**Chapter 5: Sample Design**

**Multiple Choice**

1. Under what kind of sampling procedure must the researcher adhere closely to precise selection procedures to ensure that the results are projectable to the population under study?

a. nonprobability

b. non-random

c. probability

d. quota

e. none of these

Answer: c

1. \_\_\_\_\_\_\_\_ samples must be selected in such a way that every element of the population has a known and equal chance of being selected.

a. Cluster

b. Simple random

c. Convenience

d. Systematic random

e. Stratified random

Answer: b

1. \_\_\_\_\_\_\_\_\_\_\_\_\_ is the total group of people from whom information is obtained.

a. Sample of interest

b. Census of interest

c. Population of interest

d. Subset of interest

e. The entire universe

Answer: c

1. What do convenience, judgment, quota, and snowball samples have in common?

a. They can all be classified as nonprobability samples.

b. They can all be classified as probability samples.

c. They all use random number tables to generate samples.

d. If properly invoked, they all provide projectable results.

e. They utilize every nth element in the sample frame.

Answer: a

1. Which of the following is a correct statement regarding probability samples?

a. The researcher can be sure of obtaining information from a representative cross-section of the population of interest

b. Sampling error can be computed.

c. The survey results can be projected to the total population.

d. All of these statements are correct.

e. None of these are correct.

Answer: d

1. Which of the following sampling methods, if properly invoked, will produce projectable results?

a. quota

b. convenience

c. systematic

d. snowball

e. stratified quota

Answer: c

1. Which of the following types of samples enables the researcher to compute sampling error?

a. nonprobability

b. convenience

c. probability

d. all of these

Answer: c

1. Which of the following could serve as the basis for forming a stratum?

a. usage rate

b. gender

c. income level

d. all of these

e. none of these

Answer: d

1. Stratified random samples are often confused with which of the following nonprobability sampling techniques?

a. quota

b. convenience

c. judgment

d. snowball

e. none of these

Answer: a

1. Which of the following sampling techniques would give the researcher the most confidence in projecting the findings to the overall population?

a. quota

b. projectable judgment

c. simple random

d. snowball

e. stratified snowball

Answer: c

1. In order to compute a skip interval, the researcher needs to know the desired sample size and the \_\_\_\_\_\_\_\_\_\_.

a. census

b. incidence rate

c. stratified sample

d. population size

e. none of these

Answer: d

1. If the researcher is expecting different responses between males and females in a study, which type of sample might be most useful?

a. judgment

b. snowball

c. stratified random

d. systematic random

e. none of these

Answer: c

1. Which of the following sampling methods is the most statistically efficient (the most representative)?

a. simple random

b. systematic random

c. stratified random

d. cluster

e. All are equally statistically efficient.

Answer: c

1. The type of error which results from the fact that samples are not perfectly representative of the populations from which they are drawn is known as \_\_\_\_\_\_\_.

a. measurement error

b. systematic error

c. sampling error

d. nonsampling error

e. selection error

Answer: c

1. Which of the following sample types is often used as a substitute for simple random sampling?

a. snowball

b. judgment

c. quota

d. systematic

e. none of these

Answer: d

1. A researcher randomly selected 10 census tracts from a metropolitan area. Within each census tract, 30 households were randomly selected. The sampling technique just described would be a \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

a. quota sample

b. area cluster

c. stratified random

d. systematic random

e. systematic quota

Answer: b

1. All other things equal, larger samples will have less \_\_\_\_\_\_\_\_\_\_\_ than smaller samples.

a. measurement error

b. sampling error

c. time and cost

d. nonsampling error

e. interviewer error

Answer: b

1. The difference between the sample result and true population value is known as \_\_\_\_\_\_\_\_\_\_.

a. level of confidence

b. nonsampling error

c. acceptable error

d. none of these

Answer: c

1. The first step in the development of a sampling plan is to:

a. determine sample size.

b. select a sampling method.

c. choose a data collection method.

d. define the population of interest.

e. decide which statistical techniques are appropriate.

Answer: d

1. The \_\_\_\_\_\_\_\_\_\_\_\_\_ is a list of the members or elements from which units to be sampled are selected.

a. population

b. sample frame

c. sample source

d. sample picture

e. universe

Answer: b

1. What is the most important reason for the growing popularity of nonprobability samples?

a. sampling error can be computed

b. representative of population

c. lower cost than probability samples

d. less nonresponse bias than other types of sampling

Answer: c

1. If a researcher offers beer drinkers an extra incentive to recruit their friends who also drink beer to participate in the study, s/he is using a(n) \_\_\_\_\_\_\_\_sample.

a. cluster

b. systematic

c. stratified

d. snowball

e. none of these

Answer: d

1. Of the following, which is the most important consideration when choosing a sample?

a. size of the sample

b. size of the population

c. how well the sample represents the population

d. how well the population represents the sample

Answer: c

1. In a \_\_\_\_\_\_\_\_\_\_\_, data are obtained from or about every member of the population of interest, while in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_, information is obtained from or about a part of the population and used to make estimates about various characteristics of the total population.

a. sample, census

b. sample, study

c. census, sample

d. census, study

Answer: c

1. Which of the following is an advantage to internet sampling?

a. respondents complete survey at their convenience

b. data collection is relatively inexpensive

c. the interview can be administered under software control

d. survey can be completed quickly

e. All of these

Answer: e

1. Which of the following is a nonprobability sample in which quotas, based on demographic or classification factors selected by the researcher, are established for population subgroups?

a. Quota sample

b. Convenience sample

c. Stratified sample

d. Systematic sample

e. Snowball samples

Answer: a

1. Interviewing costs are dramatically reduced under which of the following sample type?

a. Systematic

b. Simple random

c. Stratified

d. Cluster

e. None of these

Answer: d

1. The “bigness” of Big Data can be seductive and lead researchers to not question which of the following?

a. representativeness

b. sample frame

c. purposeful nonrandomness

d. all of these

Answer: a

1. Which of the following is *not* a piece of required information in order to determine sample size?

a. estimated population standard deviation

b. estimated population median

c. acceptable level of sampling error

d. desired level of confidence

e. All are necessary to determine sample size.

Answer: b

1. The idea that a large number of sample means or proportions will approximate a normal distribution, regardless of the distribution of the population from which they were drawn, is known as:

a. sample variance

b. population variance

c. central limit theorem

d. random error

e. simple random sample

Answer: c

1. A continuous distribution, which is bell-shaped and symmetric about the mean, is known as:

a. the normal distribution.

b. the chi-square distribution.

c. the F-distribution.

d. the mean distribution.

e. the binomial distribution.

Answer: a

1. A researcher wants to know the average number of times per month respondents eat at fast food restaurants. The statistic that s/he is most interested in would be the\_\_\_\_\_\_\_\_\_.

a. variance

b. mean

c. standard deviation

d. proportion

Answer: b

1. Which of the following is not a determinant of sample size for probability samples?

a. budget available

b. research objectives

c. rule of thumb

d. all of these are determinants

Answer: d

1. If we were making inferences from a single sample, we would expect that there would be a \_\_\_\_ percent probability that the sample mean or proportion generated from our sample results would be within two standard errors of the true population mean.

a. 68.26%

b. 99.74%

c. 97.5%

d. 95.44%

e. 98.00%

Answer: d

1. Higher levels of confidence generally require:

a. larger sample sizes.

b. greater variance.

c. smaller sample sizes.

d. larger standard deviation.

Answer: a

1. When a research company routinely uses samples of 300 for their studies, they are using which type of plan to determine sample size?

a. the 50% rule

b. budget available

c. rule of thumb

d. number of subgroups to be analyzed

Answer: c

1. How many respondents should be in each important subgroup of a sample, at a minimum?

a. 10

b. 25

c. 50

d. 95

e. 100

Answer: e

1. Which of the following statements about sample size is false?

a. There is no direct relationship between population size and the size of the sample required to estimate population parameters.

b. The larger the sample variance, the larger the sample size that is required.

c. The higher the level of confidence, the larger the sample size that is required.

d. The larger the population, the larger the sample size that is required.

e. All of these statements are false.

Answer: d

1. Holding constant at a 95% level of confidence, if the standard deviation increases, then the sample size required to represent the population in question will be \_\_\_\_\_\_\_.

a. larger

b. about the same

c. smaller

d. not applicable

Answer: a

1. As the level of acceptable error increases in the sample means formula, the sample size required to represent a particular population is:

a. smaller

b. larger

c. about the same

d. none of these

Answer: a

1. Which of the following is not required to determine sample size using the sample means formula?

a. the standard error of the mean

b. desired level of confidence

c. estimate of population standard deviation

d. level of tolerable error

e. all of these are required.

Answer: a

1. Which of the following is *not* a method for estimating the population standard deviation?

a. prior study results

b. conduct a pilot study

c. use secondary data

d. using population size

Answer: d

1. \_\_\_\_\_\_ is a range of values within which the true population value is estimated to fall.

a. Interval estimate

b. Point estimate

c. Population estimate

d. Sample estimate

e. Universe estimate

Answer: a

1. Which of the following is not a measure of central tendency?

a. variance

b. mean

c. median

d. mode

Answer: a

1. Standard error of the mean is:

a. a measure of dispersion of a large population.

b. a measure of dispersion of large sample.

c. the standard deviation of a distribution of sample means.

d. the error in the computation of population standard deviation.

e. none of these

Answer: c

1. All of the statistical methods for determining sample size in this chapter assume which of the following?

a. a large population

b. a valid questionnaire

c. simple random sampling

d. stratified sampling

e. none of these

Answer: c

1. Which of the following would increase the necessary sample size in a study?

a. smaller mean of the variables in question

b. less need for precision

c. need to divide sample into sub-groups

d. larger population

e. smaller population

Answer: c

1. About 68% of the area under a standard normal curve covers one \_\_\_\_\_\_\_\_\_.

a. mean

b. sample

c. variance

d. standard deviation

e. median

Answer: d

1. When a researcher is not sure if people who responded to the survey are different from those who did not respond, this brings into question the issue of:

a. inappropriate sample size.

b. systematic bias.

c. nonresponse bias.

d. refusal bias.

Answer: c

1. A(n) \_\_\_\_\_\_\_\_\_\_\_\_ normal distribution is a normal distribution with a mean of zero and a standard deviation of one.

a. balanced

b. standard

c. stock

d. ordinary

e. outstanding

Answer: b

1. The \_\_\_\_\_\_\_\_\_\_\_\_\_ includes all the possible individuals or objects from whom or about which information is needed to meet the objectives of the research.

a. group

b. selection

c. population

d. range

e. variance

Answer: c

1. \_\_\_\_\_\_\_\_\_\_\_ sampling error is the amount of sampling error the researcher is willing to accept.

a. Given

b. Projected

c. Accepted

d. Allowable

e. Tolerable

Answer: d

1. The results of a sample can be used to generate which of the following concerning the population mean?

a. point estimate

b. interval estimate

c. dot estimate

d. point and interval estimate

e. interval and dot estimate

Answer: d

**True/False**

1. In marketing research, it is always preferable to take a census rather than a sample of the population under study.

Answer: False

1. Ideal census conditions are seldom available, even when the population is very small.

Answer: True

1. Probability samples are more popular in marketing research than nonprobability samples.

Answer: False

1. One of the advantages of Internet surveys is that target respondents can complete the survey at their convenience.

Answer: True

1. A shortcoming of Internet surveys relative to other modes of data collection is the need to input the data into a database after it has been collected.

Answer: False

1. Marketing researchers might view a respondent whose family works in marketing as a security threat.

Answer: True

1. Nonprobability samples cost less than probability samples.

Answer: True

1. A judgment sample enables the researcher to make statistical inferences about population values.

Answer: False

1. Stratified sampling is a type of probability sampling.

Answer: True

1. Simple random sampling is often used as a substitute for systematic sampling.

Answer: False

1. The size of the population is needed in order to compute a skip interval.

Answer: True

1. Simple random samples require a detailed listing of the population of interest.

Answer: True

1. Convenience samples should not be used in marketing research.

Answer: False

1. The key to making accurate predictions about the characteristics or behavior of a large population on the basis of a relatively small sample lies in the way in which individuals are selected for the sample.

Answer: True

1. Developing an appropriate sampling frame is often one of the easiest things that a researcher faces.

Answer: False

1. The final step in the sampling process is execution of the operational sampling plan.

Answer: True

1. There are four types of probability sampling methods: simple random sampling, systematic sampling, quota sampling, and cluster sampling.

Answer: False

1. Researchers prefer simple random samples to stratified samples because of their potential for greater statistical efficiency.

Answer: False

1. From the standpoint of statistical efficiency, cluster samples are generally less efficient than other types of probability samples.

Answer: True

1. Increasingly researchers are turning to methodologies that involve blending sample based on interviews collected by different means such as SMS, mail and telephone.

Answer: True

1. Systematic sampling includes a compromise for expediency and has a very small risk of producing a nonrepresentative sample.

Answer: True

1. The greater the number of subgroups to be analyzed, the smaller the necessary sample size.

Answer: False

1. In a normal distribution, the mean, median, and mode are equal.

Answer: True

1. If large enough samples are taken, most human behavior can be plotted using a normal distribution curve.

Answer: True

1. Theoretically, the sampling distribution of the mean is always normally distributed.

Answer: True

1. Population size is the most important determinant of effective sample size.

Answer: False

1. A normal distribution has a total of 6 standard deviations.

Answer: True

1. The level of acceptable error (e) in the sample proportions formula is expressed in terms of a percent.

Answer: True

1. Some normal distributions cannot be transformed into standard normal distributions.

Answer: False

1. A range of values with which the true population value is estimated to fall is known as the point estimate.

Answer: False

1. A confidence interval always includes the true population value.

Answer: False

1. Budget is rarely a consideration when determining sample size.

Answer: False

1. Subgroups are often chosen based on demographics of the sample, such as gender, income, etc.

Answer: True

1. If a researcher takes enough samples, the data will begin to approach a normal distribution.

Answer: True

1. The “budget available” approach forces the researcher to explore alternative data-collection approaches and to carefully consider the value of information in relation to cost.

Answer: True

1. The total area under a normal curve is greater than one.

Answer: False

1. The finite population correction factor (FPC) is an adjustment to the required sample size that is made in cases where the sample is expected to be equal to 5 percent or more of the total population.

Answer: True

1. The normal distribution is bell-shaped and has only one mode.

Answer: True

1. A sample distribution is a frequency distribution of all the elements of an individual (single) population.

Answer: False

1. Online interviewing and Internet panels, along with social-media–driven sampling, have had no impact concerning feasible sample sizes.

Answer: False

1. A particular normal distribution is uniquely defined by its mean and standard deviation.

Answer: True

1. The proportional property of a normal distribution provides the basis for the statistical inferences.

Answer: True

1. The confidence level is the probability that a particular interval will include true population value.

Answer: True

1. Regardless of how the target sample size is determined, the researcher is confronted with the practical problem of figuring out how many sampling units will be required to complete the assignment.

Answer: True

1. In addition to being interested in estimating sampling means, marketing researchers frequently are interested in estimating proportions or percentages.

Answer: True

**Essay Questions**

1. A researcher invokes a pilot sample and finds that respondents from households with less than $50,000 annual income respond very differently than respondents from households with greater than $50,000 annual income, with regard to the key survey questions. In addition, the researcher’s preliminary results show greater variance among respondents in the over $50,000 households. Given the preceding, which probability sampling method should the researcher invoke and why?

Answer: When a key demographic factor is related directly to the key survey questions and objectives, and there is great variance among respondents across the demographic factors, a stratified random sample should be used. This is because stratified random samples are more statistically efficient than other types of probability sampling techniques; hence, sampling costs, which are usually linear, can be reduced.

1. A researcher is developing a body of knowledge for the development of a formal questionnaire. Part of the process involves conducting four focus groups. Outline an appropriate sampling strategy for generating the focus-group respondents.

Answer: The appropriate sampling procedure for generating focus group respondents would be a convenience sample, if the information needed was widely held across the population of interest. If the information needed is possessed only by some potential respondents, then a screened sampling procedure, known as a judgment sample would be used. If the behavior of interest is low incidence, then a snowball sample would be appropriate.

1. Suppose a marketing researcher was doing a survey of snow skiers residing in South Louisiana, for the specific purpose of estimating the feasibility of offering discounted snow ski rental equipment. The idea was gauge the need, interest and price expectations of these snow skiers as they head to Colorado or some other snow skiing destination. What type of sample would be needed?

Answer: It is plausible to assume that there will a low incidence of snow skiers in South Louisiana. Instead of surveying at random, the researcher should resort to a referral or snowball sampling technique.

1. When and why does sampling error occur? If the sampling error emanates from some type of improper execution of the sampling plan what is it called? Can it be measured? What kind of sampling error can be measured and how can it be reduced?

Answer: Sampling error occurs because samples are not perfectly representative of the populations from which they are drawn. Sampling error emanating from improper execution of sampling procedures is referred to as administrative error and CANNOT be measured. However, random error is due to chance and cannot be avoided, but can be reduced by increasing sample size. It cannot, however, be totally eliminated.

1. Distinguish between probability and nonprobability samples. What are the advantages and disadvantages of each?

Answer: A probability sample ensures that each element within the population of interest has a known chance of being chosen. The advantages are: 1) representative cross-section, 2) sampling error can be computed, and 3) survey results are projectable to the total population. The disadvantages are: 1) expensive, 2) more complex design, and 3) it takes more time to execute.

Non probability samples do not ensure that each unit will have a known chance of being chosen. Discretion is usually left up to the researcher. The advantages are: 1) cost less, 2) excellent in exploratory research, 3) execution is quick, and 4) it can be adequately representative. The disadvantages are 1) the sampling error cannot be computed, 2) it may not be representative, and 3) results cannot be projected to the total population. Nonprobability samples are popular because they can be quicker, cheaper, and easier to conduct. Sometimes nonprobability samples give quick answers that are “good enough.”

1. Assuming the research objectives of the study can be accomplished, researchers would much prefer to estimate the required sample size using the sample proportion formula rather than the sample means formula. Why?

Answer: The sample means formula requires that the researcher make an estimate of the population standard deviation. Since most studies are “new” studies, the researcher will probably have to invest some time in estimating the population standard deviation, usually via a pilot sample. The sample proportions formula requires no such estimate from a pilot study.

1. Compute the required sample size given the required confidence in the sample results is 90%. The level of tolerable sampling error is 1% and the estimated population standard deviation is 5.

Answer: The required sample size given the above requirements, using the sample means formula, would be 1,353.

1. A researcher is conferring with a client to do interviews for a particular topic, which the researcher will subcontract to a field services firm for $10 per usable response. The researcher’s client wants to be 95.44% confident of the results. Assume the sample proportions formula is appropriate, and that the level of tolerable sample error is 4%. The budget for data collection only offered by the client can be up to but not over $10,000. How many usable responses are needed for the given level of confidence and much will the subcontractor charge the market researcher for sampling? Is the budget for data collection large enough?

Answer:  
1) Sample proportions formula is appropriate.  
2) 95% confidence equals of Z-value of 2  
2) Computed sample size would be 625 usable responses  
3) Cost of sampling: $10 x 625 = $6,250  
4) Data Collection budget is $10,000  
5) The budget is large enough

1. A researcher wants to estimate the percentage of all adults that have used the Internet to seek pre-purchase information in the past 30 days, with a tolerable sampling error (E) of 0.03 and a confidence level of 97.5%. If secondary data indicated that 25% of all adults had used the Internet for such a purpose, what is the sample size?

Answer:  
1) at 97.5% confidence, Z = 2.24  
2) sample proportions formula is appropriate  
3) P = .25; 1 – P = .75  
4) Tolerable Error = .03  
5) Computed Sample size of 1,046 (rounded up)

1. A researcher wants to estimate a population mean. The level of tolerable sampling error is 0.2 of a purchase occasion, with a confidence level of 95.44%. If the estimated population variance is 5 for the most important question in the study, what is the desired sample size?

Answer:  
1) at 95.44% confidence, Z = 2  
2) sample means formula is appropriate  
3) Variance = 5  
4) Tolerable Error = .2  
5) Computed Sample size of 500

1. Discuss and give examples of three methods that are used in marketing research for determining sample size.

Answer: The first method is the budget available. If the project has a total budget for data collection of $20,000 and each survey administered costs $20, then the sample size can be no larger than 1,000 people. The second method is the rule of thumb. This is the case where the sample size is some given number, usually determined by the research client. The client probably has chosen that number because of experience with a previous research project. The third method is the traditional statistical method where statistical formulas are used to determine the sample size under given variance, level of confidence, and desired error levels.