Introduction to Psycholinguistics

Lecture 12

Course review

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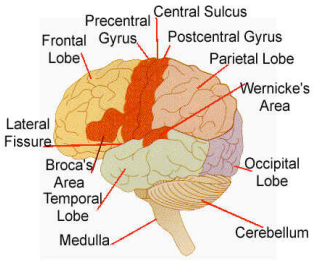
Readings

- For the exam we expect you to have read
  - Chapter 1 In: V. Fromkin (2000). *Linguistics: an introduction to linguistic theory*. Oxford: Blackwell
  - Coltheart, *Trends in Cognitive Science*, 1999
  - Lexical processing and the mental lexicon. In: A. Radford, M. Atkinson, D.Britain, H. Clahsen, & A. Spencer (1999). *Linguistics: an introduction* (pp. 226-239). Cambridge, CUP.
  - Tanenhaus et al., *Science*, 1995
  - Matthew W. Crocker (1999). Mechanisms for sentence processing. In: Garrod & Pickering (eds) *Language processing*. Psychology Press: London (downloadable from course web page)

Lecture 1: Linguistic and biological foundations

- Linguistics
  - Phonological, lexical, syntactic, and semantic knowledge
  - Ambiguity
    - Types: Lexical, structural, referential
    - Extent: Local, global, multiple
- Evolutionary/Developmental
  - *Logical problem of language acquisition*
    - Innate position (*Universal Grammar*): uniformity of language acquisition on the basis of limited and noisy evidence
    - Learned (*tabula rasa*): Language is one of many puzzles in cognition; children's intelligence enables them to solve it
  - Is language uniquely human: Continuity versus discontinuity position
    - Hockett's 10 features: e.g., arbitrariness, displacement, structure-dependence, creativity
    - Teaching apes language
    - Child language acquisition: fixed stages, critical period

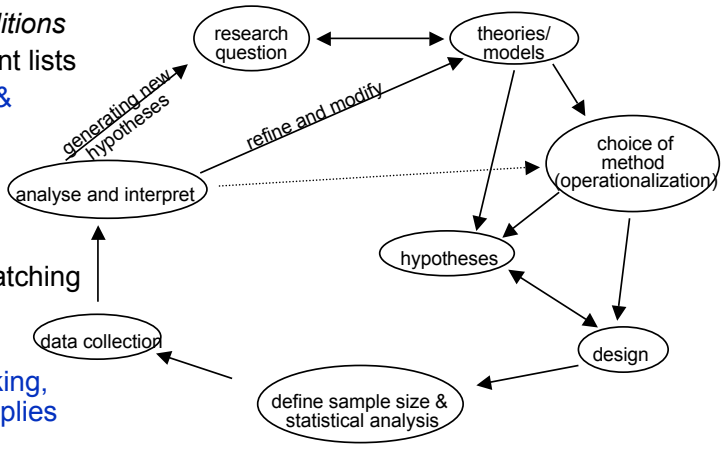
Lecture 1: Linguistic and biological foundations



- Biological/neuroscience foundations
  - Cortical lobes: organization of language
    - Paul Broca: Broca's area
    - Wernicke: Wernicke's area
  - Broca's aphasia
    - Sparse speech, non-fluent
    - Intonation and stress patterns are deficient
    - Lack of grammatical structure
      - Poor sentence construction, disjointed words, no function words and inflections (*Son ... Smart ... Boy ... Good ...Good …)*
  - Wernicke's aphasia
    - Deficits in comprehension and repetition
    - Speak fluently but content is often incorrect
    - Difficulty in word retrieval, generation of neologisms

Lecture 4: Experimental methods I

- Experiment design
  - Definition of *experiment*
  - Empirical research cycle
  - Design
    - Remember *dependent* vs. *independent* variables
    - *Factors*, *levels*, & *conditions*
    - Constructing experiment lists
  - Ways of minimizing noise & confounds
    - Use of filler items
    - Pseudo-randomization
    - Counter-balancing
    - Length & frequency matching
    - Random sampling
  - Pros and cons of different methods such as eye tracking, reaction times or yes/no replies



Lecture 4: Experimental methods I

- Building statistical models for your data: the mean as an example
  - Standard deviation: measure goodness-of-fit between model & data
  - Probability distributions: probability which which a score occurs
- How do we know that our data patterns “means” something (signal) and is not just noise
  - When we are more than 95% certain that our results cannot be caused by chance: Confidence level: $p < 0.05$
- Choosing a statistical test
  - Type of design
    - Relationships versus differences
    - Number of groups/variables: One vs. two or more
    - Way of measuring: Dependent (repeated measures, within-subjects), independent (between-subjects), or mixed
  - Type of data: nominal, ordinal, interval, and ratio

Lecture 6: Experimental methods II

- Exploring data: Quantitative data: e.g., reading times
  - Bargraphs of means & confidence intervals
  - Boxplots: quartiles, median, outliers
  - Histograms: Skew (lack of symmetry) and kurtosis (pointyness)
- Inferential statistics: Parametric tests
  - ➪ Requirements for performing parametric tests
    - The data
      - ➪ Must be at least interval-scale data
      - ➪ Must be normally distributed
      - ➪ Variances in populations/groups/conditions roughly equal (*homogeneity of variance*)
    - Types of test statistics
      - ➪ Comparing two means: *t*-test
      - ➪ Comparing more than two means: *F*-statistic
- Example from eye-tracking: Main effect versus interaction

Lecture 7: Lexical processing - Part I

- Stages of lexical processing
  - ➪ Identification: *Initial contact*, *lexical selection* (activation of candidate entries), *word recognition* (end point of selection phase, competition)
  - ➪ *Lexical access* (phonolog., synt., and semantic information become available) and *integration* (of the word in the sentence context)
- Serial versus parallel lexical processing
- Factors that influence time/accuracy of lexical access
  - ➪ E.g., word frequency, lexical similarity, uniqueness point
- Competition in lexical access: competitor set determined by
  - ➪ Degree of match between candidate word and input
  - ➪ Extent to which input matches representations of alternative words
- Methods: e.g., shadowing, lexical decision, eye tracking
- An example from eye tracking: *Pick up the candy* / *candle*

Lecture 10: Situated comprehension - Part I

- High-level summary of the reviewed findings
  - Tanenhaus et al., *Science* (1995) ☺
    - Rapid use of visual referential context for structure building
  - Sedivy et al. (1999)
    - Rapid use of contrastive properties of same-type objects for semantic interpretation
  - Altmann & Kamide (1999) ☺
    - Rapid use of verb selectional restrictions
  - Kamide et al. (2003) ☺
    - Rapid use of case-marking, verb meaning, and world knowledge
  - Knoeferle et al. (2005)
    - Rapid use of depicted events for thematic role assignment
    - Relative priority of non-stereotypical depicted events over stereotypical thematic role knowledge
- Revise further the design & gaze patterns for the studies with a ☺

Lecture 11: Embodied comprehension

- Definition of *embodiment*
- Amodal versus perceptual (modal) conceptual representations
- Empirical evidence for embodied comprehension comes from, e.g.
  - fMRI
    - Activation of areas in the pre-motor cortex during spoken sentence comprehension in addition to activation in e.g., Broca's area
  - Reaction times
    - Faster response times for sensibility judgments when actual manual/visual actions matched those expressed in a sentence
  - Reading times
    - Shorter reading times when actual manual/visual actions match those expressed in a sentence

And finally ...

... GOOD LUCK IN THE EXAM.

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