



AP[®] Statistics 2002 Sample Student Responses Form B

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3. A preliminary study conducted at a medical center in St. Louis has shown that treatment with small, low-intensity magnets reduces the self-reported level of pain in polio patients. During each session, a patient rested on an examining table in the doctor's office while the magnets, embedded in soft pads, were strapped to the body at the site of pain. Sessions continued for several weeks, after which pain reduction was measured.

A new study is being designed to investigate whether magnets also reduce pain in patients suffering from herniated disks in the lower back. One hundred male patients are available for the new study.

- (a) Describe an appropriate design for the new study. Your discussion should briefly address treatments used, methods of treatment assignment, and what variables would be measured. Do not describe how the data would be analyzed.

For this new study, you should first randomly assign your 100 subjects to either a control or experimental group. You could do this by numbering each subject and using a random number table to pick 50 subjects to assign to either group. The control group will not receive any treatment, while the experimental group will receive the magnets, embedded in soft pads, strapped to the body at the site of pain. The control group, however, should receive a placebo by having empty soft pads strapped to the body at the site of pain. The independent variable is whether the subjects received the magnet treatment, and the dependent variable, which is the variable that is measured, is the reduction of the self-reported level of pain in the subjects. To reduce any bias, this should be a double-blind study, where neither the subjects or administrators know whether treatment is being given.

- (b) Would you modify the design above if, instead of 100 male patients, there were 50 male and 50 female patients available for the study? If so, how would you modify your design? If not, why not?

Yes, the design should be modified. Because gender might be a confounding variable, I would use a blocked design. With this new design, female and male results would not be compared, but would instead call for two separate experiments. You would randomly assign 25 males to a control group and 25 males to an experimental group. You would also randomly assign 25 females to a separate control group and 25 females to a separate experimental group. You would then continue the experiment, treating females and males as separate experiments.

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- 1) The patients should be randomly divided into two groups, 50 people in each.
- 2) One group should receive the magnetic treatment. ^{This is} treatment ~~or~~ During the session, the magnets are strapped to the body.
- 3) The other group receives 'fake' treatment. ^{This is control group} During the session, not the magnets, but just small iron tiles are strapped to the body of the patient.
- 4) After several weeks the pain reduction is to be measured in both groups.

- (b) Would you modify the design above if, instead of 100 male patients, there were 50 male and 50 female patients available for the study? If so, how would you modify your design? If not, why not?

In this case, the number of women in both treatment and control groups should be the same:

Group	No. of Men	No. of Women	Total
Treatment	25	25	50
Control	25	25	50
Total	50	50	100

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