed that participants' memory was improved in the placebo condition relative to the caffeine condition.

What is the independent variable?

Drink type – **if you wrote "Redbull" – you'd get .5/1**

What is the dependent variable?

Memory

Do you have any concerns about this study? If yes, what?

YES!, all participants experienced the levels of the IV in the exact same order. Therefore it is possible that results in the placebo condition improved because participants had practice, and this improvement in memory score has nothing to do with caffeine vs. placebo

Based on those concerns, what would you recommend to your friend?

If my friend wants to keep this as a within subjects design, then it is critical that the levels of the IV be **counterbalanced** across participants. **This means that for half the participants, they experience the caffeine condition first and the placebo condition second. For the other half of participants, they experience the placebo condition first and then the caffeine condition second. ** *notice how I go on to explain what counterbalancing means***

Alternatively, my friend could use a between subjects design which eliminates the problem of these time related effects. This would mean that participants are randomly assigned to either the caffeine condition OR the placebo condition. Scores between the 2 groups could then be compared.

The administrators at Weight Watchers want to increase membership sales. They want to design an advertising campaign that will appeal to both men and women. They have two ideas in mind, one campaign that emphasizes feeling good and another that emphasizes looking good. You have been recruited to design an experiment to shed light on the matter.

What is the correct name of this factorial experiment?

Mixed experimental and subject

Identify the factors and levels present in the experiment.

Factor A: Gender (2 levels; male, female)

Factor B: Campaign type (2 levels: feeling good; looking good)

Identify the DV.

Membership sales

Identify the main effects and interactions you will be examining in this study.

Main effect of Factor A (Gender). Regardless of campaign type, will membership sales differ between males and females?

Main effect of Factor B (campaign type): Regardless of gender, will the different campaign types lead to differences in membership sales? (Will the looking good campaign lead to more sales than the feeling good campaign?)

Interaction: Will the effect of campaign type (feeling good; looking good) on membership sales depend on gender? (Will gender lead to bigger differences in membership sales for one campaign type compared to the other?)

Sheila runs a dating agency for male executives. She's interested finding out what type of client females are more willing to date. She keeps count of how many dates each of the men go on. The men are categorized according to their age (young / mature), the type of car they drive (sporty / luxury) and what they do on a first date (coffee, movie, or dinner). You have been recruited to design an experiment to shed light on the matter.

What is the correct name of this factorial experiment?

Mixed experimental and subject (if you said quasi experimental, that would be OK too – because all IVs are quasi-independent

Identify the factors and levels present in the experiment.

Factor A: Age (2 levels: young; old)
Factor B Car (2 levels: luxury; sporty)
Factor C: Date activity (3 levels: coffee; movie; dinner)

Identify the DV

# of dates

Identify the main effects and interactions you will be examining in this study.

Main effect of Factor A: Regardless of the type of car they drive, or what they do on the first date, is there a difference in the number of dates between young and old men? (do young men go on more dates than old men? or is the reverse true?)

Main effect of Factor B: Regardless of their age, or what they do on the first date, is there a difference in the number of dates between mean who drive sporty cars compared to men you drive luxury cars? (do sporty car men go on more dates than luxury car men? or is the reverse true?)

Main effect of Factor C: Regardless of the type of car they drive, or their age, is there a difference in the number of dates among men who go for coffee, go to a movie, or go to dinner for a first date?

Does the number of dates depend on some combination of those 3 factors? For example, is it that young men, you drive sporty cars, and who go for coffee the ones that get the most dates? Or is it young men you drive luxury cars and go to dinner the ones that get the most dates?

A researcher is interested in driving ability in the elderly compared to young adults and whether or not driving ability changes according to time of day. To test this research question, 20 young adults (aged 30 to 40) completed a simulated driving test under 2 conditions; light (to mimic daytime) and dark (to mimic nighttime). Importantly the order (day, night) was counterbalanced. A total of 20 elderly adults (aged 70 to 80) completed the same task; that is a simulated driving test under 2 conditions; light (to mimic daytime) and dark (to mimic nighttime). The order (day, night) was counterbalanced. In the driving test, participants drive along the country roads. The researcher measured reaction time to press on the brakes after an animal suddenly appears on the road in front of the car.

What is the correct name of this factorial experiment?

Mixed factorial

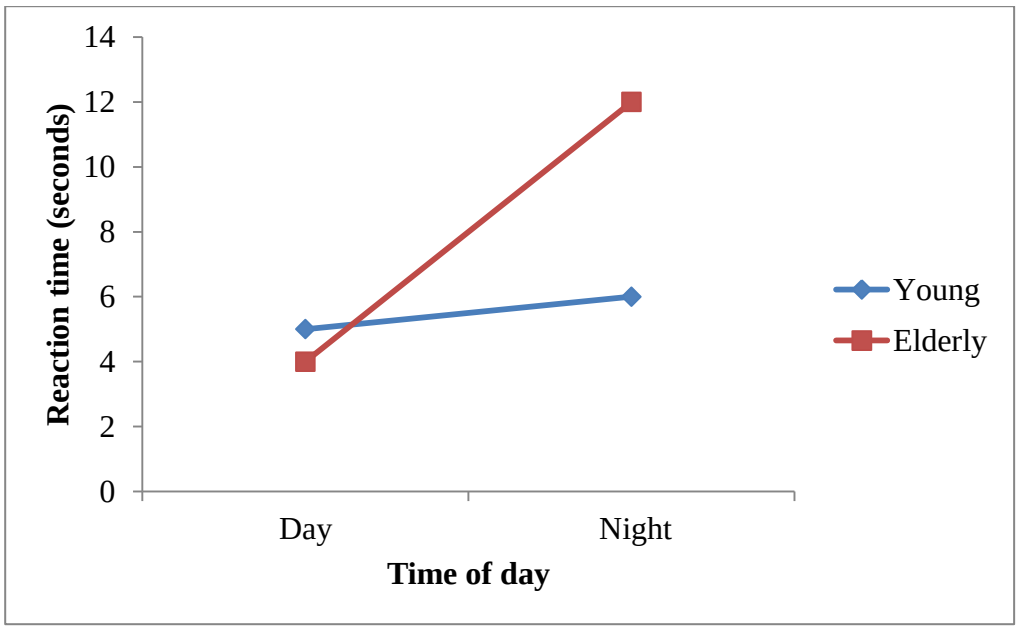
Identify the factors and levels present in the experiment.

Factor A: Age (2 levels; young, elderly)

Factor B: time of day (2 levels; daytime; nighttime)

Identify the DV

Reaction time



Here is the data. What effects do you see? What recommendations would you make based on these results?

It seems like you have 2 main effects, and there is definitely an interaction. The first main effect is that on average, reaction time is slower at night compared to day (regardless of whether one is young or old). The second main effect is that on average reaction time is slower for the elderly compared to younger adults (regardless of the time of day). The interaction shows that the effect of age on reaction time is much different at night than at day. Specifically when it's daytime, there isn't much difference in reaction time between elderly and young adults. But at nighttime, there is a big difference such that the elderly are much slower to react than are young adults.

Based on these results, I would recommend that elderly not drive too much at night.