

**STA304H1F - Summer 2014:**  
**Surveys, Sampling, and Observational Data**

**SUPPLEMENTARY EXERCISES for Chapter 2**

**1. a)** Give a specific example in which:

- (i) An element is not in the target population but in the sampling frame
- (ii) An element is not in the sampling frame but in the target population

**b)** What is the statistical term for the bias in (i) ?

**c)** What is the statistical term for the bias in (ii)?

**2.** A survey is conducted to determine how much beer is consumed by U of T students. A simple random sample of registered students is asked "*How much beer do you drink ?*"

Briefly explain what is wrong with this question and reword it to improve the question.

**3. True/False?**

- a)** The sampled population is always a subset of the target population.
- b)** Selection bias is a type of non-sampling error.
- c)** A census will obtain more accurate results than a sample.
- d)** Giving rewards and incentives to participants of surveys will increase response accuracy.

**4.** Refer to the "Hite Report" from Lohr's textbook-(excerpt is given on the next page) to answer the following questions:

- a)** How were the respondents 'self-selected' ? Why should this be avoided in surveys?
- b)** Why might one expect these respondents to be more educated than the general population?
- c)** Give an example of a leading question in this particular survey.
- d)** Identify the following:
  - (i) Target population
  - (ii) Sampling frame
  - (iii) Observational unit
  - (iv) Sampling unit

**Excerpt from Lohr , 2 ed (Pg#1):**

Shere Hite's book *Women and Love: A Cultural Revolution in Progress* (1987) had a number of widely quoted results:

- 84% of women are "not satisfied emotionally with their relationships" (p. 804).
- 70% of all women "married five or more years are having sex outside of their marriages" (p. 856).
- 95% of women "report forms of emotional and psychological harassment from men with whom they are in love relationships" (p. 810).
- 84% of women report forms of condescension from the men in their love relationships (p. 809).

The book was widely criticized in newspaper and magazine articles throughout the United States. The *Time* magazine cover story "Back Off, Buddy" (October 12, 1987), for example, called the conclusions of Hite's study "dubious" and "of limited value."

Why was Hite's study so roundly criticized? Was it wrong for Hite to report the quotes from women who feel that the men in their lives refuse to treat them as equals, who perhaps have never been given the chance to speak out before? Was it wrong to report the percentages of these women who are unhappy in their relationships with men?

Of course not. Hite's research allowed women to discuss how they viewed their experiences, and reflected the richness of these women's experience in a way that a multiple choice questionnaire could not. Hite erred in generalizing these results to all women, whether they participated in the survey or not, and in claiming that the percentages above applied to all women. The following characteristics of the survey make it unsuitable for generalizing the results to all women.

- The sample was self-selected—that is, recipients of questionnaires decided whether they would be in the sample or not. Hite mailed 100,000 questionnaires; of these, 4.5% were returned.

- The questionnaires were mailed to such organizations as professional women's groups, counseling centers, church societies, and senior citizens' centers. The members may differ in political views, but many have joined an "all-women" group, and their viewpoints may differ from other women in the United States.

- The survey has 127 essay questions, and most of the questions have several parts. Who will tend to return such a survey?

- Many of the questions are vague, using words such as "love." The concept of love probably has as many interpretations as there are people, making it impossible to attach a single interpretation to any statistic purporting to state how many women are "in love." Such question wording works well for eliciting the rich individual vignettes that comprise most of the book, but makes interpreting percentages difficult.

- Many of the questions are leading—they suggest to the respondent which response she should make. For instance: "Does your husband/lover see you as an equal? Or are there times when he seems to treat you as an inferior? Leave you out of the decisions? Act superior?" (p. 795)

Hite writes “Does research that is not based on a probability or random sample give one the right to generalize from the results of the study to the population at large? If a study is large enough and the sample broad enough, and if one generalizes carefully, yes” (p. 778). Most survey statisticians would answer Hite’s question with a resounding “no.” In Hite’s survey, because the women sent questionnaires were purposefully chosen and an extremely small percentage of those women returned the questionnaires, statistics calculated from these data cannot be used to indicate attitudes of all women in the United States. The final sample is not *representative* of women in the United States, and the statistics can only be used to describe women who would have responded to the survey.

Hite claims that results from the sample could be generalized because characteristics such as the age, educational, and occupational profiles of women in the sample matched those for the population of women in the United States. But the women in the sample differed on one important aspect—they were willing to take the time to fill out a long questionnaire dealing with harassment by men, and to provide intensely personal information to a researcher. We would expect that in every age group and socioeconomic class, women who choose to report such information would in general have had different experiences than women who choose not to participate in the survey.