

Methodology of Kinanthropology

A Collection of Study Materials



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Course objectives

- The aim is to prepare the student for the necessary steps in the thesis.
- Adoption of principles of professional work, access to the world of professional literature, methods of selecting topics and methods of professional work, work with literature and information sources. They will be acquainted with citation methods and bibliographic references.
- Basic research strategies, research plans and methods of data collection and analysis.
- Statistics – basic characteristics and methods in sw Statistica



Assessment methods

- Written test from terminology - the test consists of 30 questions, 66% of correct answers is needed to pass.
- Project of thesis at chosen topic.

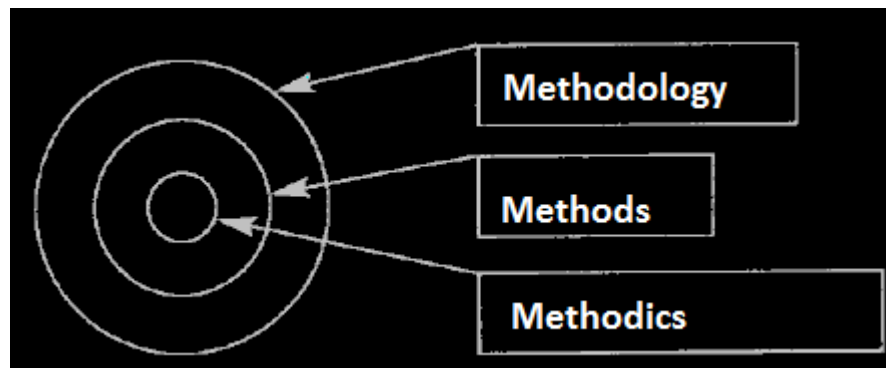
References

- YIN, Robert K. *Case study research and applications: design and methods*. Sixth edition. Los Angeles: Sage, 2018. xxx, 319. ISBN 9781506336169.
- THOMAS, Gary. *How to do your case study : a guide for students and researchers*. 1st ed. Los Angeles: Sage, 2011. xi, 231. ISBN 9780857025623.
- *Single case research methodology : applications in special education and behavioral sciences*. Edited by David L. Gast - Jennifer R. Ledford. Second edition. London: Routledge, Taylor & Francis Group, 2014. xix, 415. ISBN 9780415827911.
- MERTENS, Donna M. a John A. MCLAUGHLIN. *Research and evaluation methods in special education*. Thousand Oaks: Corwin Press, 2004. xiv, 275. ISBN 0761946535.
- THOMAS, Gary. *How to do your research project : a guide for students in education and applied social sciences*. 2nd ed. London: Sage, 2013. xix, 307. ISBN 9781446258873.



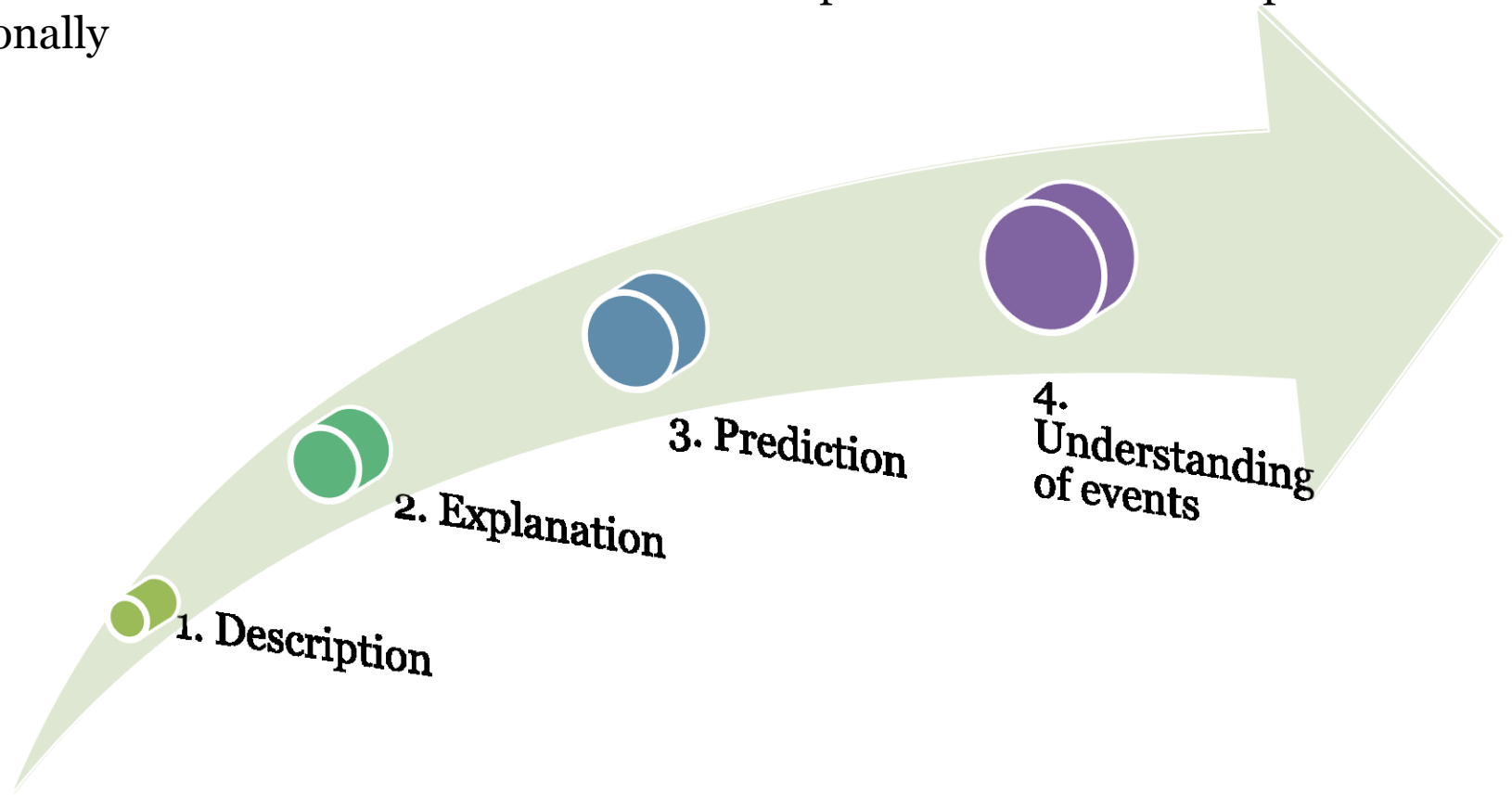
Delineation of the terms

- “methodology of science”, “method of science” and “methodics of scientific work”
 - Methodology: study of methods
 - Method: tool to research a given research subject
 - Methodics: procedures which are related to research aim implementation



Aims of Science

To describe various structures and relationships in this world and explain them rationally

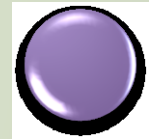
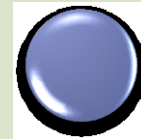
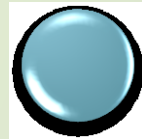


Characteristics of Research

a process of gathering data

it questions the knowledge so far and makes a synthesis

it leads to widening knowledge



a systematic process

it leads to widening knowledge

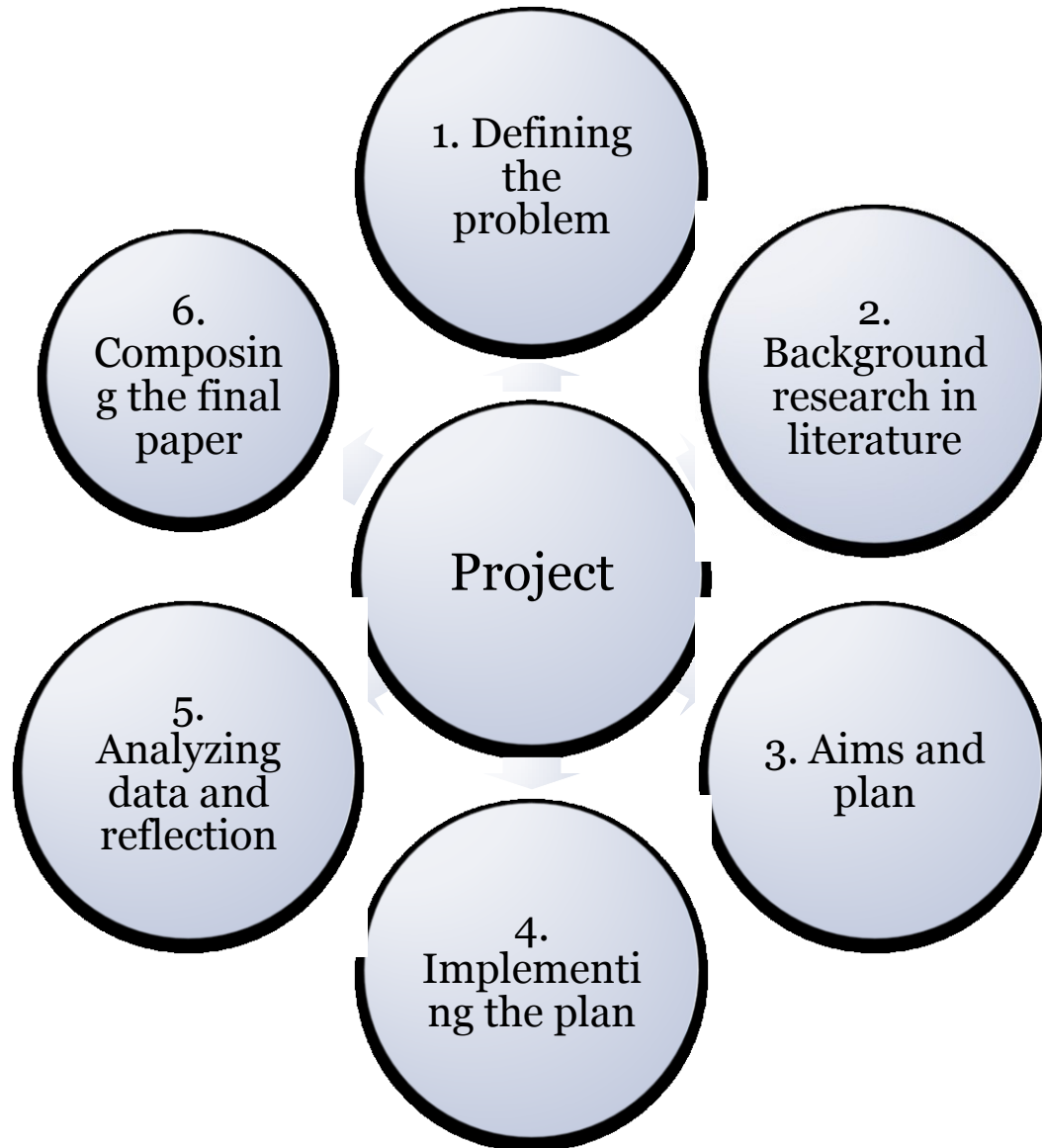
it is a combination of all of the above characteristics

Research Model

<u>Scientific Paper Model</u>	<u>Everyday Thinking</u>	<u>Paper Structure</u>
Scientific question	Why	Introduction
Suggesting a theory	Our answer	Introduction
Identifying variables	What to observe	Methods
Defining hypotheses	Expectation	Methods
Research plan	How	Methods Results
Gathering data, testing hypotheses	Gathering/analyzing data	
Evaluating results	What does it mean	Discussion
Critical summary	What is the meaning	Conclusions



The basic stages of creating the final paper





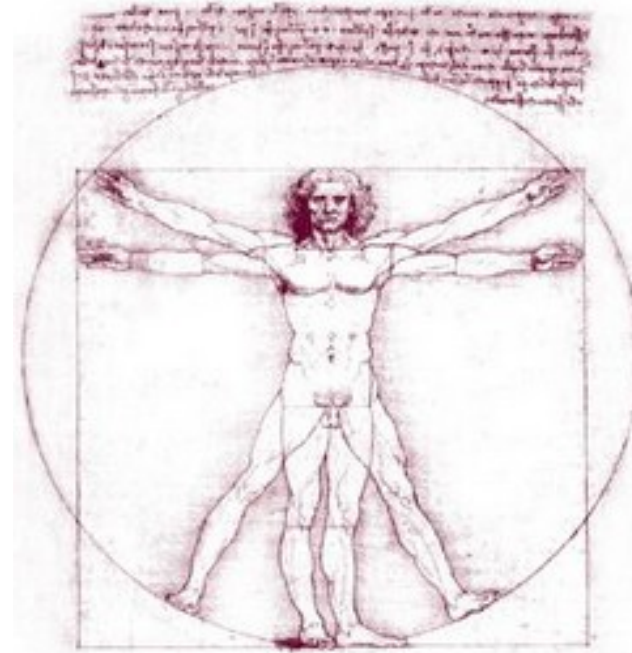
KINANTHROPOLOGY

AS A SCIENCE ON HUMAN MOVEMENT

- kinésis (to move)
- anthrópos (human)
- logos (word)

Kinanthropology

- **research methodology**
- **research subject**
- **scientific language**
- **theory**



The subject of Kinanthropology

- researching a human in motion
- researching human movement
- researching human motorics (motor activity)
- researching physical (motor) activity of a human
- researching human kinetics



Validity, Reliability, Objectivity

- Validity (content, criteria, concurrent, predictive, constructive)
 - we measure what we assume we are measuring
 - the user has to make the right decisions from the measurement results
 - Reliability
 - degree of agreement of measurement results performed under the same conditions
 - Objectivity
 - It is determined by the degree of concordance of test results obtained simultaneously by different examiners
 - evaluation of sets in aesthetic - coordination sports (figure skating)
- Without reliability we cannot achieve validity
 - The measurement method may have high reliability but still low validity



Homework 1

To next lesson...:

- Think and specify topic of thesis
- Find citation standard at our university



2nd lesson

Literary research synthesis of knowledge / theoretical part


- It precedes the creation of scientific work and it is, among other things, the design of a research project and the selection of a suitable methodology
- A systematic and repeatable procedure for finding and merging already created results
- Searching for literature and information sources
 - Libraries, electronic information resources, other Internet resources
 - Identification of keywords.
 - Choice of citation index: Web of Science, SCOPUS, Google Scholar.
 - Edit a search query.
 - Selection of relevant articles.
 - Study of selected articles.

Literary research

- You identify gaps in the literature
 - Avoid researching the researched
 - Don't make the same mistakes as your predecessors
 - Start where the others left off
 - You can compare your project with others
 - You will find the procedure, methods and results suitable for your project
 - You identify conflicting opinions
-
- [Discovery.muni.cz](http://discovery.muni.cz) (access vpn.muni.cz)
 - [Google Scholar](http://scholar.google.com) (scholar.google.com)

Citation standard

- Publication and citation ethics
- citation creation: APA
- a citation record can be found
 - in <http://discovery.muni.cz>
 - in the library system <http://aleph.muni.cz>
 - Zotero citation manager integrated with all browsers can be used



The Basics of APA Formatting

In-Text Citations

- Used to cite information that you have taken from another source and used in your paper in the form of:
 - Direct Quotes
 - Paraphrasing
 - Summary
- Whenever you use a source, provide in parenthesis:
 - the author's name and the date of publication

Ex.= (Jones, 1999)

- for quotations and close paraphrases, provide the author's name, date of publication, and a page number

Ex.= (Jones, 1999, p. 27)

In-text Citations: Formatting Quotations

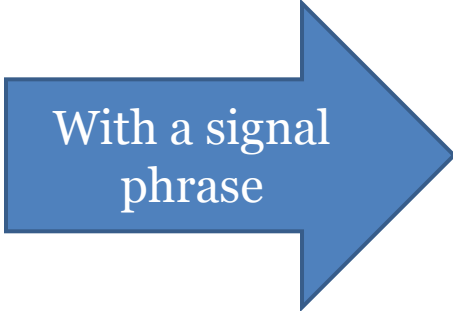
With a signal
phrase

Caruth (1996) states that a traumatic response frequently entails a “delayed, uncontrolled repetitive appearance of hallucinations and other intrusive phenomena” (p. 11).

Without a
signal phrase

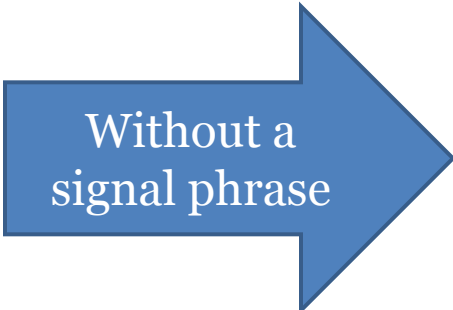
A traumatic response frequently entails a “delayed, uncontrolled repetitive appearance of hallucinations and other intrusive phenomena” (Caruth, 1996, p. 11).

In-text Citations: Formatting a Summary or Paraphrase



With a signal
phrase

Smith (2002) explained that sibutramine suppresses appetite by blocking the reuptake of the neurotransmitters serotonin and norepinephrine in the brain (p. 594).



Without a
signal phrase

Sibutramine suppresses appetite by blocking the reuptake of the neurotransmitters serotonin and norepinephrine in the brain (Smith, 2002, p. 594).

In-text Citations: A Work with Two Authors

With a signal phrase

According to feminist researchers Bergin and Tate (1997), “It is no longer true to claim that women's responses to the war have been ignored” (p. 2).

When citing a work with two authors, use “and” in between authors’ name in the signal phrase, but use “&” between their names in parenthesis.

Without a signal phrase

Some feminists researchers question that “women's responses to the war have been ignored” (Bergin & Tate, 1997, p. 2).

In-text Citations: A Work with Three to Five authors

- When citing a work with three to five authors, identify all authors in the signal phrase or in parenthesis.


(Harklau, Siegal, and Losey, 1999)

- In subsequent citations, only use the first author's last name followed by "et al." in the signal phrase or in parentheses.

(Harklau et al., 1993)

In-text Citations: A Work with Six and More Authors


- When citing a work with six and more authors, identify the first author's name followed by "et al."



With a signal
phrase

Smith et al. (2006) maintained that....

OR...




Without a
signal phrase

(Smith et al., 2006)

In-text Citations: A Work of Unknown Author


- When citing a work of unknown author, use the source's full title in the signal phrase and cite the first word of the title followed by the year of publication in parenthesis. Put titles of articles and chapters in quotation marks; italicize titles of books and reports.



With a signal
phrase

According to "Indiana Joins Federal
Accountability System" (2008), ...

OR...



Without a
signal phrase

("Indiana," 2008)

In-text Citations: Organization

- When citing an organization, mention the organization the first time when you cite the source in the signal phrase or the parenthetical citation.

The data collected by the Food and Drug Administration (2008) confirmed that...

- If the organization has a well-known abbreviation, include the abbreviation in parenthesis the first time the source is cited and use only the abbreviation in later citations.

Food and Drug Administration (FDA) confirmed ...
FDA's experts tested...

References Page

Center the title (References) at the top of the page. Do not bold it.

THE PURDUE OWL'S AWESOME EXAMPLE OF AN APA PAPER

1

References

Double-space reference entries

Cummings, J. N., Butler, B., & Kraut, R. (2002). The quality of online social relationships. *Communications of the ACM, 45*(7), 103-108.

Hart, L., Wood, J.F., Smith, V., & Westbrook, N. (2004). Friendships through IM: Examining the relationship between instant messaging and intimacy. *Journal of Computer-Mediated Communication, 10*(1), 38-48.

Tidwell, L.C., & Walther, J.B. (2002). Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations: Getting to know one another a bit at a time. *Human Communication Research, 28*(3), 317-348.

Underwood, H., & Findlay, B. (2004). Internet relationships and their impact on offline relationships. *Behaviour Change, 21*(2), 127-140.

Flush left the first line of the entry and indent subsequent lines

Order entries alphabetically by the author's surnames

References: Basics

- Invert authors' names
 - last name first followed by initials: **Smith, J.Q.**
- Alphabetize reference list entries by the last name of the first author of each work
- Capitalize only the first letter of the first word of a title and subtitle, the first word after a colon or a dash in the title, and proper nouns:

Toward effective poster presentations: An annotated bibliography

References: Basic Format for Books

- Author, A. A. (Year of publication). *Title of work: Capital letter also for subtitle*. Location: Publisher.

Ex.:

Calfee, R. C., & Valencia, R. R. (1991). *APA guide to preparing manuscripts for journal publication*. Washington, DC: American Psychological Association.

References: Article form an Online Periodical

- **With DOI Assigned**

- Author, A. A., & Author, B. B. (Date of publication). Title of article.

Title of Journal, volume number, page range.

doi:0000000/000000000000

Ex.:

Brownlie, D. (2007). Toward effective poster presentations: An annotated bibliography. *European Journal of Marketing*, 41, 1245-1283. doi:10.1108/03090560710821161

References: Article form an Online Periodical

- **With no DOI Assigned**
- Online scholarly journal articles without a DOI require the URL of the journal home page.
 - Author, A. A., & Author, B. B. (Date of publication). Title of article.
Title of Journal, volume number. Retrieved from
<http://www.journalhomepage.com/full/url/>

Ex.:

Kenneth, I. A. (2000). A Buddhist response to the nature of human rights. *Journal of Buddhist Ethics, 8*. Retrieved from <http://www.cac.psu.edu/jbe/twocont.html>

References:

Online Encyclopedias and Dictionaries

- **Online Encyclopedias and Dictionaries**
 - Often encyclopedias and dictionaries do not provide bylines (authors' names). When no byline is present, move the entry name to the front of the citation. Provide publication dates if present or specify (n.d.) if no date is present in the entry.

Ex.:

Feminism. (n.d.). In *Encyclopædia Britannica online*. Retrieved from <http://www.britannica.com/EBchecked/topic/724633/feminism>

References: Web Document, Web Page, or Report

- List as much of the following information as possible
 - Author, A. A., & Author, B. B. (Date of publication). *Title of document*. Retrieved from <http://Web address>

You may have to
hunt around to
find the
information;
don't be lazy!

Ex.:

Angeli, E., Wagner, J., Lawrick, E., Moore, K., Anderson, M., Soderland, L., & Brizee, A. (2010, May 5). *General format*. Retrieved from <http://owl.english.purdue.edu/owl/resource/560/01/>



Conclusion

Don't trust citation managers ☺

Knowledge of the standard is crucial !!!

OR

Search and check data from books, printed magazines,
electronic documents,...



Homework 2

- Do library research for 1 pages on the selected topic.
- Use of at least 5, at most 5 years old, sources
- Process the search using the citation standard APA



3rd lesson



Research proposal

- what is the proposed research about,
- what it is trying to reveal or what it wants to achieve,
- how to proceed,
- what we will learn and why it is valuable.

Three general but central questions:

- What?
- How?
- Why?

Research proposal

- *What* is the subject that the research seeks to reveal (do or achieve). Formulated in this way, it refers directly to research questions, first in general and then specifically.
- *How* does it mean how we want to answer research questions through research. Answering the question of how it means dealing with research methods. The methods here depend on research questions.
- *Why* it means for what purpose this research is necessary. It points out the rationale (or significance or importance and expected contribution) of the research. It recognizes that any research requires significant investments in time, energy and other resources, and these investments require justification. It also includes the notion of research design (and research itself). The arguments presented in the proposal are intended to answer to some extent the question of why research is valuable.
- Generally, a good way to proceed when preparing a research proposal is to focus on *what before how*.

Hierarchy of concepts

1. research area,
 2. research topic,
 3. general research questions,
 4. specific research questions,
 5. questions in data collection.
- Areas differ in the level of abstraction and generality and it is necessary to logically interconnect them by induction and deduction.
 - The upper level is the most general and most abstract. The lower level is the most specific and concrete.

Hierarchy of concepts

Questions

- At a very general level: What?
- What is my research about?
- What is its purpose?
- What does he want to come up with or what does he want to answer?
- Specially: What questions does he want to answer?

How

- How will my research answer the questions asked?

Why

- Why is it important to do this research?

More specifically

- What is my research area? Did I identify it clearly?
- What is my topic? I identified it clearly, does it belong to the given research area?
- What are my general research questions?
- What are my specific research questions?
- Does each specific research question meet the empirical criterion? - Is it clear what data is needed to answer each question?

Selection of respondents

- In **quantitative** research, a sample can be **random** (if representativeness is important) or **intentional** (if, for example, the aim of the research is to study the relationship between variables).
- Many different sampling strategies are used in **qualitative** research (maximum homogeneity and variation, critical case, typical case).

Selection of respondents

- is part of the research process,
- is in line with the logic of the study and
- the selection plan is described

Quantitative study:

- the sampling strategy of the sample, especially if it is purposeful or representative (or both),
- what will be the objectives in relation to the generalization of results;
- what size the sample will be;
- how will be selected.

Qualitative study:

- the sampling strategy, including the intention to generalize the results;
- the size of the proposed sample;
- how the research sample will be selected.

Data Collection

- Execution of design - data collection
- Each method has a different way of obtaining data.

Quantitative data

- Tools - questionnaires, standardized measuring instruments, ad hoc rating scales or observation forms.
- Use an existing measuring tool or develop your own measuring tool (or part of it)?
- One or both of these options are acceptable and depend on the study. Each alternative has implications for what needs to be included in the research proposal.

existing tool - state a brief history of its origin, its use in research and its psychometric characteristics.

own tool - give an outline of the steps to be taken, including the method of tool verification.

Data Collection

Qualitative data

- More difficult, a number of options
- If **interviews** are to be conducted, what type of interview and, above all, what degree of structuring will be used? If standardized, how will the tool be prepared and tested (if appropriate)?
- We think the same with **observation**: What degree of structuring and standardization do we assume? How will the forms or manuals used be prepared and tested?
- If **documents** are used, which and how? Will we indicate the method of selection and consideration of the possibility of access?
- If **diaries, notes, reports** or other qualitative material are used, how will their collection and possible selection be organized? What instructions will be given to participants in the case of diaries, notes and reports on critical events?

Data analysis

- The analysis of **quantitative** data is performed using statistics - a well-established and documented technique
- Analysis of **qualitative** data - dynamic development, there are various approaches and options for how to proceed, such as coding
- In the project proposal - at a general level, define which analytical technique can be used, including computer programs, if any are used in the analysis.
- Data analysis is an area where the student must seek the advice of an expert, because the level of methodological qualification plays a big role here (eg multiple regression or grounded theory).
- It is permissible for students not to have technical proficiency at the stage of design preparation, before starting the research. The student will gain this proficiency only during the research and should demonstrate it after completing the research. It is good if the student acquires technical proficiency before starting the research 😊

Homework - Project

1. Study population or selection
 - Describe the subject or object (expected number, distribution according to eg gender, age structure or other specific characteristics that lead to the selection of the respondent and his inclusion in the research), the method of his selection: random, intentional, stratified
2. Measuring procedures, data acquisition
 - **HOW** (specify: instrument, instrument, questionnaire, other method, validated procedure, observation, interview, ...) and **WHAT** (specify specific variables to focus on) I will measure
 - define variables, scales and their properties (continuous, discrete, ordinal, qualitative...).
 - Are measurement procedures standardized? Yes/No. If yes (how is standardization ensured), if not (how do you ensure validity, reliability and objectivity, eg pilot verification)?

Homework - Project

4. Pilot study / pilot verification

- It was / was not, will be / will not be. Describe how it will go...

5. Data collection

- Indicate the expected schedule and procedure for data collection

6. Data analysis

- Indicate which approach will be used in the analysis of the data:
- statistical characteristics, frequencies, percentages, graphs,
- comparison of average values of two or more selections (t-test, ANOVA), search for mutual relations (correlation, linear regression), etc.
- other procedures: analysis, synthesis...

7. Solution of special situations

- If necessary, mention some atypical areas that may make research more difficult:
- Time, financial demands, human resources issues

8. Limits of research

- weaknesses, limitations, anticipated difficulties



Systematic review

Systematic review (research work) starts with a well-thought-out review / research question

The main **disadvantage** - be as good as the primary studies (data) that it finds

Input search

In the search tools discovery.muni.cz, ezdroje.muni.cz, MEDLINE, google scholar... find out if there is no answer to our review question, ie a systematic review.

The review question is the first step in creating a systematic review and its correct formulation is absolutely essential for the whole systematic review.

Exclusion and inclusion criteria

Search strategy

The goal of a search strategy is to find all relevant sources published on a given topic.



Systematic review

Evaluation of the relevance of the scientific evidence sought

The evaluation of relevance within systematic reviews must always be performed independently by two authors of systematic review..

Quality evaluation / Critical evaluation

Critical evaluation of studies is another important step in the process of creating a systematic review. The protocol for the critical evaluation of the studies must be stated in the protocol.

Data extraction

The goal of data extraction is to identify and extract relevant data that will be used in data synthesis in quality studies

Data synthesis

Depending on the type of scientific evidence, the planned output of data synthesis must also be described in the systematic review protocol.

- statistical (meta-analysis) and narrative or
- carried out using contingency tables

STATISTICS

- **If you bet in EuroJackpot, it's a gamble.**
- **If you bet that you will get three straight lines in the cards, it's fun.**
- **If you bet the price of gas rises by 10%, it's a business. Do you see the difference?**

- Martin Sebera, www.fsps.muni.cz

Research rules from the point of view of data analysis

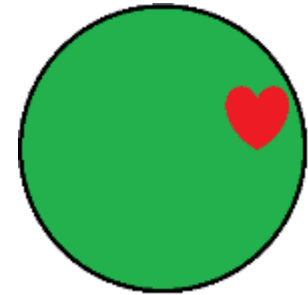
1. The preparation of a research survey is the most important part
2. data collection and analysis is used to reject / reject **predetermined** work tasks and hypotheses (exploratory vs. confirmatory approach)
3. always keep in mind the factual aspect of the research, especially in relation to the interpretation of statistical results

Software offer (Masaryk university):

<https://inet.muni.cz/app/soft/licence?app.setlang=EN>

Basic concepts

- **Basic** and **sample set** and its scope (N)
- Choice:
 - random (each element has the same probability of selection)
 - systematic (nth object, $n < N$)
 - stratified (random selection in groups)



Types of variables

type of variable	
continuous	temperature, pressure, dew point, time, length, weight
discrete	number of people
nominal	type of temperament, sex, name of product
ordinal	performance in the 100 m run, grades in school, price of a product
interval	length, weight, time, velocity, acceleration
rational	length, weight, time, velocity, acceleration
categorical	type of work: sedentary, physical, physical and sedentary. means of transportation to work: on foot, by bike, bus, car, own transport
dichotomous	sex: male, female truth, lie

Basic statistical characteristics

numbers that tell us some information about our data.

Characteristics:

- levels
 - mean values
 - Arithmetic (weighted) mean – a sum of all values divided by the number of values.
 - Geometric mean – a product of all values extracting the n-th root.
 - Median – such a value that represents the median in data arranged by size and thus divides data into two halves having the same number of values.
- variability
 - Extent of dispersion – difference between the maximum and the minimum
 - Quantiles – a number of values divided into equal parts. It is assumed that values are sorted from the lowest to the highest value.
 - Quartiles – divide values into 4 parts. The lower quartile is located in the first quarter, the upper quartile in the third quarter.
 - Percentiles – divide a series of values into 100 parts.
 - Variance – a sum of squared deviations from the arithmetic mean divided by the number of values. It informs about the homogeneity of values, or how much the values vary from the mean.
 - Standard deviation – the square root of the variance
 - Coefficient of variation – the proportion of the arithmetic mean and standard deviation. It enables us to compare the variability of files with unequal units.

By using various statistical characteristics we lose a lot of valuable information about the original data.



Hypotheses testing statistical significance α

In the statistics applies only what we can prove by calculation.

The level α is usually selected 0.05 (5%).

Thus, if we reject the level of **statistical significance** and our hypothesis, it means nothing to our scientific hypothesis and our research.

$$\alpha = 0,05$$

$p < \alpha$, reject null hypothesis

$p > \alpha$, not reject null hypothesis

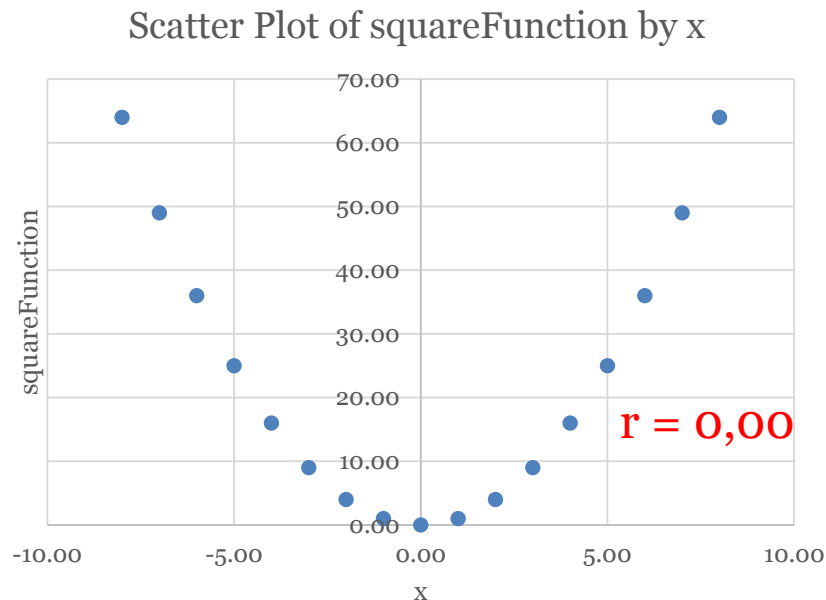
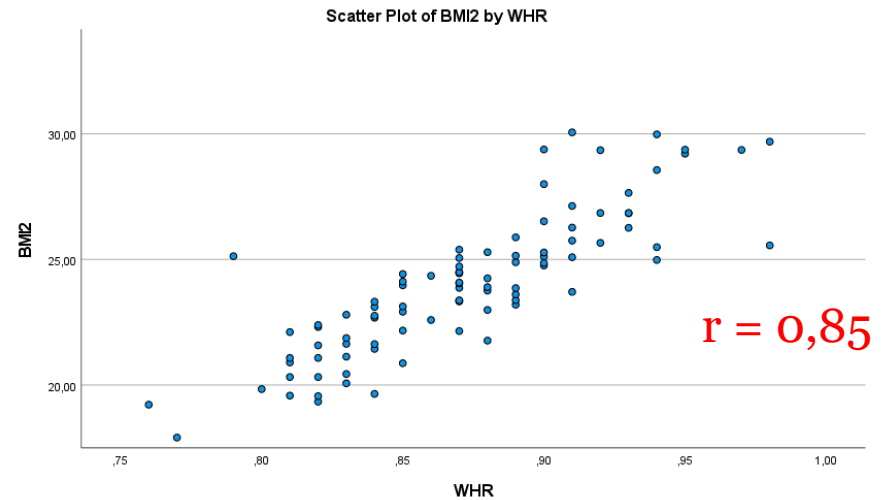
Correlation

- It is usually denoted by r .
- It takes values ranging from -1 to 1, the sign then decides whether the correlation is direct (plus sign) or indirect (minus sign).
- Correlation can measure a relationship between two or more variables.
- start with the graphic interpretation of data (scatter plot)
- Correlation usually take the absolute values from 0 (very little or no relationship) to 1 (relationship is very strong).

Correlation

Limitations of this coefficient:

- it measures only linear relationships.
- it does not recognize which variable is dependent and which is independent.
- We cannot decide on the causality of the relationship between variables.





Myths, mistakes, fakes and explanations in statistics