

Chapter 11 – Producing Data: Part II Review

Test Yourself Exercise Answers are answers or sketches. All of these problems are similar to ones found in Chapters 8–10, for which the solutions in this manual provide more detail.

11.1 (c) hives with bees; hives with no bees; no hives.

11.2 (d) elephant damage.

11.3 (a) Label the students 01 through 28 alphabetically (down the columns).

(b) Using Table B. and starting on line 122, the selected students are 13 = Fullmer, 15 = Guo, 05 = Burke, 09 = Ding, 08 = Devore, and 27 = Rabin. (c) The response variable is “How much I trust the Internet for health information.”

11.4 (b) the 295,000 households that responded.

11.5 (d) all U.S. households.

11.6 (b) Even though it is minimal, there is still nonresponse.

11.7 (a) Subjects were not assigned to be either parents or nonparents.

11.8 (c) We cannot make causal conclusions since we have an observational study.

11.9 Many answers are possible. One possible lurking variable is student attitude about the purpose of college (students with a view that college is about partying, rather than studying, may be more likely to binge drink and more likely to have lower grades). Remember that a correct example of a lurking variable *must* be a variable that simultaneously drives both “GPA” and “binge drinking” together.

11.10 No doubt, Question A had 60% favoring a tax cut, while Question B had 22% favoring a tax cut. The question wording in A packages all government spending into an impersonal block that people don’t relate to, or might even strongly oppose. The question wording in B describes government spending with greater detail, and mentions government spending priorities most people care about (education, defense, etc.).

11.11 (c) The two factors are the news report (two levels) and the primes (two levels); the treatments are the four combinations of all levels of the two factors.

11.12 (b) the rating of U.S. reaction.

11.13 People who visit the *NOVA Science Now* website don’t represent American adults broadly. Those people taking the survey went out of their way to participate

in this online poll, and they read pro and con arguments after watching a program about the issue. It seems reasonable to believe that these people understand the issues better than most American adults.

11.14 (a) a matched pairs experiment.

11.15 (b) No treatments were assigned. Testing eyesight and IQ are not applying treatments.

11.16 (b) This is confidentiality; the researcher does not know which survey belongs to which participant.

11.17 (b) This is the definition of informed consent.

Supplementary Exercises

11.18 (a) One possible population: all full-time undergraduate students in the fall term on a list provided by the registrar. Answers will vary. (b) A stratified sample with 125 students from each class rank is one possibility. (c) Mailed or emailed questionnaires might have high nonresponse rates. Telephone interviews exclude those individuals without phones. Face-to-face interviews might be more costly than your funding will allow. Some students might be sensitive about responding to questions about sexual harassment.

11.19 This is an experiment because the explanatory variable (type of introduction) was assigned for each call made. The response variable is whether or not the interview was completed.

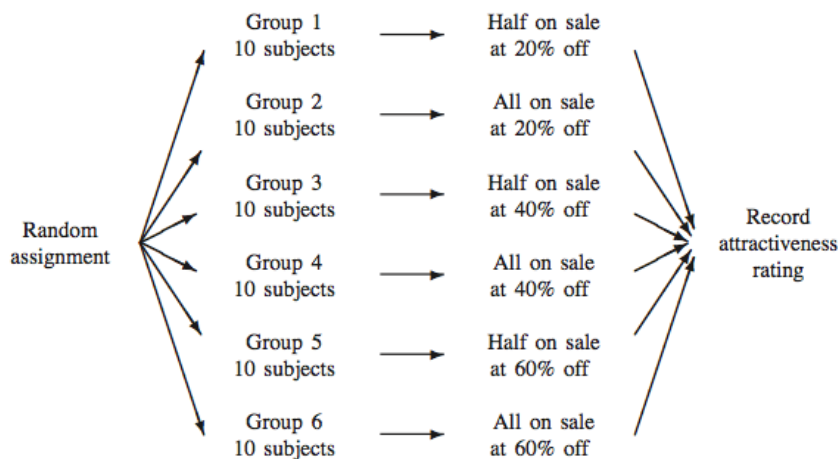
11.20 Parents who fail to return the consent form may be more likely to place less priority on education, and therefore may give their children less help with homework, and so forth. Including those children in the control group is likely to lower that group's score. Note: This is a generalization, to be sure; we are not saying that *every* such parent does not value education, only that the percent of this group that highly values education will almost certainly be lower than that same percent of the parents who return the form.

11.21 (a) Increase. **(b)** Decrease. **(c)** Increase. **(d)** Decrease. (Note: The first and third statements make an argument in favor of a national health insurance system, while the second and fourth suggest reasons to oppose it.)

11.22 (a) The table shows the six treatments—three levels of Factor A (discount level) and two levels of Factor B (fraction of shoes on sale).

		Factor B Fraction on sale	
		50%	100%
Factor A	20%	1	2
Discount	40%	3	4
Level	60%	5	6

(b) The diagram is shown. From line 111 of Table B, the first 10 subjects (group 1) are 48, 60, 51, 30, 41, 27, 12, 38, 50, and 59.



11.23 (a) The explanatory variable is the amount of alcohol one drinks (moderate, none, or heavy). The response variable is whether they developed heart disease. **(b)** Maintaining a healthy weight, getting enough sleep, and exercising regularly are lurking variables because they are not the primary variables of interest, but they are related to the explanatory and response variables. **(c)** No. The result is only based on observational studies since it is not ethical to assign people to drink certain amounts of alcohol every day. We cannot make causal associations with observational studies.

11.24 (a) The response variables are the ratings on the statements and the explanatory variable is the font that was used on the package. **(b)** *Completely randomized design*: Randomly assign 50 students to Group 1 (Impact font) and the other 50 to Group 2 (Sketchflow Print font). Compare the ratings of Group 1 with those of Group 2. **(c)** *Matched pairs design*: Each subject rates the same statements

twice: once with the Impact font, and once with the Sketchflow Print font. Compare the ratings for each font (for example, by looking at the difference between the two sets of ratings).

11.25 (a) In an observational study, we simply observe subjects who live near highways and compare them with others who do not live near highways. In an experiment, we would *assign* where the subjects live. **(b)** Answers will vary. For example, those who live near highways might have less money and be attracted to the (possibly) lower housing costs near a highway. Money (available for housing and health care) would be a variable that might be confounding. **(c)** No. It is not ethical to randomly assign a person to live near a highway or not.