Answers to Review Exercises

Part I. Design of Experiments

Chapter 2. Observational Studies

1. (a) Too hasty. What about population size?

   Comments: Michigan may include the big bad city, but Minnesota has twice the population of Michigan. The crime rate is lower in Michigan. (Of course, there probably are neighborhoods in Detroit that are best avoided.)

   (b) This is better reasoning, because the population of the U.S. increased over the period 1991–2001. Looking at rates would make the point even more clearly. (In fact, there has been a remarkable decline in crime rates over the period 1980–2005.)

2. (a) What's missing is the number of cars on the road, and there were a lot more Corvettes. (For example, 33,586 Corvettes were sold in 2002, versus 8,065 Q45s.) You need to look at rates. If anything, thieves prefer the Q45—a much classier car.

   (b) Same issue as (a).

   (c) False. The rate is low because the denominator is large relative to the numerator. The rate compares the number of jeeps stolen to the number sold. That's the point of using a rate.

3. No. In the Salk trial, the parents who consented were on the whole better off than the parents who did not consent, and their children were more at risk to begin with (p. 4).

4. (a) They were controlling for age and sex as possible confounders; this is discussed on p. 13, with respect to a specific disease—lung cancer.

   (b) This is the wrong conclusion to draw. Ex-smokers are a self-selected group, and many people give up smoking because they are sick. So recent ex-smokers include a lot of sick people. (Other epidemiological data show that if you quit smoking, you will live longer.)

5. No. The data from the double-blind study are more reliable, and suggest that the results from the single-blind were biased.

6. Subjects who did not improve during the first part of the trial probably concluded that they were on the placebo (whether they were or they weren't) and would be switched to the "real" medication during the second part of the trial. This expectation made them improve—the placebo effect.

7. (a) This is an observational study, so confounding may be a problem.
   (b) Rates of cervical cancer go up with age. Women of different marital status have different patterns of sexual activity, and are therefore exposed to different kinds of risk; similarly for education. In other words, age, marital status, and education are potential confounders.
   (c) Pill users are more active sexually than non-users, and have more partners. That seems to be what makes the rate of cervical cancer higher among pill users. (This is like example 2 on p. 16 or exercise 11 on p. 23.)
   (d) No; see (c).

8. Memorial Day is at the end of May; Labor Day is early in September. Just over 25% of the days of the year fall in between. Even if burglars work the same amount every day, over 25% of the burglaries would occur between Memorial Day and Labor Day.

9. (a) False. (b) True. (c) False: that is the whole point of experiments.

   Discussion. People who eat lots of fruits and vegetables are different from the rest of us in many other ways. Some other aspect of diet or life style may be protective. Of course, the observational studies might be right; something in the fruits and vegetables other than the vitamins might be the protective factor.

10. (a) Observational study. (b) Yes. (c) Yes.
    (d) No. The gene would also have to be associated with controlling behavior by the mother (p. 20).
    (e) A mother who sees her child eat too much might respond in a way that psychologists would interpret as "controlling"—Johnny, stop eating!
    (f) No. The *Chronicle* seems to have over-reacted.

11. (a) The treatment group consists of those who finished boot camp. The control group consists of other prisoners—including those who do not volunteer, or those who volunteer but do not complete the program.
    (b) This is observational. The prisoners decide whether to volunteer for boot camp and whether to stay in the program or drop out. That is the problem: those who volunteer and stay the course might be quite different from who volunteer but drop out.
    (c) False.

    Comment. An experiment could be done either like the polio trial (p. 1ff) or the HIP trial (exercise 9 on pp. 22–23):

    > *Like the polio trial*. Ask for volunteers. Randomize some of the volunteers to treatment (assignment to boot camp) and some to control. Compare the recidivism rate for the two groups—but include the dropouts in the treatment group. (Otherwise, you still have the problem of self-selection.)

Like the HIP trial. Take a group of prisoners. Randomize some to treatment (invitation to participate in boot camp) and some to control. Compare the recidivism rate for the two groups—but include in the treatment group those who decline to participate and those who drop out. (Again, this is to guard against the problem of self-selection.)

12. False. The conclusion does not follow. This is just like the admissions study (pp. 17ff). The Democrats may be concentrated in wards with low turnouts. Here is an example, with only two wards (and see exercise 13 on p. 24).

	DEMOCRATS		REPUBLICANS	
	Total number	Number voting	Total number	Number voting
Ward A	1000	100	100	5
Ward B	100	60	1000	500

Part II. Descriptive Statistics

Chapter 3. The Histogram

1. 66 inches, 72 inches.

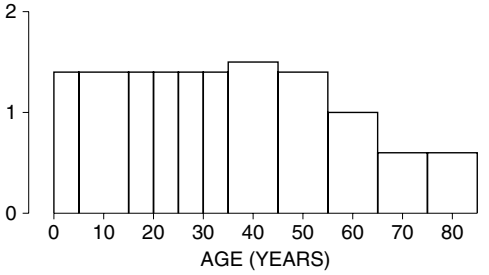
2. (a) There are more at age 1. The histogram is higher at 1 than at 71.

   (b) There are more at age 21.

   (c) There are more age 0–4,

   (d) 50%

Histogram for review exercise 2, chapter 3



3. (a) Rounding.

   (b) No. Taking percentages adjusts for the difference between the total numbers. On the whole, rental units tend to be smaller.

   (c) Rental units are smaller, as noted above.