**Instructions:** Below are the descriptions (and references) for three studies. For each, you’ll need to answer the same set of questions.

*Article 1* **Harakeh, Z., & Vollebergh, W. A. (2011). Actions Speak Louder than Words: An Experiment on the Impact of Peers Discouraging Young Adult Smoking. *European Addiction Research*, *17*(6), 316-320.**

This study investigates whether antismoking peer pressure and/or nonsmoking peers are protective factors and decrease young adults' likelihood to smoke. An **experiment** was conducted among 59 daily-smoking young adults aged 16-24 years. The **experiment** consisted of four conditions. During the session, the confederate\* and participant sat in a camper van and had to do a 30-min joint music task. The participants' smoking behavior was observed during this task. [The analysis showed] that young adults smoked fewer cigarettes in the presence of a nonsmoking model pressuring the young adult not to smoke compared to a heavy-smoking model not using any pressure. At the same time, the results indicated that the total number of cigarettes smoked did not differ significantly for nonsmoking peers verbally pressuring the young adult not to smoke compared to nonsmoking peers not verbally pressuring the young adult. Our findings indicate that the protective effect of peer influence merely lies in that the peer does not smoke. Therefore, antismoking programs and policy should focus specifically on reducing exposure to smoking peers.

\**a “confederate” is a person who is cooperating with the researchers unbeknownst to the participant.*

**Questions:**

1. What is the observational unit?

*Person (young adult)*

1. Identify the treatment (explanatory) variable, the outcome (response) variable, and their types (numerical or categorical).

*Explanatory variable: confederate type – categorical (4 options)*

*Response variable: # cigarettes smoked – numerical*

1. Is this an observational study or an experiment?

*experiment, since the explanatory variable (confederate type) was assigned.*

1. Was randomization used? If so, was it random assignment, random selection, or both?

*Unclear. It does not state whether subjects were randomly placed into treatment groups; if so, that would be random assignment. It also does not state if these subjects were randomly selected from the population.*

1. What is the population of interest? If it’s not clear, tell me what population you *think* the researchers are interested in.

*Young adults who smoke*

1. **If an experiment**, answer the following questions:   
   a) Is a placebo or other control used?

*Not really. I suppose the “nonsmoking/nonpressure” group could be considered the control (because they’re not subjecting the unit to any external forces), but it’s more correct to think about this as 4 distinct treatments.*

b) Are subject or researchers (or both) blinded?

*No blinding, because both researcher and subject are aware of the confederate type. However, the subject is naïve to the purpose of the study and doesn’t realize the confederate is part of the experiment at all.*

c) Was blocking used?

*The subjects do not appear to have been blocked.*

d) Are there ethical or practical considerations that might prohibit the use of random assignment, placebo, or blinding?

*We should be considerate of the fact that the confederate will be exposed to secondhand smoke (and possible smoking themselves), so they should already be smokers. Since the study subjects already smoke this is less of a concern for them. Practical considerations prohibit blinding, since knowledge of “treatment” is kind of the point.*

1. Are there any obvious improvements you might make to the study?

*Possibly increase sample size? Since there are only 59 subjects and 4 treatments, that means there were only ~12 subjects per treatment. Also, if the subjects were not randomly assigned to treatments, they should be.*

*Article 2* **abcnews.com (June 30, 2015). “Study Investigates Possible Link Between Citrus and Skin Cancer”. (http://abcnews.go.com/Health/study-investigates-link-citrus-skin-cancer/story?id=32133539)**

Cancer researchers are examining if eating citrus might put people more at risk for developing melanoma since researchers have long known that certain citrus juices on the surface of the skin can make skin so sensitive to light that people can end up with serious burns.

Dr. Abar Qureshi, director of dermatology at Brown University and Rhode Island Hospital, and his team wanted to know if simply eating citrus could also lead to a higher risk of sensitivity to light and as a result developing skin cancer.

To do this, researchers, in collaboration with Rhode Island Hospital and Brigham and Women’s Hospital in Boston, examined health and diet data from more than 100,000 participants for up to 26 years. All of those involved were health professionals -- participants of the ongoing Nurses' Health Study and Health Professionals Follow-Up Study.

The researchers found that those who ate the most citrus fruits or juices (about 1.6 servings of citrus per day) had a higher incidence of melanoma, up to 36 percent higher than their peers, according to the study published this week in the Journal of Clinical Oncology.

**Questions:**

1. What is the observational unit?

*Person (health professionals)*

1. Identify the treatment (explanatory) variable, the outcome (response) variable, and their types (numerical or categorical).

*Explanatory variable: amount of citrus fruit/juice consumed – numerical (servings/day)*

*Response variable: melanoma – categorical (yes/no)*

1. Is this an observational study or an experiment?

*Observational study, since nothing was assigned or imposed, and there aren’t separate treatment groups.*

1. Was randomization used? If so, was it random assignment, random selection, or both?

*Unclear. Does not state whether participants were chosen randomly.*

1. What is the population of interest? If it’s not clear, tell me what population you *think* the researchers are interested in.

*They only investigated health professionals, so it’s possible that is their population. However, I think they are attempting to make a conclusion about all American adults.*

1. **If an observational study**, answer the following questions:   
   a) Is the article making a claim of cause-and-effect? If so, do you think this claim is justified?

*Hard to say! The title of the article is pretty subdued (“study investigates possible link”) and doesn’t claim cause-and-effect. But in the second paragraph, we do see a claim of cause-and-effect: “…wanted to know if simply eating citrus could also lead to a higher risk…”*

*This claim is not justified, as this was not an experiment. There are lots of confounding variables (see below) that could explain the observed increase in melanoma, and we have no evidence that they controlled for any of these in their analysis.*

b) List one possible confounding variable, and explain why it would be confounding.

*People who live in tropical locations may eat more citrus (since citrus fruits are native to those regions) and be more likely to develop skin cancer (since the sun is stronger, there are more hours of daylight, and the weather is nicer which encourages more time outside).*

c) Are there ethical or practical considerations that might prohibit the use of a controlled experiment in this situation?

*If citrus intake really does lead to increased probability of melanoma, it would be unethical to force people to eat more citrus. (Just like it’s unethical to force people to smoke as part of an experiment, since smoking leads to increased risk of various fatal diseases.) However, since I don’t believe that citrus fruits actually cause melanoma, I don’t see any reason they couldn’t do an experiment.*

1. Are there any obvious improvements you might make to the study?

*I think an experiment is a better idea, where people in one region of the country are assigned a certain amount of citrus fruit to eat. But if an experiment is not possible, then we should try to control for potentially confounding factors (including gender, race, region, and sun exposure) as part of the statistical analysis.*

*Article 3*  **Maglia, M. et al., (2019). Combining group psychotherapy and yoga exercises improves quality of life in mental health professionals: a controlled randomized clinical trial. *Mental Illness,* 11(2).**

Graphical user interface, text, application

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**Questions:**

1. What is the observational unit?

*Mental health professionals*

1. Identify the treatment (explanatory) variable, the outcome (response) variable, and their types (numerical or categorical).

*Explanatory variable: treatment – categorical (yoga with psychotherapy vs “usual stress coping strategies”)*

*Response variable: stress perception -- ?? I don’t know how they measured this!*

1. Is this an observational study or an experiment?

*Experiment (specifically, RCT)*

1. Was randomization used?

*Yes, random assignment was used because that’s how RCTs work.*

1. What is the population of interest? If it’s not clear, tell me what population you *think* the researchers are interested in.

*Mental health professionals*

1. **If an experiment**, answer the following questions:   
   a) Is a placebo or other control used?

*No*

b) Are subject or researchers (or both) blinded?

*Yes, in that participants were “unaware of which group was the experimental one”. That is, they didn’t know what was being tested.*

c) Was blocking used?

*It does not mention any blocking in this description.*

d) Are there ethical or practical considerations that might prohibit the use of random assignment, placebo, or blinding?

*You couldn’t possibly use a placebo here, since there’s no way to trick people into thinking they’re undergoing psychotherapy or doing yoga when they’re not.*

1. Are there any obvious improvements you might make to the study?

*There’s not much detail in this description, so there are many follow-up questions: How many participants? Did they have a history with yoga or psychotherapy? How when was “stress perception” measured?*