

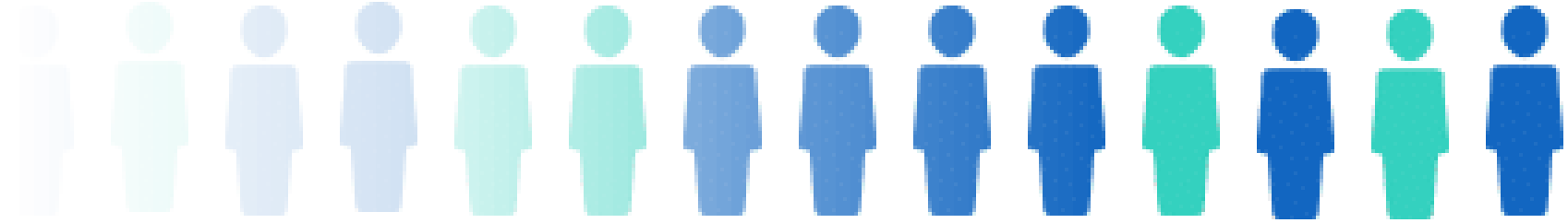
LCDB7011

Quantitative Research Methods

Week 2 – Sampling
Dr. Helen LEE



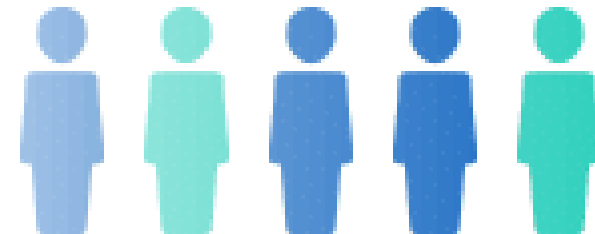
Population



Population and Sample



Sample



<https://www.scribbr.com/methodology/population-vs-sample/>

Population and Sample (Field, 2005)



- **Population:** Business researchers are interested in understanding organisational dynamics, be it from the marketing, consumers, strategy, accounting aspects, amongst others. Population implies the entire people in a setting.
- **Population** could be:
 - a. Very general – implies all human beings in a setting
 - b. very small – e.g. all males of a certain age born in a certain location; all male Chinese students at UWTSD, etc.
- **Sample:** Populations are usually large, we never have access to the entire population, So, we collect data from a sub-set. That sub-set is called Sample.

SAMPLING

- A sample is “a smaller (but hopefully representative) collection of units from a population used to determine truths about that population” (Field, 2005)
- Why sample?
 - Resources (time, money) and workload – we cannot do it all!
 - Gives results with known accuracy that can be calculated mathematically
- The sampling frame is the list from which the potential respondents are drawn
 - E.g. the population of a town
 - E.g. Course participants
 - Must assess sampling frame errors

SAMPLING.....

- Decide: What is your population of interest?
 - To whom do you want to generalize your results?
 - E.g. All people in a certain place
 - E.g. Students
 - Young people (18-25)
 - E.g. Women aged 15-45 years
- Can you sample the entire population?

Sample Representativeness

Three factors influence sample representativeness:

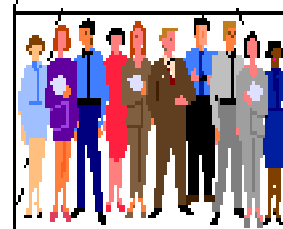
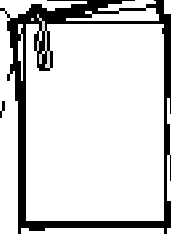
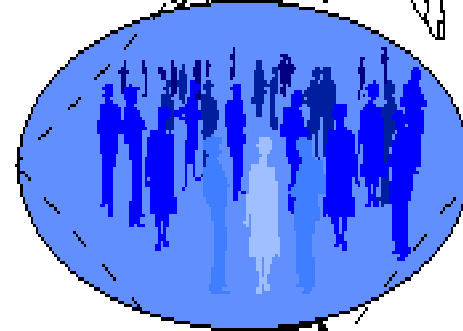
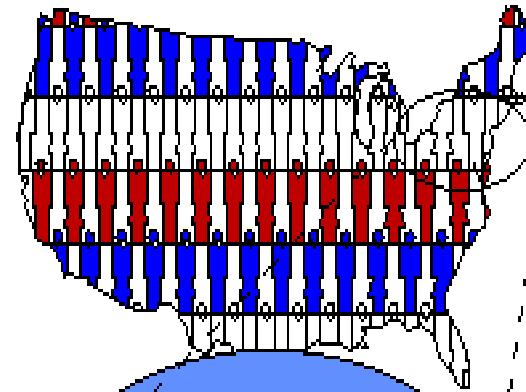
1. Sampling procedure
2. Sample Size
3. Participation

Who do you want to generalize to?

What population can you get access to?

How can you get access to them?

Who is in your study?



The Theoretical Population

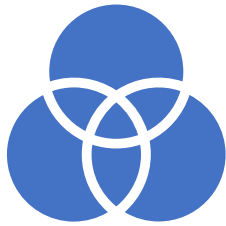
The Study Population

The Sampling Frame

The Sample

SAMPLING BREAKDOWN

SAMPLING.....

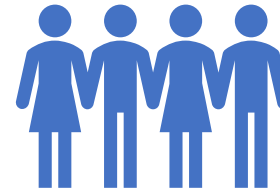


3 factors that influence sample representative-ness

Sampling procedure

Sample size

Participation (response)



When might you sample the entire population?

When your population is very small

When you have extensive resources

When you don't expect a very high response

Types of Samples

- Probability (Random) Samples

All members of your target population have the same chance to be included in your research)

- Non-Probability Samples

Only some elements of the population are included, based on convenience availability or because the researcher decides they are representative. Therefore, it is not known to which extent the sample really represents the population.

Process

- The sampling process comprises several stages:
 - Defining the population of concern
 - Specifying a sampling frame, i.e. a set of items or events possible to measure
 - Specifying a sampling method for selecting items or events from the frame
 - Determining the sample size
 - Implementing the sampling plan
 - Sampling and data collecting
 - Reviewing the sampling process

SAMPLING FRAME

- Because a researcher rarely has direct access to the entire population of interest in social science research, a researcher must rely upon a **sampling frame** to represent all of the elements of the population of interest.
- A sampling frame is a list or other device used to define a researcher's population of interest.
- The sampling frame must be representative of the population.
- Examples:
 - Class list
 - Business directory
 - Client list

- (Douglas B. Currivan (2004) "Sampling Frame" Sage Encyclopedia of Research Methods, srmo.sagepub.com/view/the-sage-encyclopedia-of-social-science-research-methods/n884.xml)

Practicality

- Identify possible sampling frames in your area of interest.
In other words, where are you going to get your respondents from?
- Ensure that your suggestions are representative.

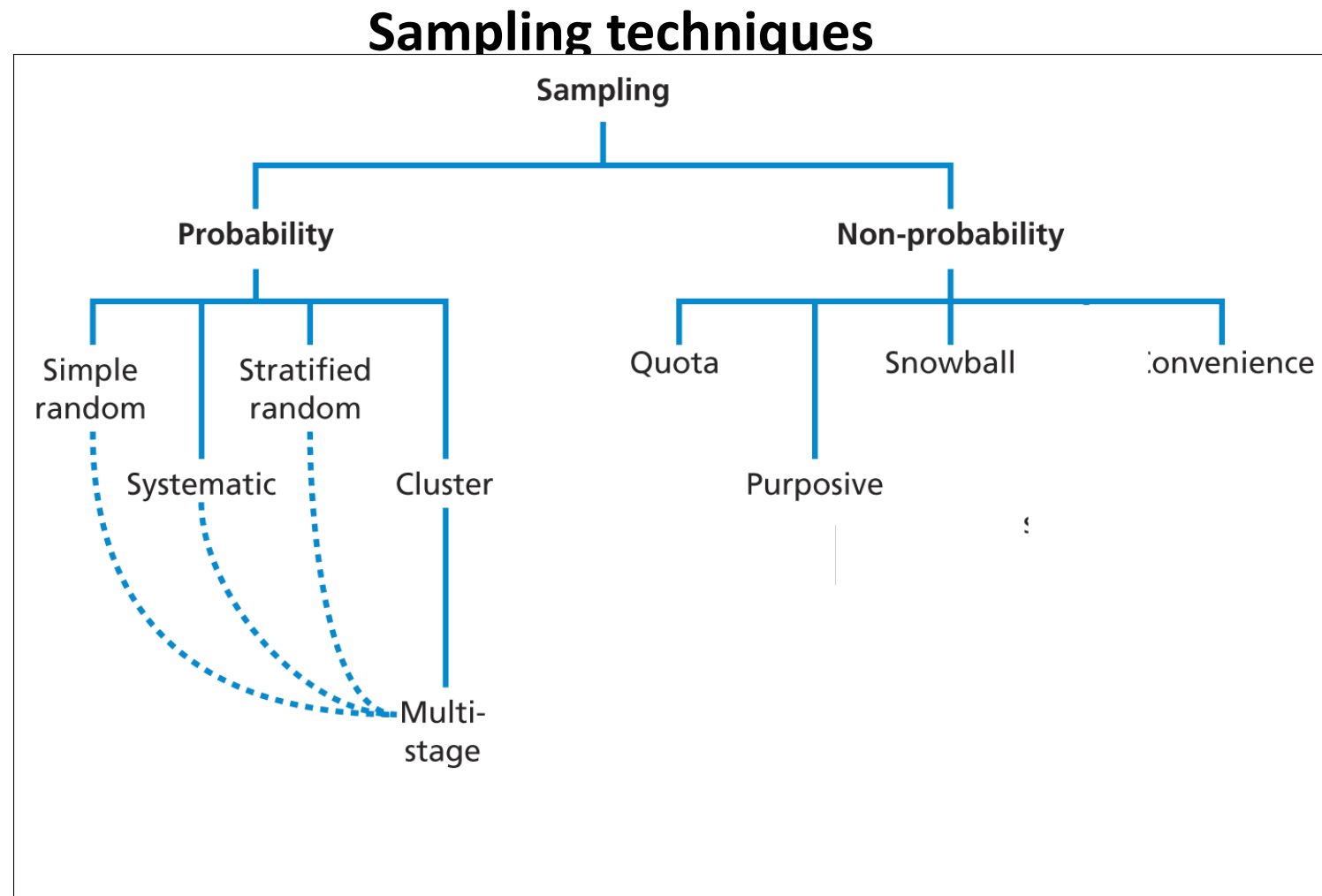
Random Sampling and Non-random Sampling

<https://youtu.be/be9e-Q-jC-0?si=BwY8W2Hn2X5AksTW>

[What is sampling | Probability vs Non Probability sampling | Methods | Types & Technique Explained \(youtube.com\)](#)
(6:45 mins)

[Sampling: Sampling & its Types | Simple Random, Convenience, Systematic, Cluster, Stratified](#) (13:17)

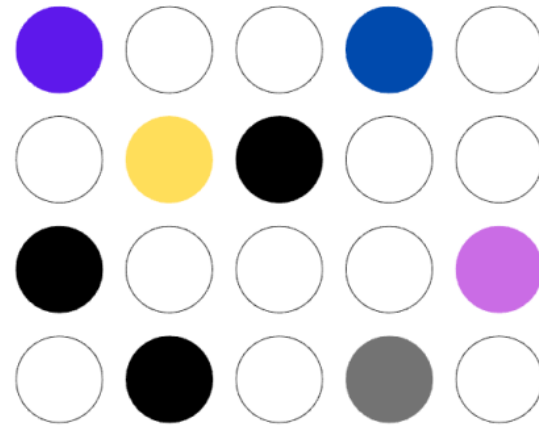
Sampling and Sample Size



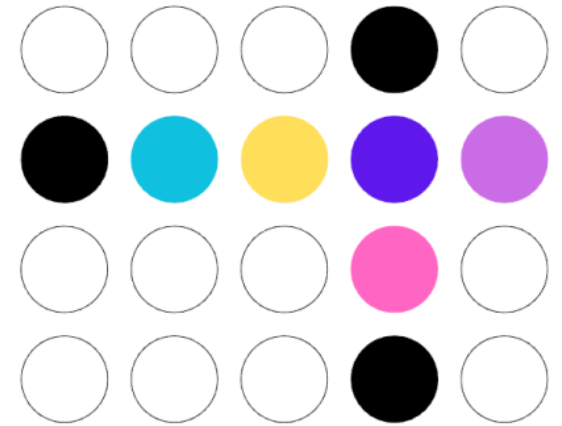
Source: Saunders et al. (2009)

Probability Sampling Vs Non-Probability Sampling

**Probability
sampling**

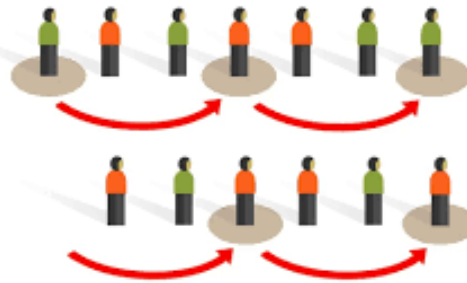


**Non-probability
sampling**

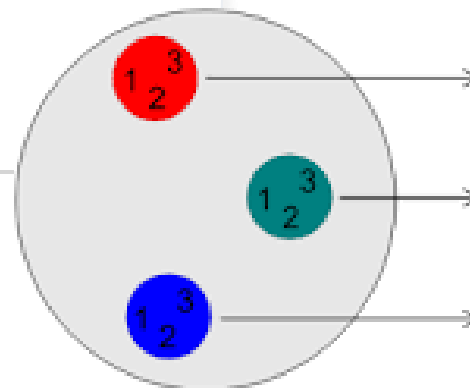
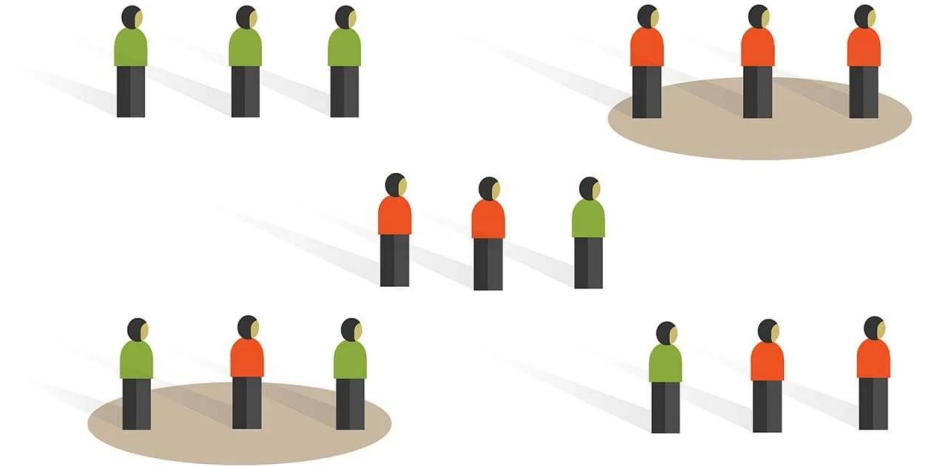


Random Sampling

Systematic sampling



Cluster sampling



Population



Strata



Stratified sample



PROBABILITY SAMPLING

- A **probability sampling** scheme is one in which every unit in the population has a chance (greater than zero) of being selected in the sample, and this probability can be accurately determined.
- Probability sampling includes:
 - Simple Random Sampling → picking a sample at random
 - Systematic Sampling → picking every n th respondent
 - Stratified Random Sampling → pick randomly within specified groups, e.g. same number of randomly selected men and women
 - Cluster Sampling → all or randomly selected individuals within a naturally present grouping 'cluster' e.g. geographical area that is assumed to be representative of the sampling population

PROBABILITY SAMPLING

Nonresponse effects can turn *any* probability design into a nonprobability design.

- Who has not responded?
- Is there a pattern?
- Was there a group of late responders? Are their answers different?

SIMPLE RANDOM SAMPLING

- Applicable when population is small, homogeneous & readily available
- All members of the population are given an equal probability to be included.
- A table of random number or lottery system is used to determine which units are to be selected.

Disadvantages

- If sampling frame large, this method impracticable.
- Minority subgroups of interest in population may not be present in sample in sufficient numbers for study.

SYSTEMATIC SAMPLING

- Systematic sampling is based selecting respondents according to a pre-arranged scheme, such as choosing every 10th name from a list
- All elements have the same probability of selection (in the example given, one in ten). It is *not* 'simple random sampling' because different subsets of the same size have different selection probabilities - e.g. the set {4,14,24,...,994} has a one-in-ten probability of selection, but the set {4,13,24,34,...} has zero probability of selection.



SYSTEMATIC SAMPLING

As described above, systematic sampling is an EPS method, because all elements have the same probability of selection (in the example given, one in ten). It is not 'simple random sampling' because different subsets of the same size have different selection probabilities - e.g. the set {4,14,24,...,994} has a one-in-ten probability of selection, but the set {4,13,24,34,...} has zero probability of selection.



STRATIFIED SAMPLING

Where a population embraces a number of distinct categories, the frame can be organized into separate "strata." (groups). Each stratum is then sampled as an independent sub-population, out of which individual elements can be randomly selected.

- Every unit in a stratum has same chance of being selected.
- Using same sampling fraction for all strata ensures proportionate representation in the sample.
- Adequate representation of minority subgroups of interest can be ensured by stratification & varying sampling fraction between strata as required.
- Selection of criteria can become complicated
- Multiple strata may require a higher sample size

CLUSTER SAMPLING

Cluster sampling is an example of 'two-stage sampling'

- A number of (geographical) areas is chosen;
- A sample of respondents *within* those areas is selected.
- Population divided into clusters of homogeneous units, usually based on geographical contiguity.
- Sampling units are groups rather than individuals.
- A sample of such clusters is then selected.
- All units from the selected clusters are studied.
- Can cut travel and other costs but can also lead to higher sampling error, e.g. clusters may not be representative.

Difference Between Strata and Clusters

- Although [strata](#) and clusters are both non-overlapping subsets of the population, they differ in several ways.
- All strata are represented in the sample; but only a subset of clusters are in the sample.
- With stratified sampling, the best survey results occur when elements within strata are internally [homogeneous](#). However, with cluster sampling, the best results occur when elements within clusters are internally [heterogeneous](#)

Video on Sampling



Sampling (4:55 mins)

<https://youtu.be/be9e-Q-jC-0>

NON-
PROBABILITY
SAMPLING

CONVENIENCE

VOLUNTEER



NON-PROBABILITY SAMPLING

- Any sampling method where some elements of population have *no* chance of selection , or where the probability of selection can't be accurately determined. It involves the selection of elements based on assumptions regarding the population of interest,
- *Example: We visit every household in a given street, and interview the first person to answer the door. In any household with more than one occupant, this is a nonprobability sample, because some people are more likely to answer the door (e.g. an unemployed person who spends most of their time at home is more likely to answer than an employed housemate who might be at work when the interviewer calls) and it's not practical to calculate these probabilities.*





NON-PROBABILITY SAMPLING

- Non-probability Sampling includes:
 - **Convenience Sampling** : based on convenience
 - Snowball Sampling: based on one respondent encouraging another person to participate in the research
 - Quota Sampling : based on a predetermined number of respondents from mutually exclusive groups. The ratio may or may not reflect the ratios in the target population.
 - Purposive Sampling: based on the characteristics of the respondents, e.g. certain level of experience, job type held etc.

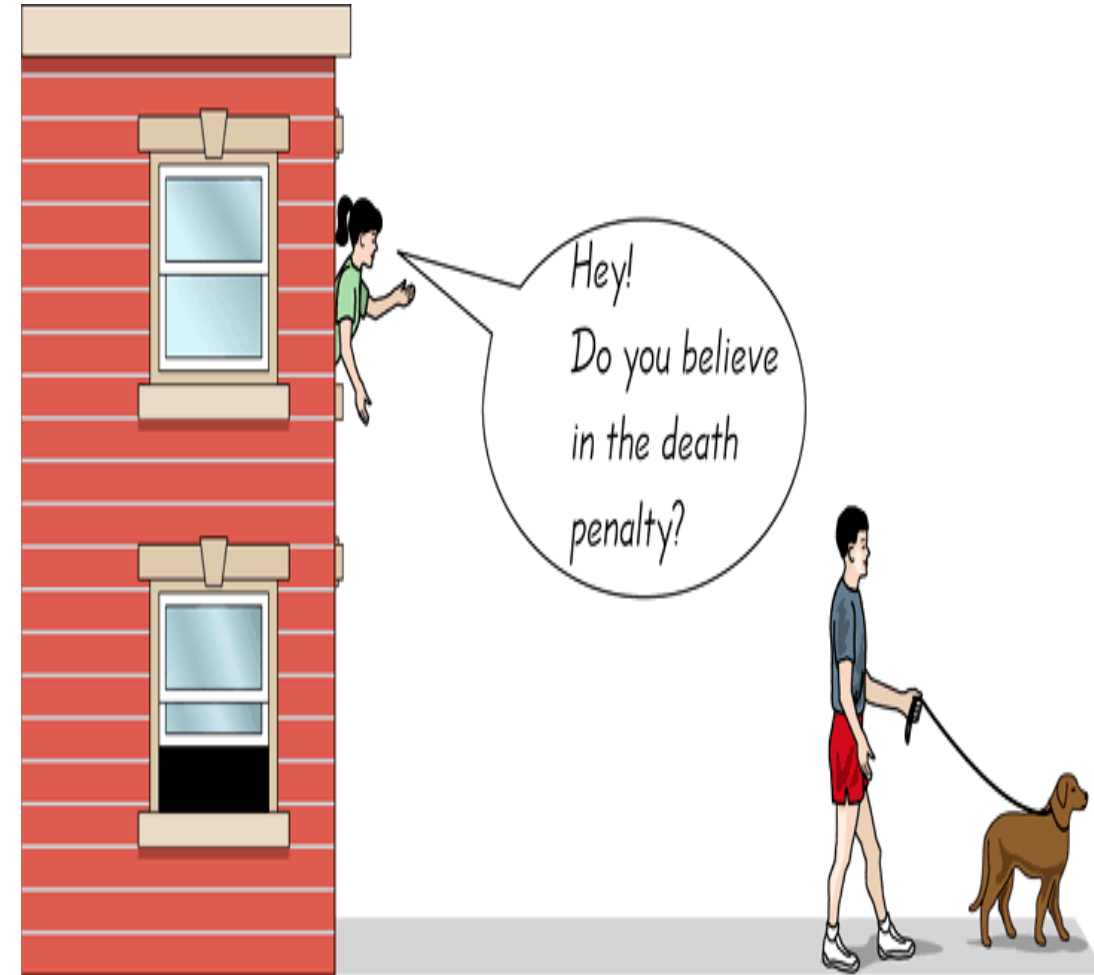
All of these methods need a strong justification in your research design chapter!

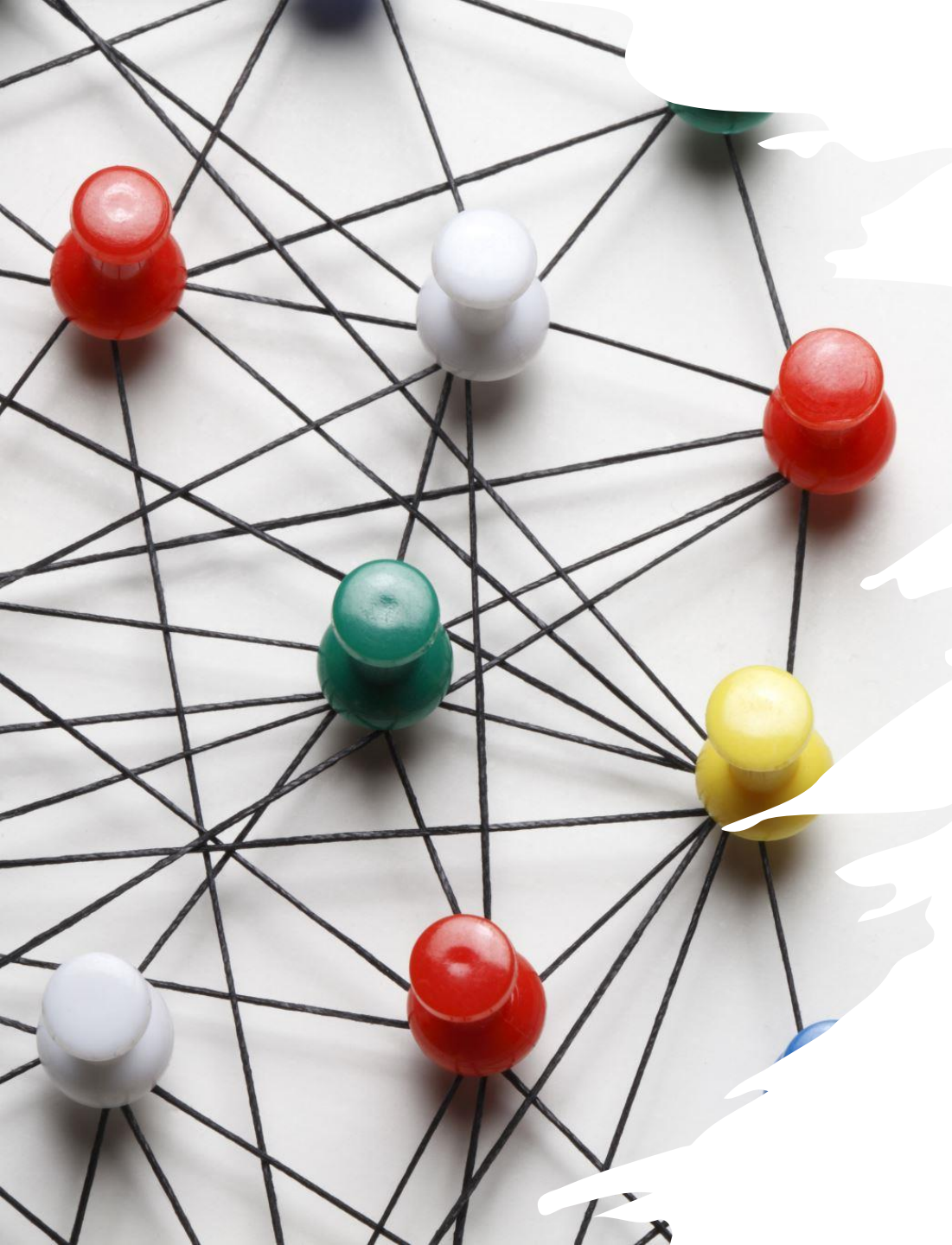
CONVENIENCE SAMPLING

- Use results that are *easy to get*

-In this type of non-probability sampling, the sample is made up of those elements or units of the population that are closely available and convenient to reach.

-A major disadvantage of this type of sampling is that the researcher cannot make a scientific generalisation about the total population based on the sample.





Summary

- Quantitative research needs to be based on a sample population and a sample frame.
- Sampling methods are differentiated into probability and non probability methods.
- Non probability methods generally include convenience, snowballing, quota sampling
- Probability sampling includes methods such as Simple Random Sampling, Systematic Sampling, Stratified Random Sampling, or Cluster Sampling
- [Sampling: Simple Random, Convenience, systematic, cluster, stratified - Statistics Help](#)

