SAMPLING

Week 6 Slides

ScWk 240

Purpose of Sampling

Why sampling? - to study the whole population?

A major reason studying samples rather than the whole group is that the whole group is so large that studying it is not feasible. Example- college students in CA. If we can study the whole population, we do not need to go through the sampling procedures. Much research is based on samples of people.

Representativeness - how representative the selected cases are?

Then, can knowledge gained from selected cases be considered knowledge about a whole group of people? The answer depends on whether those selected cases are *representative* of larger group. Newsmagazine articles about public opinion: How can we be sure that the results reflect the public's true opinion, in other words, how much they can represent views of all Americans. The ultimate purpose of sampling is to get accurate *representativeness*. The important consideration about samples is how representative they are of the population from which we draw them.

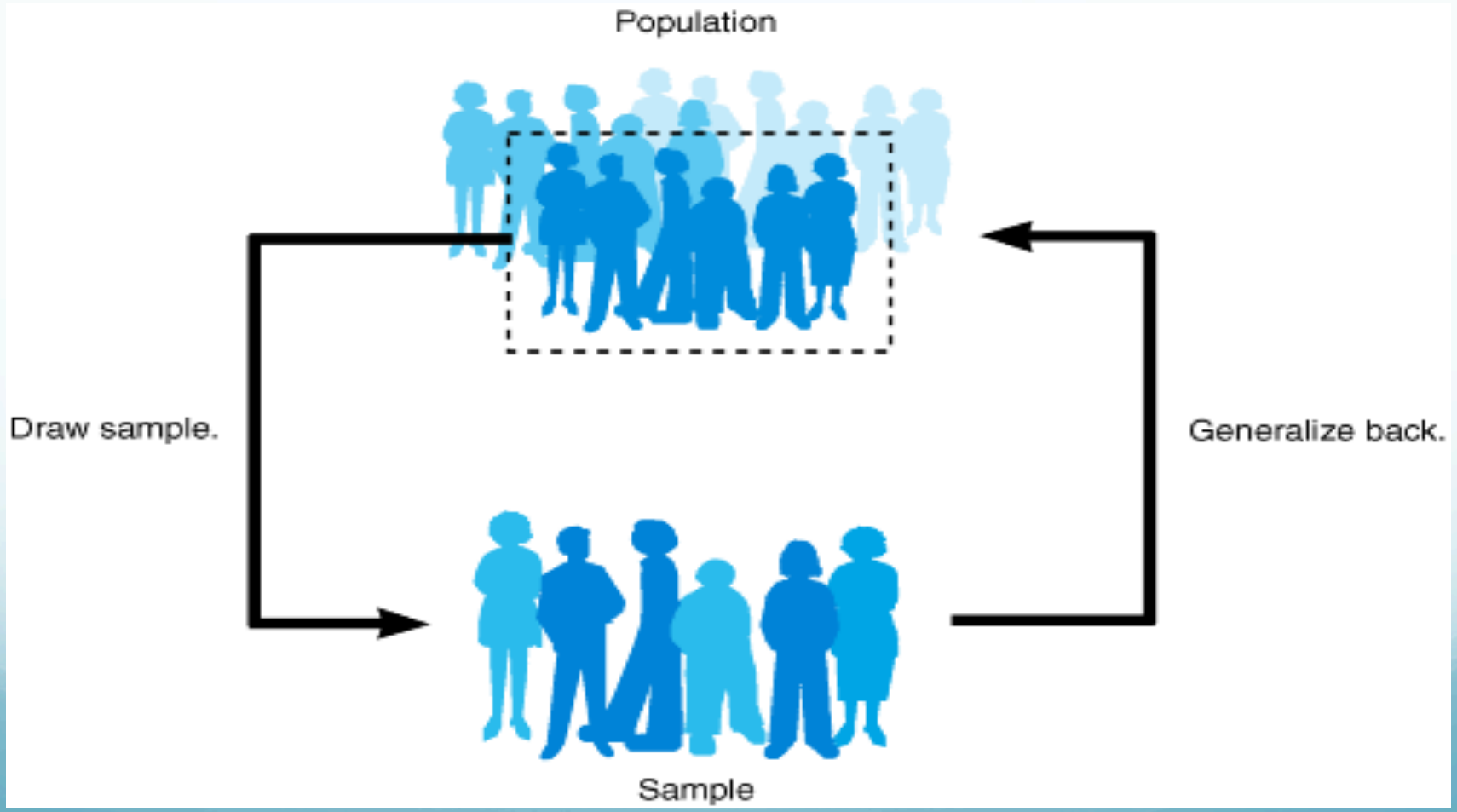
Casual vs. scientific sampling

In both daily life and practice, we are involved in sampling decisions - movies, car purchases, class selections, etc; to get feedbacks about service satisfaction from clients – what is said in community or agency meeting. How much of this information is representative? The information can be misleading or biased - The people who attend or are the most vocal at a meeting may be the most satisfied (or most dissatisfied). If a sample size is too small, information can be biased as well. Scientific sampling is considerably more careful and systemic than casual, everyday sampling.

In research, scientific sampling procedures have been developed so that we can minimize the likelihood that samples we select will be biased or too small.

Purpose of Sampling (Cont.)

What is sampling? The process of drawing a subset of people from a population so that results with that subset may be generalized to the population. See below:



Sampling Terminology

(Study/Target) Population **All possible cases of what you are interested in studying. This is the group you would like to sample from because this is the group you are interested in generalizing to. A sample is drawn from a population. The target (study) population often is people who have some particular characteristics in common, such as all American, all eligible voters, all school-age children, and so on. To select a good sample, we need to clearly define the population from which you draw the sample.**

The definition of population should specify four items:

Content: the particular characteristics that the members of the population have in common

Unit: unit of analysis

Extent: spatial or geographic coverage

Time: the temporal period during which a unit must possess the appropriate characteristics to qualify for the sample

Sampling Terminology (Cont.)

Sampling Frame

- -- A listing of all element (cases) in a study population.
- -- In many studies, we draw the actual sample from this listing.

Examples: listings of telephone numbers, or customers from a local electric utility tend to exclude certain groups, such as….???? telephone books???? case lists????

The adequacy of sampling frame is crucial in determining the quality of the sample. In other words, the degree to which the sampling frame includes all members of the population is most important. Some of the adequate sampling frames consist of lists of members of organizations. For example, membership rosters of NASW, APA. The population consists of the sampling frame, and we can make legitimate generalizations only about the sampling frame. Many social workers, for example, do not belong to NASW. Thus, a sample taken from the NASW membership roster represents only NASW members and not all social workers. It is important to assess carefully who the list includes and who the list excludes.

Why Random Selection?

- The word **random** refers to a process that generates a mathematically random result, one in which no humanly generated pattern exists.
- Social work researchers usually try to select their cases using a random procedure in order to assure that no human bias exists in the selection process. They hope that the inferences they draw from their study will be maximally generalizable, statistically accurate, and useful. Using random procedures allows the use of probability sampling methods.

Sampling Techniques

Probability Sampling

- based on **probability theory**
- ***equal probability of selection*** can ensure representativeness
- ***random selection***
- Can estimate ***sampling error***

Types of probability sampling

Simple Random Sampling
Stratified Sampling
Cluster Sampling

Simple Random Sampling (SRS)

- Applies random selection using random numbers
- Generally assumed in all probability sampling applications.
- Once a sampling frame has been established, the researcher assigns a single number to each member in the list without skipping any number in the process.
- A table of random numbers is sometimes used to select element for the sample
- Many computer programs can generate a series of random numbers.
- SRS is easy to accomplish and explain to others.
- SRS often is impractical, especially not most statistically efficient when dealing with large scale projects.
- Simple vs. not most efficient & not good representation of subgroups

To deal with these issues you may turn to other sampling techniques.

Stratified Sampling

For even greater precision, and to ensure adequate numbers of small subgroups (e.g., ethnic minority groups) in the sample.

(1) Divide the sampling frame into homogeneous subgroups

↓

(2) Taking a SRS in each subgroup

You will be able to represent not only overall population, but also key subgroups of population, especially small minority group (age, gender, etc.).

Cluster Sampling

You may have to sample a population that is spread across a wide geographic region. Imagine taking a SRS of all the residents of CA to conduct personal interviews. By the luck of the draw, you will wind up with respondents who come from all over the state. Your interviewers are going to have a lot of traveling to do.

Cluster random sampling addresses the problem. Use the follow steps:

(1) Divide a population into clusters

(usually along geographic boundaries) or some populations are already grouped into clusters (e.g., churches, schools)

↓

(2) randomly select clusters

↓

(3) measure all elements within sampled clusters.

We carry out cluster sampling mainly because of efficiency of administration, and to reduce the need to even larger samples.

Nonprobability Sampling

We can use probability sampling techniques only when we can have a sampling frame. Many times in social work research, it is impossible to develop a sampling frame of a population. For example, undocumented immigrants are, by definition, not listed anywhere

Perhaps you just want to evaluate a program in a your agency and don't care whether the program would work with other people in other places and at other times.

Researchers often must rely on their judgment to purposively select a sample that seems representative or that seems to fit the purpose of the inquiry. Sometimes they simply rely on available subjects

All of the sampling techniques that do not involve the use of probability methods are called nonprobability sampling (do not involve random selection). Generally, probability sampling is the preferred method.

However, in some circumstances in applied social research, it is not feasible, practical, or theoretically sensible to use random sampling.

When you use nonprobability sampling, it is important to be cautious and mindful of the risks inherent in it.

Convenience and Purposive Sampling

Convenience (availability) Sampling:

--relying on available subjects

--inexpensive and uses ready access to a certain population

--you can ask for volunteers and provide incentives to them

--weakness is that you have no evidence of representativeness

--you must justify that this is the most feasible method

Purposive Sampling:

--based on researcher's judgment or prior knowledge

--suppose that you want to examine effect of support group among female, adult children, of aged adults– you would purposively choose aged adult caregivers, who are female, adult children, and never been in a support group.

Quota and Snowball Sampling

Quota Sampling

You rely on available subjects but strive to representatives by constructing matrix representing one or more characteristics (gender, age, education, religion, race, etc.), and then collecting data from people who had all the characteristics in a given parameter.

You continue sampling for each cell until you get the desired number and then stop.

If you already have 40 women for your sample, but not the 60 men, you would continue to sample men. If eligible women respondents come along, you would not sample them because you have already met your quota.

Although using quotas may improve representativeness, it is still nonprobability sampling and rely on available subjects - often depending on who comes along when.

Snowball Sampling

You begin by identifying people who meet the criteria for inclusion in your study.

Then you ask them to recommend others they know who also meet the criteria.

Subjects are accumulated gradually in a snowball fashion. For example, if you are studying undocumented immigrants, you are not likely to find good lists of immigrants within a specific geographic area. However, if you identify one or two, you may find that they know who the other illegal immigrants in the area and how you can find them. Useful in investigating in sensitive topics, such as child abuse or drug use, where the perpetrators or the victims might hesitate to identify themselves if approached by a stranger, such as a researcher, but might be open to an approach by someone who they know shares their experiences or deviant status.

Although probability sampling is less risky than nonprobability sampling from the standpoint of generalizing accurately to a population, some good studies use nonprobability sampling. Rather than think you must always use probability sampling, you should understand when certain sampling techniques are more appropriate than others, the functions of each techniques, how feasibility constraints bear on the choice of a sample procedures, and the risks inherent when samples are too small or vulnerable to bias.

Extreme Case, Sequential, and Theoretical Sampling

- **Extreme Case** – select cases based on their unusualness or difficulty of finding
- **Sequential** – select cases based on some preset order of selection
- **Theoretical** – select cases according to theory

Determining Sample Size

- Should consider the number of variables, the amount of sampling errors, population homogeneity, sampling fraction (the number of element in the sample relative to the number of elements in the population), and sampling techniques (more complex sampling techniques requires bigger sample sizes).
- Often determined by multiplying the number of variables by the minimum number of cases per variables required by the appropriate statistical procedure
- Statistical power analysis: how large a sample needs to be in order for researchers to have an adequate probability of obtaining statistically significant findings.

Sensitivity to Diversity in Sampling

Regardless of whether you are using probability or nonprobability sampling techniques, you should be careful to avoid biases:

- **Gender bias – do** not generalize to both genders when one gender is not adequately represented in the research sample.
- **Use cultural sensitivity** in all phases of research, including sampling.
- Carefully examine whether certain minority groups are inadequately represented in the sample, or unwarranted generalizations are made to the entire population.
- Employ local community members as research staff
- Providing transportation and child care or data collection at home
- Choose a sensitive and accessible setting - may not want to travel to strange area, convenient and safe setting
- Use and train culturally competent interviewers & bilingual staff