Lecture 10

The Speaker 2

Lexical Retrieval

Remember that speech begins with an idea in the speaker's brain.

Remember that the lexicon is a dictionary of all the words a speaker knows. A lexical entry carries information about the meaning of the word, its grammatical class, the syntactic structures into which it can enter, and the sounds it contains (its phonemic representation). A word can be retrieved using two different kinds of information: meaning or sound. The speaker retrieves words based on the meaning to be communicated and has the task of selecting a word that will be appropriate for the desired message. The word must also be of the appropriate grammatical class (noun, verb, etc.) and must be compatible with the structure that is being constructed.

It is most certainly not the case that the structure is constructed before the words are selected, nor are all the words selected before the structure is constructed. In fact, the words and the structure are so closely related that the two processes take place practically simultaneously. Ultimately, the speaker must retrieve a

lexical item that will convey the correct meaning and fit the intended structure. This means that a speaker must enter the lexicon via information about meaning, grammatical class, and structure, only later to retrieve the phonological form of the required word. The hearer's task, is the mirror image of the speaker's. The hearer must process information about the sound of the word and enter his lexicon to discover its form class, structural requirements, and meaning.

tip-of-the-tongue phenomenon

the speaker knows the word but cannot retrieve it

A phenomenon in lexical retrieval that has fascinated psycholinguists for decades is the **tip-of-the-tongue phenomenon** (Brown and McNeill 1966; Aitchison 2003). A tip-of-the-tongue state occurs when the speaker knows the word needed but cannot quite retrieve it. It is a very uncomfortable mental state, and when people experience it, they might say "I've got that word right on the tip of my tongue!" What people experience during a tip-of-the-tongue state offers a glimpse into the steps involved in lexical retrieval. Typically, people have access to the meaning- based part of the lexical representation, but experience a tip-of-thetongue state when they fail to find a fully specified form-based representation (Bock and Levelt 1994). However, people typically know something about the

word they are unsuccessfully searching for. They can often think of the initial or final sounds or letters, how many syllables it has, where primary stress is located, and even words that sound similar. People experiencing a tip-of-the-tongue state will often also perform gestures that are suggestive of the meaning of the word, though it is not necessarily the case that gesturing helps retrieval (Beattie and Coughlan 1999).

Usually ***lexical retrieval*** produces an

appropriate set of words required for the speaker's sentence.

Grammatical encoding

Levelt (1989) refers to the creation of sentence structure during sentence planning as ***grammatical encoding***.

For this the speaker must consult the internalized grammar to construct structures that will convey the intended meaning. Again, speech errors provide information about some of the characteristics of the representations that are constructed. We know, for instance, that words are represented as separate units. Speech errors like the ones below provide evidence for this:

Word exchange error

"I left my car in my briefcase". **Said:** **A.**

"I left my briefcase in my car". **Intended:** **B.**

These examples illustrate a common type of error, **exchange errors; the** exchange units here are two words. **Word exchange errors never occur** between content words and function words and are usually limited to words of the same grammatical class, nouns in the case of the example above.

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Lecture 11

The Speaker 3

Creating agreement relations

There is another class of errors, which has been studied extensively in English and several other languages, involving subject–verb agreement.

English requires that verbs and their subjects agree in number (and person).

Example:

a. The bridge close**s** at seven.

b. The bridge**s** close at seven.

Plural attraction

When a plural feature intervenes between a singular subject and its verb error can occur.

Example:

a. The *time for fun* and games *are* over.

b. The *illiteracy level* of our children *are* appalling.

Preservation error

"I can't cook worth a cam". Said: A.

"I can't cook worth a damn". Intended: B.

Sentence A above is an example of a preservation error.

In this example segment (in this case the /k/ of *can't) perseveres* and intrudes in a later word (so the speaker utters *cam rather than damn).*

Anticipation error

"taddle tennis". Said: A.

"paddle tennis". Intended: B.

Sentence A above is an example of an anticipation error.

In this situation a speech sound that has not yet been produced (the /t/ of *tennis) intrudes* in an earlier word.

Segment exchange error

"hass or grash". **Said:** **A.**

"hash or grass". **Intended:** **B.**

Sentence A above is an example of a segment exchange error.

In this situation the exchange is between two phonological elements: *the final consonants in the two words*.

What does this tell us?

Errors like the ones above demonstrate that there is a level of representation in which phonological elements are represented segmentally. Such errors are revealing about the psychological reality of linguistic representations before sound is produced. Errors like these – anticipation errors in particular – demonstrate that there is a mental representation containing the phonological form of a sentence, some time before a sentence is actually produced.

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Lecture 12

The Hearer

The hearer's task

The hearer's task is almost the mirror image of the speaker's task. First, using information from the acoustic

signal, the hearer reconstructs a phonological representation. The hearer enters the lexicon using that phonological representation to retrieve the lexical items that match. This permits the hearer to recover the semantic and structural details of the words in the message.

post-access matching

After a word has been retrieved, its full phonological representation is checked against what has been heard. This is called **post-access matching.** If the match is good enough, the word is accepted as correct and the full phonological representation from the lexicon becomes the percept.

CLOCK ☐	DOCTOR ☐	ZNER ☐	FLOOP ☐
SKERN ☐	NURSE ☐	TABLE ☐	FABLE ☐
BANK ☐	TLAT ☐	URN ☐	MROCK ☐
MOTHER ☐	PLIM ☐	HUT ☐	BAT ☐

Impossible non-words and *possible non-words*

You probably wrote N next to six of the letter strings, and might have even noticed that you responded to three of them very quickly – TLAT, ZNER, and MROCK – and to the other three somewhat more slowly – SKERN, PLIM, and FLOOP. All six strings are non-words in

English, but the first three violate the phonotactic constraints of the language. **Impossible non-words, like TLAT, ZNER, and MROCK, are** rejected very rapidly in a lexical decision task. It is as if the lexical retrieval system were carrying out a phonological screening of sorts, not bothering to look in the lexicon when the string is not a possible word in the language. In contrast, **possible non-words, like SKERN,** PLIM, and FLOOP, take longer to reject, as if the retrieval system conducted an exhaustive, ultimately unsuccessful, search for their entries in the lexicon.

The cohort model of lexical access

A word's **cohort consists of all the** lexical items that share an initial sequence of phonemes. According to the cohort model, acoustic information is rapidly transformed into phonological information, and lexical entries that match the stimulus phonologically are *activated.*

A word's **neighborhood**

A factor that affects retrieval times for words is **neighborhood density.** A word's **neighborhood** consists of all the lexical items that are phonologically similar. Some words have larger cohorts than others: the word *cot has many words that are phonologically similar to it, so it* is said to come from a dense neighborhood; in

contrast, the neighborhood for a word like *crib* is less dense.

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Lecture 13

The language gene

The search for a genetic basis for language

The ultimate indicator of the biological nature of language would be the discovery of the genetic basis of language, as all aspects of human biology are directly encoded in our DNA.

Researchers began genetic investigations by conducting pedigree studies.

These are studies that examine the heritability of a particular trait (or disorder) in several generations of a family.

Gopnik (1990, 1997) showed that members of over three generations of one family had suffered from specific language impairment (SLI), dyslexia, and other language disorders, indicating that genetic anomalies associated with language development can be inherited.

A major breakthrough came with the discovery by Lai and colleagues (Lai et al. 2001) of a specific gene,

FOXP2, *that was implicated in the language disorders of an extended family.*

Members of the family exhibited symptoms like those of agrammatic aphasics: effortful and non-fluent speech, lacking in syntactic organization. Their grammar appeared to be broadly impaired; they had difficulty manipulating phonemes and morphemes and understanding complex sentences (Watkins, Dronkers, and Vargha-Khadem 2002). The disorder was attributable to a mutation of the ***FOXP2*** *gene, which was transmitted by heredity.*

The logic of all of this !

If a mutated version of a gene is responsible for language disorders, it is reasonable to infer that an intact version of that gene is implicated in normal language development and representation. It was suggested that a ***"gene for language"*** *had been discovered.*

However !

The ***FOXP2*** *gene is associated with the development of other parts of human anatomy unrelated to language, including the lung, the gut, and the heart. It is also a gene that is not confined to Homo sapiens; it is also found in other mammals, including mice (Marcus and Fisher 2003).*

While the relationship of FOXP2 to heritable language disorders is an exciting breakthrough, it is important to remember that it cannot be the gene for language.