Language production

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Language production vs. comprehension

- A common core of processes found in comprehension and production
- Production is not simply the reverse of comprehension
  - processes with production that have no direct counterpart in comprehension

The speech chain

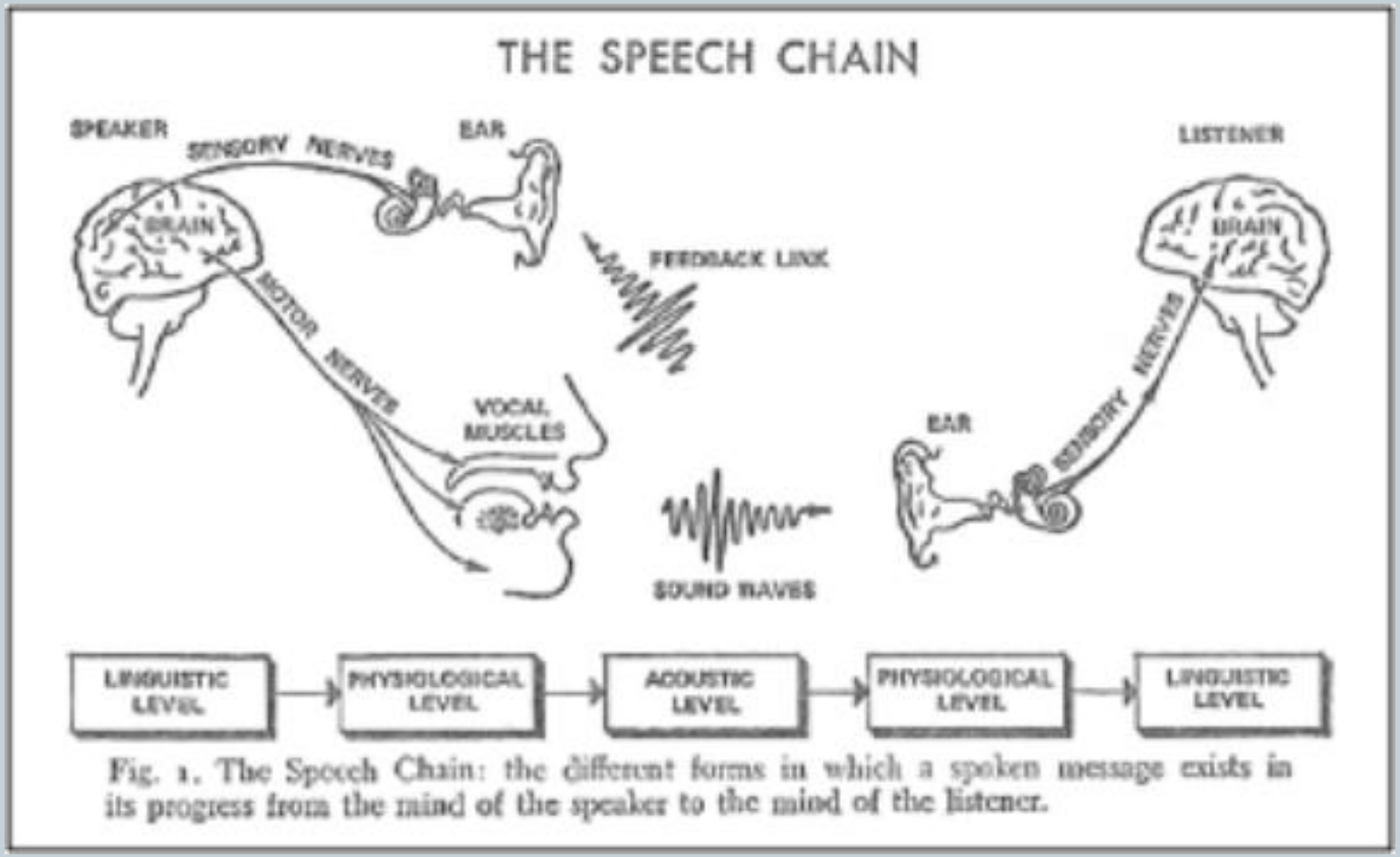


Fig. 1. The Speech Chain: the different forms in which a spoken message exists in its progress from the mind of the speaker to the mind of the listener.

Four stages of production

- conceptualizing
- formulating
- articulating
- self-monitoring

- What about the order?
- Sub-stages?
- Interaction?
- What processes have gone awry in slip-of-the-tongue situations?

TABLE 8.1 Major Types of Slips of the Tongue

Type	Example
Shift	That's so she'll be ready in case she decide to hits it (decides to hit it).
Exchange	Fancy getting your model renosed (getting your nose remodeled).
Anticipation	Bake my bike (take my bike).
Perseveration	He pulled a pantrum (tantrum).
Addition	I didn't explain this clarefully enough (carefully enough).
Deletion	I'll just get up and mutter intelligibly (unintelligibly).
Substitution	At low speeds it's too light (heavy).
Blend	That child is looking to be spaddled (spanked/paddled).

- 一男生看到舅舅：买舅啊，二菜！舅舅：这孩子，这么大话了，连人都不会说！
- 上学时周末回家，晚饭后烟瘾犯了，打算借口去散步。在门口换鞋时老爸问我干吗去？我随口说了句：去散个烟！
- 妈妈出门打麻将之前，跟我说：你把衣服都放到冰箱里，把菜都捡到洗衣机里面。
- 有次吃冰棍，我咬了一口，大叫：烫死我了！

Explanations of speech errors

- Freudian
  - more than one idea at a time: intrapsychic conflicts
  - concurrent, or mutual opposing action of two different intentions: conscious vs. disturbing
  - cannot readily explain anticipation and perseveration errors
- Psycholinguistic
  - reveal planning units (Fromkin, 1971)
    - phonetic features, phonemes, morphemes, words, etc.
  - the existence of an autonomous syntactic processor (Garrett, 1975, 1980)

Four stages of production

- conceptualizing a message to be conveyed
  - general agreement on the existence of “mentalese”
    - the form in which ideas exist before they are put into words
    - a representational system distinct form language
  - little agreement on the properties of this pre-linguistic mental representation
- formulating it into a linguistic plan
  - This area of study has received more focus.
  - This process is understood much better.

Linguistic planning

- Serial models (Fromkin, 1971, 1973; Garrett, 1975, 1980)
  - a series of stages, each devoted to one level of linguistic planning
  - Fromkin's six-stage model

TABLE 8.2 Fromkin's Model of Speech Production

Stage	Process
1	Identification of meaning—a meaning to be conveyed is generated.
2	Selection of a syntactic structure—a syntactic outline of the sentence is constructed, with word slots specified.
3	Generation of intonation contour—the stress values of different word slots are assigned.
4	Insertion of content words—appropriate nouns, verbs, and adjectives are retrieved from the lexicon and placed into word slots.
5	Formation of affixes and function words—function words (articles, conjunctions, prepositions), prefixes, and suffixes are added.
6	Specification of phonetic segments—the sentence is expressed in terms of phonetic segments, according to phonological rules.

SOURCE: Based on "The Non-Anomalous Nature of Anomalous Utterances," by V. A. Fromkin, 1971, *Language, 47,* pp. 27–52, Linguistic Society of America.

Serial models

- In which stage do speech errors occur?
  - She's already trunked two packs (packed two trunks).
  - Stop beating your brick against a head wall. (Stop beating your head against a brick wall.)
  - singing sewer machine (Singer sewing machine)
  - frish gotto (fish grotto)
  - blake fruid (brake fluid)
  - glear plue sky (clear blue sky)
    - extremely rare

The sequence of planning units

- It certainly run outs fast (runs out).
  - Is outs pronounced as [auts] or [autz]?
    - accommodation
      - Elements that are shifted or deleted are accommodated to their error-induced environments.
- An anguage lacquisition (a language acquisition)
- Easy enoughly (easily enough)
- Formulation of phonetic representation after the morphological level

The sequence of planning units

- Formulation of syntactic structure precede lexical insertion into syntactic structure (Garrett, 1975)
  - Observations
    - Most sound and morpheme exchanges occur within 0 to 1 word; word exchanges take place over longer stretches.
    - Most speech errors occur within the clause; nearly all that do not are word exchanges.
    - The word exchanges tend to preserve the grammatical class of the item.
  - The introduction of sounds and morphemes comes later when the syntactic outline is in place and involves more local exchanges of material.

The sequence of planning units

- Evidence on the role of working memory in linguistic planning (Ferreira and Pashler, 2002)
  - Whether each stage of word production interferes with performance on a concurrent, unrelated task
  - Tasks associated with the early stages of word production (the lemma and lexeme stages) slowed performance on a concurrent task of discriminating different tones.
    - Early stages of production draw from central processing resources.
  - Tasks associated with phoneme selection produced no interference.
    - The stage of phoneme selection does not draw from central processing resources.

Editing processes

- intervene between the planning of an utterance and its articulation
- laboratory-induced speech errors
  - a list of word pairs to read silently
  - occasionally a cue that they must read one pair aloud
  - varying the nature of the word pairs that precede the target pair
  - phonological bias technique
    - ball doze
    - bash door
    - bean deck
    - bell dark
    - darn bore
    - RESPOND
    - barn door (spoonerism 30%)

Editing processes

- an alternative speech plan that competes with the plan to produce the target pair
- cases in which such alternative plans are generated but not actually produced
  - vary the properties of the resulting speech error
    - big dutch
    - bang doll
    - bill deal
    - bark dog
    - dart board
    - RESPOND
    - bart doard (10%): the lexical bias effect
  - error generated covertly but suppressed by an editing process
  - Editing operations exist for a variety of criteria, including phonological, syntactic, semantic, and situational criteria (Motley et al., 1983).

Editing processes

- Lane, Groisman and Ferreira (2006)
  - describe mutually known objects to another person
  - one condition: asked to not leak privileged information to the other person
  - another: not specifically requested to not leak certain information
    - referred to the privileged information more often when given the conceal instruction than when not
    - Intrusive thoughts: Don't think of a pink elephant.
    - editing processes are not error-proof.

Linguistic planning

- Parallel models
  - multiple levels of processing take place simultaneously during the course of language production
  - Dell (1986)
    - four levels of nodes in permanent memory
      - semantic
      - syntactic
      - morphological
      - phonological
    - representations work in parallel
    - a node at one level can activate other nodes at the same level or at other levels

Linguistic planning

- Dell (1986)
  - assumption: positive feedback from “later” to “earlier” stages of processing
  - an account of the lexical bias effect in terms of feedback from the phonological to the morphological nodes
  - the phonemic similarity effect
    - the tendency for intruding phonemes to be phonemically similar in their distinctive feature composition to the target phonemes.
    - by incorporating a level of distinctive features into the phonological level
  - speaking rates
    - constant parameters of activation dynamics (spreading and decay rates)
    - slow speaking: more time for activation to spread from the current morpheme to the correct sounds and for the activation of previously activated sounds to decay
      - fewer errors

Number agreement

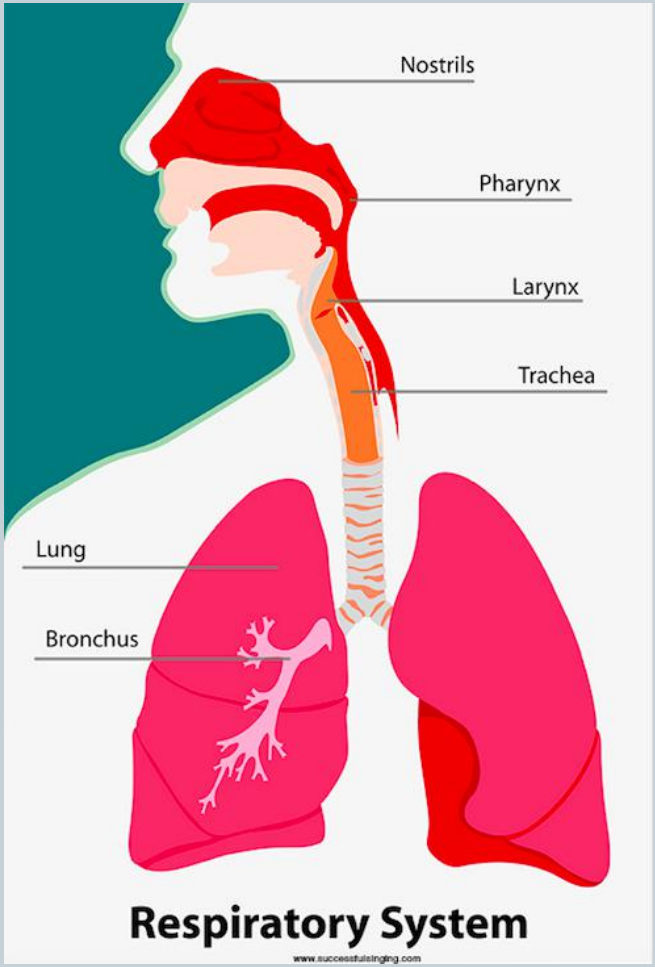
- Helpful in evaluating serial VS parallel models
- Number agreement between subjects and either verbs or pronouns
  - Bock and Cutting (1992): phrase interruptions led to more errors than clause interruptions
    - The report of the destructive fires were accurate.
    - The report that they controlled the fires were printed in the paper.
    - clause planning precedes planning at the lexical level

Four stages of production

- conceptualizing
- formulating
- **articulating**
- **self-monitoring**

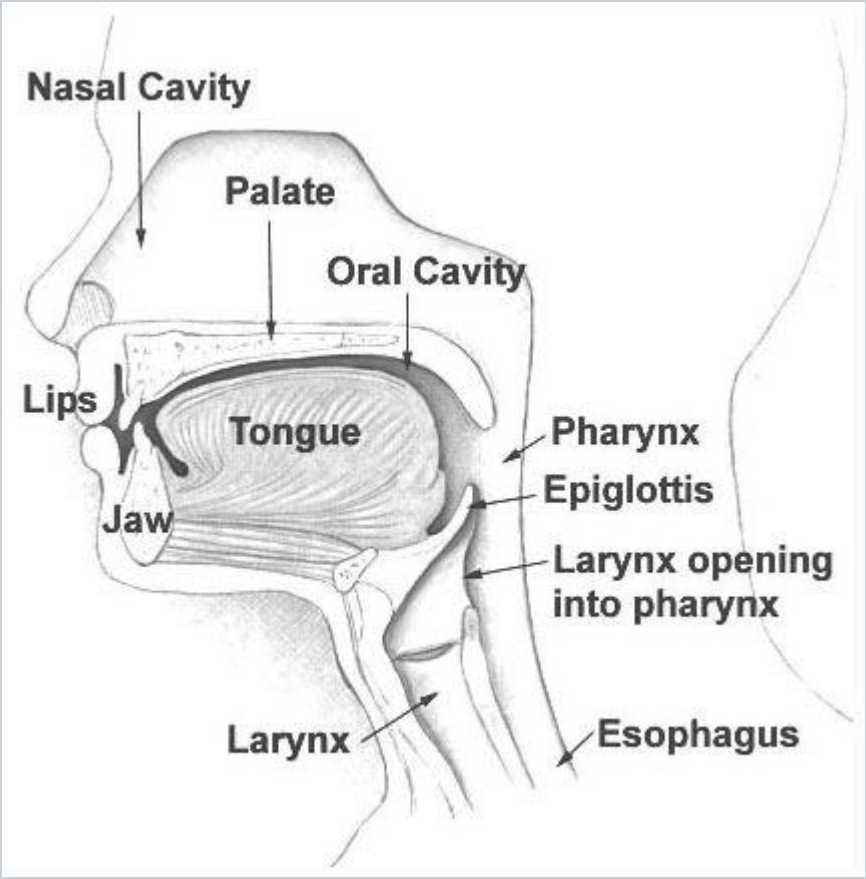
Articulating/implementing the linguistic plan

- Three systems of muscles
  - respiratory
  - laryngeal
  - supralaryngeal or vocal tract



Articulating

- Laryngeal: vocal cords responsible for the distinction between voiced and voiceless
  - length, thickness, tension
- The vocal tract
  - size and shape of the oral cavity and the nasal cavity



Articulation

- not as the production of a series of discrete sounds
  - coarticulation
    - anticipatory
    - perserveratory
      - undershooting of the target

Self-monitoring

- self-repairs (Levelt, 1983)
  - First, we interrupt ourselves after we have detected an error in our speech.
  - Second, we usually utter one of various editing expressions. These include terms such as uh, sorry, I mean, and so forth.
  - Finally, we repair the utterance.

Self-monitoring

- self-repairs
  - instant repairs
    - consist of a speaker's retracing back to a single troublesome word, which is then replaced with the correct word
      - Again left to the same blank crossing point—white crossing point.
  - anticipatory retracing
    - the speaker retraces back to some point prior to the error
      - And left to the purple crossing point—to the red crossing point.
  - fresh starts
    - the speaker drops the original syntactic structure and just starts over
    - From yellow down to brown—no—that's red.

Editing facilitates comprehension

- Fox Tree & Schrock (1999)
  - the discourse marker oh
  - passages that contained oh
  - passages with oh excised
  - word recognition faster after oh than when oh was excised
    - oh used to signal that the conversation is about to change direction
    - sudden reaction to new or surprising information, such as a surprise recollection or a surprise offer

Editing facilitates comprehension

- Brennan & Schober (2001)
  - the length of correction time
  - fluent and disfluent instructions to select objects on a graphical display
  - faster response to target words after disfluencies with long edit intervals than when disfluencies were absent
    - Move to the pur-oh yellow square.
    - Move to the yellow square.
  - Long editing intervals enable the listener to confirm that the speaker is having difficulty and then cancel the erroneous material.
- Disfluencies occur in spontaneous speech at a rate of approximately 6 words per 100 (Bortfield, Leon, Bloom, Schober, & Brennan, 2001).