After conducting an experiment, we must consider whether the differences we observed are about as big as we might get just from the randomization alone, or whether they are bigger than that. If we decide that they are bigger, we’ll attribute the differences to the treatments. In that case, we say the differences are statistically significant.

**Blocking** - when we group similar individuals together and then randomize within each group, we can remove much of the variability due to the difference among the group.

Ex: The progress of a type of cancer differs in men and women. A clinical experiment to compare three therapies for this cancer therefore treats gender as a blocking variable. Create a flowchart.

*Diagram of flowchart showing blocking.*

**About CHANTIX**

CHANTIX is a non-nicotine pill. CHANTIX is a non-nicotine prescription medication specifically developed to help adults 18 and over quit smoking. Over 6 million people in the U.S. have already been prescribed CHANTIX.

How is CHANTIX different from other smoking cessation products?

CHANTIX does not contain nicotine. It works in two ways: it targets nicotine receptors in the brain; attaches to them; and blocks nicotine from reaching them. It is believed that CHANTIX also activates these receptors, causing a reduced release of dopamine compared to nicotine.

It’s recommended that you begin your CHANTIX treatment a week before you stop smoking completely. This gives CHANTIX a chance to build up in your body. You may smoke during the first week of your CHANTIX treatment, but you should stop smoking completely on Day 8 of your treatment.

*Diagram showing CHANTIX usage instructions.*
**LIPITOR**

*High Cholesterol and Heart Disease*

**Benefits of LIPITOR**

*LIPITOR lowers cholesterol*

Along with diet and exercise, LIPITOR is known to:

- Lower LDL ("bad") cholesterol by 21% - 36%
- Lower triglycerides (a type of fat in the blood) by 24% - 32%
- Raise HDL ("good") cholesterol by 5% - 7%

*Average effects depend on dose.*

*LIPITOR may start working within 2 weeks.* If you miss a dose of LIPITOR, take it as soon as you remember. Do not take 2 doses at the same time. Do not increase the dose or take extra doses.

*LIPITOR may cause side effects.* Common side effects may include:

- Nausea
- Headache
- Diarrhea
- Flatulence
- Upper respiratory tract infection

If you experience any of these side effects, consult your doctor.

**LIPITOR Help Protects the Heart**

LIPITOR has been shown to reduce the risk of heart attack, stroke, certain kinds of heart surgeries, and chest pain in patients with several different risk factors for heart disease.

**LIPITOR Has an Excellent Safety Profile**

LIPITOR is based on 15 years of research. Lipitor has been studied in more than 400 ongoing and completed studies. These studies include more than 80,000 patients.

**LIPITOR is Preferred**

Three times more cardiologists surveyed would recommend LIPITOR to their own family members over other cholesterol-lowering medications.

**LIPITOR Offers Patient Support**

My HeartWise™ is a patient support program for people who take LIPITOR. It helps you achieve your cholesterol goals with valuable offers, tools, and education.


### Living Healthy

**Tools and Resources**

- FAQs
- **LIPITOR Money-Saving Offers and Information**

**Sign up for a
30-Day Free Trial of LIPITOR**

**Join My HeartWise™**

**Help achieving your cholesterol goals

### CHANTIX® (varenicline) is a prescription medicine to help adults quit and avoid smoking. You may benefit from quit-smoking support programs and/or counseling during your quit attempt. It's possible that you might slip and smoke while taking CHANTIX. If you do, you can stay on CHANTIX and keep trying to quit.

Some patients have reported changes in behavior, agitation, depressed mood, suicidal thoughts or actions when attempting to quit smoking while taking CHANTIX or after stopping CHANTIX. If either you, your family, or caregiver notice agitation, depressed mood, or changes in behavior that are not typical for you, or if you develop suicidal thoughts or actions, stop taking CHANTIX and call your doctor right away. Also, tell your doctor about any history of depression or other mental health problems before taking CHANTIX, as these symptoms may worsen while taking CHANTIX.

The most common side effects include nausea (30%), sleep problems, constipation, gas, and/or vomiting. If you have side effects that bother you or don't go away, tell your doctor.

You may have trouble sleeping, vivid, unusual, or strange dreams while taking CHANTIX. You should use caution driving or operating machines until you know how quitting smoking with CHANTIX may affect you.

CHANTIX should not be taken with other quit-smoking products. You may need a lower dose of CHANTIX if you have kidney problems or get dialysis.

Before starting CHANTIX, tell your doctor if you are pregnant, plan to become pregnant, or if you take insulin, asthma medicines, or blood thinners. Medicines like these may work differently when you quit smoking.

Uninsured? Need help paying for medicine? Pfizer has programs that can help, no matter your age or income. You may even qualify for free Pfizer medicines. Call 1-866-766-2460 or click here for more info www.pfizerhelpfulanswers.com.
A "baseline treatment" is called a control treatment, and the experimental units to whom it is applied are called a control group.

Two classes of individuals who can affect the outcome of an experiment:
1. those who can influence the results (subjects, treatment administrators, technicians)
2. those who evaluate the results (judges, physicians)

Single-blind vs. Double-blind

Placebo - "fake pill" or "sugar pill"
Placebo effect - subjects given the placebo report an improvement

Control group NOT needed, but nice to have.

Completely Randomized Two-Factor Experiments

Ex: Suppose the makers of OptiGro want to ensure that their product will work under a wide variety of watering conditions. Now, there are two factors... water and fertilizer.

<table>
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<td>1</td>
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Ex: A psychology professor at Cornell (Ithaca, NY) teaches same course in two successive semesters... same book, syllabus, office hours, etc. and only varied his teaching style. Fall... subdued demeanor. Spring... expansive gestures and lectured with more enthusiasm. He gives an evaluation to both classes at the end of the semester. Fall rates 2.93, spring rates 4.05 on a 5-point scale. Was this due to his style? Could the weather have impacted the responses? Weather and evaluation could be confounding variables.
Lurking Variables vs. Confounding Variables

A lurking variable is associated with both of two other variables and makes it seem as though one variable causes the other.

Ex: Countries with more TV sets per house tend to have longer life expectancies.

A confounding variable is associated in a non-casual way with a factor that affects the response. You cannot tell if the effect was caused by the factor or by the confounding variable.

An article in a local newspaper reported that dogs kept as pets tend to be overweight. Veterinarians say that diet and exercise will help these chubby dogs get in shape. The veterinarians propose two different diets (Diet A and Diet B) and two different exercise programs (Plan 1 and Plan 2). Diet A: owners control the portions of dog food and dog treats; Diet B: a mixture of fresh vegetables with the dog food and substitute regular dog treats with baby carrots. Plan 1: three 30-minute walks a week; Plan 2: 20-minute walks daily. Sixty dog owners volunteer to take part in an experiment to help their chubby dogs lose weight.

1. Identify the following:
   a. the subjects:
   b. the factor(s) and the number of level(s) for each:
   c. the number of treatments:
   d. whether or not the experiment is blind (or double-blind):
   e. the response variable:

   | 60 chubby dogs   | diet (2 levels) | exercise (2 levels) | 4 | neither or single blind weight loss |

2. Design an experiment to determine whether the diet and exercise programs are effective in helping dogs to lose weight.

   - Group 1 - Diet A and Plan 1 (15 dogs)
   - Group 2 - Diet A and Plan 2 (15 dogs)
   - Group 3 - Diet B and Plan 1 (15 dogs)
   - Group 4 - Diet B and Plan 2 (15 dogs)

I will place all of the dogs in a hat and randomly place them in groups. The first 15 dogs go in group 1, the next 15 in group 2, and so on. The four groups each receive one of the four treatments listed above, and then I will measure and compare weight loss.
Multiple Choice: MC #6, 7, 14, 26, 33, 34, 37

A television station is interested in predicting whether voters in its viewing area are in favor of federal funding for abortions. It asks its viewers to phone in and indicate whether they support or are in favor of or are opposed to this. Of the 2241 viewers who phoned in, 1574 (70.24%) were opposed to federal funding for abortions.

6. Referring to the information above, the viewers who phoned in are
   A) a voluntary response sample  B) a convenience sample  C) a probability sample  D) a population

7. Referring to the information above, the sample obtained is
   A) a simple random sample  B) a single-stage sample  C) a census  D) probably biased

14. A public opinion poll in Ohio wants to determine whether registered voters in the state approve of a measure to ban smoking in all public areas. They select a simple random sample of 50 registered voters from each county in the state and ask whether they approve or disapprove of the measure. This is an example of a
   A) systematic county sample  B) stratified sample  C) multistage sample  D) simple random sample

26. A sociologist wants to study the attitudes of American male college students toward marriage and husband-wife relations. She gives a questionnaire to 25 of the men enrolled in Sociology 101 at her college. All 25 complete and return the questionnaire. The sample in this situation is
   A) all men taking a comparable sociology class  B) the 25 men who received and returned the questionnaire  C) all the men in the Sociology 101 class  D) all married men in the Sociology 101 class

A study of human development showed two types of movies to groups of children. Crackers were available in a bowl, and the investigators compared the number of crackers eaten by children watching the different kinds of movies. One kind of movie was shown at 8 AM (right after the children had breakfast) and another at 11 AM (right before the children had lunch). It was found that during the movie shown at 11 AM, more crackers were eaten than during the movie shown at 8 AM. The investigators concluded that the different types of movies had an effect on appetite.

33. The results cannot be trusted because
   A) the study was not double-blind. Neither the investigators nor the children should have been aware of which movie was being shown
   B) the investigators were biased. They knew beforehand what they hoped the study would show
   C) the investigators should have used several bowls, with crackers randomly placed in each
   D) the time the movie was shown is a confounding variable

34. The response variable in this experiment is
   A) the number of crackers eaten  B) the different kinds of movies  C) the time the movie was shown  D) the bowls

37. Two variables in a study are said to be confounded if
   A) one cannot separate their effects on a response variable  B) they are highly correlated
   C) they do not have a normal distribution  D) one of them is a placebo

Textbook TB p. 312 #1, 2, 4, 5, 7, 9, 21, 23

AP Questions 2011B #2 - acrophobia 2001 #4 - fruit trees

**Complete these on separate paper to be turned in.**