Methods in Psycholinguistics

04/04/2017

Today

- **Part 1:** Why and how to do experiments

- **Part 2:** Class logistics

Behavioral measures

- Goal:
  - measure behavior to draw inferences about **representations** and **processes** (computations)
- Components:
  - method for measuring an aspect of behavior
    - task
    - response
  - model/hypotheses about underlying processes
  - **linking hypothesis** (model linking behavior to underlying process)

Example: the Parsing Wars

Consensus: language processing is incremental.
No consensus: language processing is

modular & serial.
driven by heuristics.

Garden Path Model
(Clifton, Frazier)

distributed & parallel.
driven by integration of
available information.

Constraint-Based Accounts
(Tanenhaus, MacDonald)

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The horse raced past the barn fell.

Application of syntactic
heuristics followed by
integration of contextual
information

Interpretation of sentence
against multiple available
cues/constraints

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Examples of responses/tasks

- Choices
- Time measures (RT)
  - reading times
  - word recognition
    - lexical decision
    - naming
  - Memory measures
    - recall
    - recognition
- Psychophysical measures
  - discrimination
  - identification
- Overt/natural behaviors
  - eye movements
  - mouse movements
  - errors
- Brain imaging
  - ERPs
  - fMRI

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The horse raced past the barn fell.
The landmine buried in the sand exploded.

Linking hypothesis: reading time reflects processing effort.

Common experimental goals

- measure interpretation
- assessing difficulty (resource assumptions)
  - errors
  - response times
- stages of information processing
- probing representations
  - priming

Some terminology

- independent variable
  - what is manipulated
- dependent variable
  - what is measured
- hypothetical construct
  - what inferences are made about
- beware of conflating dependent variable and hypothetical construct

Experimental design

- goal: maximize probability of making valid inferences
  - maximize sensitivity (null effect problem)
  - minimize measurement error
  - avoid misattribution (confounds)
- choices about selecting/manipulating independent variables
  - between/within participants
  - randomize/counterbalance
- rules/heuristics/assumptions for drawing inferences from dependent measures (statistics)

Frequent problems

- null effects

- signature data pattern thinking

- "My experiment didn't work"

Class logistics

https://canvas.stanford.edu/courses/65782/assignments/syllabus