Slide 1


research
knowledge
fact
society
model
interpretation
support
structure
work
idea
practical
practice
expansion
information
Research: Part 2
Host: Dr. Bryan Hawley

Slide 2

HOUSEKEEPING

Notes and recording will be sent out tomorrow
Certificates will be emailed 1 week out
Questions
All presented tonight is based off OUR OWN CLINIC system
Email (info@drbryanhawley.com)
Lets begin

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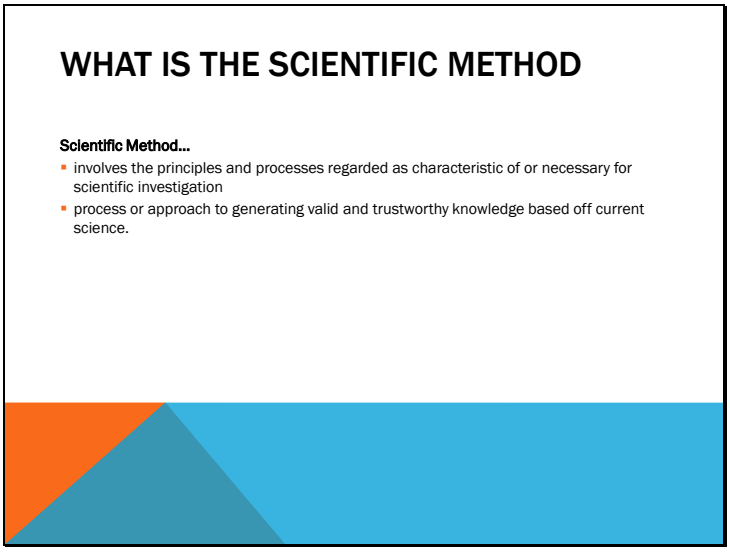
Slide 4


WHAT IS THE SCIENTIFIC METHOD
Scientific Method...
involves the principles and processes regarded as characteristic of or necessary for scientific investigation
process or approach to generating valid and trustworthy knowledge based off current science.

Slide 5

Hypothesis Formation

A scientific hypothesis is the initial building block in the **scientific method.** Many describe it as an "educated guess," based on prior knowledge and observation. While this is true, the definition can be expanded. A hypothesis also includes an explanation of why the guess may be correct.

S.W.A.G.
"**Scientific Wild Ass Guess**"

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Relationships of the Variables

Correlational relationship (variables are related)

Causal relationship (cause and effect)

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Time is an important element of any research design, one of the most fundamental distinctions in research design nomenclature is ***cross-sectional*** versus ***longitudinal*** studies.

Cross-sectional study is one that takes place at a single point in time. In effect, we are taking a 'slice' or cross-section of whatever it is we're observing or measuring.

Longitudinal study is one that takes place over time -- we have at least two (and often more) waves of measurement in a longitudinal design.

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ETHICS IN RESEARCH

Keeping a balance between protecting participants vs. quest for knowledge

Ethical Decision Making in Research

Although codes, policies, and principals are very important and useful, like any set of rules, they do not cover every situation, they often conflict, and they require considerable interpretation. It is therefore important for researchers to learn how to interpret, assess, and apply various research rules and how to make decisions and to act in various situations. The vast majority of decisions involve the straightforward application of ethical rules.

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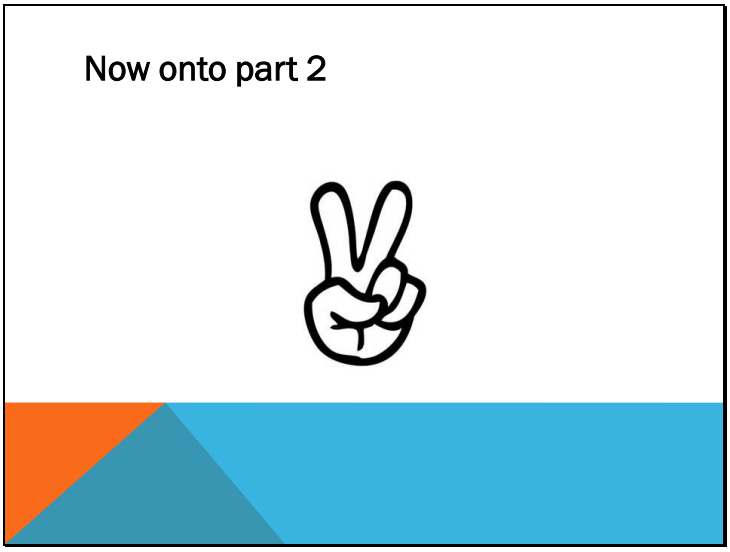

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Research design

This provides the glue that holds the research project together. A project design is used to structure the research, to show how all of the major parts of the research project -- the samples or groups, measures, treatments or programs, and methods of assignment -- work together to try to address the central research

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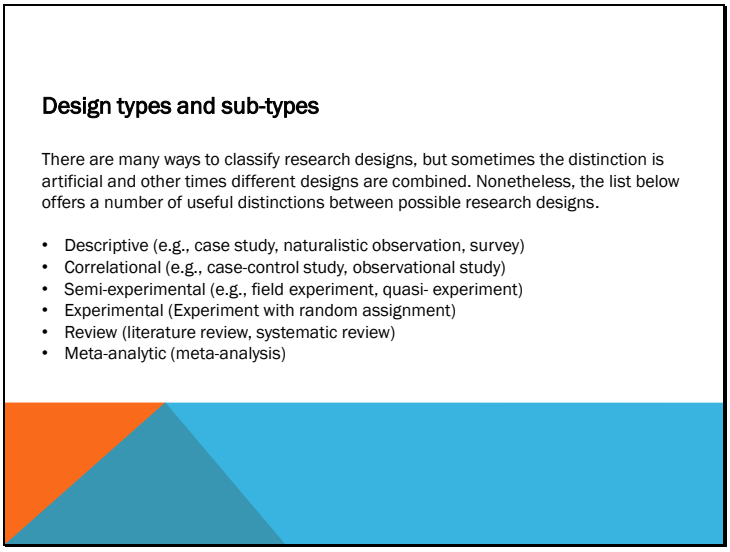
Design types and sub-types
There are many ways to classify research designs, but sometimes the distinction is artificial and other times different designs are combined. Nonetheless, the list below offers a number of useful distinctions between possible research designs.
• Descriptive (e.g., case study, naturalistic observation, survey)
• Correlational (e.g., case-control study, observational study)
• Semi-experimental (e.g., field experiment, quasi- experiment)
• Experimental (Experiment with random assignment)
• Review (literature review, systematic review)
• Meta-analytic (meta-analysis)

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Experimental Design

In scientific studies, experimental design is the **gold standard** of research designs. This methodology relies on random assignment and laboratory controls to ensure the most valid, reliable results. Although researchers recognize that correlation does not mean causation, experimental designs produce the strongest, most valid results.

Random assignments
Controlled Environments
Strict Protocols and guidelines

Very reproducible under same conditions

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So why don't we use Experimental Design protocols on all research?

However, experimental design is often not practical for many studies in social science, education and business because researchers cannot, in many instances, exercise laboratory controls in natural-world settings or randomly assign subjects.

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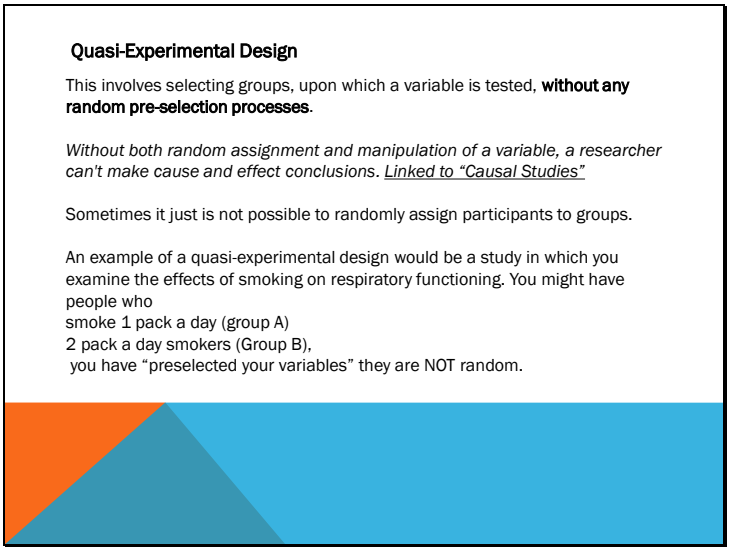
Quasi-Experimental Design
This involves selecting groups, upon which a variable is tested, without any random pre-selection processes.
Without both random assignment and manipulation of a variable, a researcher can't make cause and effect conclusions. Linked to "Causal Studies"
Sometimes it just is not possible to randomly assign participants to groups.
An example of a quasi-experimental design would be a study in which you examine the effects of smoking on respiratory functioning. You might have people who
smoke 1 pack a day (group A)
2 pack a day smokers (Group B),
you have "preselected your variables" they are NOT random.

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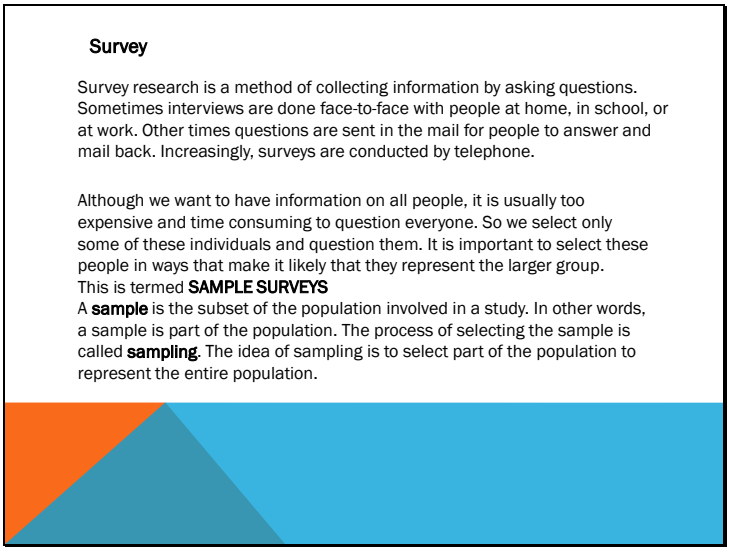
Survey
Survey research is a method of collecting information by asking questions. Sometimes interviews are done face-to-face with people at home, in school, or at work. Other times questions are sent in the mail for people to answer and mail back. Increasingly, surveys are conducted by telephone.
Although we want to have information on all people, it is usually too expensive and time consuming to question everyone. So we select only some of these individuals and question them. It is important to select these people in ways that make it likely that they represent the larger group.
This is termed SAMPLE SURVEYS
A sample is the subset of the population involved in a study. In other words, a sample is part of the population. The process of selecting the sample is called sampling. The idea of sampling is to select part of the population to represent the entire population.

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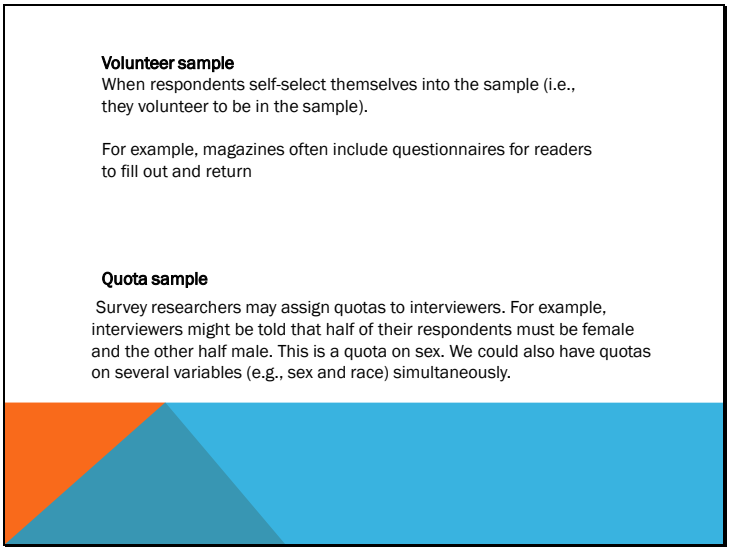
Volunteer sample
When respondents self-select themselves into the sample (i.e., they volunteer to be in the sample).
For example, magazines often include questionnaires for readers to fill out and return
Quota sample
Survey researchers may assign quotas to interviewers. For example, interviewers might be told that half of their respondents must be female and the other half male. This is a quota on sex. We could also have quotas on several variables (e.g., sex and race) simultaneously.

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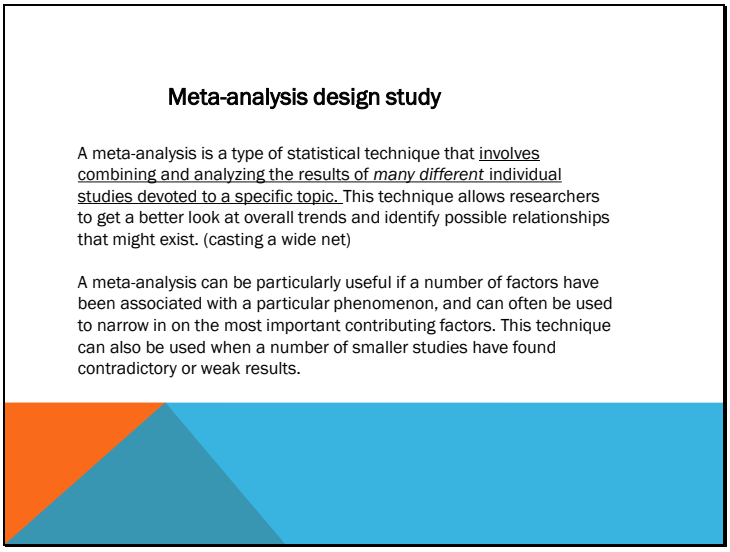
Meta-analysis design study
A meta-analysis is a type of statistical technique that involves combining and analyzing the results of *many different* individual studies devoted to a specific topic. This technique allows researchers to get a better look at overall trends and identify possible relationships that might exist. (casting a wide net)
A meta-analysis can be particularly useful if a number of factors have been associated with a particular phenomenon, and can often be used to narrow in on the most important contributing factors. This technique can also be used when a number of smaller studies have found contradictory or weak results.

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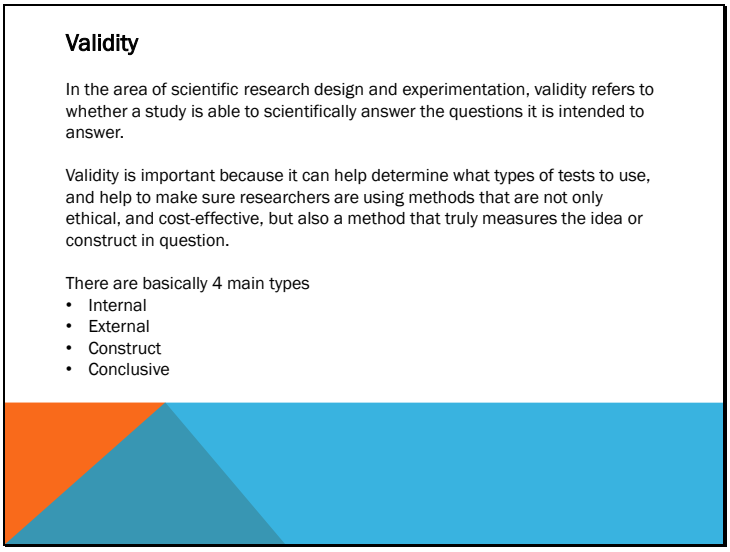
Validity
In the area of scientific research design and experimentation, validity refers to whether a study is able to scientifically answer the questions it is intended to answer.
Validity is important because it can help determine what types of tests to use, and help to make sure researchers are using methods that are not only ethical, and cost-effective, but also a method that truly measures the idea or construct in question.
There are basically 4 main types
• Internal
• External
• Construct
• Conclusive

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Internal Validity:

is the approximate truth about inferences regarding cause-effect or causal relationships (we spoke about causal relationships in Part 1). Thus, internal validity is only relevant in studies that try to establish a causal relationship. It's not relevant in most observational or descriptive studies

What internal validity means is that you have evidence that what you did in the study (i.e., the program) caused what you observed (i.e., the outcome) to happen. You created under controlled circumstances a Cause = Effect event

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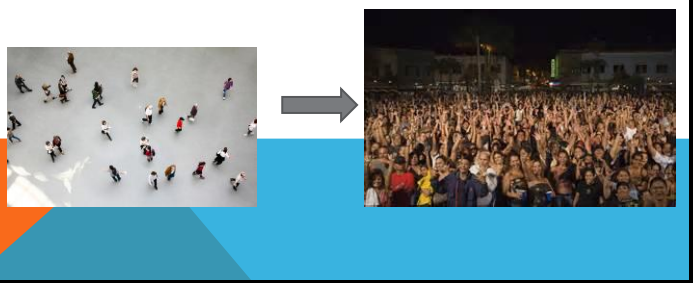
External Validity

External validity refers to how a study's results can be generalized to a larger population. In this case, validity is determined in part by whether a study's outcomes can be replicated in and across other samples, times and settings.

A study with high external validity can therefore be repeated in multiple contexts with similar outcomes.



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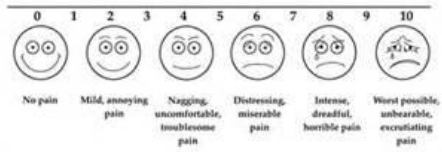
Construct Validity

Construct validity defines how well a test or experiment measures up to its claims. It refers to whether the operational definition of a variable actually reflect the true theoretical meaning of a concept.

An example could be a doctor testing the effectiveness of painkillers on chronic back sufferers.
Every day, he asks the test subjects to rate their pain level on a scale of one to ten –
Pain exists, we all know that, but it has to be measured subjectively.
In this case, construct validity would test whether the doctor actually was measuring pain and not numbness, discomfort, anxiety or any other factor.



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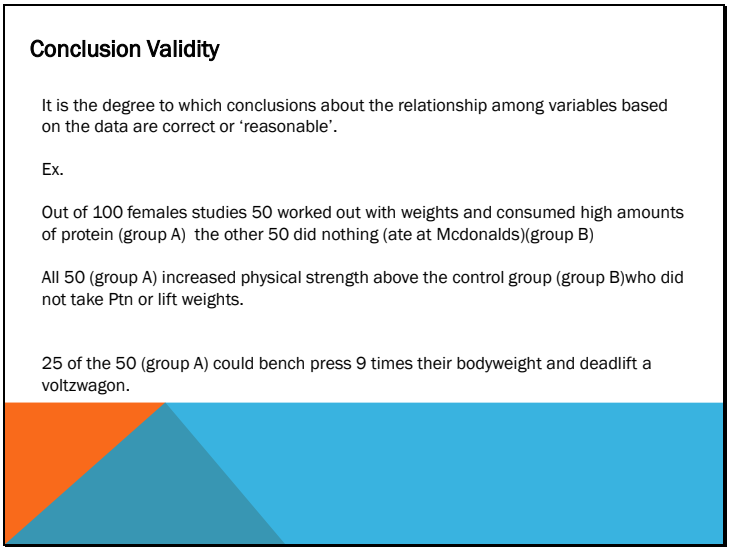
Conclusion Validity
It is the degree to which conclusions about the relationship among variables based on the data are correct or 'reasonable'.
Ex.
Out of 100 females studies 50 worked out with weights and consumed high amounts of protein (group A) the other 50 did nothing (ate at Mcdonalds)(group B)
All 50 (group A) increased physical strength above the control group (group B)who did not take Ptn or lift weights.
25 of the 50 (group A) could bench press 9 times their bodyweight and deadlift a voltzwagon.

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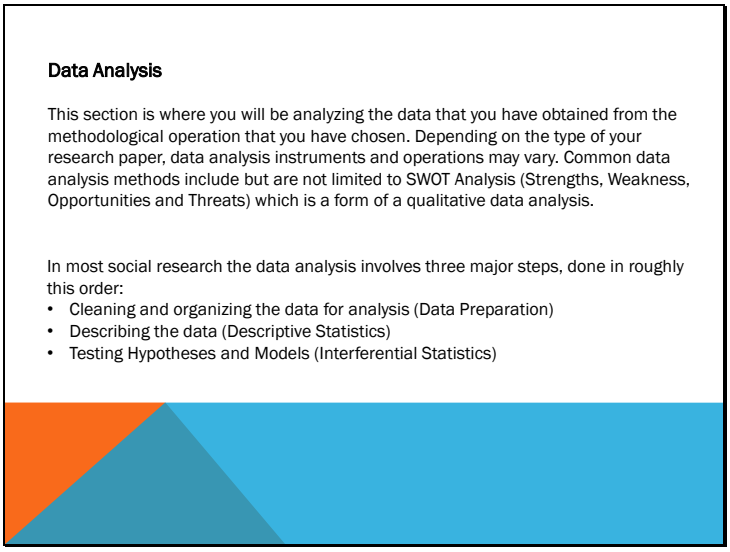
Data Analysis
This section is where you will be analyzing the data that you have obtained from the methodological operation that you have chosen. Depending on the type of your research paper, data analysis instruments and operations may vary. Common data analysis methods include but are not limited to SWOT Analysis (Strengths, Weakness, Opportunities and Threats) which is a form of a qualitative data analysis.
In most social research the data analysis involves three major steps, done in roughly this order:
• Cleaning and organizing the data for analysis (Data Preparation)
• Describing the data (Descriptive Statistics)
• Testing Hypotheses and Models (Interferential Statistics)

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Data Preparation:
This involves checking or logging the data in; checking the data for accuracy; entering the data into the computer; transforming the data; and developing and documenting a database structure that integrates the various measures.

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Descriptive Statistics:

These are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data. With descriptive statistics you are simply describing what is to be analyzed, or what the data shows.

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Inferential Statistics

With inferential statistics, you are trying to reach conclusions that extend beyond the immediate data alone. For instance, we use inferential statistics to try to infer from the sample data what the population might think.

Advertising and marketing agencies use Inferential Statistics

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2 Main types of Research Papers

- Analytical
- Argumentative

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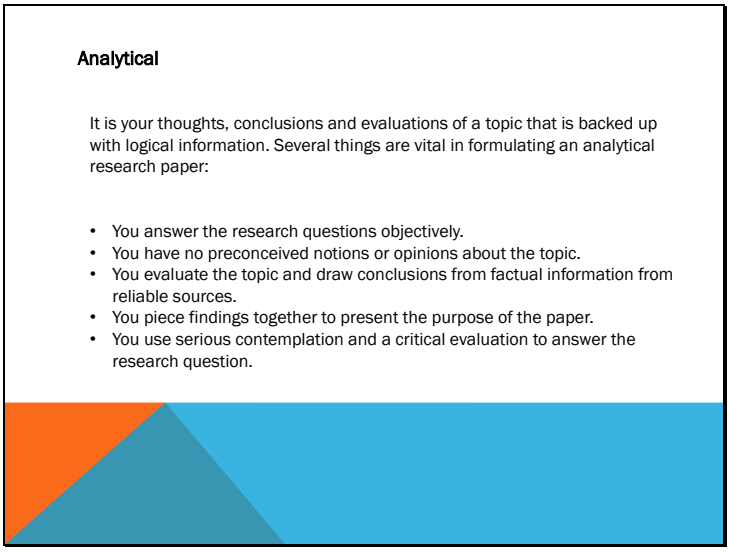
Analytical
It is your thoughts, conclusions and evaluations of a topic that is backed up with logical information. Several things are vital in formulating an analytical research paper:
• You answer the research questions objectively.
• You have no preconceived notions or opinions about the topic.
• You evaluate the topic and draw conclusions from factual information from reliable sources.
• You piece findings together to present the purpose of the paper.
• You use serious contemplation and a critical evaluation to answer the research question.

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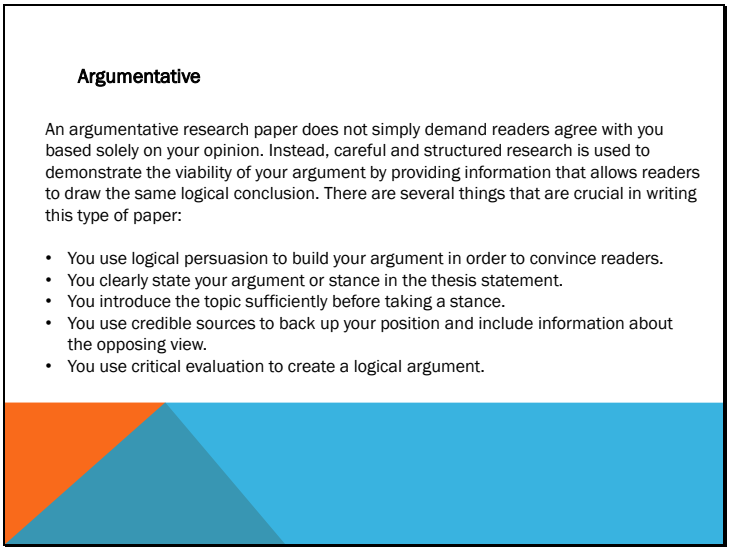
Argumentative
An argumentative research paper does not simply demand readers agree with you based solely on your opinion. Instead, careful and structured research is used to demonstrate the viability of your argument by providing information that allows readers to draw the same logical conclusion. There are several things that are crucial in writing this type of paper:
• You use logical persuasion to build your argument in order to convince readers.
• You clearly state your argument or stance in the thesis statement.
• You introduce the topic sufficiently before taking a stance.
• You use credible sources to back up your position and include information about the opposing view.
• You use critical evaluation to create a logical argument.

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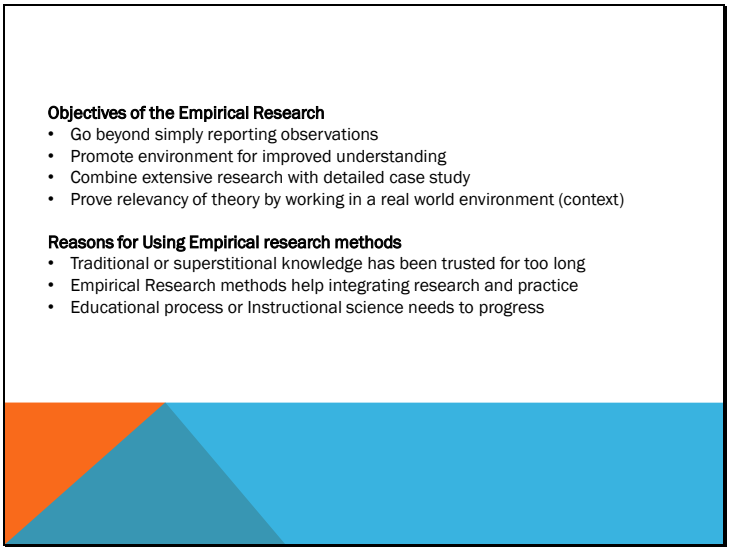
Objectives of the Empirical Research
• Go beyond simply reporting observations
• Promote environment for improved understanding
• Combine extensive research with detailed case study
• Prove relevancy of theory by working in a real world environment (context)
Reasons for Using Empirical research methods
• Traditional or superstitional knowledge has been trusted for too long
• Empirical Research methods help integrating research and practice
• Educational process or Instructional science needs to progress

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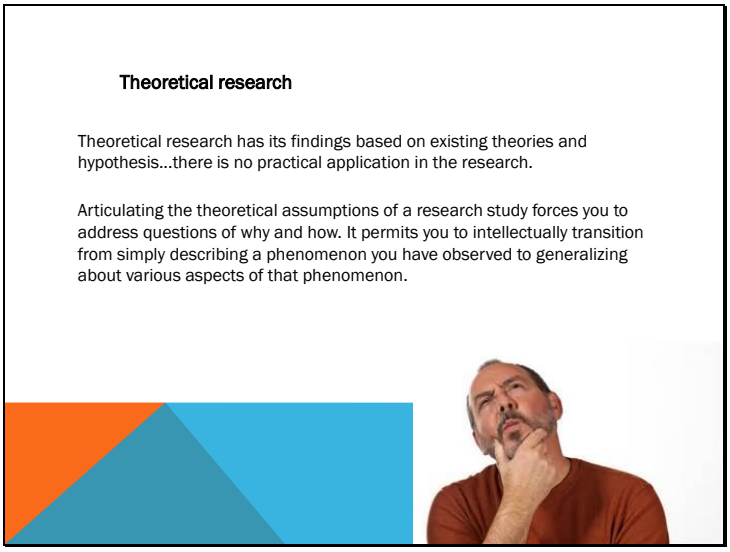
Theoretical research
Theoretical research has its findings based on existing theories and hypothesis…there is no practical application in the research.
Articulating the theoretical assumptions of a research study forces you to address questions of why and how. It permits you to intellectually transition from simply describing a phenomenon you have observed to generalizing about various aspects of that phenomenon.

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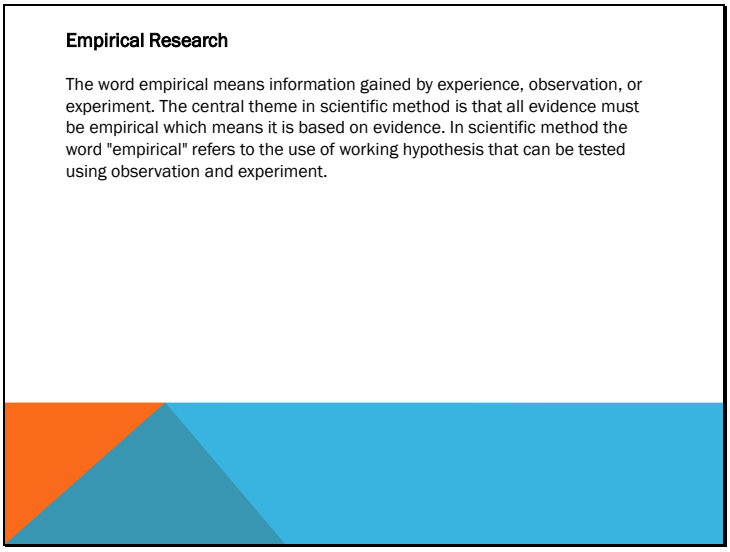
Empirical Research
The word empirical means information gained by experience, observation, or experiment. The central theme in scientific method is that all evidence must be empirical which means it is based on evidence. In scientific method the word "empirical" refers to the use of working hypothesis that can be tested using observation and experiment.

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Blind Studies

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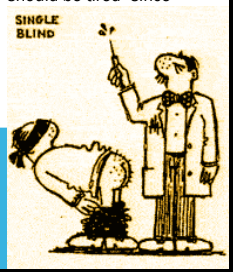
Single Blind Studies

In single blind studies, the experimenter (or observer) is aware of who or what belongs to the control group and the experimental group.

The Single-Blind research method is a specific research procedure in which the researchers (and those involved in the study) do not tell the participants if they are being given a test treatment or a control treatment. This is done in order to ensure that participants don't bias the results by acting in ways they "think" they should act. For example, if a participant believed they were in the group that received a sleeping drug, they may report that they are tired because they believe they "should be tired" since they're in the sleeping drug group.



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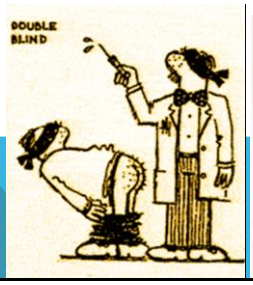
Double Blind Studies

A study is referred to as double-blind if both the researcher and the participants are not aware of which treatment each participant is receiving.
For example, in a study of a particular medication, half of the participants usually receive a placebo and the other half get the actual medication of interest.

In a double-blind experiment, neither the researchers nor the participants know who received the placebo and who received the medication.
Double-blind studies are conducted to prevent bias on the part of the researchers and the participants.



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Triple-blind:
Triple-blind (i.e., triple-masking) studies are randomized experiments in which the treatment or intervention is unknown to (a) the research participant, (b) the individual(s) who administer the treatment or intervention, and (c) the individual(s) who assess the outcomes.

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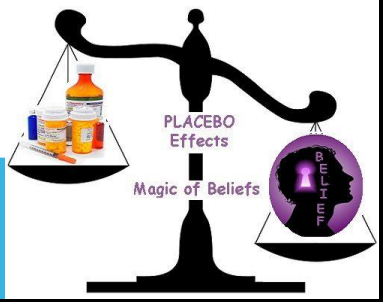
Placebo Effect:

The placebo effect refers to the phenomenon in which some people experience some type of benefit after the administration of a placebo. A placebo is a substance with no known medical effects, such as sterile water, saline solution or a sugar pill. In short, a placebo is a fake treatment that in some cases can produce a very real response. The expectations of the patient play an important role in the placebo effect; the more a person expects the treatment to work, the more likely they are to exhibit a Placebo Response



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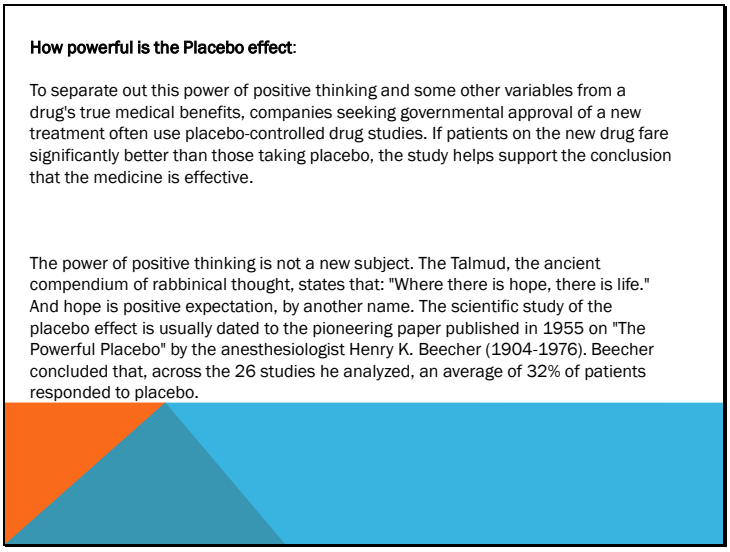
How powerful is the Placebo effect:
To separate out this power of positive thinking and some other variables from a drug's true medical benefits, companies seeking governmental approval of a new treatment often use placebo-controlled drug studies. If patients on the new drug fare significantly better than those taking placebo, the study helps support the conclusion that the medicine is effective.
The power of positive thinking is not a new subject. The Talmud, the ancient compendium of rabbinical thought, states that: "Where there is hope, there is life." And hope is positive expectation, by another name. The scientific study of the placebo effect is usually dated to the pioneering paper published in 1955 on "The Powerful Placebo" by the anesthesiologist Henry K. Beecher (1904-1976). Beecher concluded that, across the 26 studies he analyzed, an average of 32% of patients responded to placebo.

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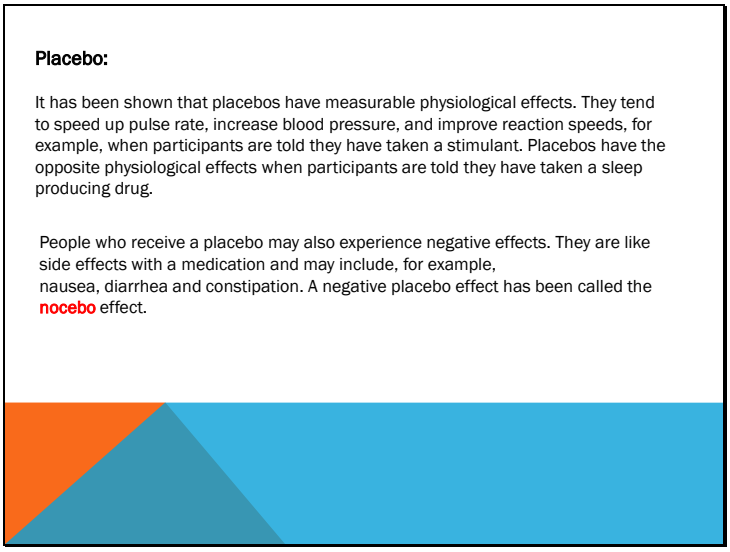
Placebo:
It has been shown that placebos have measurable physiological effects. They tend to speed up pulse rate, increase blood pressure, and improve reaction speeds, for example, when participants are told they have taken a stimulant. Placebos have the opposite physiological effects when participants are told they have taken a sleep producing drug.
People who receive a placebo may also experience negative effects. They are like side effects with a medication and may include, for example, nausea, diarrhea and constipation. A negative placebo effect has been called the nocebo effect.

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Nocebo Effect:
The lesser known brother of the placebo effect, the nocebo effect is the opposite. It is the harmful results from negative thought. Nocebo literally means, "I will harm."

Cancer patients that are seemingly healthy get a terminal diagnosis and all of a sudden they fall ill and start looking like their diagnosis.

There are countless stories of people being cursed by a witch doctor and suddenly they manifest the respective ailments. Or the voodoo story. In the past, people who were told that harmful voodoo is being practiced on them also suddenly exhibited the suggested afflictions.

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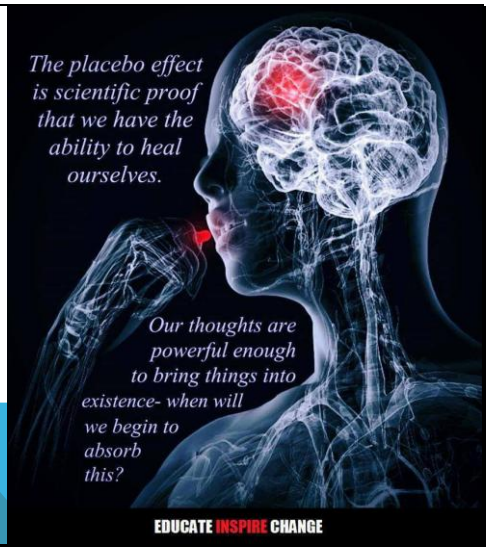
We do have the uncanny ability to either Heal or Destroy ourselves.



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The Hawthorne Effect:

This is a well-documented phenomenon that affects many research experiments in social sciences.
It is the process where human subjects of an experiment change their behavior, simply because they are being studied. This is one of the hardest inbuilt biases to eliminate or factor into the design.

Subjects are always liable to modify behavior when they are aware that they are part of an experiment, and this is extremely difficult to quantify. All that a researcher can do is attempt to factor the effect into the research design, a tough proposition, and one that makes social research a matter of experience and judgment.

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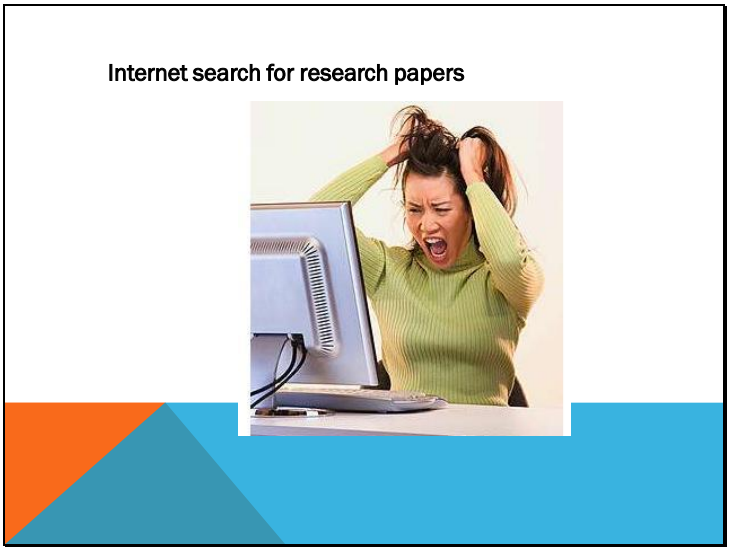

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