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Pharmacy 476

How to Construct a Hypothesis

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Objectives

- Discuss the purpose of the hypothesis in the research proposal
- Present the definition of a hypothesis
- Demonstrate hypothesis development using examples

The Research Hypothesis

- Clarify, specify and focus the research problem/question
 - gives the research a central and focused theme
 - provides direction
 - makes you think about what you're going to study and test
 - “hunch”, “best guess” based on supportive or at least suggestive evidence

The Research Hypothesis

- “...a proposition, condition, or principle which is assumed, perhaps without belief, in order to draw out its logical consequences and by this method to test its accord with facts which are known or may be determined.”¹ huh?
- “...a proposition that is stated in a testable form and predicts a particular relationship between two (or more) variables.”²

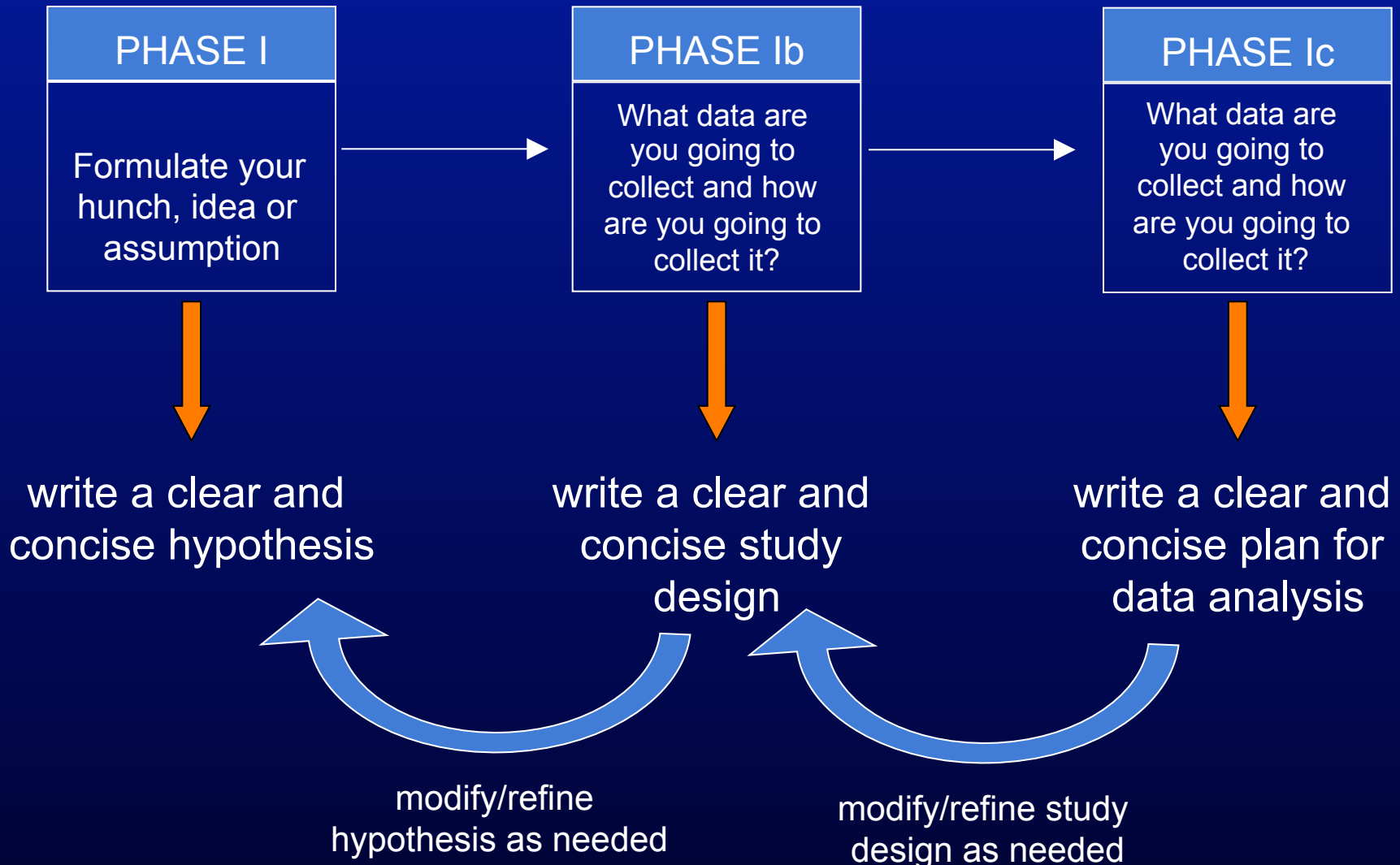
¹Webster’s International Dictionary of English Language, 1986

²Black JA, Champion DJ. Methods and issues in social research; 1976, John Wiley & Sons, NY.
Kumar, R. Chapter 6: Constructing Hypotheses. In: Research Methodology, 2nd Edition.

The Research Hypothesis

- The (and *your*) hypothesis has (will have) certain characteristics:
 - it is a tentative proposition (still to be proven)
 - based on the research problem you submitted (assignment #1)
 - its validity is not yet known (it hasn't been previously tested)
 - it specifies a relationship between two or more variables

The Hypothesis as a Component of the Research Proposal



The Research Hypothesis

- The hypothesis should be:
 - simple, specific and conceptually clear
- The average age of the male students in this class is higher than that of the female students
 - says what will be measured and compared and what it will establish
- ‘Suicide rates vary inversely with social cohesion’¹
 - is clear and specific but unclear what or how it will be tested
 - how will “social cohesion” be measured??

The Research Hypothesis

- The hypothesis should be:
 - capable of verification
 - methods have to be available
 - related to and/or supported by an existing body of knowledge
 - can't be fictitious or hypothetical!
 - measurable
 - the hypothesis has to be expressed in terms that can be measured
 - if it can't be measured then it can't be tested!

Types of Hypotheses

- Research and alternate (or null)
 - *you will write a research hypothesis*
 - the alternate hypothesis is what will be true if the research hypothesis is proved to be incorrect
- Others
 - hypothesis of difference
 - hypothesis of point-prevalence
 - hypothesis of association

The Research Hypothesis

- The hypothesis is subsequently tested to determine if:
 - it's right
 - partially right
 - wrong

} using a well designed study
- Errors in testing a hypothesis
 - the selected study design is faulty
 - the sampling procedure is flawed
 - the method of data collection is inaccurate or incomplete
 - the analysis/statistical plan is wrong

Errors in Hypothesis Testing

The Importance of Study Design

	True	False
Accept	Correct	Type I Error
Reject	Type II Error	Correct

- Type I error: the hypothesis is accepted when in fact it's false; false positive
- Type II error: the hypothesis is rejected when in fact it's true; false negative

The Research Hypothesis

- The hypothesis brings clarity to the research problem and helps direct study design

—examples

There are disparities in access to health care for different ethnic groups.

The problem of prescription drug abuse.

Aspirin is a problem in inflammatory bowel disease.

The Research Hypothesis

- more examples
 - Health care providers have reduced their appointment times so they can see more patients in a short period of time. Patients also have to wait up to an hour beyond their scheduled appointment time to see a physician. This causes dissatisfaction and doesn't give patients enough time to discuss important topics with their doctors. This leads to a decline in medication compliance, particularly in patients who do not speak English or those who are not health literate. *so what's the hypothesis???*
 - Cystic fibrosis patients may benefit from the use of prophylactic ampicillin against *Staphylococcus aureus* because inhibiting its colonization may improve oxygenation.

Next Assignment

- Introduction and Hypothesis and Aims
 - clearly stated, concise
 - supported by the background information you provided in the introduction
- Group assignment
 - first session

Format

Assignment #2

- Word document
 - include your edited research problem statement
 - followed by the introduction with the header:
Introduction
 - the hypothesis follows the introduction and should be easily identifiable
 - header or bolded (e.g., ***hypothesis***)
 - the aims follow the hypothesis
 - Specific Aims:
 - should be numbered and in a list
 - a reference list is helpful but not required
 - acceptable references
 - Rubric, rubric, rubric



Additional Source Information

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