

Day 2: Psycholinguistics and Orthography

Lecture 2

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Lecture Outline

1. Definitions
2. Architectures
3. Generative Phonology and Reading
4. Theories of Reading: A Review of Hypotheses

Defining Psycholinguistics

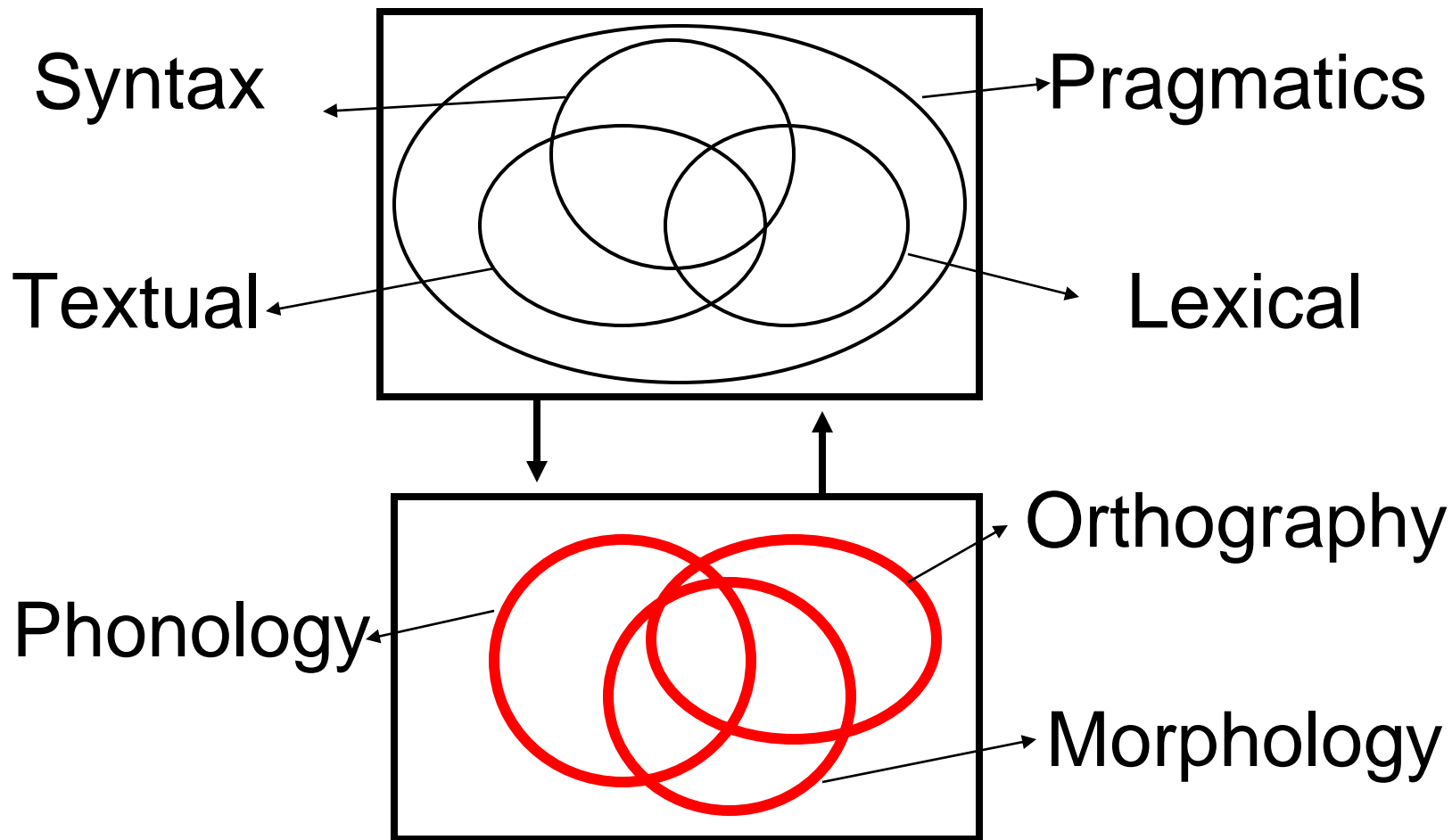
Definition of Psycholinguistics

- The area of linguistics that studies:
 1. The cognitive processes involved in **language production** (generation) and **comprehension** (perception).
 2. The cognitive processes involved in **Language acquisition**.
 3. The processes involved in **reading** and **spelling**

The Architecture of Reading

Focus on the Bottom-up Processor

Interactive Model of Reading Comprehension



Focus on Bottom-up Processor

- For reading aloud to take place, the reader must make use of the following competencies:
 1. Phonetic/phonological competence: (Day 1, Lectures 1 & 2)
 2. Orthographic competence: (Day 1, Lectures 1 & 2, Day 2, Lectures 1 & 2)
 3. Morphological competence: (Day 3, Lectures 1 & 2)

Indispensable Core Skills-1

- “The core reading subskill is forming connections between speech and print. More technically, this comes down to connections between specific speech units called **phonemes** and specific **letters** that represent them... This, then, is the core reading subskill. You have to learn which letters represent which phonemes in English. You do not ...

Indispensable Core Skills-2

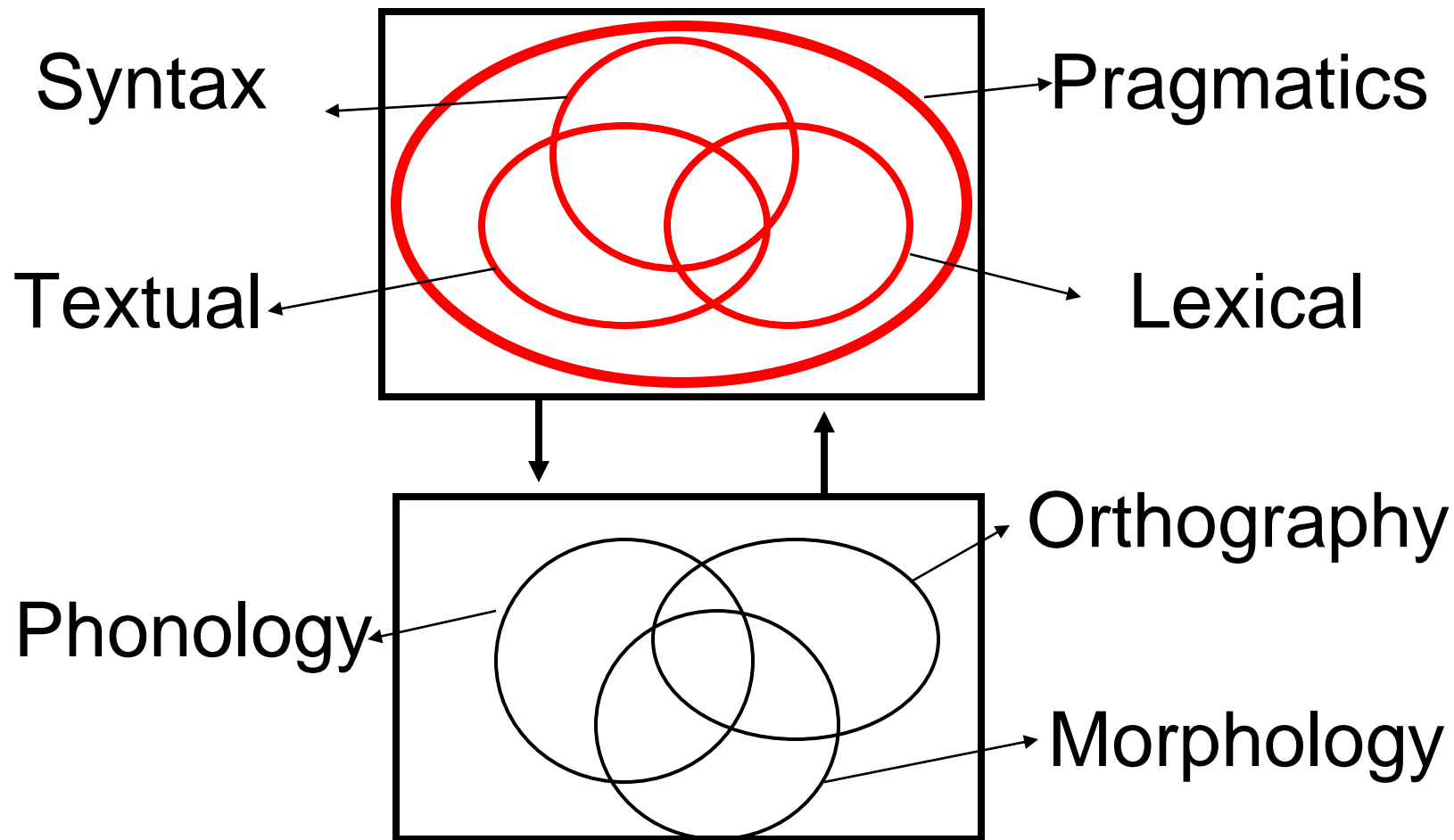
- ... have to learn every single letter-sound unit, but you need a substantial “working set In every complex skill, there is a similar working set of basic units that have to be learned – feet positions in ballet, for example – out of which higher-order units can be constructed. We can call the working set of letter-phoneme units the appearance of others; and so on.”

Farnham-Diggory (2003:X, XII)

The Architecture of Reading

Focus on the Top-Down Processor

Interactive Model of Reading Comprehension



The Top-down Processor and Reading

- For reading comprehension to take place, the reader must make use of the following competencies:
 1. Pragmatic competence (see below)
 2. Syntactic competence (Day 3, Lecture 2)
 3. Lexical competence (see below)
 4. Textual competence (Day 4, Lecture 2)

Focus on the Pragmatic Component

Defining Pragmatics


- **Definition:** Pragmatics is the area of linguistics that:
 1. Studies how context affects meaning.
 2. Language use that is appropriate to its communicative context.
 3. Pragmatic competence is a lifelong learning adventure.

Pragmatic and Encyclopedic Knowledge

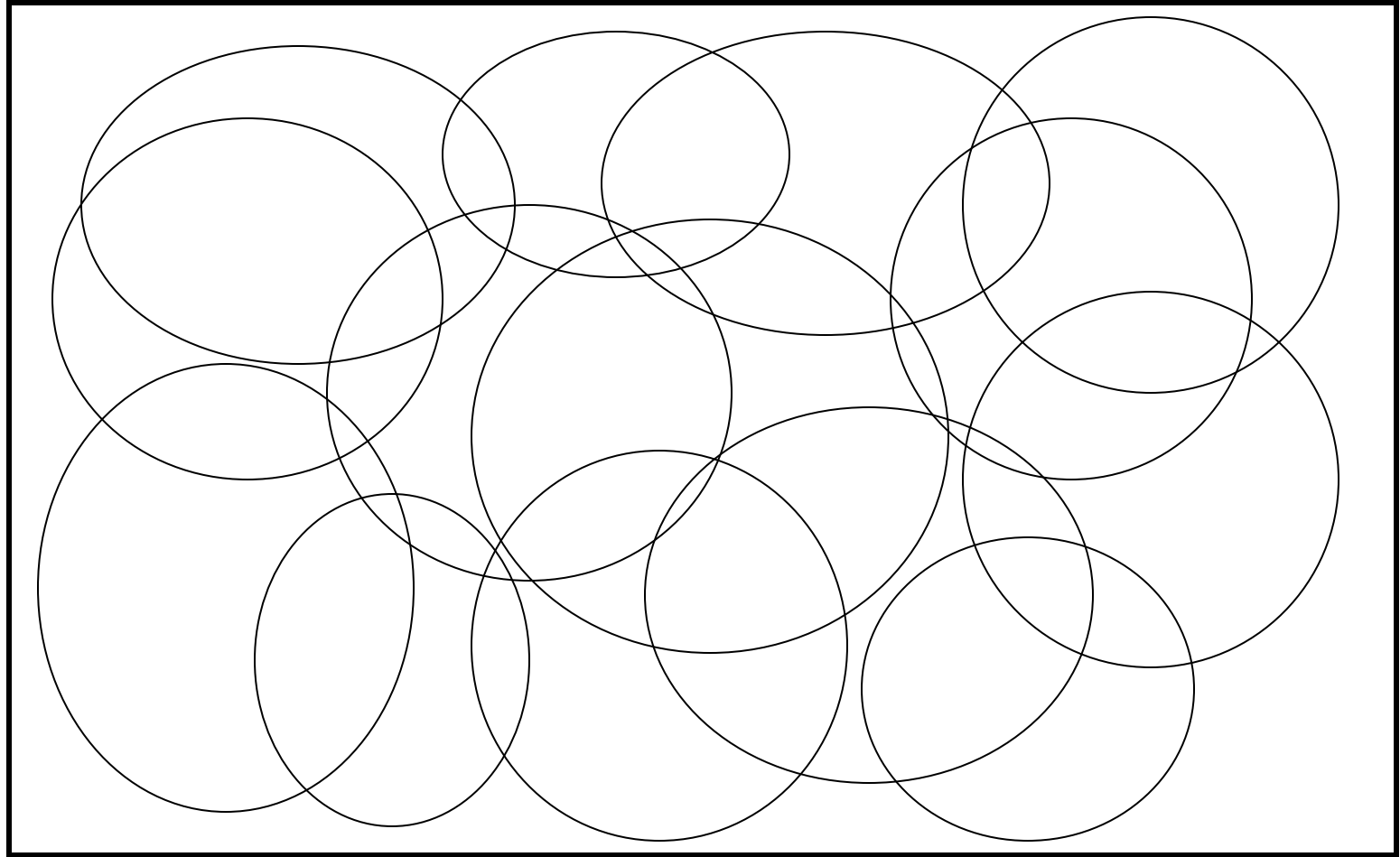
- **Encyclopedic Knowledge:** Pragmatic competence is in large part determined by the speaker or reader's encyclopedic knowledge system. It comprises everything that one knows about the world that may help one to process and understand oral or written communications.

Pragmatic Competence and Semantic Domains

Semantic Domains

- **Semantic Domains and Encyclopedic Knowledge:** Encyclopedic knowledge is divided into separate but interacting areas of knowledge called semantic domains.
-  Semantic Domain Analysis was introduced by Nida and Louw but it is applicable to reading comprehension.

Graphic Representation of Semantic Domains



Semantic Domains & Comprehension

- **Semantic Domains:** Semantic domains consist of macro and micro domains. Each semantic domain has areas of specialized vocabulary. One's ability to comprehend oral or written texts is directly proportionate with one's familiarity with the specific semantic domains or sub-domains of the texts in question.

Pragmatic Competence and Commonsense

Pragmatics & Commonsense-1

- “An Intelligent system, then, cannot be stuffed with trillions of facts. It must be equipped with a smaller list of core truths and a set of rules to deduce their implications. But these rules of commonsense, like the categories of commonsense, are frustratingly hard to set down. Even the most straightforward ones fail to capture our everyday reasoning. ... Only when artificial ...

Pragmatics & Commonsense-2

- ... intelligence researchers tried to duplicate common sense in computers, the ultimate blank slate, did the conundrum, now called ‘the frame problem,’ come to light,” Pinker (1997:14-5). *How the Mind Works*.

Pragmatics & Commonsense-3

- “The efficiency [of communication], though, depends on the participants’ sharing a lot of background knowledge about the events and about the psychology of human behavior. They must use this knowledge to cross-reference the names, pronouns, and descriptions with a single cast of characters, and to fill in the logical steps that connect each sentence with the ...

Pragmatics & Commonsense-4

- ... next. If background assumptions are not shared – for example, if one’s conversational partner is from a very different culture, or schizophrenic, or is a machine– then the best parsing in the world will fail to deliver the full meaning of the sentence. Another team is trying to teach a computer the basics of human common sense, **which they estimate to comprise about ten million facts,**” Pinker (1994:227) *The Language Instinct*.

Pragmatic Competence and Logic

Pragmatics Competence and Logic-1

- Pragmatic Competence includes implicatures: “implicatures are deductions that are not made strictly on the basis of the content expressed in the discourse, not on the basis of the lexical items alone” Fromkin et al. (2007:206).
- **Implicatures = Presupposition + Entailments**

Pragmatics Competence and Logic- 2

- *“Mary cannot drive anymore.”*
1. What are some of your presuppositions about this sentence?
 2. What are some of the deductions that this sentence entails?

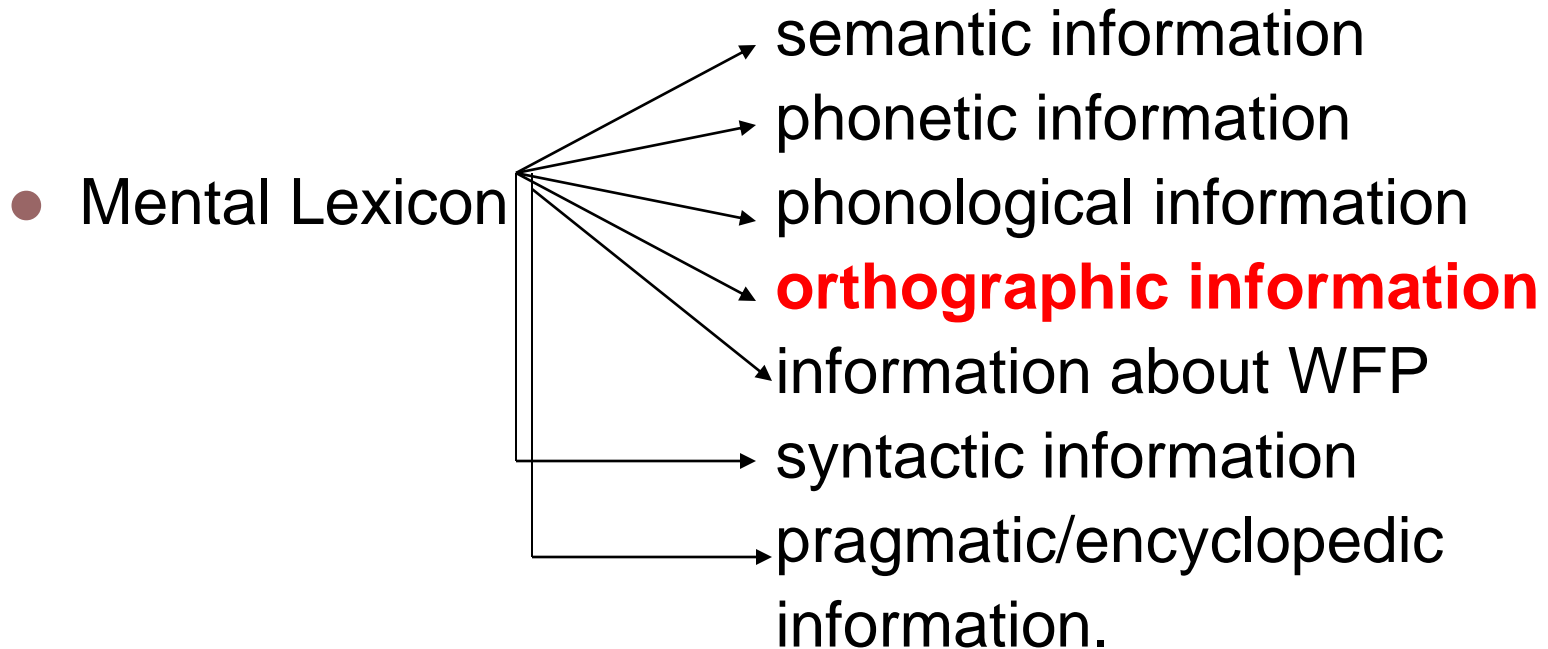
The Lexical Component

The Mental Lexicon

- **Definition of the Lexicon:** “Your mental storehouse of information about words and morphemes is what we have been calling the lexicon,” Fromkin et al. (2003:174).

Theories of the Mental Lexicon

- Words in the mental dictionary are listed as suggested by the following diagram:



Orthographic Information-1

- **Orthographic Relations:** Presumably, orthographic words are related to each other in a complex system of mapping:
 1. Similar/different onsets
 2. Similar/different nucleus
 3. Similar/different codas

Orthographic Information-2

- Orthographic Relations: Here are interested only in:
 1. **Homographs:** Same spelling, but different meanings
 2. **Homophones:** Same pronunciation, but different spellings
 3. **Homonyms:** Same pronunciation and same spelling but different meanings

Examples of Homonyms (Polysemy)

1. <cardinal> vs. <cardinal> vs.
<cardinal>
2. <bank> vs. <bank>
3. <race> vs. <race>
4. <conviction> vs. <conviction>

Homographs, Homophones and Reading-1

- “**Homophones, homographs**, and especially **homonyms**, present some of the same decision-making dilemmas and can cause problem-solving nightmares for the developing reading processor [new readers] because they create lexical ambiguity...”

Homographs, Homophones and Reading-2

- ...Top-down processing schema-activating strategies can help with polysemous words and homonyms because they will prime the reader to understand the text right away from the beginning,” Birch (2002:141-2).

Homonyms and the Phonemic Principle


- The **Phonemic Principle** leads to many homonyms in tone languages where tone is not indicated in the orthography. 📌 The abundance of homonyms in the orthography of African languages is responsible for processing difficulties and re-reading because a rich syntactic environment is needed to make sense of the word.
- (See Day 4, Lecture 1 for more details.)

Homograph Avoidance

Maximum Differentiation-1

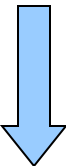
- “Homograph avoidance is an orthographic feature which is exploited widely in the interest of lexical access,”
Coulmas (1989:173)

Maximum Differentiation-2

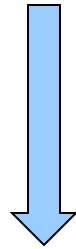
- “Differentiating homonyms on the graphemic level has obvious advantages for the decoding process, but it is an additional burden of the acquisition of an orthography making extensive use of this principle,” Coulmas (1989:173)
-  Doing so causes problems for spelling but this can be mitigated (See Day 4, Lecture 1 for an optimal approach)

Type of Orthography and the Reading Process

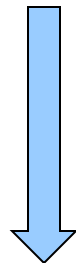
Orthographic Rules

- Orthographic rules include all the rules that speakers deploy to arrive at the correct pronunciation (and/or spelling of words):
 - Orthographic Word
 - Graph-to-Phone Mapping Rule(s)
- 

Generative Model of Reading Aloud




- Orthography Type
(transparent vs. opaque)



- Phonation/Reading Aloud


Classification of Orthographies-1

- **Transparent or shallow:** the relationship between sound and spelling has a very high degree of predictability.
-  This results into a direct mapping. Reading and spelling are easier. Most languages being reduced to writing have transparent orthographies.

Classification of Orthographies-2

- **Opaque or deep:** the relationship between sound and spelling cannot be predicted consistently. According to Pinker, spelling-to-reading is 84% predictable in English.

Classification of Orthographies-3

-  Opaque orthographies take longer to acquire. However, they rely less on top-down skills to arrive at the correct pronunciation because homonyms, homographs, and homophones are relatively rare. However, there is heavy reliance on morphophonology for graph-to-phone mapping.

Review of the Theories of Reading

Word Superiority Effect-WSE-1

- **The Maximal Projection Unit of Reading:** The minimal unit of reading is the grapheme. They organize into a larger unit called the syllable. Syllables organize yet in a larger unit called the “orthographic word”. This is the unit that all readers rely on to read. This has been called the “**Word Superiority Effect**” or the “**Word Advantage**”.

Word Superiority Effect-WSE-2

- **“Minimalist Hypothesis”** i.e., WSE, claims that the whole orthographic word has to be seen before reading can proceed. The claim that the whole word must be seen is also referred to as the **“Holistic Word Recognition”**: **Exterior letters** (the first last letters) of words have been found to be particularly useful in reading.

Word Superiority Effect-WSE-3

- “One finding that led to this renewed interest was the demonstration that a letter could be better recognized when presented in the context of a word than when presented in a random letter string or even when presented alone. This advantage, called the word advantage or word superiority effect, was shown to exist even if the possibilities of postperceptual guessing and memory loss were eliminated,” Massaro and Jesse (2005:40-41)

In Support of the WSE

Disclaimer: This is **NOT** an authentic research but still it proves the point.

Practice

“According to a research at Cambridge University, it doesn't matter in what order the letters in a word are, the only important thing is that the first and last letter be at the right place. The rest can be a total mess and you can still read it without problem. This is because the human mind does not read every letter by itself, but the word as a whole.”

Theories of Reading: Computational Model


Decision-Making & Reading-1

- **Multiple Source of Information:**
Massaro and Jesse (2005:43) argue that the **Minimalist Hypothesis** (WSE) is not the best explanation for the reading process. They propose that reading proceeds by tapping into multiple sources of information

Decision-Making & Reading-2

- **Decision making in word recognition:** People can arrive at the correct recognition only by providing partial information.
- 📖 The Game Jeopardy is a prime example of the computational apparatus deployed in reading. However, there are too many wrong guesses!

Decision-Making & Reading-2

- “An important question is the nature of the reader’s knowledge about orthographic structures. It is possible to distinguish between two broad categories: **statistical redundancies** and rule **governed regularities**,” Massero and Jesse (2005:44).
-  Which of the two is most helpful?

Frequency, Regularity & Reading-1

- **Correlation between frequency and retrieval:** “A simple property of memory is that the more often you hear something the better you remember it. Uncommon words, therefore, have weak memory entries and should be harder to retrieve,” Pinker (1999:123) *Words and Rules*.

Frequency, Regularity & Reading-2

- **Frequency of occurrence and irregularity in form:** “Here is a Top Ten list, the ten most common verbs in English:
- **Verb Number of occurrences in a million words of text**

1.	be	39, 175
2.	have	12, 458
3.	do	4, 367
4.	say	2, 765
5.	make	2, 312

Frequency, Regularity & Reading-3

- **Frequency of occurrence and irregularity in form:** “Here is a Top Ten list, the ten most common verbs in English:

6.	go	1, 844
7.	take	1, 575
8.	come	1, 561
9.	see	1, 513
10.	get	1, 486

Frequency, Regularity & Reading-4

- **Combination of Regularity and Frequency:** The decision-making approach has to factor in the following combination in accessing words:
 1. Frequent and regular
 2. Frequent but irregular


Frequency, Regularity & Reading-5

3. Infrequent but regular
 4. Infrequent and irregular
- These combinations have important pedagogical impacts of the acquisition of reading.

Dual-route Hypothesis-1

- **Working Hypothesis:** Regular and irregular forms are presumably stored and accessed differently from regular words, Pinker (1999:23) *Words and Rules*. Pinker (1994:274)
- **Storage in the Mental Lexicon:** Irregular words (especially sight words) are stored whole in the lexicon.

Dual-route Hypothesis-2

-  **Lexical Access:** The amount of time needed to recognize regular words is different from the amount of time needed to recognize irregular forms.
- High frequency irregular words, i.e., **sight words** (about 300 in English) are recognized faster than low frequency regular words.


Dual-route Hypothesis-3

- **Finding:** “For high frequency irregular words, phonological information from the lexicon is available sooner than low-frequency words and therefore has less of a chance to be inhibited by information from the grapheme-phoneme correspondence route,” Massaro and Jesse (2005:45).

Dual-route Hypothesis-4

- **Processing Rare Words:** “Studies have found that people take a few hundredths of a second longer to recognize rare regular forms than common ones.”
- **Regular Words:** “Common regular forms are faster to recognize than uncommon ones,” Pinker (1999:138, 139) *Words and Rules*.

Dual-route Hypothesis-4

- **The Length Effect:** It is easier to recognize longer words than shorter words; that is, longer words are more idiosyncratic than shorter words. Shorter words have more concurrent candidates than longer words.
-  This is particularly true for tone languages whose orthographies rely on the phonemic principle when tone is not marked.

Homework

Exercise 1

- How would you describe the orthography of your language(s):
 1. Transparent orthography?
 2. Phonemic principle?
 3. Homograph avoidance?
 4. Homophone differentiation, how?

Exercise 2

1. What problem(s) have you noticed when you or somebody else is reading a text in your language(s)?
2. What problem(s) have you noticed when you or somebody else is writing in your language(s)?

Selected References

Selected References-1

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