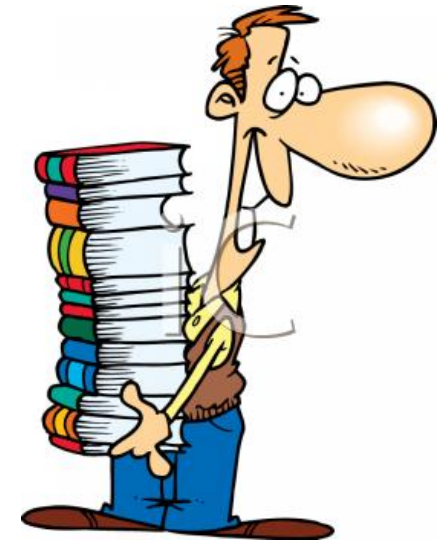


# Data types in biomedical research



[www.illustrationsof.com](http://www.illustrationsof.com)

Ivana Kolčić

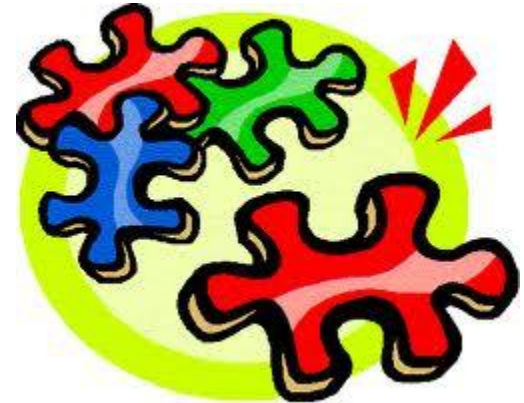




# Research components:

---

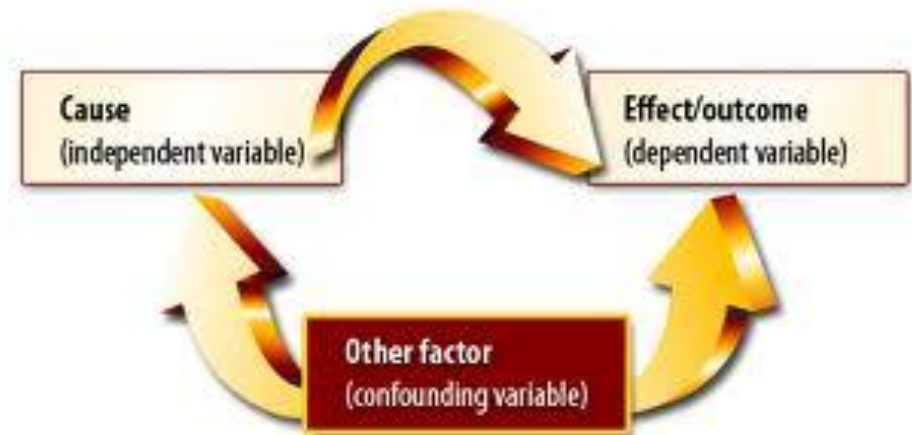
- Research question
- Background
- Design (type of research)
- Examinees
- Variables**
- Statistical data analysis



# Variables in research:

---

- Predictor variable(s)
- Outcome variable(s)
- Confounding variables



# Measures / types of variables

---

Variable	Features of variables	Example	Descriptive statistics	Informativene ss level
<b><i>Categorical Nominal</i></b>	Unordered/unarranged categories	Sex, urbanization	Number, proportion	Low
<b><i>Ordinal</i></b>	Orded/arranged categories	Grades, scales	Median	Medium
<b><i>Numerical (continuous)</i></b>	Arranged categories with equal intervals	Height, weight	Mean or median	High

---

# Type of data?

---

- Height
  - Grades
  - Age in years
  - Weight
  - Insuline concentration
  - Blood glucose
-

# Type of data?

---

How many cigarettes do you smoke a day?

- 1-5
  - 6-10
  - 11-15
  - 16-20
  - 21 and more
-

# Type of data?

---

Have you ever had a heart attack?

Yes

No

Do you suffer from hypertension?

Yes

No

?

---



# Type of data?

---

Gender:

- Male
- Female



# Type of data?

---

Marital status:

- married
- divorced
- widowed
- single
- lives alone
- ?



# Type of data?

---

Education:

- elementary school
- high school
- two-year college
- four-year college
- ?



# Type of data?

---

## Likert scale

- Claim: Violence among the youth is becoming an increasing problem in Croatia.

I agree completely

1

I agree

2

Undecided

3

I disagree

4

I argue strongly against

5

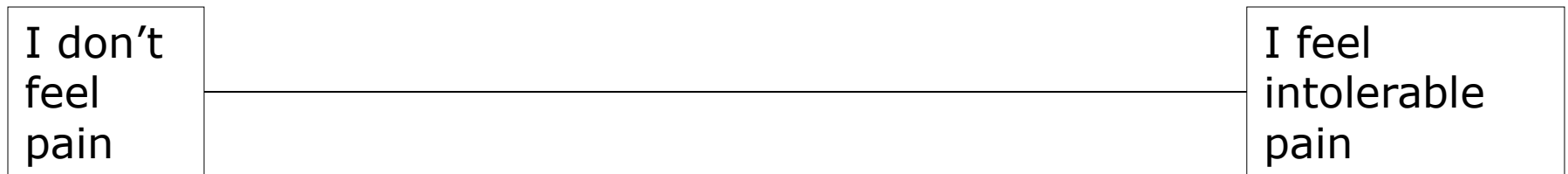
---

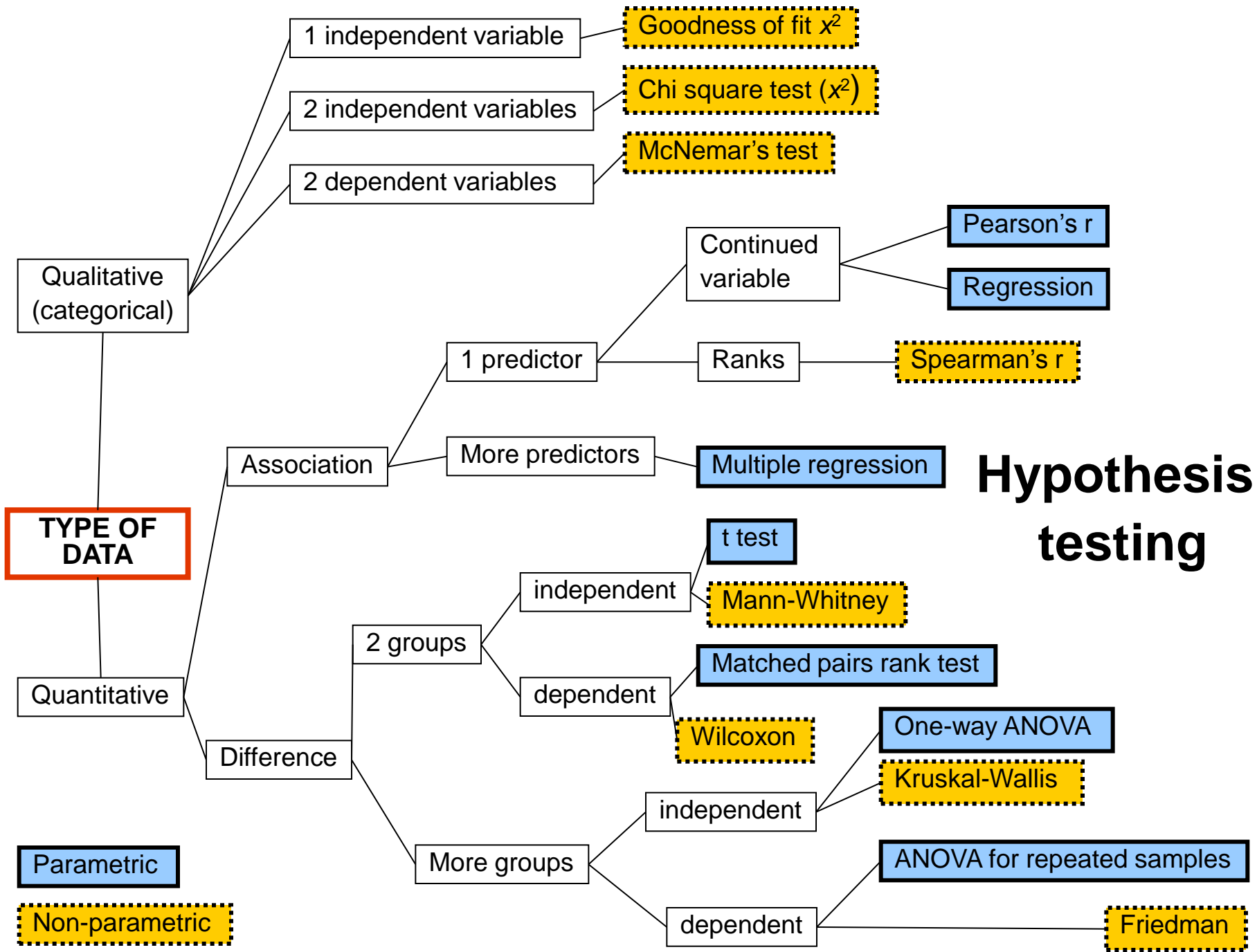
# Type of data?

---

Visually analogous scale

■ E.g. pain level that examinee experiences





# Hypothesis testing

Parametric

Non-parametric



**Is it size that matters?**

# Statistical data analysis – basic concepts

---

Mean (sum/number)

Standard deviation:

$$s = \sqrt{\frac{\sum_i (x_i - \bar{x})^2}{n-1}}$$

Minimal – maximal value

Range (min-max)

(Per)centiles (100')

Median (50%)

Interquartile range (75'-25')

---



# Hypothesis testing

---

- P-value
- Less than 0,05 (or 0,01)
- 20 tests
- Choice of statistical test - depends on research question, type of analyzed variables and study design

