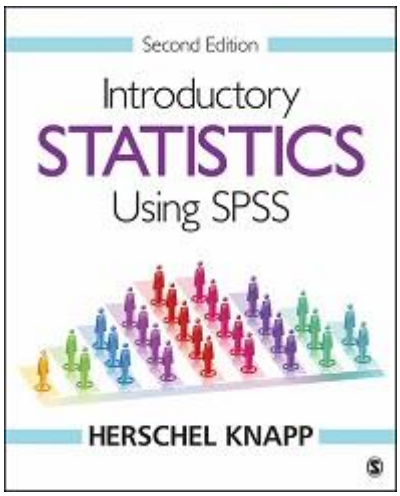
Introductory Statistics Using SPSS 2nd edition Knapp Solutions Manual

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Chapter 2

Sampling

Solutions to All Exercises

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NOTE: It is not expected that your answers will match the solutions below verbatim or that your methods will be identical, but they should concur conceptually.

Exercise 2.1

(a)
In terms of time, gathering a sample of an entire population could take weeks, months, or possibly years depending on the size of the population, geographical area involved, and the complexity of the data to be gathered. The point of research is to get the answer to a meaningful question, presumably, to solve a problem or improve a situation. Such answers can be expedited by sampling, as opposed to gathering data on the entire population. Attempting to sample the entire population would be so time-consuming that by the time you had acquired your full data set, the nature of the initial problem may have changed substantially, thereby making your findings virtually irrelevant.

(b)
No matter what method of gathering data one uses (e.g., in-person surveys, phone surveys, postal/e-mail contact, tests), costs are involved. When it comes to data collection, subject participation fees are customary, data collection teams need to be paid, additionally, there are administrative costs involved (photocopying, office space, equipment, office supplies, etc.). Considering the volume of individuals that would be involved in studying an entire population, the costs would be prohibitive.

(c)
Beyond the lengthy time and exorbitant costs that would be involved in studying an entire population, it is seldom feasible to gather data on so many people. The population may span a broad geographical region, requiring lengthy travel among the research staff. Within a population, one would likely encounter a variety of languages; it may not be possible to translate verbal/written instructions to engage everyone in the population. Additionally, some studies may involve experiments that can only be administered at a special facility; it would be impossible to arrange to round-trip-commute every member of a population to that facility to participate.

(d)
Extrapolation involves working diligently to gather a representative sample in sufficient quantities to facilitate stable statistical processing. If the data gathered constitute a representative sample, then one could confidently extrapolate the findings, in order to (better) comprehend the overall population that it was drawn from; this is also known as external validity.

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Exercise 2.2

(a)
The population is the largest possible realm of sampling. For example, if we are studying instructors in the school district, the population would be the full list of every single instructor in the school district.

(b)
The sample frame is the available list of the population that could potentially be sampled. For example, the sample frame of instructors would consist of only those included on this list, but the list may not consist of the entire population—there may be omissions (e.g., does not include substitutes, does not include those who opt not to be on the list, does not include instructors who recently joined the school district or those who are suspended or on sabbatical).

(c)
The sample is the portion of instructors that will be selected from the sample frame. For example, you may decide to randomly select 100 instructors or some percentage of the instructors to study.

(d)
A representative sample is a sample that is proportionally equivalent to the larger population that it was drawn from. For example, if there are 40% men and 60% women in the population, then the sample should consist of those same proportions. Also, the sample shouldn't all be drawn from any single school—the sample should be evenly drawn from across the school district.

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Exercise 2.3

(a)
The population is the entire student body currently enrolled (e.g., 22,000 students).

(b)
The sample frame is the available list of students currently enrolled (e.g., 16,000 students).

(c)
Fortunately, the list of participants in the sample frame were already numbered from 1 to 16,000. I would want to gather data on 2% of the sample frame (16,000 x .02 = 320); I would use SPSS to generate 320 random numbers between 1 and 16,000—this list would indicate which students on the sample frame to recruit. Actually, I would probably generate more than 320 random numbers just in case SPSS produces some duplicates.

(d)
I would build (and test) an online survey. Next, I would send an e-mail to each of the 320 students in the sample set; the e-mail would concisely explain the nature of the study, and courteously request that they voluntarily click on the link to the online survey.

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Exercise 2.4

(a)
The population is every single subscriber of this Internet service.

(b)
The sample frame is the list of subscribers who have agreed to be on their customer contact list (they checked a box in their user profile that says "Yes, you may contact me to engage in customer satisfaction surveys").

(c)
Suppose the list consists of 500,000 subscribers and I want to sample 1,000 subscribers. I would begin by dividing the population size by the sample size to derive the *k* (skip) term (500,000 ÷ 1,000 = 500). Next, I'd have the computer generate a random number between 1 and 500; this number would be the start point (let's say that number is 42). The sample would then consist of the subscribers on the list who are at positions 42, 542, 1,042, 1,542, 2,042, etc. (start at 42 and keep adding 500 to generate the sample list).

(d)
First, I would build the survey using an online survey system, and test it (myself) to make sure that it's operating properly. Then I would send individual e-mails to each recipient. Sending individual e-mails would preserve the anonymity among the participants (nobody could see the e-mail addresses of the other participants). In the body of the e-mail, I'd explain the nature of the research, explain that their participation is voluntary (and appreciated), and provide the link to the survey website.

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Exercise 2.5

(a)
The population is all of the people who enter the library.

(b)
The sample frame consists of those who enter the reference section.

(c)
I would approach each person in the reference section and ask if they would be willing to spend a few minutes answering some simple questions about how they use the library. In order to satisfy the strata (children/adult), the first question would be "How old are you?" or "Are you 18 or older?" I'd want to get at least 30 in each stratum (at least 30 children, and at least 30 adults).

(d)
I would use a clipboard with a prepared questionnaire. Regarding the children, I would presume that children at a library would be accompanied by an adult. It would be a good idea to interview the adult with the child together to gather more complete information and to make sure that the adult (parent) is okay with their child participating in the survey process.

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Exercise 2.6

(a)
The population is every single person who lives within the 300 blocks of Cityville.

(b)
The sample frame would be the (partial) list of all of those who reside in Cityville, but that list may not exist or not be accessible.

(c)
To use area sampling, first we would need to label the 300 blocks (1-300). Next, we would select some percentage of the blocks to sample; for example, 10%, which would require selecting 30 blocks (300 x .10 = 30). We would randomly select the 30 blocks using a random number generator generating numbers contained within 1 and 300. Next, suppose that we've decided to survey five households per block, we'd need to gather all of the addresses on each of those blocks and randomly select five of them to survey.

(d)
Next we would assemble the list of targeted addresses (five per specified block) and send out our survey teams to administer the survey(s).

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Exercise 2.7

(a)
I wouldn't want to bother people who are walking someplace, or who are engaged in conversations with friends/family, so I would approach people waiting in line (for food or an attraction) since they'd probably be a bit bored just waiting in line.

(b)
I would greet them and tell them my name, just to be friendly, and then tell them that I work for Acme Research Firm (I'd point to my badge) and tell them that I'm gathering some information about how much money they intend to spend today and ask them if they wouldn't mind estimating that amount for me. Whether they choose to respond or not, I'd thank them.

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Exercise 2.8

(a)
With the permission of the administration of a local school, I would stand at the exit of the school at the end of the day and hand out flyers that says “If you have dyslexia, you may be eligible to partake in our (paid) survey”—the flyer would include contact information. After I completed the survey procedure with each participant, I would ask if he or she knows of anyone else with dyslexia who might be interested in being in this study. I would also approach the school administration to ask them if they would be willing to offer the survey recruitment flyer to any students that have been identified as dyslexic.

(b)
I would schedule each potential participant individually and begin with a dyslexic diagnostic test. If the participant meets the criteria for dyslexia, then I would administer the survey.

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Exercise 2.9

(a)
I would ride the bus starting at 8:00 a.m. At first I'd approach anyone. If they consented to talk to me, I would begin by asking them their age. Once I'd hit my quota for a group (50 minors, 100 adults), I'd stop approaching that group and proceed with the other group. When I'd gathered all 150 surveys, I'd stop the sampling process completely, and move on to the analysis (off the bus).

(b)
I would approach potential participants, identify myself as a staff member of the Acme Bus Company (I'd point to my badge), and ask the person if I could ask them a few questions about their impressions of their bus riding experience(s). I would record their responses on a clipboard, which would contain the printed survey. The first question I would ask is "What is your age?" which I would record on the survey form; if they didn't want to tell me their age, I would ask "Are you 18 or over?" unless it was obvious that the person was clearly either a child or an adult. This way I could keep a running count of how many minors and how many adults I had surveyed. To adhere to ethical standards, if a child is with an adult, I would ask the adult if I could ask them (the adult) a few questions about their bus riding experience, and then after they knew what the questions were, I would ask the adult if I could ask the same question to their child. If a child is alone on the bus, I wouldn't approach them, since there would be no adult present who could authorize the child's participation in this survey. If anyone, especially a child, is resistant to talking with me, I'd just thank them and courteously end the conversation—I wouldn't pursue the questioning.

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Exercise 2.10

(a)
I would coordinate with the local school district to distribute flyers to all students who are enrolled in the specified school district. The flyer would be addressed to the parents and say: “If you have a child who is under 18 years old who would like to participate in a community tutoring program 3 days a week from 3:30 p.m. to 5:00 p.m., please call or text us at (555) 555-5555 or e-mail us FreeTutor@AcmeSchool.edu.”

(b)
I would ask students to provide copies of their report cards so we could track (changes in) grades over the course of the tutoring program.

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