Structure of RESEARCH PROPOSAL

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What is a research proposal?

- A research proposal is your PLAN
  - It describes in detail your study
  - Decisions about your study are based on the quality of the proposal
    - Approvals to proceed by the Institutional Review Board

What are the essential ingredients?

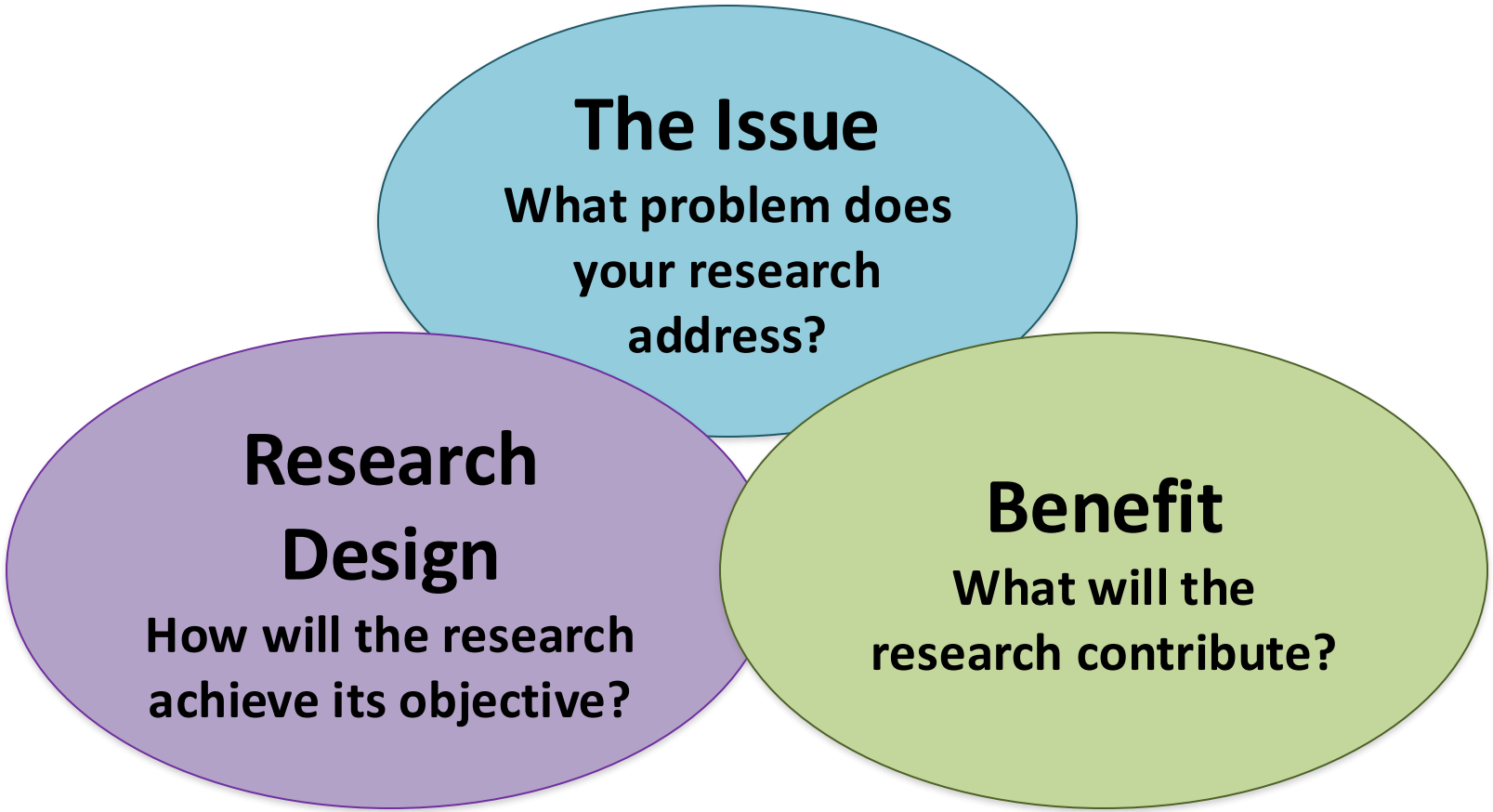


Figure adapted from MIT OCW

Research proposals make you:

OUTLINE steps in your proposed research

the available methodologies for data collection

JUSTIFY your research

Data collection

Data analysis

THINK through your experiments

Anticipate potential PROBLEMS

Anticipate a realistic TIMETABLE

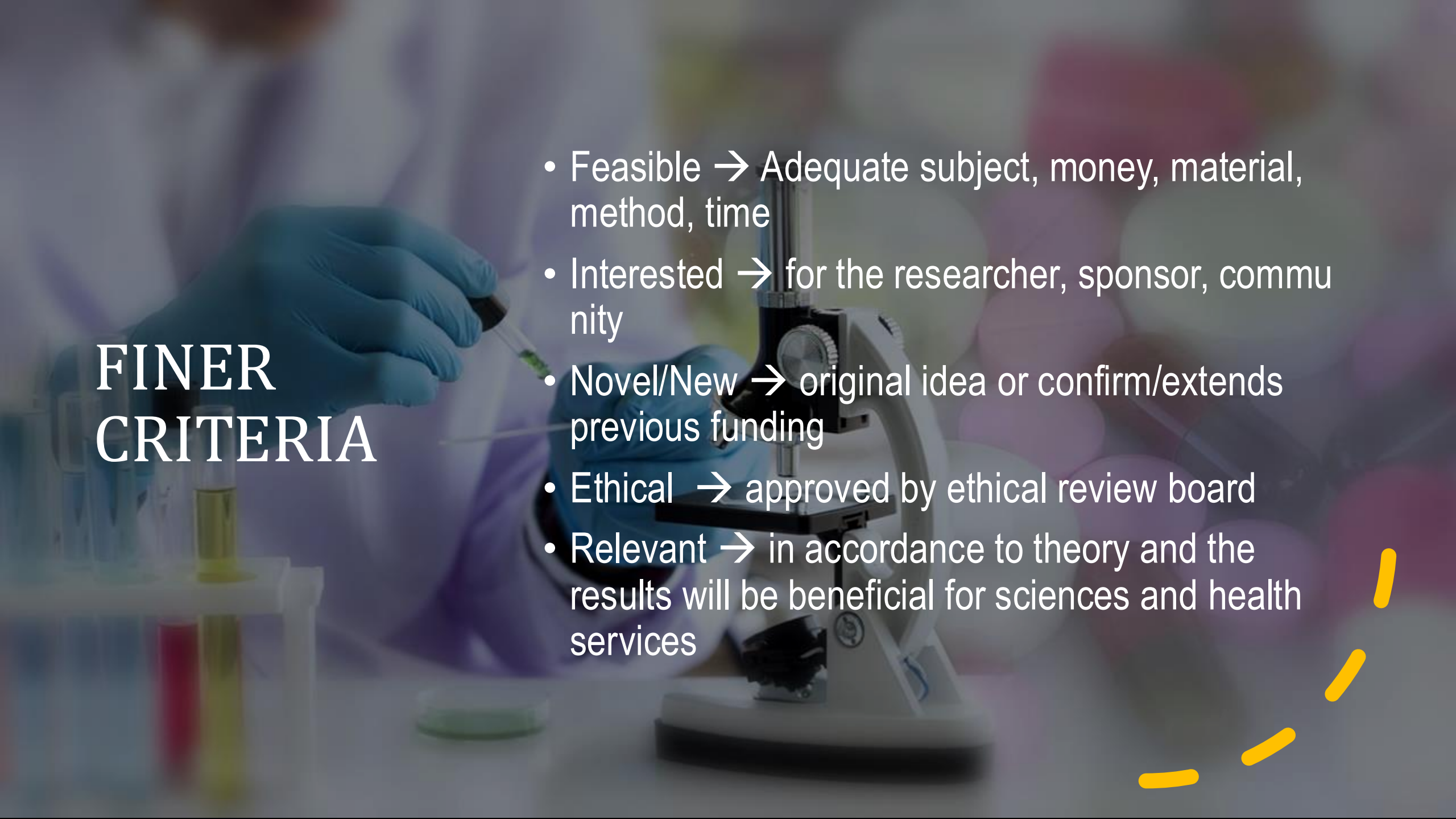
Figure adapted from MIT OCW

Structure of Proposal

1. **Main Page**
   a. Proposal Title (less than 20 words)
   b. Name of researcher(s)
   c. Name Research Supervisor and Department
   d. Summary of proposal (less than 250 words)
   e. Keywords: 4 – 6 words
2. **Proposal content**
   a. Background (not more than 2 pages)
   b. Problem identification, research question(s) and hypothesis
   c. General objective, specific objective(s), research benefits
   d. Literature review (6- 8 pages), theoretical framework, conceptual framework
   e. Methods (not more than 5 pages)
      - Research design
      - Population and sample
      - Sampling techniques
      - Sample size determination
      - Variables (independent, dependent, confounding)
      - Methods for data collection
      - Operational definition
      - Data analysis plan
      - Timetable
      - Research ethics
      - References (Vancouver style)
   f. Appendices:
      - Informed consent (if applicable)
      - Questionnaires (if applicable)
      - Dummy Table

Title

- Mini-abstract
- Clear, Concise, not too long (less than 20 words?)
- Describe the content of the study
- Informative → clearly indicate the independent and dependent variables
- FINER



FINER CRITERIA

- Feasible → Adequate subject, money, material, method, time
- Interested → for the researcher, sponsor, commu nity
- Novel/New → original idea or confirm/extends previous funding
- Ethical → approved by ethical review board
- Relevant → in accordance to theory and the results will be beneficial for sciences and health services

CHAPTER 1

- Background / Introduction
- Problem Identification and Research Question
- Hipothesis
- Objectives (General & Specific)
- Benefit of the Research

Background

- Elements of a proposal background (SPQR → Situation, Problem, Question, Response)
- The purpose of this section is to explain the context of your proposal and to describe, in detail, why it is important to undertake this research.
- Assume that the person or people who will read your research proposal know nothing or very little about the research problem.

Problem identification

- A summary of the background made into one paragraph that states the problem to be studied.
- As with the background, this section should reflect on the reasons why research is important.
- Describe the major issues or problems to be addressed by your research. Do not forget to explain how and in what ways your proposed research builds upon previous related research.

Problem identification

- E.g.

Malaria remains the most devastating infectious disease, particularly in Africa. One reason is that the parasite causing the disease is resistant to all clinically useful antimalarial drugs. We therefore have to devise alternative strategies to target the parasite.

Hypothesis

- Temporary answer research question
- Exploratory and descriptive study, does not require a hypothesis
- Good hypothesis → has a strong theoretical basis, states the relationship between variables

Objectives

- Include general and specific objectives
- General → refer to broader aspects
- Specific → mentioned things that are directly measured or assessed from the research → can be divided into several points → answered in conclusion

CHAPTER 2

Literature Review

Theoritical Framework

Conceptual Framework

Literature review

- This is NOT just a summary of literature → it is a critical analysis of the existing
- Show how your project:
  - Literature SUPPORTS your hypothesis
    - EXTENDS previous work
    - AVOIDS previous mistakes
- most time-consuming aspect in the preparation of your research proposal.

THEORITICAL FRAMEWORK

- Summary of the literature review in the form of schematic chart
- Describes various variables arranged systematically and logically, various components of the problem being studieD

CONCEPTUAL FRAMEWORK

- part of theoritical framework being studied in the research
- Describes the variables studied

PENGARUH EKSTRAK ETANOL *CENTELLA ASIATICA* TERHADAP KOGNISI, KEKUATAN OTOT, DAN KADAR INTERLEUKIN-6 PADA TIKUS *SPRAGUE-DAWLEY* TUA

xxxxx (15xxxxxxx)
Fakultas Kedokteran Universitas Indonesia

KERANGKA TEORI

Centella asiatica (CA)

kandungan

Triterpenoid (e.g. asiatikosida)

Polifenol

berefek

Antioksidan

mencegah

Radikal bebas

Stres oksidatif

Penuaan (*aging*)

terjadi pada tingkat

Sel dan jaringan
- Pemendekan telomer
- Kerusakan DNA & organel

Organisme
- ↓ fungsi dan integritas organ
- ↑ risiko penyakit degeneratif

sumber

Eksogen

Endogen

sumber

Kimia

Herbal

Efek samping?

↓ kekuatan otot

↑ IL-6

↓ kognisi

KERANGKA KONSEP

Tikus *Sprague-Dawley* (SD) tua

mengalami

- ↓ kognisi
- ↓ kekuatan otot
- ↑ kadar IL-6 darah

apabila diberikan

Vitamin E (kontrol positif)

Ekstrak etanol *Centella asiatica*

variabel bebas

diharapkan dapat

variabel terikat

- ↑ kognisi
- ↑ kekuatan otot
- ↓ kadar IL-6 darah

Methodology

CHAPTER 3

- Introduce the overall methodological approach.
- Indicate how the approach fits the overall research design.
- Describe the specific methods of data collection.
- Explain how you intend to analyze and interpret your results (i.e. statistical analysis, theoretical framework).
- If necessary, provide background and rationale for unfamiliar methodologies.
- Address potential limitations.

Tips on Drafting Methodology

- Break down your methodology into subsections.
  - these sections may include subjects, design, apparatus, instrumentation, process, analysis, etc.
- Remember that your methods section may also require supporting literature.
- Anticipate and pre-empt the audience's methodological concerns.
  - Acknowledge major problems.
  - Justify your approach by showing how benefits outweigh potential problems.

Types of Research Methodologies

Qualitative Research

- Historical

- Content Analysis

- Ethnographic

Research by Practitioners

- Action

Quantitative Research

- Experimental

- Single-Subject

- Correlational

- Causal-Comparative

- Survey

Research methods are broadly distinguished between the following categories:

Quantitative

- ✓ **Measure prevalence** of issues, **verify hypotheses** and **establish causal relations** between variables
- ✓ **Large samples, structured** data collection, and predominantly **deductive** analysis

Qualitative

- ✓ **Explore and discover themes, develop theories,** rather than verify hypotheses and measure occurrences
- ✓ **Smaller samples, semi-structured** data collection, **inductive** analysis

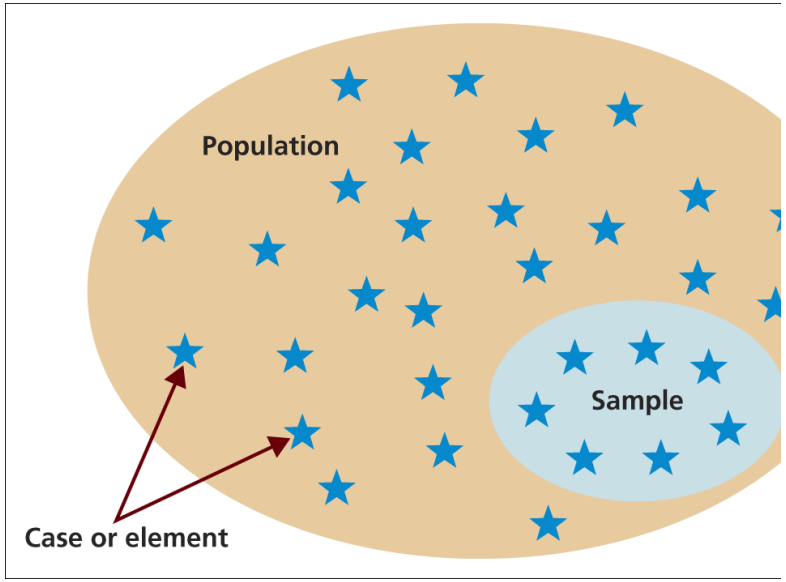
Mixed Methods

- ✓ **Combines both qualitative and quantitative** to (1) collect and analyse both types of data and (2) use both approaches in tandem

Population in Research

If the data you collect really are the same as you would get from the rest, then you can draw conclusions from those answers which you can relate to the whole group.

This process of selecting just a small group of cases from out of a large group is called **sampling**.



What is the sample size and sampling method?

- Sample size
  - How many will be included
  - Based on sample size calculation

- Sampling methods
  - The probability sampling technique that will be followed
  - How the sampling unit will be selected

How the sample was recruited

- The participants section described what type of sample was used
  - E.g. a convenience sample or simple random sample
- The procedures section describes how the sample was actually recruited or contacted
- How were they identified?
- Where were they recruited?
- What method, exactly, was used to recruit them?
  - For example, with fliers in local grocery stores asking interested volunteers to make contact by phone or email?
  - Using random digit dialing from a list of phone numbers from an entire zipcode?

Who collected the data Things to consider:

- Did others collect data, such as teachers, or parents?
- Did others collect data, like research assistants?
- Did people who collected data have special training or education?
- Did they have notable characteristics—that is, was it important that a person who collected the data was male or female or of a certain age, race or ethnicity?

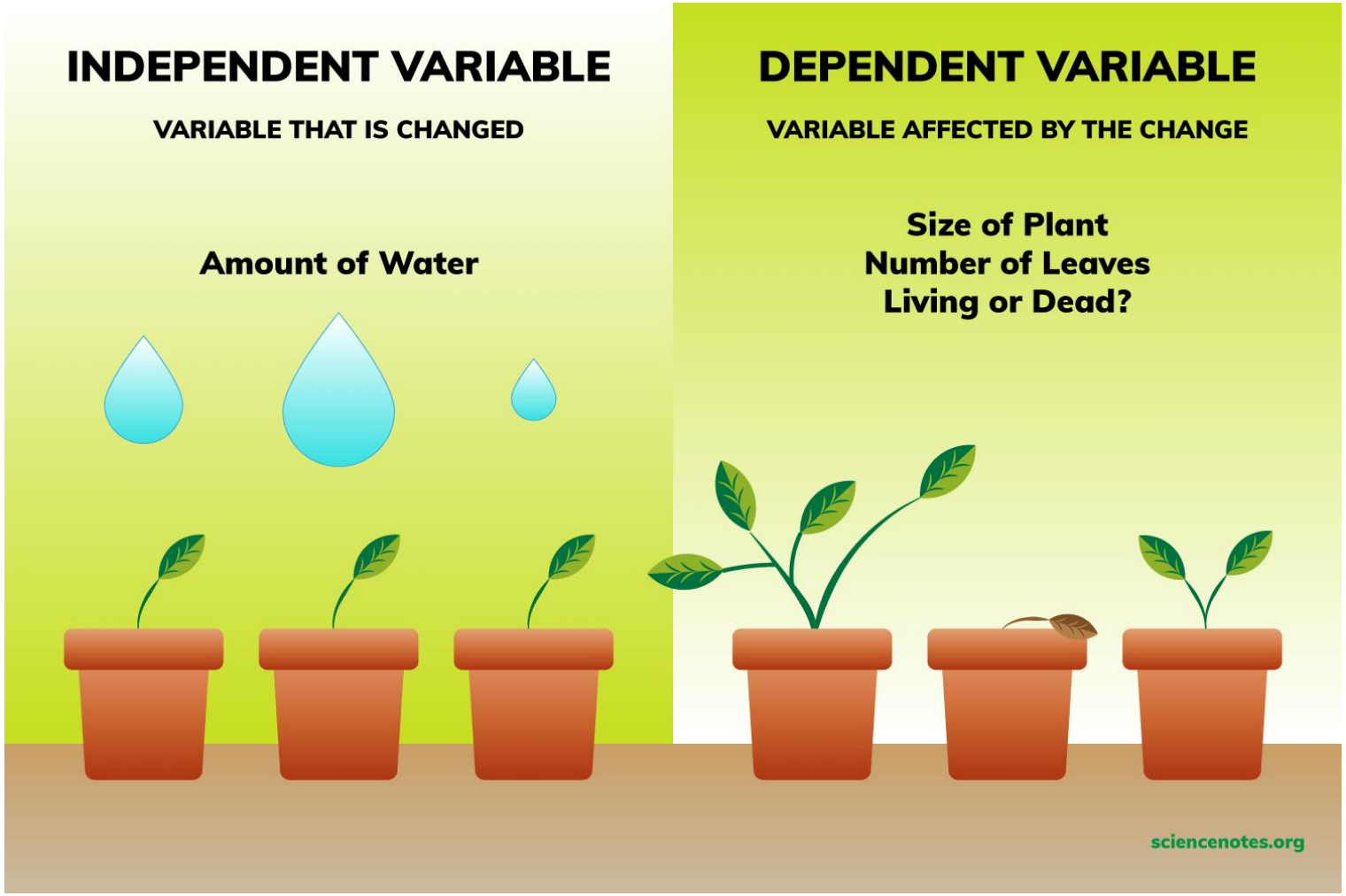
Where did activities take place

- Was data collected at a school?
- Did interviews happen at home, or at a place of the participants choosing?
- Was the place where data was collected private—so that a participant could feel secure in discussing confidential information?
- Was data collected in a lab, at a university or other institution?

Response Rates

- About 20 – 30% usually return a questionnaire
- Follow up techniques could bring it up to about 50%
- Still, response rates under 60 – 70% challenge the integrity of the random sample
- How the survey is distributed can affect the quality of sampling

VARIABLES


INDEPENDENT VARIABLE
VARIABLE THAT IS CHANGED
Amount of Water
DEPENDENT VARIABLE
VARIABLE AFFECTED BY THE CHANGE
Size of Plant
Number of Leaves
Living or Dead?
sciencenotes.org

RESEARCH METHODS FOR COLLECTING DATA

Research methods for collecting data

Research method	Primary or secondary?	Qualitative or quantitative?	When to use
Experiment	Primary	Quantitative	To test cause-and-effect relationships.
Survey	Primary	Quantitative	To understand general characteristics of a population.
Interview/focus group	Primary	Qualitative	To gain more in-depth understanding of a topic.
Observation	Primary	Either	To understand how something occurs in its natural setting.
Literature review	Secondary	Either	To situate your research in an existing body of work, or to evaluate trends within a research topic.
Case study	Either	Either	To gain an in-depth understanding of a specific group or context, or when you don't have the resources for a large study.

RESEARCH METHODS FOR ANALYZING DATA

Research methods for analyzing data

Research method	Qualitative or quantitative?	When to use
Statistical analysis	Quantitative	To analyze data collected in a statistically valid manner (e.g. from experiments, surveys, and observations).
Meta-analysis	Quantitative	To statistically analyze the results of a large collection of studies. Can only be applied to studies that collected data in a statistically valid manner.
Thematic analysis	Qualitative	To analyze data collected from interviews, focus groups or textual sources. To understand general themes in the data and how they are communicated.
Content analysis	Either	To analyze large volumes of textual or visual data collected from surveys, literature reviews, or other sources. Can be quantitative (i.e. frequencies of words) or qualitative (i.e. meanings of words).

Operational Definitions

An operational definition is a detailed specification of how one would go about measuring a given variable.

Operational definitions should be tied to the theoretical constructs under study.

The theory behind the research often claries the nature of the variables involved.

Operational definition can range from very simple and straightforward to quite complex depending on the nature of the variable and the needs of the researcher.

As researchers, we have to accept that there is no perfect operational definition for a given construct (e.g., IQ).

Operational definition of terms

E.g.

Smoking

Obesity

Child maltreatment

Repeated abortion

Gestational diabetes

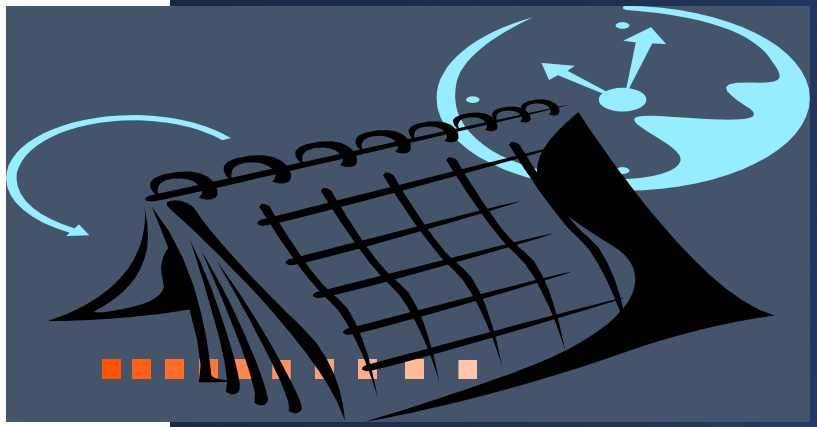
Severe hypertension

	Variable Name	Variable Type	Definition	Scale
			Predisposing Component (P)	
1	Age	Exogenous	Age of the patient. All adults 18 years and above	Continuous in years
2	Gender	Exogenous	Male or Female	Categorical (Dichotomous): Male = 0; Female = 1
3	AA_Hisp	Exogenous	The ethnicity of the patient. Whether patient's ethnicity is African American or Hispanic or not	Categorical: 1 = African American or Hispanic; 0 = Others
4	Dementia	Exogenous	Patient has dementia or not	Categorical (Dichotomous): No dementia = 0; Yes = 1
5	No Depression	Exogenous	Patient has no depression	Categorical (Dichotomous) No depression = 1; Depression = 0
6	Healthy lifestyle (HLS)	Exogenous	Refer to the healthy lifestyle for the patient, which is tobacco-free, alcohol-free, and no drug abuse	Categorical: 2 = Patient has a healthy lifestyle with no smoking, no alcohol, and no drugs; 1 = Patient does one of the above; 0 = Patient does 2 or more of

Operational definition and measurement instruments for study variables.

Timeline/Plan of Work

- Some things to keep in mind:
- Consult your advisor.
- Be aware of important dates for submitting and defending dissertations.
- Do not be overly ambitious.
- Remember that your proposed timeline demonstrates your awareness of the various elements of the study (IRB approval, travel; design, testing, and length of experiments; negotiation of entry into the study site; purchase of necessary equipment; drafting; redrafting).



Timeline

- Helps you keep your experimental design in the correct order
- Avoids “dead” time
- When building your timeline
  - Consult with other students in your lab that have done similar studies

Budget

- Give you an appreciation of research costs
- Prevents you from overspending!
- Provide specific explanations for:
  - Need for specific technologies
  - Need for other financial requests (e.g. conference, instrumentation, staff, bursaries etc).
  - Do you really need this kit?

Revise and Edit

- Back-up proposal everyday!
- Always print on paper and edit
- Use standard font
- Number your pages
- Read out loud

Evaluation of proposals

- The aims/objectives are likely to be achievable in the given time period
- The rationale for the proposed study is reasonable
- The scientific design is described and adequately justified

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- di Francia, G. Toraldo (1981). *The Investigation of the Physical World*. Cambridge University Press. ISBN 978-0-521-29925-1.
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- http://www.cgd.ucar.edu/cms/agu/scientific_talk.html

Any Questions?