




RESEARCH IN PHYSICAL THERAPY



Scientific Method

- Decide on a problem
 - Gather facts to refine the problem
(narrow definition is best)
 - Develop hypotheses (through induction)
 - Test hypotheses
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Variables of the study

- **Dependent variables (measured or tested variable):**


It is the outcome that expected to be changed in response to manipulation of the independent variable

- **Independent variables**

(also called treatment, controlled or manipulated variable):



hypotheses

- **Generating tentative guesses (hypotheses) about the relation of the variables**
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Research hypothesis



statistical hypothesis





Types of hypothesis

A research hypothesis is also classified as directional , non-directional or null



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- *Directional*: One that specifies the direction of the expected findings; this is done when the researcher has definite reasons; for expecting certain relationships or certain differences to occur between groups.
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- *Non-directional*: Doesn't, specify, the direction that expected differences or relationships may take.
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● Null



- It predicts no relationship between I.V. and D.V.
- It is used when statistical testing procedures are applied to the data.

Example:

- There is no relationship between maternal smoking and newborn's birth weight.
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- complex research will have a multiplicity of hypotheses
 - Simple rule of thumb: State one hypothesis for every subproblem and/or for every data-collection device that is used.


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- There is no upper limit on the number of hypotheses we can have
 - The hypothesis are not supported, this does not negate the value of the research.
 - Some of our most important theoretical thinking has resulted from research that did not support its hypothesis.



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- The two major elements which structure hypotheses are the:
 - 1. Researcher's previous experience.
 - 2. Literature.
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Importance of R.H.:


- It provides direction for the type of research (i.e. design, sampling, data collection .. etc.).
- Suggests the type of statistical analysis to be used in the study.
- Identifies the variables to be manipulated and/or measured

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- ***Characteristics of research hypothesis:***
 - *1. It should be improve or adding to our body knowledge.*
 - *2. It should be testable.*
 - *3. It should be stated clearly in other word you must define what your variables mean.*
 - *4. It should be realistic in its aims (not over ambitious).*


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- An important outcome of stating a hypothesis is that it helps us think about the data to be collected and analyzed; it helps guide the choice of data-gathering methods and techniques. (research type)
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■ Research types



Research Classification (Methods Based)

- Research method is characterized by the techniques employed in collecting and analyzing data.
 - • On the basis of method, research can be classified as:
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Historical

- The purpose of historical research is to arrive at
- conclusions concerning trends, causes or effects of past occurrences.
- • This may help in explaining present events and
- anticipating future events.
- • The data are not gathered by administering instruments to individuals, but by collecting them from original documents or by interviewing the eye-witnesses (primary source of information).




DESCRIPTIVE RESEARCH

- Descriptive research describes the present status of people, attitudes, and progress.
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Forms of Descriptive Research


- Ex post facto (after the fact)
 - Case studies
 - Correlation studies
 - Developmental studies
 - Survey studies
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Ex Post Facto Research

- Ex post facto research is sometimes called causal comparative research.
- Ex post facto research is research that takes place after the fact.
- Often ex post facto research is used to explain something in the present from data collected sometime in the past.



Case Studies

- Case studies are usually an examination into one element of a population, e.g., one school district, one school, one research class, one person.
 - Case studies are often conducted in social work and counseling for diagnosis and recommendation purposes.
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Correlational Studies

- Correlational studies examine the relationship between two or more variables.
- Correlations examine how variables covary together.




Developmental Studies

- Developmental studies are concerned with changes that take place as a function of time.
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Types of Developmental Studies

- Longitudinal studies
 - Long term, collect data from the same subject over a number of years
 - Cross sectional studies
 - Short term, usually 6 months or less and all data are collected
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Survey Design


Surveys are used to gather extensive amounts of information for large groups of individuals in short time spans.





EXPERIMENTAL RESEARCH

- **Experimental research explores cause and effect relationship and thus often used for hypothesis testing**
- **It does so by controlling/manipulating the independent variable(s) and seeing how these control/manipulation affect the dependent variable**
- **But such control and manipulation is possible only in laboratory situation**

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- It is the only type of research which can establish truly the cause and effect relations.
 - Two types of experimental research
 - (1) quasi-experimental research
 - (2) true experimental research.



Research Characteristics

interesting problems

A problem for study must be interesting



Objectivity:

- An investigator must strive at every step to eliminate personal bias, to be intellectually honest, and to put aside prejudice

Simplicity:

- Problem solving requires moving from the complex approach to the simple. Complicated approaches serve only to confuse, not elucidate.
- A first principle of the scientific method is simplicity

Fragmentation:

- The scientist does not attempt to attack all fronts at once. He does not deal with a problem globally, but breaks it down into its parts,



Quantification:

- There is a basic scientific premise that if a phenomenon exists, it can be measured and if it can be measured, it can be understood.

Verification:

- Each step in an investigation should be subject to verification through checking and rechecking. The thorough investigator checks the validity of his instruments, the reliability of the data, the adequacy and correctness of the statistical procedures employed, the legitimacy of his conclusions, and, above all, the accuracy of the written report.



Precision:

- There is no tolerance in science for haziness.
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Patience:

- A good research question cannot be answered easily. If it could be, it would have already been answered. It is the difficult questions which require research and the answers come only with intense effort and patient, reflective thought. An answer, at least the correct answer, cannot be hurried.



Structure and Content of a Manuscript

A manuscript is typically composed of a number of sections:

- title
 - abstract;
 - key words;
 - introduction;
 - Literature review
 - methods;
 - results;
 - discussion;
 - conclusions; and
 - references
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