

# Final Project

Prepared by Dr. Alfaisal Hasan

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Lecture NO 3



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**Dr. Alfaisal Hasan**

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# Research Population and Sampling

# Introduction

The stage of defining the research community and selecting the appropriate sample for research represents an essential stage in the scientific research process, whereby the tools that will be used in collecting the data are determined, as well as the methods of analyzing these data that are collected, whether from the research community or the sample, and the generalizability of the results obtained. In some cases, the researcher may not have sufficient skills to help him identify the research Population, which leads the researcher to a wrong choice of the sample used, which entails the inadequacy of the tools employed to analyze the data collected, and then the lack of The credibility of the results obtained

# Introduction

## Population

The study population is a subset of the target population from which the sample is actually selected.

## Sample

A subgroup of the study population that the researcher chooses according to certain bases to collect data from them that enable him to study the phenomenon under research and test hypotheses, and then the possibility of generalizing the results to the study population.

## Reasons for using the sample method

- Geographical spread of the study population
- Difficulty identifying the study population
- Time factor
- Cost element
- Changes in the study population
- control and supervision
- The extent of the homogeneity of the Study Population

# 1. Random (Probability) Samples

- ❑ It depends on the equality of the probabilities of choosing any member of the original community.
- ❑ Randomness is the researcher's way of achieving parity between individuals.
- ❑ The researcher is given a representative sample of its population at a lower cost while avoiding the researcher's selection bias and the resulting problems that question the validity of the results.
- ❑ The probability samples participate in defining the study population, preparing a list of its components, and then choosing a sample of sufficient size to represent the characteristics of the population.

## 1.1 Simple Random Samples

- A simple random sample is a technique for selecting a subgroup of a population where the prospect of getting selected is equal for all the population members.
- Since the sample is selected randomly or by chance, a simple random sample fairly represents the characteristics of the population under study.
- A simple random sample can be chosen randomly from any defined population, assuming that every member is eligible to be picked.

## 1.1 Simple Random Samples

### Lottery method

When the population list is prepared, each member of the population is marked with a number. The numbers are drawn randomly from the box to select samples. In our example, the researcher must choose 300 students from 15,000. All the students are assigned a number. The researcher will randomly draw 300 numbers out of a box filled with numbers from 1 to 15,000.

## 1.1 Advantages of Simple Random Samples

- Study Population items have equal chances of selection.
- Don't be bound by a specific order or planned system.
- No prior knowledge of the study population is required.
- Due to its reliance on the law of probability, it avoids bias.
- The sample can be pulled easily from lists that include data on the study population.
- Low sampling error as it requires the homogeneity of the study population.
- Using computer programs for selection can save time, effort, and money.

## Disadvantages of Simple Random Samples

- Tables of random numbers are tedious, especially if the sample is large.
- Advanced lists are not available for the study community, and if they are, they are usually inaccurate
- In the case of uncertainty about the homogeneity of the study population, the results obtained may lead to errors.

## 1.2 Systematic Sample

- In which the individual is selected from the sample randomly, then the researcher proceeds to choose the rest of the cases on regular or equal numerical dimensions between the cases so that the distance between any two successive units is fixed in all cases  $k$ .

## 1.2 Systematic Sample

❑ We follow the following steps:

- 1- Determine the original community (N)
- 2- Determine the desired sample size (n)
- 3- Determining the skip interval (the distance between the sample members) through  $K = N/n$
- 4- Randomly choose a number between (1 and the value of K)
- 5- Add to the chosen number the value of K regularly to get the sample you want

## 1.2 Systematic Sample

Example: If the original population consists of (100) units, and we want to obtain a sample of (20) units, how can you achieve this using regular random sampling?

$$K = N/n$$

$$N=100 \text{ \& } n=20$$

$$K=100/20=5$$

Now choose a number between (1 and 5), let it be (4), and that is random, and we make the number (4) the starting point, and we add (5) to it constantly and regularly, so that the size of the selected sample becomes (20) individuals.

## 1.2 Systematic Sample

knowing that :

1. The first case was randomly selected, which is (4)
2. Second case = First case +  $K = 4 + 5 = 9$
3. 3rd case = 2nd case +  $K = 9 + 5 = 14$
4. Fourth case = Third case +  $K = 14 + 5 = 19$

Thus, it becomes clear that to determine any unit, we must know the unit number that precedes it and then add to it the length of the category

## 1.2 Advantages Systematic Sample

- Easy to Execute and Understand.
- Control and Sense of Process.
- Clustered Selection Eliminated.
- Low-Risk Factor.
- Assumes the Size of the Population Can Be Determined.
- Need for a Natural Degree of Randomness.
- Greater Risk of Data Manipulation

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## 1.3 Stratified Random Sample

- Stratified random sampling allows researchers to obtain a sample population that best represents the studied population by dividing it into **subgroups called strata**.
- To increase the probability of representing the characteristics of the population in the sample, we resort to **stratified random sampling**.
- It is another type of random sampling, but it deals with a **heterogeneous population**.

## 1.3 Stratified Random Sample

- 1- Identification of the Whole Population.
- 2- Determining the sub-population based on the characteristics of the population.
- 3- Determine the sample size
- 4- Classify the members of society according to the previously defined sub-classes so that each individual belongs to **only one group**.
- 5- Choosing a simple random sample from each sub-layer.

## 1.3 Stratified Random Sample

❑ Stratified random sampling divides the population into smaller groups, or strata, based on shared characteristics. A random sample is taken from each stratum in direct proportion to the stratum's size compared to the population.

### ❑ Equal Method:

An equal number is taken from each stratum, even if the number of individuals differs.

- There is equality between classes, even in the case of difference.

## 1.3 Stratified Random Sample

### □ Proportional Method :

A number is taken here proportional to the percentage each population stratum represents. If we have a population whose size is  $(n)$  and can be divided into several layers with different sizes, we are supposed to choose samples from each.

## 1.3 Stratified Random Sample

❑ Ideal Method :

This method is one of the most accurate methods, as it does not limit the number to each stratum of the population but rather is concerned with the degree of variance within each layer; if it is large, the number increases, and if the group is homogeneous, the number decreases.

## 1.3 Stratified Random Sample

❑ The following is an example of stratified random sampling:

Researchers are performing a study designed to evaluate the political leanings of economics students at a major university. The researchers want to ensure the random sample best approximates the student population, including gender, undergraduates, and graduate students.

## 1.3 Stratified Random Sample

❑ The following is an example of stratified random sampling:

The total population in the study is **1,000** students and from there, subgroups are created as shown below.

- Male undergraduates = 450 students (out of 100) or 45% of the population
- Female undergraduates = 200 students or 20%
- Male graduate students = 200 students or 20%
- Female graduate students = 150 students or 15%

## 1.3 Stratified Random Sample

❑ The following is an example of stratified random sampling:

The Faculty members' training needs

- Lecturer =  $500 * 20\% = 100$
- Assistant Prof =  $1000 * 20\% = 200$
- Associate Prof =  $300 * 20\% = 60$
- Professor =  $100 * 20\% = 20$
- Total =  $1900 * 20\% = \mathbf{380}$

## 1.3 Stratified Random Sample Advantage

### **Accurately Reflects Population Studied**

Stratified random sampling accurately reflects the studied population because researchers are stratifying the entire population before applying random sampling methods. In short, it ensures that each subgroup within the population receives proper representation within the sample.

As a result, stratified random sampling provides better coverage of the population since the researchers control the subgroups to ensure that all of them are represented in the sampling.

(Murphy, 2021 )

## 1.3 Stratified Random Sample Disadvantage

### Can't Be Used in All Studies

This method of research cannot be used in every study. Several conditions must be met for it to be used properly. Researchers must identify **every member of a population being studied** and classify each of them into one, and only one, **subpopulation**. As a result, stratified random sampling is disadvantageous when researchers can't confidently classify every member of the population into a subgroup. Also, finding an exhaustive and definitive list of an entire population can be challenging.

(Murphy, 2021 )

## 1.4 Cluster Random sampling

- In cluster sampling, researchers divide a population into smaller groups known as **clusters**. They then randomly select among these clusters to form a sample.
- Cluster sampling is a probability sampling method often used to study large populations, particularly those widely dispersed. Researchers usually use pre-existing units such as schools or cities as their clusters.

(Thomas, 2022 )

## 1.4 Cluster Random sampling

### Step 1: Define your population

As with other forms of sampling, you must first begin by clearly defining the population you wish to study.

### Step 2: Divide your sample into clusters

This is the most essential part of the process. The quality of your clusters and how well they represent the larger population determines the [validity](#) of your results.

(Thomas, 2022 )

## 1.4 Cluster Random sampling

### **Step 3: Randomly select clusters to use as your sample**

If each cluster is a mini-representation of the larger population, randomly selecting and sampling from the clusters allows you to imitate simple random sampling, which supports the validity of your results.

### **Step 4: Collect data from the sample**

You then conduct your study and collect data from every unit in the selected clusters.

(Thomas, 2022 )

## 1.4 Cluster Random sampling

A researcher aims to identify the thoughts of primary school teachers about the role of the educational supervisor in the educational process and the community consists of **(5000)** teachers distributed over **(100)** schools, and it wants to obtain a sample of **(500)** teachers. How is this done using cluster randomization?

- 1- The size of the community (5000) teachers.
- 2- The desired sample size (500) teachers.
- 3- The average number of teachers in schools =  $5000 \div 100 = 50$  teachers in each school.
- 4- The number of selected clusters (schools) =  $500 \div 50 = 10$  schools.
- 5- The researcher randomly selects (10) schools from (100).
- 6- The sample size is all teachers in the selected schools.

## 1.4 Cluster Random Sampling Advantages

- Cluster sampling is time- and cost-efficient, especially for samples that are widely geographically spread and would be difficult to sample otherwise correctly.
  - Because cluster sampling uses randomization if the population is clustered properly, your study will have high [external validity](#) because your sample will reflect the characteristics of the larger population.
- (Thomas, 2022 )

## 1.4 Cluster Random Sampling Disadvantages

- [Internal validity](#) is less strong than with simple random sampling, particularly as you use more stages of clustering.
- If your clusters are not a good mini-representation of the population as a whole, then it is more difficult to rely upon your sample to provide valid results.
- Cluster sampling is much more complex to plan than other forms of sampling.

(Thomas, 2022 )

## 2. Non-Random Samples

- **Non-probability sampling uses non-random criteria like the availability, geographical proximity, or expert knowledge of the individuals you want to research to** answer a research question.
- Non-probability sampling is used when the population parameters are either unknown or impossible to identify individually. For example, visitors to a website that doesn't require users to create an account could form part of a non-probability sample.

(Nikolopoulou, 2022)

## 2. 1. Convenience sampling

**Convenience sampling** is primarily determined by convenience to the researcher.

This can include factors like:

- Ease of access
- Geographical proximity
- Existing contact within the population of interest

Convenience samples are sometimes called “accidental samples” because participants can be selected for the sample simply because they happen to be nearby when the researcher is collecting data.

(Nikolopoulou, 2022)

## 2. 1. Convenience sampling

**Example:** you are investigating the association between daily weather and shopping patterns. To collect insight into people's shopping patterns, you decide to stand outside a significant shopping mall in your area for a week, stopping people as they exit and asking them if they are willing to answer a few questions about their purchases

(Nikolopoulou, 2022)

## 2. 2. Intended sampling

It is also called the **target sample** because the researcher chooses this type of sample to achieve **his purpose** so that he estimates his need for information, and he selects the study sample freely, meaning that this type of sample is not representative of anyone.

- The selection is made according to specific criteria.
- Availability of certain characteristics in the sample units.
- Choose units intentionally.

## 2.3. Quota sampling

- ❑ Select a predetermined number or proportion of units, called a quota. Your quota should comprise subgroups with specific characteristics (e.g., individuals, cases, or organizations) and be selected non-randomly.
- ❑ Your subgroups, called **strata**, should be mutually exclusive. Your estimation can be based on previous studies or other existing data if there are any

## 2.3. Quota sampling

- ❑ This helps you determine how many units should be chosen from each subgroup.
- ❑ In the data collection phase, you continue to recruit units until you reach your quota.

### Tip

- ❖ Your respondents should be recruited non-randomly, with the end goal being that the proportions in each subgroup coincide with the estimated proportions in the population.

## 2.3. Quota sampling

1. Proportional quota sampling is used when the size of the population is known. This allows you to determine the quota of units you need to include in your sample to represent your population.

Example: in a particular company, there are 1,000 employees. They are split into 2 groups: 600 people who drive to work and 400 who take the train.

You decide to draw a sample of 100 employees. You would need to survey 60 drivers and 40 train riders for your sample to reflect the proportion seen in the company.

## 2.3. Quota sampling

### 2. Non-proportional

- Used when the size of the population is unknown. Here, it's up to you to determine the quota of units you will include in your sample in advance.

**For example, you are seeking opinions about the design choices on a website** but do not know how many people use it. You may draw a sample of 100 people, including a quota of 50 people under 40 and 50 over 40.

- This way, you get the perspective of both age groups.

(Nikolopoulou, 2022)

## 2.3. Quota sampling

**Note that quota** sampling may sound similar to [stratified sampling](#), a probability sampling method where you divide your population into subgroups that share a common characteristic.

- ❖ The critical difference here is that in stratified sampling, you take a random sample from each subgroup. In contrast, in quota sampling, the sample selection is non-random, usually via convenience sampling. In other words, who is included in the sample is left up to the subjective judgment of the researcher. you take a random sample from each subgroup in stratified sampling

(Nikolopoulou, 2022)

## 2.3. Quota sampling

**Example:** You are seeking to interview 20 homeowners and 20 tenants between the ages of 45 and 60 living in a particular suburb.

- ✓ You stand at a convenient location, such as a mall, and randomly select people to talk to who appear to satisfy the age criterion. You must first determine whether they do indeed fit the criteria of belonging to the predetermined age range and owning or renting a property.
- ✓ Sampling continues until quotas for various subgroups have been selected. If contacted units are unwilling to participate or do not meet one of the conditions (e.g., they are over 60 or do not live in the suburb), they are replaced by those who do.

## 2.4. Snow Ball Sampling

- Is used when the population you want to research is challenging or there is no existing database or other sampling frames to help you find them. Research about socially marginalized groups such as drug addicts, homeless people, or sex workers often uses snowball sampling.
- To conduct a snowball sample, find one willing to participate in your research. You then ask them to introduce you to others.
- Alternatively, your research may involve finding people who use a specific product or have experience in the area you are interested in. In these cases, you can also use networks of people to gain access to your population of interest.

(Nikolopoulou, 2022)

## 2.4. Snow Ball Sampling

### Example:

- ✓ You are studying homeless people living in your city. You start by attending a housing advocacy meeting and striking up a conversation with a homeless woman.
- ✓ You explain the purpose of your research, and she agrees to participate. She invites you to a parking lot serving as temporary housing and offers to introduce you around.
- ✓ In this way, the process of snowball sampling begins. You met someone who could then put you in touch with others in the group.

(Nikolopoulou, 2022)

## 6. Sample Size

### Factors affecting sample size:

1. The degree of accuracy and confidence in the results that the researcher seeks to achieve:

Accuracy: the larger the sample size, the more accurate the results.

Confidence : means how close the sample results are to the actual results.

2. The degree of generalization that the researcher seeks from the results of his research: The greater the researcher's need and desire for the results of his research to be broadly generalizable to the original study population, the more he must increase the size of the selected sample.

## 6. Sample Size

3. **Homogeneity or heterogeneity:** whenever the characteristics of the population are homogeneous, the required sample size is relatively small, and there is a need to increase the sample size when there are significant and numerous fundamental differences between observations of the study population.
4. **The size of the population:** The more observations of the study population increase, the larger the required sample size and vice versa, noting that the proportion of the sample to the study Population decreases as the population increases.

## 6. Sample Size

### 5. Research Methodology

- Survey research needs a larger number of samples compared to experimental studies which may need a smaller number.

Also, the method used for data collection may impose on the researcher a certain size of the study sample. For example, **observation or interview** requires a relatively small sample size.

# Data Collection

# Introduction

- In the data collection stage, the researcher must consider two types of data that he can use to identify and analyze the various aspects of the phenomenon, which are primary and ***secondary*** data.
- **To collect high-quality data relevant to your purposes, follow these four steps.**

Step 1: Define the aim of your research

Step 2: Choose your data collection method

Step 3: Plan your data collection procedures

Step 4: Collect the data

# Primary & Secondary Data

## ❑ Primary Data

«Data that is collected by the researcher directly for the first time about the phenomenon under study»

Sources: observation, interview, questionnaire, and Focus group.

## ❑ Secondary Data

“Information and data collected by someone earlier.”

# Secondary Data

## Internal sources:

Data in the company's records (number of employees ,production volume ,profits, etc.)

## External Sources:

(books - periodicals - bulletins - statistics - reports .....)

Advantages: including low cost - speed of obtaining - accuracy - .....

Disadvantages include obsolescence of secondary data and problems collecting secondary data from several sources, .....

# Methods for Collecting Primary Data

1. Questionnaire.
2. Interview
3. Observation
4. focus groups.

## **Factors influencing the choice of primary data collection method:**

- The nature of the research.
- The Research Methodology.
- The definition of the population and sample.
- Researcher's time and financial capabilities.
- Researcher's knowledge of the tool used to collect data.

# 1. The Questionnaire

A questionnaire is a research instrument consisting of a set of questions to collect information from a respondent.

## **Methods of distributing the questionnaire:**

1. Direct distribution
2. Regular mail
3. E-mail
4. Website

# 1. The Questionnaire

- ❑ **Structured Questionnaires:** Structured questionnaires collect quantitative data. The questionnaire is planned and designed to gather precise information. It also initiates a formal inquiry, supplements data, checks previously accumulated data, and helps validate any prior hypothesis.
- ❑ **Unstructured Questionnaires:** Unstructured questionnaires collect qualitative data. They use a basic structure and questions but nothing that limits a respondent's responses. The questions are more open-ended to collect specific data from participants.

# 1. The Questionnaire

**Some of the widely used types of questions are:**

A) ***Closed Questions***: each question specifies a set of answers.

Such as yes-no questions, multiple-choice questions, or answers.

***Examples of these questions:***

(1) Do you buy one of the company's products? (Yes / No)

(2) If yes, which of the following is an influencing factor in purchasing the commodity? (more than one answer can be chosen)

- Price.
- The quality.
- The Packing.
- The color.

# 1. The Questionnaire

## **Multiple-Choice Questions:**

Multiple-choice questions are a close-ended question type in which a respondent has to select one (single-select multiple-choice question) or many (multi-select multiple-choice question) responses from a given list of options. The multiple-choice question consists of an incomplete stem (question), correct answers, incorrect answers, close alternatives, and distractors. Of course, not all multiple-choice questions have all of the answer types. For example, you probably won't have the wrong or right answers if you're looking for customer opinion.

# 1. The Questionnaire

**B. Open-Ended Questions:** Open-ended questions help collect qualitative data in a questionnaire where the respondent can answer in an accessible form with little to no restrictions.

# 1. The Questionnaire

**Closed-open questions:**

***Example: What are the appropriate policies to develop the performance of the company's employees?***

- Staff training.
- Material incentives.
- Reducing working hours.
- Decentralize decision-making.
- Other .....

# 1. The Questionnaire

## Steps Involved in Questionnaire Design

### Identify the scope of your research:

Think about what your questionnaire will include before you start designing its look.

The clarity of the topic is of utmost importance as this is the primary step in creating the questionnaire. Once you are clear on the purpose of the questionnaire, you can begin the design process.

# 1. The Questionnaire

## **Be flexible with your options:**

While designing, the survey creator needs to be flexible regarding “option choice” for the respondents. Sometimes, the respondents may not necessarily want to choose from the answer options provided by the survey creator. An “other” option often helps keep respondents engaged in the survey.

## **The open-ended or closed-ended question is a tough choice:**

If the questionnaire requires the respondents to elaborate on their thoughts, an open-ended question is the best choice. If the surveyor wants a specific response, close-ended questions should be their primary choice. The key to asking closed-ended questions is to generate easy data to analyze and spot trends.

# 1. The Questionnaire

## **It is essential to know your audience:**

A researcher should know their target audience. For example, if the target audience speaks primarily Spanish, sending the questionnaire in any other language would lower the response rate and accuracy of the data. Something that may seem clear to you may be confusing to your respondents. Use simple language and terminology that your respondents will understand, and avoid technical jargon and industry-specific language that might confuse your respondents.

# 1. The Questionnaire

## ☐ Questionnaire letter:

A letter from the researcher before starting the questionnaire.

It should include several points, including:

- The research problem and objectives.
- The importance of respondent participation.
- The scientific purpose of the questionnaire.
- The type of information required.
- Confidentiality of the information.

# 1. The Questionnaire

## ☐ Personal data of the respondents:

Such as age, gender, marital status, income, .... etc.

## ☐ Questionnaire topics:

Each part includes questions that reflect one of the study variables and help in data collection and analysis.

# 1. The Questionnaire

## ☐ Questionnaire design skills:

- Follow the questions logically
- Avoid embarrassing questions
- Avoid open-ended questions whenever possible
- The validity of the questionnaire questions
- Keywords
- No overlap between alternatives
- Avoid suggestive questions
- Avoid questions that begin with the negative

# 1. The Questionnaire

## ☐ METHODS FOR TESTING AND EVALUATING SURVEY QUESTIONS :

- Small sample
- Experts (arbitrators)
- Validity and reliability tests

## 2. The Interview

- ❑ An interview is a qualitative research method that relies on asking questions to collect data. Interviews involve two or more people, one of whom is the interviewer asking the questions.
- ❑ There are several types of interviews. **Interview types:**
  - ✓ Structured interviews have predetermined questions asked in a predetermined order.
  - ✓ Unstructured interviews are more free-flowing.
  - ✓ semi-structured interviews fall in between.

## 2. The Interview

### Interview types:

Personal interview - Telephone interview - Computer interview.

### Effective Interviewing Skills:

- ✓ Define the purpose of the interview, such as setting and introducing the interview objectives.
- ✓ Pre-interview preparation, such as identification of persons and entities involved in the interview – identification and preparation of a list of questions.....

## 2. The Interview

- ✓ Implementation and conduct of the interview, such as:

Inform people for the purpose of the interview - Set an appropriate date - Speak out loud - Avoid denying the respondent .....

- ✓ Record information, such as:

Recording information with the exact words used - Informing the respondent of recording the interview - .....

### 3. The Observation

- ❑ Watching and carefully observing a particular behavior or phenomenon under certain environmental conditions and factors to obtain accurate information to diagnose this behavior or phenomenon and to determine the relationship between variables and predict their behavior in the future.
- ❑ **Observation types:**
  - Simple Observation
  - Structured observational

### 3. The Observation

❑ The observation process, including:

- Determining the goal.
- Identify the persons involved.
- Determine the period
- Time and Place
- Observation tools

## 4. The Focus Group

- ✓ A group that usually consists of 7 to 10 people (experts) with a general supervisor
- ✓ Discussions aimed at exchanging ideas and observations.
- ✓ Low-cost method
- ✓ Provides descriptive data, not quantitative data
- ✓ It is challenging to perform statistical operations on this data.

# The Validity

## What is validity?

Validity refers to how accurately a method measures what it is intended to measure. If research has high validity, it produces results corresponding to real properties, characteristics, and variations in the physical or social world.

High reliability is one indicator that the measurement is valid.

# The Validity

## What is Validity?

**Examples:** - If the thermometer shows different temperatures each time, even though you have carefully controlled conditions to ensure the sample's temperature stays the same, the thermometer is probably malfunctioning, and therefore its measurements are invalid.

- If a symptom questionnaire results in a reliable diagnosis when answered at different times and with different doctors, it indicates that it is valid as a measurement of the medical condition.

# The Validity

**However, reliability on its own is not enough to ensure validity. A test may not accurately reflect the real situation even if it is reliable.**

The thermometer that you used to test the sample gives reliable results. However, the thermometer was not calibrated properly, so the result is 2 degrees lower than the true value. Therefore, the measurement is not valid.

# The Validity

## Example:

A group of participants take a test designed to measure working memory. The results are reliable, but participants' scores correlate strongly with their reading comprehension level. This indicates that the method might have low validity: the test may measure participants' reading comprehension instead of their working memory.

# The Reliability

## What is reliability?

Reliability refers to how consistently a method measures something. The measurement is considered reliable if the same result can be consistently achieved by using the same methods under the same circumstances.

### Example:

You measure the temperature of a liquid sample several times under identical conditions. The thermometer displays the same temperature every time, making the results reliable.

# The Reliability

## What is reliability?

**Example:** A doctor uses a symptom questionnaire to diagnose a patient with a long-term medical condition. Several different doctors use the same questionnaire with the same patient but give different diagnoses. This indicates that the questionnaire has low reliability to measure the condition.

# How to Write the Recommendations

**Recommendations in research** are a crucial component of your discussion section and the conclusion of your research paper.

As you conduct your research and analyze the data you collected, perhaps some ideas or results don't quite fit the scope of your research topic. Or, maybe your results suggest further implications of your results or the causal relationships between previously studied variables than covered in extant research.

# How to write the recommendations

## Recommendations for future research should be:

- Concrete and specific
- Supported with a clear rationale
- Directly connected to your research

Overall, strive to highlight ways other researchers can reproduce or replicate your results to draw further conclusions and suggest different directions that future research can take, if applicable.

# How to write the recommendations

There are many ways to frame recommendations, but the easiest is to follow the formula of research question – conclusion - recommendation.

## **Example:**

### **Research question**

How can teachers at your local preschool ensure that social skills that contribute to maintaining peer relationships are promoted in children aged 1 to 4?

# How to write the recommendations

## Conclusion

An essential condition for controlling many social skills is mastering the language. If children have a better command of the language, they can express themselves better and better understand their peers. Opportunities to practice social skills are thus dependent on the development of language skills.

## Recommendation

The investigation revealed that mastering language is essential for social skills. On this basis, future research should examine the ability of language development programs to expand the language skills of children aged 1 to 4.

# How to write the recommendations

## Recommendation example that you can use as a template to write your own:

The current study can be interpreted as a first step in researching COPD speech characteristics. However, the results of this study should be treated with caution due to the small sample size and the lack of details regarding the participants' characteristics.

Future research could further examine the differences in speech characteristics between exacerbated COPD patients, stable COPD patients, and healthy controls. It could also contribute to a deeper understanding of the acoustic measurements suitable for e-health measurements.

# Reference List

Scientific honesty requires the documentation of all references that the researcher used in his research. There are two types of reference documentation:

- The documentation of references within the research.
- The documentation of references at the end of the research. There are several scientific approaches to the process of documenting references, the most important of which are:

# Reference List

**There are several scientific approaches to the process of documenting references, the most important of which are:**

1. The American Psychological Association (APA).
2. Chicago Manual of Style.
3. Harvard Style.



# Thank You