Speech/Language Production I

- **Common Features of Models**
  - extensive pre-planning
  - distinct stages of processing
  - general (intended meaning)-to-specific (utterance) organization
  - most models use speech errors as data

Spreading Activation Theory (Dell)

- four levels of activity
  - Semantic (meaning)
  - Syntactic (grammatical structure of words in the planned sentence)
  - Morphological (basic units of meaning or word forms)
  - Phonological (sounds)

  - representation formed at each level
  - processing occurs simultaneously at all levels
  - uses speech errors as primary data

Spreading Activation (cont’d)

- Lexicon: connectionist network containing nodes for concepts, words, morphemes, and phonemes
- Insertion rules (which is highest activated?) determine items selected for insertion into sentences
- Errors predicted by model:
  - Errors more likely when speaker has not formed a coherent speech plan
  - Errors should be from same category
  - Anticipation errors (because of multiple activations; “The sky is in the sky”)
  - Exchange errors (because once selected, items’ activation turns to zero (“I hit the bat with my ball”)

Speech Production II

- **Levelt/Bock approach**
  - four stages: message, functional processing, positional processing, and phonological encoding
  - information about syntax (lemma) available before sound (lexeme)
  - consistent with TOT phenomenon

Neuropsychological evidence of staged selection

- Content-word retrieval vs. syntactic processing
- Distinction between anomia (e.g., word selection difficulties) vs. agrammatism (inability to construct grammatically correct sentences)
- Jargon aphasia: can construct grammatically correct sentences but not find correct words

Processes in Writing (Hayes & Flower, 1980)

- Planning: generating info from LTM, organizing
• Translating: producing language conforming in meaning to that retrieved in the planning stage
• Reviewing: editing what is written

11 Language Disorders

12 Types of Disorders
• Aphasia: acquired disorder of language due to brain damage
• Dysarthria: disorder of motor apparatus of speech
• Developmental language disturbances
• Associated disorders
  – Alexia
  – Apraxia
  – Agraphia

13 Major Historical Landmarks
• Broca (1861): Leborgne: loss of speech fluency with good comprehension
• Wernicke (1874): Patient with fluent speech but poor comprehension
• Lichtheim (1885): classic description of aphasic syndromes

17 Additional Aphasia Syndromes

18 Broca's Aphasia
• Telegraphic, effortful speech
• Agrammatism
• Some degree of comprehension deficit
• Writing and reading deficits
• Repetition abnormal – drops function words
• Buccofacial apraxia, right hemiparesis

20 Wernicke's Aphasia
• Fluent, nonsensical speech
• Impaired comprehension
• Grammar better preserved than in BA
• Reading impairment often present
• May be aware or unaware of deficit
• Finger agnosia, acalculia, alexia without agraphia

22 Conduction Aphasia
• Fluent language
• Naming and repetition impaired
• May be able to correct speech off-line
• Hesitations and word-finding pauses
• May have good reading skills

23 Global Aphasia
• Deficits in repetition, naming, fluency and comprehension
• Gradations of severity exist
• May communicate prosodically
• Involve (typically) large lesions
• Outcome poorest; anomic

24 Transcortical Aphasias
1 Transcortical Motor
• Good repetition
• Impairment in producing spontaneous speech
• Good comprehension
• Poor naming

2 Transcortical Sensory
• Good repetition
• Fluent speech
• Impaired comprehension
• Poor naming
• Semantic associations poor

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27 Associated Deficits
• Alexia without Agraphia
  • Impairment in reading with spared writing
• Apraxia
  • Loss of skilled movement not due to weakness or paralysis
30 Fundamental Lessons
- Language processors are localized
- Different language symptoms can be due to an underlying deficit in a single language processor
- Language processors are regionally associated with different parts of the brain in proximity to sensory or motor functions

31 What Language Disorders Reveal about Underlying Processes
- Pure Word Deafness: selective processing of speech sounds implies a specific speech-relevant phonological processor
- Transcortical Sensory Aphasia: repetition is spared relative to comprehension; selective loss of word meaning; some cases suggest disproportionate loss of one or more categories

32 What Language Disorders Reveal about Underlying Processes
- Aphasic errors in word production: reveal complex nature of lexical access
  - Phonological vs. semantic errors: independent vs. interactive relationship?
  - Grammatical class: nouns vs. verbs (category specificity)
- Broca’s aphasia: syntax comprehension and production
  - Central syntactic deficit; loss of grammatical knowledge
  - Problems in “closed-class” vocabulary (preposition, tense markers)
  - Limited capacity account
  - Mapping account (inability to map from parsing to thematic roles)
- Jargon Aphasia: can construct grammatically “better” sentences than agrammatics, but can’t find words, producing neologisms; reinforces distinction between content and grammatical structure

33 Prosody
- Linguistic vs. nonlinguistic prosody
- Evidence for hemispheric differences
- Clinical syndromes
  - Disturbances of comprehension
    - Auditory affective agnosia
    - Phonagnosia
  - Disturbances of prosodic output
    - Aprosodias

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36 Aphasia and the Semantic System
- Meaning stored separately from form
- Models of representation in semantics
  - Feature-based models (see categorization)
  - Nondecompositional meaning
- Modality-specific semantic deficits: optic aphasia as an example