Sample Preparatory Assignment

**Placebos and Blinding**

In the next class, you will need to be able to find the average (the mean) of a set of numbers, and identify treatment, response, and extraneous variables. You will also need to think about when it is possible to hide information about an experiment from the participants and why you might want to do so.

1) Using technology, find the means of each of the following set of numbers:

   Part A: \[8 \ 14 \ 0 \ 7 \ 1 \ 24\]

   Part B: \[24 \ 132 \ 140 \ 65 \ 7\]

   Part C: \[4 \ -3 \ -3 \ -2 \ 6 \ 1 \ -4 \ 0 \ 10\]

2) You have a group of participants who have had knee surgery.

   Part A: If you tell them, “Here’s a pill for your pain,” will they know that they took pain medication?
     a) Yes
     b) No

   Part B: If you give them a pain pill, will they know whether it was a high-strength, low-strength, or even a no-strength pill (no active medication at all is called a **placebo**)?
     a) Yes
     b) No

   Part C: Let’s say that you give the patients their pain medication and ask them to rate their pain an hour later. If you tell them whether they got the high-strength dose, the low-strength dose, or the placebo, do you think it might influence how they rate their pain level? Why do you think so?

   Part D: Do you think it is ethical to give participants medication without telling them if it is a high, low, or no dosage?
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**A placebo** is a treatment that has no active ingredients. For example, pills may be made of sugar or other inactive ingredients. Placebos are used to help control the placebo effect.

Sometimes participants in an experimental study report improvement in their symptoms even though they are not receiving any active treatment. This is known as the **placebo effect**.

Adam (in treatment group) indicated a 5-point improvement in pain level (from 10 to 5).

Betty (in control group) indicated a 2-point improvement in pain level (from 10 to 8).

However, Betty had received a placebo and so must be exhibiting the placebo effect. We must assume that 2 points of anyone’s improvement may be due to the placebo effect. Therefore, we should attribute only 3 points of Adam’s improvement to the medication.

**Blinding:** When a researcher shields a participant from knowing which experimental condition they are receiving.

**Double-blinding:** When both the participant and the evaluator is shielded from knowing which experimental condition the participant is receiving.

The following table gives average pain ratings from the patients described above. Patients were not told which medication they received.

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Pain before treatment</th>
<th>Pain after treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-strength dosage</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Low-strength dosage</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Placebo</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

Note that if the researchers only gave high-strength pain pills, they would think that the medication caused five levels of pain reduction (from an 8 rating to a 3 rating). We can see from the use of the placebo that simply getting a pill led to two levels of pain relief in that group of patients. The researcher must consider the possibility that all participants are exhibiting some degree of the placebo effect, meaning that even participants not receiving the pain reliever are reporting a decrease in pain.

Look back at the high-strength dosage group. If the placebo accounts for two levels of pain reduction, then the high-strength dose improved pain by three levels, not by five.
Sample Preparatory Assignment

3) When a researcher shields participants from knowing which treatment they are receiving, it is said to be a **blind study**. Suppose you want to conduct an experiment to compare essay scores for students participating in one of two different review courses for the SAT college admissions exam: an 8-hour course and a 40-hour course. Is it possible to blind the participants from knowing which course they took? Explain.

4) One treatment for joint inflammation is a cortisone shot. A cortisone shot usually involves injecting a steroid into the joint to reduce inflammation, along with an anesthetic to cut down on pain.¹ A researcher wants to evaluate the effectiveness of this method of cortisone treatment on reducing inflammation. Which of the following placebos would it be hardest for the patient to tell whether he or she were receiving the treatment or placebo?

a) A pill, which contained both the steroid and anesthetic.
b) A sugar pill, which contains neither the steroid nor anesthetic.
c) An injection in the joint, which contains the anesthetic, but not steroid.
d) An injection in the joint, which contains the steroid, but not the anesthetic.

Monitoring your readiness

5) To effectively plan and use your time wisely, it helps to think about what you know and do not know. How confident are you that you can:

Part A: Find the mean of a set of data?
Part B: Understand the issues involved in giving patients placebos?

If you are not confident in the above skills, you should seek help by:

- seeing your instructor before class,
- asking your instructor for on-campus resources,
- setting up a study group with classmates, or
- working with a tutor.

¹ [http://www.mayoclinic.org/tests-procedures/cortisone-shots/basics/definition/prc-20014455](http://www.mayoclinic.org/tests-procedures/cortisone-shots/basics/definition/prc-20014455)