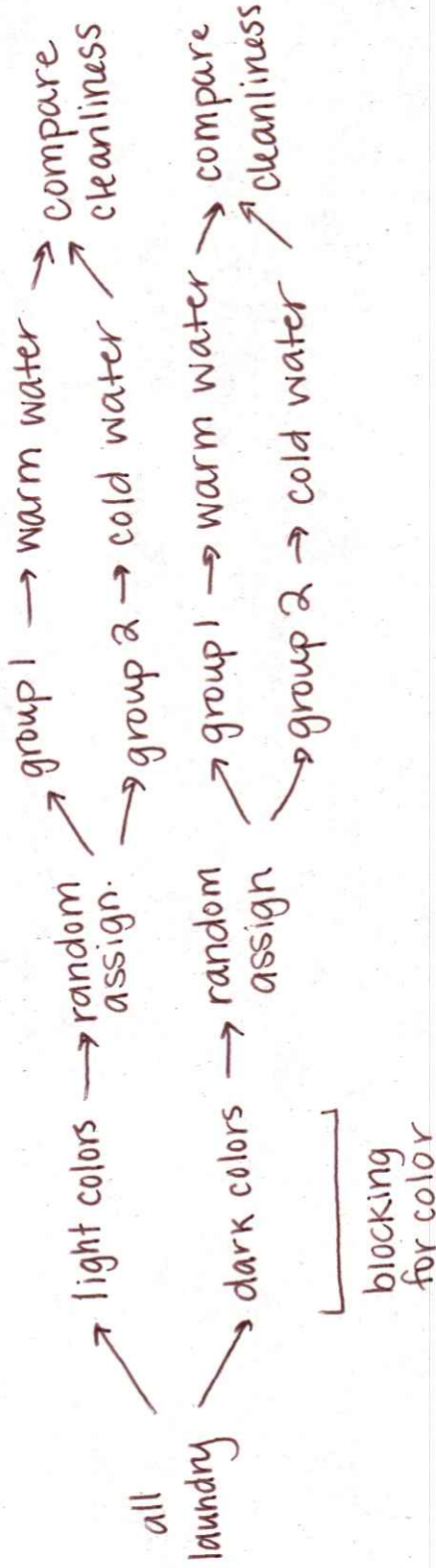


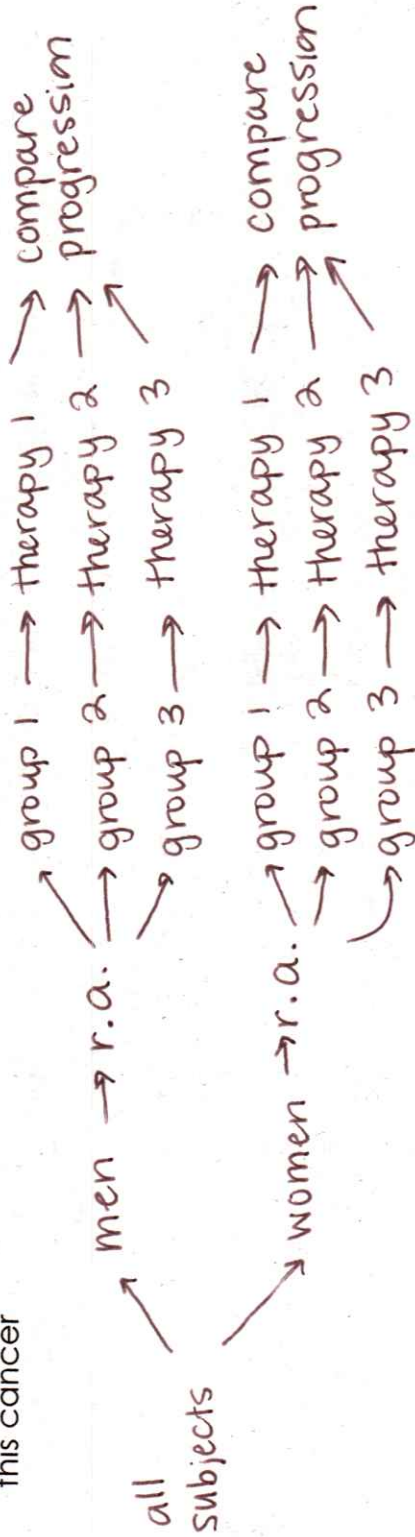
Block Design: A group of experimental units or subjects that are known before the experiment to be similar in some way that is expected to systematically affect the response to the treatments. (Similar to stratified samples for surveys)

**Control what you can, block what you can't control, and randomized the rest. ^{treatments}

1) Suppose you want to test a new hand wash detergent for clothes to see if it works better in warm or cold water. The response variable is a cleanliness rating from 0 (very dirty) to 10 (very clean).

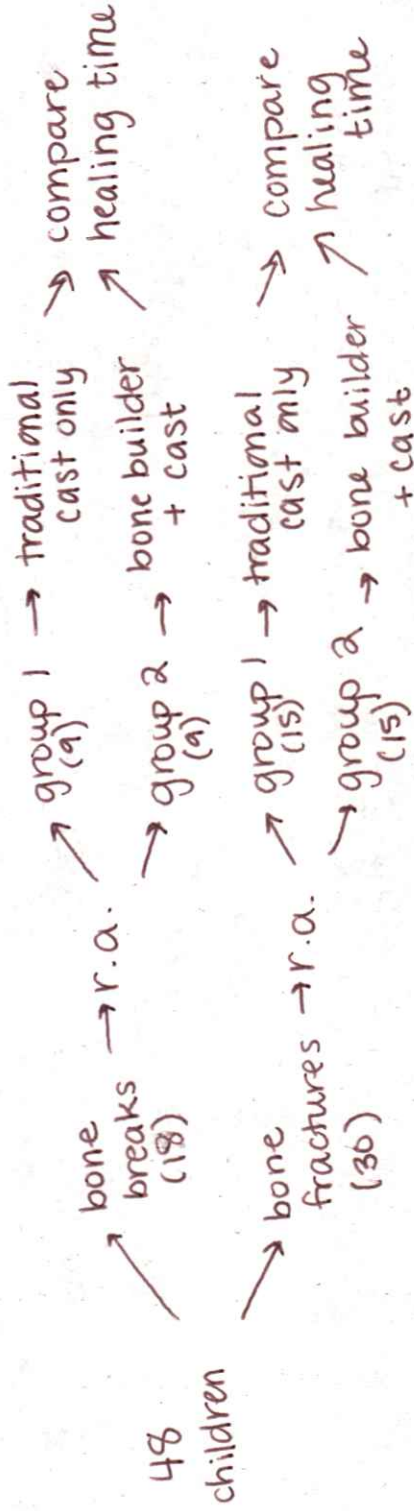


2) We want to monitor the progress of a type of cancer that differs in women and men. We want to test 3 therapies for this cancer

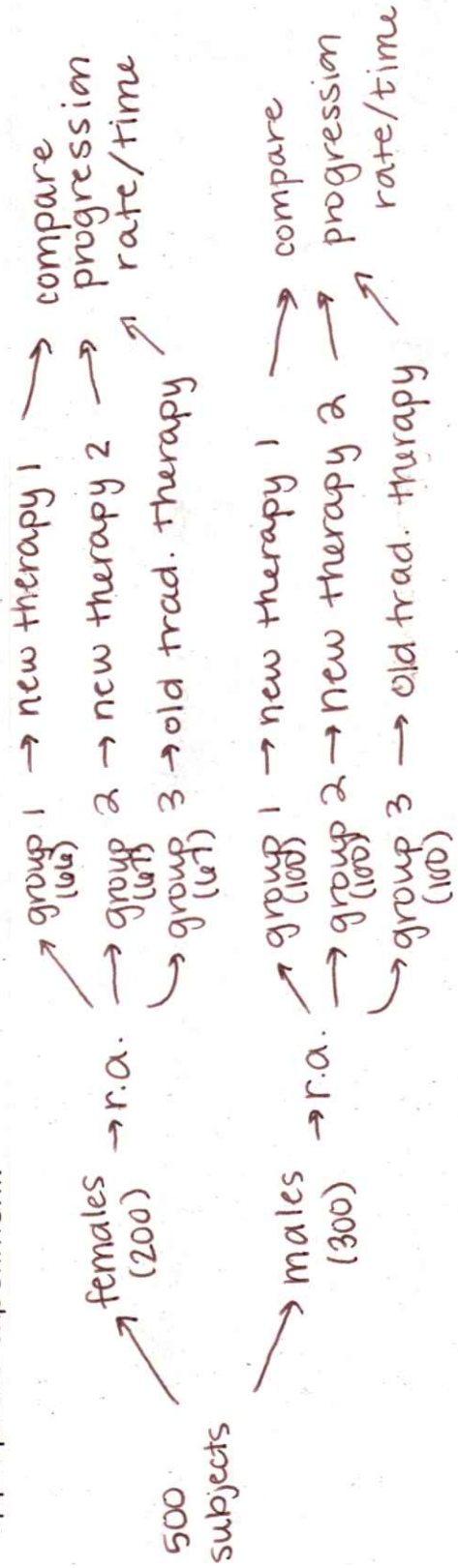


* blocking for gender *

3) Researchers believe that a new drug called Bone Builder will help bones heal after children have broken or fractured a bone. The researchers believe that Bone Builder will work differently on bone breaks than on bone fractures. Bone builder will be used in conjunction with traditional casts. To test the impact of Bone Builder on bones healing, the researchers recruit 18 children with bone breaks and 30 children with bone fractures. Design an appropriate experiment to determine if Bone Builder will help bones heal.



4) The progress of a certain disease differs in men and women. A clinical experiment was conducted to see how two different therapies might help slow down the progress of that disease. The researchers want to test to see if the therapies are more effective than the older, traditional, therapy and they also want to see if there is a difference between the two new therapies. A total of 500 subjects volunteered: 200 females and 300 males. Design an appropriate experiment.



1) Researchers want to investigate whether taking aspirin regularly reduces the risk of heart attack. Four hundred men between the ages of 50 and 84 are recruited as participants. The men are divided randomly into two groups; one group will take aspirin, and the other group will take a placebo. Each man takes one pill each day for three years, but he does not know whether he is taking aspirin or the placebo. At the end of the study, researchers count the number of men in each group who have had heart attacks. → blinded

Identify the:

population: all men ages 50-84 → sample
subjects: 400 men ages 50-84

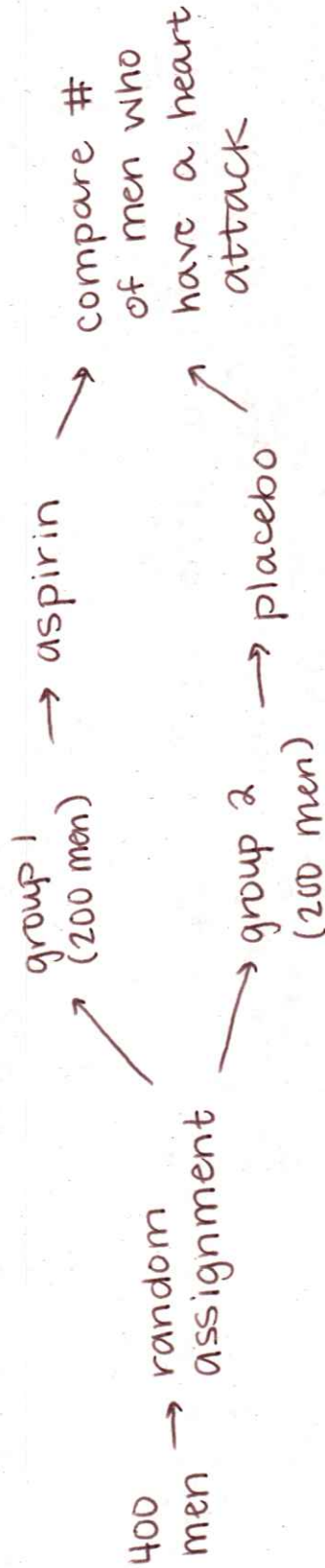
explanatory variable(s): pill taken (general) response variable: # of men with heart attacks

treatment(s): aspirin, placebo (specific)
(whether or not they had a heart attack)

What type of experiment would be best to use?

comparative randomized experiment

Create a diagram to explain how this experiment could be carried out?



2) An educational software company wants to compare the effectiveness of its computer animation for teaching biology with that of a textbook presentation. The company gives a biology pretest to each of a group of high school juniors, and then divides them into two groups. One group uses the animation, and the other studies the text. The company retests all students and compares the increase in biology test scores in the two groups. Is this an example of an observational study or an experiment? Explain.

an experiment → the way that they study (animation versus text) is the explanatory variable and one of two treatments is being imposed on the students

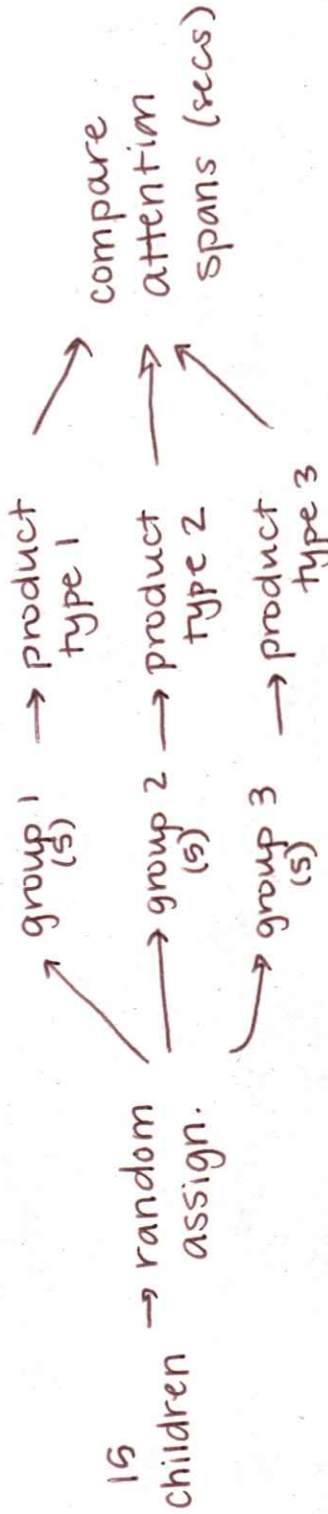
3) A food scientist has developed a new type of corn that is to yield greater amounts of corn for harvest. Some factors involved in growing corn are the amount of water (only rain or watered in the morning daily); the amount of sun (full or partial); and if pesticide was used (used or not used). You have 120 plants to put into a field for the experiment. Design an appropriate experiment. **SKIP FOR NOW!**

4) In marketing children's products, it's extremely important to produce television commercials that hold the attention of the children who view them. A psychology hired by a marketing research firm wants to determine whether differences in attention span exist among advertisements for different types of products. Fifteen children under 10 years of age are randomly asked to watch one 60-second commercial for one of three types of products, and their attention spans are measured in seconds.

What type of experiment would be best to use?

comparative randomized experiment

Design the experiment.



5) Upon reconsidering the above problem, the psychology decides that the age of the child may affect the attention span. Consequently, the psychologist randomly assigns fifteen 10-year-olds, fifteen 8-year-olds, fifteen 6-year-olds, and fifteen 4-year-olds to watch one of the commercials, and their attention spans are measured.

What type of experiment would be best to use?

block design

Design the experiment.

