

## Basics of research design

- Research begins with an issue
- Then an empirical question
- Then a hypothesis
  - conjecture regarding the relationship between variables that can be tested empirically
  - Proposes specific relationship (if –then)

## What are variables?

- Measurable quantities that vary depending on other circumstances.
  - Ex: temperature
  - Ex: accuracy on speech perception in noise test.

## Independent variables vs. dependent variables

- IVs
- DV
- The idea of research is to see whether the DV varies as a function of the IV.

## Experimental vs. Descriptive Research

- Experimental research:
- Descriptive research
- Mixed design

## Experimental Research

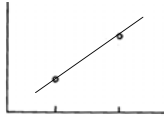
- Experimenter has a theory that some IV influences some DV
- To test theory, the experimenter alters IV and sees whether this does influence DV
- Main concern: when IV changed, need to ensure nothing else changed at the same time
- A large part of experimental design is focused on controlling these outside variables

## Types of Experimental Research

- Bivalent experiment
- Multivalent experiment
- Bivalent makes sense when there really are two categories that you want to compare.
- But if there are a range of levels of IV, breaking that down into 2 discontinuous groups can mask the underlying pattern

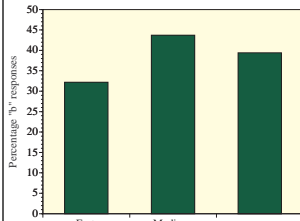
## Bivalent vs. multivalent experiments

With only 2 points, the real pattern could be this...



## Bivalent vs. multivalent experiments

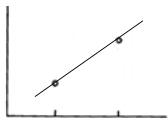
Across-talker speaking rate effect



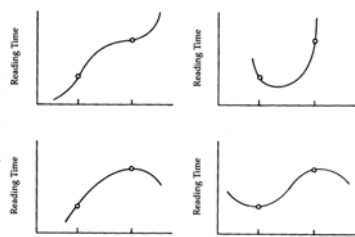
- When IV is continuous, you get a more complete picture if you test it using a multivalent design

## Bivalent vs. multivalent experiments

With only 2 points, the real pattern could be this...

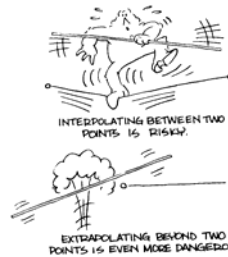


Or any of these....



Martin, D.W. (1985) Doing Psychology Experiments, 2nd Ed., p. 82

## Bivalent vs. multivalent experiments



Martin, D.W. (1985) Doing Psychology Experiments, 2nd Ed., p. 83

## Descriptive research

- In descriptive research, the experimenter isn't manipulating the situation, but is instead comparing the effect of differences that already exist.
  - Comparative research
  - Developmental research

## Longitudinal vs. Cross-sectional

- | <b>Longitudinal</b>   | <b>Cross-sectional</b>  |
|---|---|
| • Better control for other differences between groups   | • Groups may differ on other factors besides age  |
| • Slower to run   | • Faster to run   |
| • More subject loss (attrition)   | • Attrition not a factor  |
| • Order effects <ul style="list-style-type: none"> <li>– If subjects can learn from having been in the experiment, older kids will always have more of this experience than younger kids</li> </ul> | • All of the subjects are naïve <ul style="list-style-type: none"> <li>– No concern that having taken part in the study at one age might change what the person would do at a later age.</li> </ul> |

### Types of descriptive research

- Comparative
- Developmental
- Correlational

### Example: Correlational vs. Comparative

- Issue: do different personality types differ in their use of hand gestures while communicating?
- Used a personality survey that measured the extent to which people were extroverted or introverted
- Videotaped a conversation with each participant, and counted the number of hand gestures they made.
- One possibility: classify people as either introverted or extroverted, and compare the two groups.
- Other possibility: use their scores along the continuum of extrovert-to-introvert and see if this correlates with hand gestures.

### Advantages/disadvantages

- Comparative study assumes everyone is either one or the other; Correlation takes into consideration the degree to which people are one vs. the other.
- Unequal N's can be a problem for comparative.
- Square of correlation tells you how much variation in hand gestures is accounted for by extroversion.
- A skewed population can result in a strong correlation because of the extreme participants.
- If you have a restricted range, correlation won't show much.

### Types of descriptive research

- Comparative
- Developmental
- Correlational
- Survey

### Advantages of survey research

- Easy to test
- Easy to score
- Can test large numbers of people
- If the survey is well-standardized, you have a good sense of what patterns of responses are normal/typical

### Disadvantages of survey research

- Explicit questions only work on certain issues
- People may not return self-administered surveys; those that do return them may not be representative
- If the experimenter is giving the survey/interview, people feel social pressure to respond in a certain way
- If a question is ambiguous, people may respond to it in different ways, and you won't know
- If the response format annoys people they are less likely to respond
- Format issues

### Sample study 1

- What factors influence word-finding failures in both normal children and children with w-f disorders?
- Two possible factors: word frequency, and confusability/similarity to other words.
- Tests children on how well they come up with the names for these different types of words.

### Sample study 2

- Do people who get CIs feel self-conscious about them?

### Sample study 3

- When do children start using the past-tense ending correctly?
- Uses word-completion tasks, like “Joey like to skip; he skips every day. Yesterday he \_\_\_\_\_.”

### Sample study 4

- Do people who see student clinicians feel more or less satisfied than those who see professional clinicians?

### Sample study 5

- What is the relationship between amount of hearing loss and extent of hearing handicap?