

Problem identification and hypothesis formation

What does a study require?

- 1) identify the problem and form a hypothesis
- 2) design the experiment
- 3) conduct the experiment
- 4) test the hypothesis
- 5) communicate the results

Steps in creating a hypothesis

Interest in topic ->

Consideration of topic from different perspectives ->

Appearance of new ideas and potential hypotheses about topic ->

Formulation of formal relationships expressed as research hypothesis

State independent and dependent variables

How each is measured (consider reliability and validity)

Relationship between independent and dependent variable

How to test the relationship

How phrase the question:

The more precise the better

What effect does the environment have on learning styles?

What effect does the amount of exposure to words have on the speed with which they are learned?

Note shift from concepts to operational definitions.

Operational definitions – redefine the concept in terms of clearly observable operations that anyone can see and repeat.

For the following statement, identify

What terms need to be defined more precisely?

The kinds of data that could be used as evidence to support the assertion

Any questions that must be answered before a scientific study could proceed.

1. My toothpaste works better than yours.
2. The astrological predictions in the tabloid newspapers are remarkable accurate.

3. Bad things come in threes.

What is a reasonable problem?

It expresses a relation between two or more variables.

It takes a question form –

What is the effect of

Under what conditions do

Does the effect of

Should lend itself to empirical testing

Can it be measured

Can it be falsified

Experimental questions must be repeatable, observable and testable.

NEED TO ASK EMPIRICAL QUESTIONS

For each of the following **non-empirical** questions - how might we change them into reasonable questions.

Is God dead?

Are humans naturally good?

Is the mind separate from the body? Or are they one and the same?

Do we get what we deserve in life?

What is beauty?

What makes a good idea?

Correspondence with reality

Coherence (does it stick together) and parsimony (how sparing or frugal is it)

Falsifiability

Can answer empirically (Leavitt)

Know what acceptable answer look like

Worth answering

Role of theory: Popperian approach:

- Theory must be stated so that it can be falsified by a final set of observations
- Theories can only be falsified, not proven.
- Theories evolve as additions as well as replacements of outmoded formulations.
- If hypothesis does not receive support, it means the theory in its current form may be wrong.

- If repeatedly not supported, should be discarded.
- But if is unsupported, there still might another better theory to account for the restless.

In other words, observations can lead (via induction) to theories which can lead (via deduction) to predictions that we can test.

Good theories should account for most of the data, and they should be testable, it should not be restrictive, simple and predictive.

ASK ABOUT FREUDIAN PSYCHOANALYSIS, EXISTENTIALISM, BEHAVIORISM

What makes research significant (in the practical sense).

- 1) Significant research is an outcome of investigator interest, resolve and effort.
- 2) Significant research projects often are based on intuition.
- 3) Significant research is an outcome of intellectual rigor.
- 4) Significant research goes into the world and returns with something clear, tangible and well understand.
- 5) Significant research is concerned with theory, understanding and explanation.
- 6) Significant research focuses on real problems.

What sorts of research questions are worth asking?

(Sternberg, 1997)

- Is the question scientifically important? Why or why not?
- What is the question's scope? Does it seek to explain a great deal or comparatively little?
- What are the best and worse possible outcomes we might predict for the research?
- If successful results are produced, how much of a change will they contribute to psychological theory or empirical knowledge?
- Is there reason to believe that readers will be interested in the results? Why?

Sternberg (1999) - generate alternatives - how interesting, how important, will it work, and do we have the resources?

Aronson: Be bold, be bold, and be bold.

But balance with the understanding that science is cumulative and incremental.

How tell an idea will pay off?

Use common sense

Critical feedback from colleagues

Familiar with relevant literature

Feasibility:

Time required

Type of research participants

Expense

Expertise of the experimenter

Ethical sensitivity

Things to avoid:

- Do not choose method before question.
- Do not get embroiled with how to analyze the data
- Do not try to capture journal policies
- Do not use self report for all variables
- Be wary of posing questions that can not be answered
- Avoid asking questions for an answer in known
- Avoid investigating problems just because feasible.
- Avoid adding one more moderator.
- Avoid fads (follow your heart.)

Where can we get ideas?

4 sources

* everyday life (why did better job offers given to my boyfriend and other males bother me so much more than it bothered my female friends) – role of observation (joking insults)

* practical issues (absenteeism, employee morale, turnover)

* past research (bringing ideas from one field to another – social cognition), disagree with previous literature – theory X vs. theory Y – chance favors the prepared mind

* theory – wonder what will happen if – inductive approach - go from observations to theory, expect this would happen if, deductive approach - go from theory to observations.

Learn from previous experience, from classes, from talking to people, from reading, from “thin air”

McGuire, 1973:

Intensive case study: observations of a Polynesian community showed that gossip is not just idle talk, but used to achieve conflict goals.

Paradoxical incident: Kitty Genovese case.

Metaphor: Inoculation as a way of understanding how withstanding a weak persuasion attempt can prevent persuasion by a strong persuasion attempt.

Rule of thumb: Work inspired by sales people’s rule of thumb to always discuss business over a good lunch.

Account for conflicting results: Social facilitation research – people can facilitate well-learned responses but hinder non dominant responses (students should study new material alone, preferably in an isolated place, but take the exam with a lot of people, preferably on stage)

Other approaches

Look for questions that organize research programs

Boundaries of a phenomenon - will it work here as well?

How does the mechanism work?

Can a theory be tested?

Can diverse areas be unified?

Can a paradox or conflicting findings be explained?

What is the cause of a condition?

Ask questions from multiple perspectives - developmental? Physiological, evolutionary

-> Beware of how your own circumstances might inform your choices – little work at absentee fathers, but lots of work on moms working outside the home.

Little work on how maternal work might psychologically benefit the family, lots of work on its costs

or put a different way, we are limited by

the tools we have available to us

our shared view of the world

our personal psychological limitations

According to Walla (1926), best science is the product of four steps.

Preparation,
Incubation
Illumination
Verification

To get started:

Just to get your juices flowing about your future research projects, a whole variety of things can be manipulated:

Manipulate social environment - a confederate who always says a slide is blue when in fact it is green sometimes.

Manipulate physical environment - Change the size of letters, color of computer screen, temperature of room

Manipulate instructions - Tell some people that math test evaluates potential academic achievement or represents particular hard problems that might be used on future tests

Subject variables - age, gender, self-esteem - can not conclude cause-effect, nor avoid confounds

Dependent variable: **behavior measured.**

In social skills example, we can imagine that our data reflects scores on a social skills test.

speed of completing a task

number of errors made

ratings or evaluations

amount of money donated

number of hours volunteer to help

You may notice that these are all continuous variables - categorical variables will be discussed later.

ANXIETY OPERATIONALIZATION EXERCISE

Trust yourself - if your opinions are based on a thoughtful consideration of what is known and what can be discovered through the research processes.

Note Martin's fear of phobias - genius, equipment, etc.

Instead, don't invent the wheel:

Take self-esteem (or aspects of identity)

Begin from scratch and demonstrate that measurement is reliable and valid (requires time)

Review literature and adopt methods of measurement used by others.

Ask them what is more convincing

GOOD RESEARCH PRACTICES (after Hall, 1884):

1. Enthusiasm. Absorbing, fill researcher with enthusiasm.
2. Open-mindedness. Be a keen observer, be willing to learn from mistakes, be willing to listen to others' advice and criticism.
3. Common sense. Drunk loses his/her house key and searches under the street lamp to find it even though lost it some distance away. Asked why he didn't look where he had dropped it, he replied "There is more light here!" In other words, don't do something because it is easy, convenient, but because it makes sense.
4. Role-taking ability. Think of yourself as a user of researcher not just a generator. Think also about how it would be to be a participant.
5. Inventiveness. Not just for hypotheses, about design, equipment failure, lab space, recruiting and scheduling participants, analyzing data, and new explanations for restless.
6. Confidence in one's own judgment. Follow your own "gleam" or "bent".
7. Consistency and care about details. Pride, no substitute for accuracy and hours of care needed to keep complete records, proofread, analyze data accurately, etc.
8. Ability to communicate. Scientists must write in order to make user their knowledge is shared with others.
9. Honesty. Fraud does happen but it undermines the basics on which advancement to science depends.

NOTICE WHAT IS NOT LISTED - data analysis skills, etc.

Dunn, 2002 - Research topic critiques:

- Do you see the significant points made by the research idea? What are they? How well are the points made?
- What are the assumptions about thought, behavior, people, and organizations and so on, underlying the arguments?
- Have any points been overlooked? Is there any evidence or an alternative point of view that should be considered?
- Can the research idea be improved? If so, how?

- Can you identify and participial implications of the predicted results?
What are they?
- Can you identify any particular applications of the predicted results?
What are they?

Further notes:

what is science

a deep commitment to experiencing the world as it is regardless of preconceived notions
a strong concern for both scientist and research participant
profound desire to better understand our world

best approach – multiple working hypotheses

Remind people why this is worth it.

Understand professional literature, and CONTRIBUTE to it.

Can psychology be science?

It does not have the precision of “real” sciences like chemistry
psychology can be scientific because it has agreed upon methods,
tries to establish lawful, predictable relationships and proposes
a reciprocal relationship between theories and empirical data

No clear separation between the observer and the observed (how
observe your own mind)

first others can do the same things and see if they share the
experience, second study behavior rather than what is unseen.

Every person is unique.

Every wave is unique, but we have oceanography. What is
important is the pattern.

Recognizing pseudoscience.

1) associate with true science – either by beginning in true science or
confusing concepts with pseudoscience

Phrenology – began with Franz Joseph Gall, but then disproved by a set
of experiments in which maps of brain did not work. Biorhythm began
with Fleiss (the close confidant of Sigmund Freud) who believed all
humans were bisexual and everyone had a male and female side.

Female was 28 days, male was 23 days (days between end and
beginning of one menstrual cycle). Tried to tie to lunar cycle and
evolution. 1930s Alfred Teltscher thought students showed intellectual
cycles of 33 days. Renamed emotional, physical and intellectual, writes
in the 70s and 80s refereed to legitimate work on circadian rhythms,
cyclical fluctuations in bodily temperature, created calculators to chart
cycles, but failed all tests.

2) rely on anecdotal evidence

President Kennedy ostensibly at a low intellectual cycle point when decide to ride in Dallas motorcade with top down. When Arnold Palmer won the British Open in 1962, all three cycles high. But systematic research found that biorhythms can not predict accident rates, batting averages test performance, mood swings.

3) deny falsification

if nothing is wrong on a critical day, it is because another cycle balances it out.

4) reduce complexity to simplicity

predict all human activity based on biorhythm?

deductive-statistical explanation:

1. all the coins in Ralph's piggy bank are pennies.
2. Ralph has shaken a coin out of his piggy bank.
3. The coin Ralph shook out is a penny.

inductive-statistical explanation:

1. 95% of the coins in Ralph's piggy bank are pennies.
2. Ralph has shaken a coin out of his piggy bank.
3. The coin that Ralph has shaken out is likely to be a penny.

We have to deal with uncertainty and the fact that we don't have invariant or absolute rules of nature.

Why?

Because of human values and the individual state of mind.

The unique nature of the situation.

Historical and sociocultural factors.

We might find things that apply to the average person, but any particular person may not act like the average person.