PSY260- RESEARCH METHODS-II

General Revision

&

Classification of Variables on Psychological Research

To review…

1. What are the main ways to classify research in psychology?

2. How does **quantitative research** differ from **qualitative research**?

3. What distinguishes **descriptive**, **correlational**, and **experimental** research?

4. How would you ensure representativeness? – in terms of sample/population

5. Can a study be both correlational and experimental? **Why or why not?**

RESEARCH HYPOTHESIS

- It is the concrete, analyzable-testable form of a research problem.

- It is the expression of predictions about the possible outcome of a research, scientific propositions.

- We form our hypotheses in the light of theories and based on the results of studies in the literature.

Writing a hypothesis;

- *The variables of the research and the levels (different conditions) of the variables are clear.*

- *Our research method and design*

- *It guides the researcher about the statistical analyzes we will use.*

RESEARCH HYPOTHESIS

A good hypothesis;

- Theoretical foundation,

- Not contradicting what is known,

- The relationship between variables should be well defined,

- It should be testable,

- It should be testable with the time and means available,

- Clear, simple, understandable and useful…

RESEARCH HYPOTHESIS

Types of hypothesis:

1. **Null Hypothesis (H0):** There is **no difference** between the groups or indicates that there is no relationship between the variables.

2. **Research Hypothesis (H1):** A **significant difference** between groups or that there is a significant relationship between variables. The research hypothesis is established in two ways;

- **Two way- There is a significant difference or a significant relationship.... are available.**

- **One-way - indicates the <u>direction of the relationship</u> or difference (if an experimental study is not being conducted or the result is uncertain, two-way hypotheses should be preferred)**

RESEARCH VARIABLES

Variables included in the study are;

1.   Dependent Variable

2.   Independent Variable

3.   Confounding Variable

4.   Control Variable

RESEARCH VARIABLES

- **Dependent Variable**: The outcome variable (Y) is the variable whose change is of interest and whose change with respect to other variables is examined (referred to as the predictor variable in correlational research).
- The word "dependent"
- **Example** - Anxiety in social interaction impact on

- **Independent Variable**: An effect on the dependent variable that is thought to provide an effect on the dependent variable included in the study as having an effect (Relational referred to as predictor in research). – YORDAYICI

- What affects the dependent variable?
- **Example** - Anxiety in social interaction impact on

EXAMPLE

- Are students' attitudes towards the course, the teaching method applied, and their gender related to their school achievement scores?

Independent Variable(s): Attitudes towards the course, the teaching method applied, and their gender

**Dependent Variable:** School achievement scores

- **Hypothesis?**

CLASSIFICATION OF VARIABLES

Variables in Measurement and Statistics

- In order to use variables correctly in measurement and statistics, we need to understand their nature.

- Measurement is the numerical expression of the variable examined in the research.

- Each participant in the study is assigned a score related to the relevant characteristic.

- Everything in nature can be measured in **four different** ways.

CLASSIFICATION OF VARIABLES
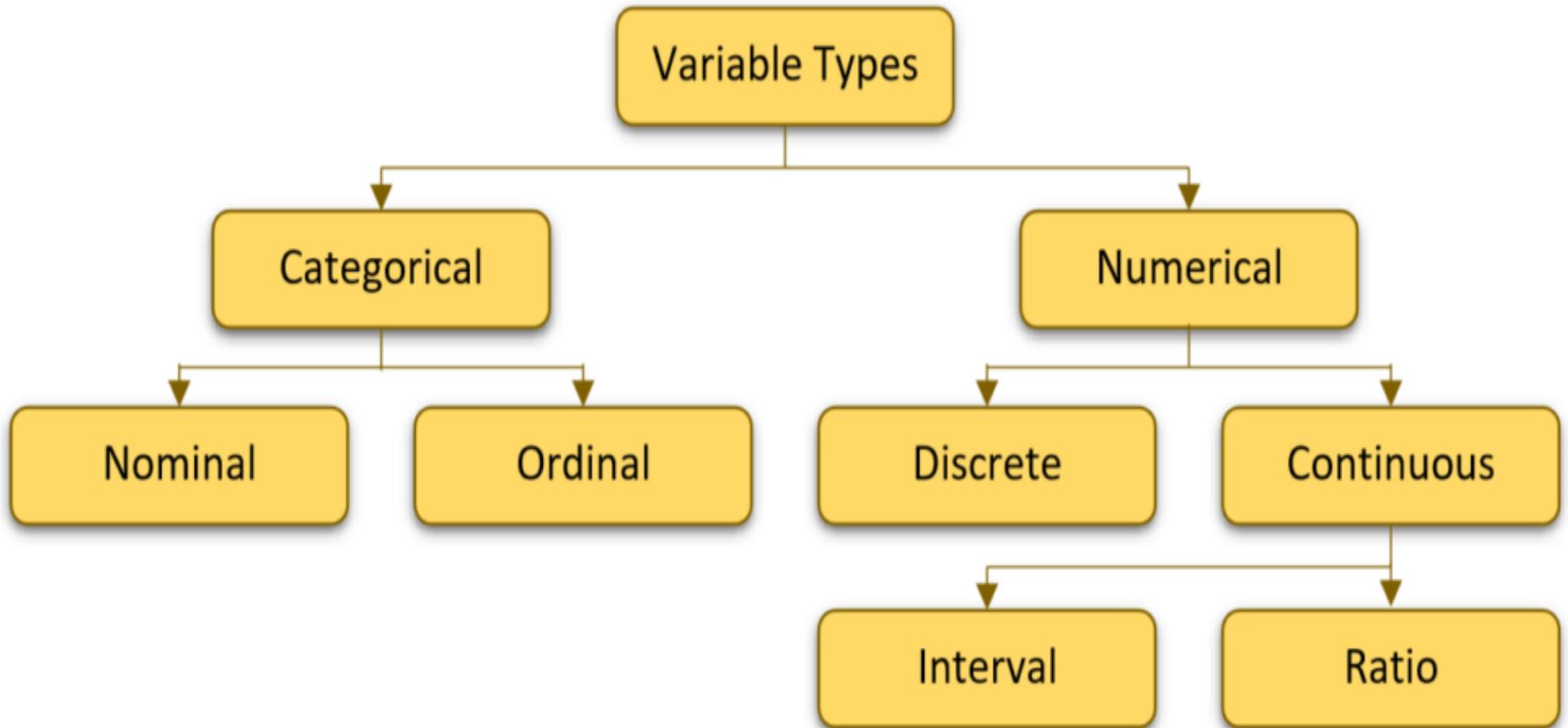
CLASSIFICATION OF VARIABLES

A discrete variable is a variable that can only take specific, countable values.

- It is typically expressed in whole numbers, and there are no intermediate values between two given points.

Examples:

- **Number of students** (A class can have 20, 21, or 22 students, but not 20.5)
- Number of siblings a person has, number of correct answers on a test, number of participants in a study.

- In contrast, **continuous variables** can take an **infinite number** of values within a given range (e.g., height, weight, temperature).
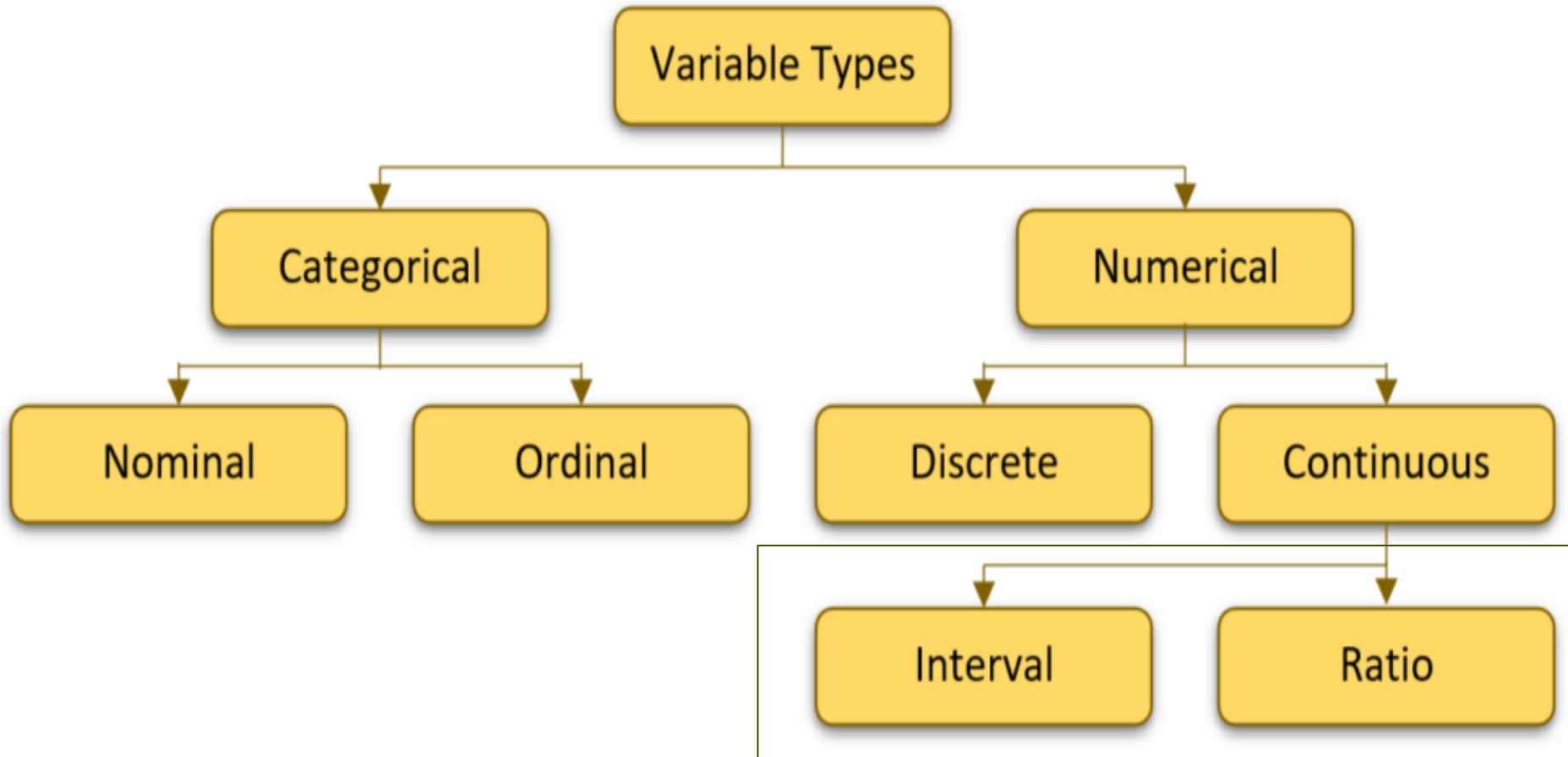
CLASSIFICATION OF VARIABLES

- **A continuous variable** is a variable that can take an infinite number of values between two specific points.
- It typically represents measurable quantities and can include fractional or decimal values.

Examples:
- **Height** (A person could be 170 cm, 170.2 cm, or 170.25 cm tall.)
- **Weight** (An object could weigh 50 kg, 50.3 kg, or 50.35 kg.)
- **Temperature** (The temperature could be 25°C, 25.1°C, or 25.15°C.)
- **Time** (A runner might finish a race in 10 seconds, 10.2 seconds, or 10.25 seconds)

*In contrast to continuous variables, **discrete variables** can only take specific, countable values…*

CLASSIFICATION OF VARIABLES

CLASSIFICATION OF VARIABLES

Interval Variable: (Eşit aralıklı düzeyde ölçme)

- An **interval variable** is a type of quantitative variable where the difference between values is meaningful and consistent, but there is **NO true zero point** (i.e., zero does not indicate the absence of the measured characteristic).

Examples:

•**Temperature in Celsius or Fahrenheit** (The difference between 10°C and 20°C is the same as between 20°C and 30°C, but 0°C does not mean "no temperature.")

•**IQ scores** (An IQ of 120 is higher than 100, but an IQ of 0 does not mean the absence of intelligence.)

•**Calendar years** (The year 2000 is 100 years after 1900, but the year 0 does not represent the absence of time.)
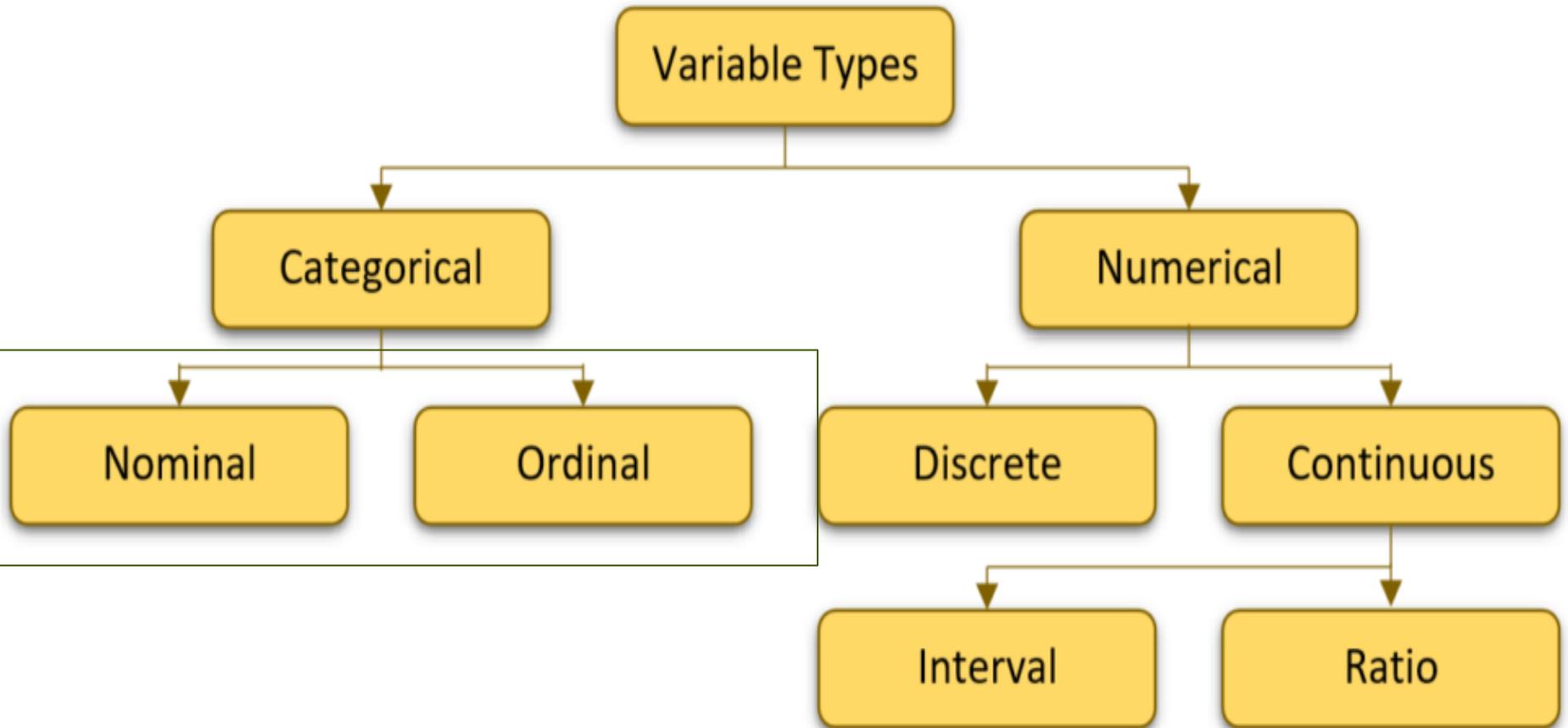
CLASSIFICATION OF VARIABLES

Ratio Variable:

- A **ratio variable** is a type of quantitative variable that has all the properties of an **interval variable**, but **WITH A TRUE ZERO POINT**, meaning that zero represents the complete absence of the characteristic being measured.

Examples:
•**Weight** (50 kg is half of 100 kg, and 0 kg means no weight at all.)
•**Age** (A 40-year-old is twice as old as a 20-year-old, and 0 years means no age.)
•**Income** (Earning $0 means having no income, and $100 is twice as much as $50.)

CLASSIFICATION OF VARIABLES

CLASSIFICATION OF VARIABLES

Nominal Variable:

- A **nominal variable** is a type of categorical variable that represents different groups or categories without any inherent order or numerical meaning.
- These variables **cannot be ranked** and the differences between them cannot be measured.

Examples:
- **Gender** (Male, Female, Other)
- **Eye color** (Blue, Green, Brown)
- **Blood type** (A, B, AB, O)
- **Birthplace** (New York, London, Tokyo, Türkiye)
- **Occupation** (Doctor, Teacher, Engineer)

CLASSIFICATION OF VARIABLES

Ordinal Variable: (*Sıralama*)

- An **ordinal variable** is a type of categorical variable that has a **specific order or ranking**, but the differences between the categories cannot be measured precisely. In other words, there is a **hierarchical relationship** between the values, but the distance between them may not be equal.

Examples:

- **Education level** (Elementary school < Middle school < High school < University)
- **Satisfaction level** (Not satisfied < Slightly satisfied < Very satisfied)
- **Social status** (Low income < Middle income < High income)

Why Levels of Measurement Matter?

- What kind of measurement of the variables you choose you decide that it is appropriate for their level.
- Research problem and hypotheses a measurement level appropriate to the measurement levels of the variables build with language
- Selecting appropriate statistical analyses
- Making correct inferences

Operational Definition

- An **operational definition** is a definition that describes how a concept or variable will be measured or observed in research or practical applications. It provides a clear, measurable expression of an abstract concept, specifying what it means and how it will be evaluated.

- **Happiness** (A person's happiness might be defined by their score on a specific happiness survey.)

- **Success** (A student's success might be measured by their score on an exam.)

- **Stress** (Stress level can be determined by the result of a specific psychological test.)

- **SOYUT ---- SOMUT**

Operational Definition

- A concept can have **more than one operational definition**. The important thing is which operations you use to define the variables in your research.

E.g.: What are the working definitions of anxiety?

- State-Trait Anxiety Scale scores

- May be an avoidance reaction… ☺

- Movement in the sympathetic nervous system - heart rate, sweating, etc.

Any questions?