Question 1. The scent of a good night’s sleep.

A recent finding demonstrated that the scent of one’s romantic partner can improve sleep (Hofer & Chen, 2020). Inspired by this study, researchers conducted an experiment in which participants were randomly assigned to sleep with a shirt with either their partner’s scent or a stranger’s scent in either a familiar room or a new room. After sleeping, participants

rated their sleep quality on a 1 (poorly rested) to 7 (well rested) scale.

1. This is a factorial design. Describe the two levels of each factor.
2. What is the dependent variable in this study? What is another operational definition of a way to measure the underlying construct that could be used?
3. For this type of study, we might worry that some participants have better or longer relationships with their partners than others, which might affect the efficacy of the scent manipulation. Since participants were randomly assigned to different conditions (partner vs. stranger scents), does this confound the experiment? Why or why not?
4. Simulated data are shown in the graph and ANOVA output table from R below to be used for this question and (e). Describe the two main effects visible on the graph and support the directional statements with the inferential statistics in APA format.

Chart

Description automatically generated with medium confidence

Table

Description automatically generated

1. Describe the interaction from the above ANOVA and support your description with the appropriate statistics from the output table in APA format.
2. Implementing the variable “sleep in a familiar room versus sleep in a novel room” is actually a challenging procedure to carry out in a laboratory environment. Suggest how a researcher could manipulate this practically and identify 2 additional extraneous variables (other than familiarity with the room) that might be difficult or impossible to fully control.
3. After looking at the data, the researcher realized that some participants in the stranger scent condition (and only this condition) reported that they had sleep apnea, a sleep disorder in which breathing stops and starts. Explain whether this poses a validity threat to the results. If it does, explain the alternate hypothesis.

Question 2. Minding your own business.

Studies examining the impact of mindfulness on prosocial behavior have produced inconsistent results. Mindfulness is a process of nonjudgmental monitoring of moment-by-moment cognition, emotion, perception, and sensation without fixation on thoughts of past and future. In some cases, an intervention to enhance mindfulness leads to more generous and cooperative behavior (prosocial) but other studies have found the opposite result or found no effect at all. As an example, a way to measure prosocial behavior in a laboratory environment is to tell participants about a charity that offers assistance to rural poor and homeless people and then give them an opportunity to participate in a task involving stuffing envelopes to mail donations requests to support the charity. The number of envelopes the participants stuffed is a quantitative measure of prosocial behavior (more work for the charity is more generous behavior).

1. A study using a simple mindfulness intervention was run comparing the intervention to a control task and then measuring prosocial behavior as above. No difference between groups was found. What statistical test was used to find this null result? Can we conclude the intervention has no effect? Explain why or why not.
2. Researchers attempting to better understand this topic (Poulin et al. 2021) used a factorial design that combined a mindfulness intervention with priming participants to think in either an independent way (about themselves) or an interdependent way (about their position in their community). The factorial intervention study found a reliable crossover interaction such that the mindfulness intervention increased prosocial behavior in participants primed for interdependence but decreased prosocial behavior in independent-primed participants. Fill in a score for the missing number of envelopes stuffed on the following table with a number consistent with the described result.

|  |  |  |
| --- | --- | --- |
|  | Mindfulness intervention | No intervention |
| Independent prime | \_\_\_\_\_\_\_\_\_\_\_ | 38 |
| Interdependent prime | 44 | 37 |

1. A friend comes up to you and says they are considering taking a class in mindfulness. They want to know if it will make them more likely to engage in prosocial behavior. What do you tell them?
2. Researchers following up this work decide to try a field experiment style study. They had participants come to the lab for a research study where they all received the mindfulness intervention and then either the interdependent or independent primes. On the way out of the lab (after they thought the experiment was over), they were approached by an additional experimenter posing as a representative of the charity. They were asked whether they would be willing to sign up to participate in a phone bank calling potential donors for the charity. Whether they agreed to help or not was recorded as the dependent variable for this study. What statistical test would be used to test whether the prime affected whether they engaged in the prosocial behavior?
3. For the design in (d), explain how this “field experiment” approach differs with respect to the external validity of the prosocial measure.
4. Compare the ethical issues posed by the designs in (b) and (d) and explain how these would be addressed as part of an appropriate informed consent process.

Question 3. More than meats the eye.

In a recent meta-analysis, a series of studies found that meat consumption was linked to lower anxiety (Dobersek et al., 2021) and better mental health. Inspired by this finding, researchers carried out a survey of college students asking how often they eat meat per week together with an assessment of anxiety that gives a score from 0-7, normal/no anxiety, up to 21, severe anxiety.

1. In this design, what are the constructs being studied and how are they operationalized?
2. Is this an experimental design? Why or why not?
3. What are the consequences of (b) for the internal and external validity of the study?
4. The researchers found a reliable relationship between the two variables such that as the rate of meat-eating increased, measured anxiety decreased. What statistical test would be used to assess the possible effect of the IV on the DV?
5. Can the researchers conclude that consuming meat leads to lower anxiety? Give an alternate hypothesis that does not support this conclusion but is consistent with the data described in (d).
6. Briefly outline a method to carry out an experimental design to examine the relationship between meat-eating and anxiety. Explain how your experimental approach resolves the alternate hypothesis you considered in (e). That is, explain how a finding from an experimental design rules out this alternate hypothesis.
7. Give an ethical issue specific to the design of this study you proposed in (f) that would need to be considered. What procedures might you have to incorporate into the study to minimize risk associated with this problem?

*(note: The study referenced in this question is an actual, recently published report that was widely discussed in secondary media sources as suggesting dangers of a vegetarian or vegan diet. The authors were quite upset about this and specifically raised two issues you may have mentioned in (e) but sadly, almost none of the media coverage included their clarification)*