YMS3E: CHAPTER "F" NAME:_____

CASE CLOSED

Can Magnets Help Reduce Pain?

Review the information in the magnets and pain relief Case Study (page 3).
Answer each of the following questions in complete sentences.
Be sure to communicate clearly enough for any of your classmates to understand what you are saying.

I. DATA ANALYSIS

a. Answer the key questions: who, what, why, when, where, how, and by whom?

b. Construct separate dotplots of the pain ratings for the individuals in the active and inactive magnet groups. Draw the plots one above the other on the same scale.

c. Describe what you see in the graphs.

d. Calculate the mean pain rating for each group. Calculate the difference between the means.

II. PRODUCING DATA

a. Were these available data or new data produced to answer a current question?

b. Is the design of the study an experiment, a survey, or an observational study? Justify your answer.

c. Why did the researchers let chance decide whether the patient received an active or inactive magnet?

d. Would it matter if the patients or doctors knew which type of magnet they had?

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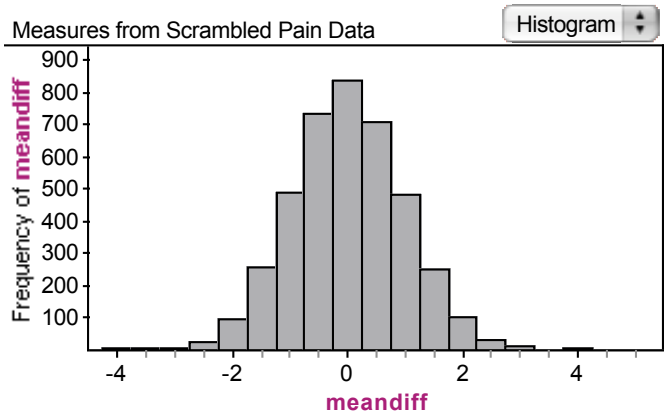
Suppose that active magnets don't really reduce pain. Then each patient should report the same final pain level regardless of whether he or she is assigned to the active or inactive magnet group. If the active and inactive magnets are *equally* effective, we should not observe a very large difference in the mean pain ratings of the two groups. Is the difference you calculated in Question 1(d) large or small? Before you answer, consider Figure P7 which displays the results of a sampling simulation. The distribution represents the mean differences we'd expect to see in repeated sampling, assuming active and inactive magnets are *equally* effective.

Figure P7:



III. PROBABILITY

a. Use the graph to estimate what percent of the time the difference in the groups' mean pain ratings is greater than 0. Explain your method.

b. Based on the graph, how likely is it that the difference in mean pain ratings is greater than the one observed in the study (diff=4.05) if active magnets *don't relieve pain*?

IV. INFERENCE

a. What would you estimate is the difference in mean pain relief when using active versus inactive magnets? Why?

b. If you were testing the claim that the active magnets did not help reduce pain any better than inactive magnets, what would you conclude? Explain.