Psycholinguistics
Areas of study

- Language behavior
  - Production, perception, comprehension, memory, errors, mental representations
- Language acquisition
- Language use
- Language attrition/loss
- Focus is real (not ideal) people
Example facts (English)

- 350 ms. for word recognition
- Average adult reads at 250 wpm
- Recognitional ability for tens of thousands of vocabulary words, most use not more than 2000-3000
- Lexical information jettisoned before propositional content
Lexical decision tasks
- E.g. glove, sadness, blove, gadness
- Two variables: time, accuracy
- 500 ms to id word, respond; else 750 ms
- Phonotactic constraints play a role
  - Reject: plib >> nlib
- Similarity plays a role
  - Accept: Blud >> blood
  - Accept: Cigraette >> cigarette
- Frequency plays a role
Priming

- Study effect one word has on others (couch/touch, light/bite, legal/illegality, cat/dog...)
- Can take place at any level (phonological, morphological, syntactic, semantic, etc.)
  - E.g. cat→dog ↔ cat→pen
- Effects: facilitation/inhibition
Experimental methods

- Sentence processing
  - Constituency
  - Complexity, parsing, recovery
  - Timing, reading, saccades
- Brain measurements
  - ERP’s (events), imaging, lesions
  - Hemispheric specialization
  - Multilinguality
McGurk Effect

- Watch this video
b, d: do we use visual information?
ba, da (videotaped, audio/video mismatch)
sound only: could distinguish
mismatch: misled!
=? no awareness of visual/auditory mismatch
more difficult => more time to process

bar-pressing experiments

- Wordwise presentation, press space bar for next word
- NOT equal times across sentence
- end of phrases, end of clauses noticeably longer to process (i.e. some integration going on)
- longer for nouns, verbs; less time for function words (prepositions, determiners, etc.)
The Chinese, who used to produce kites, used them in order to carry ropes across the rivers.
Eye movement

- Have read book/mag/newspaper, watch eyes
- Eye movement NOT smooth; rather, saccades
  - 200 msec snapshots (small window, fixation locus)
  - then jumps about 8-10 chars to right for next one
  - blind between jumps, but don’t notice
  - fixation times longer for less freq words
  - tend to fixate on content wrds (vs. function wrds)
  - difficult sentence structures: longer fixations, backward saccades
  - problems: lots of regressive saccades
  - poor readers, more saccades; good readers, many less saccades
The dog bit the cat. (BU processing)
The... after 2 sound seg’s, recog word “the”
dog...recog, access
bi- ... several possibilities, but most not feasible (built, bids, bit, bin, etc.)

but
recog DET, expect ADJ or N next, never V
DET + N, expect V next

thus: both BU & TD processing (interactive)
Recognizing “glass”
- g- hundreds of possibilities
- gl- several possibilities
- gla- handful of possibilities
- glas- 1 or 2 possible words (glass, glasses)
- “cohort” of possible words is eventually reduced to 1
Evidence for syllable structure

- bug, cat ==> (create new word)
  - “bat” much more common response
  - “but” much less common response

- onset/rhyme divisions more natural
- morphemes are activated
  - happiness ==> primes “happy” (and vice-versa)
  - compounds: crowbar ==> primes “bird”
- restrictions on affixation
  - nonsense words: turp
  - inflect: turpize, returpable
  - unpermissible inflectional combinations: returpize is OK, returpity not (re- is for V, -ity is for ADJ)
  - takes lots longer to reject illegal ones vs reject legal (but still nonsensical) ones
Evidence for hierarchical structure

- left-branching vs. right-branching
- \(*unbear+able\)
- \(re+*fillable\)
- valid substrings: larger priming effect on whole word than invalid sunstrings
- The horse raced past the barn fell.
- I believe that John smokes bothers Mary.
- When the horse kicks the boy the dog bites the man.
- The doctor warned the patient would be sick.
- Sue gave the man who was racing the car.
- The man the woman the dog bit likes eats fish.
- The man that for John to smoke would annoy died.
Garden path sentences: parser goes astray
- reading: huge # saccades, longer fixation times
- usually discussed in terms of memory usage
- don’t build more nodes than you have to: keep tree as simple as possible
- prefer to add incoming words to current level of sentence

Usually non-recoverable
Actives easier to comprehend than passives
- avoids extra overhead if semantics implausible
- “The ice cream was eaten by the policeman.” as fast as active
- “The dog was chased by the cat.” slower than active
I knew the man.
I knew the man hated me passionately.

When the boys strike the dog kills.
When the boys strike the dog the cat hisses.

Without her we failed.
Without her contributions we failed.

Is the block in the box?
Is the block in the box red?

The building blocks are red.
The building blocks the sun.
Semantics

- Plausibility: resist conceptualizations like “flimped”, “moked”
- Word-sense disambiguation
  - “They all rose.” primes both “flower” and “stand” (i.e. all meanings activated)
  - create all possible intermediate representations, then reject them as more info comes in
  - happens very quickly though
Figure 6
Average reaction time for different type of sentences adapted from (Collins & Quillian, 1969)
Figure 5
(Collins & Quillian 1969)
Issues

- Autonomy vs. interaction
- Modularity vs. integration
- Processing time
  - “… the overwhelmingly puzzling problem about sentence comprehension is how people manage to do it so fast.” (Fodor, Fodor, Garrett 1975)
- Robustness
- Multiple cues (b/d)
- Is language really special?