SEMANTIC PROCESSING *and* WORD FINDING DIFFICULTY ACROSS *the* LIFESPAN

A Practical Guide for Speech-Language Pathologists

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PREFACE

The initial idea about writing this book was from several excited and heated discussions on a topic both of us are compassionate about: "Lexicon." Although we both are first-generation immigrants learning English as a second language, we have different personal experiences, training backgrounds, and research interests. It is not surprising that we have different views on lexical acquisition and disorders. However, after years of studying, teaching, and researching semantic processing and word-finding difficulty, we realized that we needed to take a step back and look at the bigger picture. In order to have a holistic understanding of semantic processing and word retrieval difficulty, this should be viewed on a continuum from both developmental and acquired perspectives.

We noticed that most clinical approaches addressing lexical deficits are based on the same theoretical foundations. Although clinical management strategies need to be tailored for individual needs or specific deficits, the fundamental concepts are similar. Hence, it makes sense to review the conceptual frameworks and theoretical principles through an integrated approach and compare the similarities and differences among different types of semantic-related language disorders across the lifespan.

We start the book by providing readers with a review of the fundamental basis and research evidence related to semantic processing and word retrieval difficulty. We review the related research studies from different disciplines, including speech-language pathology, linguistics, psychology, neuroscience, and education, to help readers understand lexical processing and retrieval from a different but holistic viewpoint. We also try to interpret the relevant research evidence from a clinical point of view and attempt to incorporate practical considerations into our discussion. Subsequently, readers can learn about the commonly implemented, evidence-based clinical approaches for addressing lexical deficits across the lifespan. As we aim to bridge the gap between research evidence and clinical practice, we add the section of clinical implications into our discussions along

with providing sample therapy plans for the discussed treatment approaches.

While viewing developmental and acquired lexical deficits separately, we may miss out on the fundamental principles and theoretical frameworks and possibly overlook the connections between them. We hope readers can benefit from learning semantic processing and word retrieval difficulty from this nontraditional approach. This book is dedicated to practicing and future speech-language pathologists who provide valuable service to people who struggle with lexical learning and retrieval.

Pei-Fang Hung and Lei Sun
Long Beach, CA

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INTRODUCTION TO LEXICON

Lei Sun

The Importance of Words
What Is Lexicon?
Lexical Knowledge and Lexical Competence
  Receptive-Expressive Vocabulary Knowledge
  Partial-Precise Knowledge
  Depth of Knowledge
The Relationships Among Language Domains
  Lexicon and Phonology
    Phonological Representation
    Phonotactic Probability
  Lexicon and Morphosyntax
Impact of Language Disorders on Lexicon: An Overview
Discussion Questions

Chapter Objectives

1. Identify the essential elements needed for understanding and producing a linguistic message successfully.
2. Demonstrate the knowledge of the aspects of lexical competence.
3. Identify the relationships among lexicon (semantics), phonology and morphosyntax.

The Importance of Words

Words are essential to any kind of language-based processing and serve as the building blocks of the linguistic message people want to express to others. Words can convey verbal messages from speakers to listeners and convey written messages from writers to readers. Understanding and producing a linguistic message successfully requires several essential elements, inlcuding (1) good lexical knowledge (i.e., word knowledge), (2) good morphosyntactic knowledge (i.e., how the words are sequenced in a sentence), (3) paralinguistic features (e.g., intonation, pitch, volume), and (4) context (e.g., social and linguistic). The following two example sentences are used for our discussion.

(a) "The big dog angrily chases the little boy in the hallway."

(b) "The little boy angrily chases the big dog in the hallway."

Lexical Knowledge. Different lexical categories (i.e., classes of words) are required to constitute a linguistic message. Content words, words that have semantic content, play a vital role in a sentence because of the rich messages they carry. The content words in the aforementioned example sentences include nouns (dog, boy, hallway), verbs (chase), adjectives (big, little), and adverbs (angrily). Not knowing the meaning of content words

can significantly affect the listener's understanding of the intended message. On the other hand, although function words, such as articles (the) and prepositions (in), do not carry the key meaning, these words are needed to form a complete, syntactically correct sentence.

Morphosyntactic Knowledge. Both example sentences contain the same number of words and morphemes; however, they convey very different messages because of the different word order. In other words, switching the subject (person or animal performs the action) and object (person or animal receives the action) in a sentence can create different meanings. The listener has to understand the meanings of words as well as sentence structure in order to comprehend the message correctly. Therefore, both lexical and morphosyntactic knowledge is essential for correctly understanding and constructing the intended meaning.

Paralinguistic Features. Paralinguistic features include intonation, stress, pitch, volume, speech rate, modulation, and fluency, and these features can also affect the meaning of the words and sentence. For example, the intended meaning can be changed and modified when a speaker alters the intonation. The speaker can say "The little boy angrily chases the big dog in the hallway." with a rising tone to express the disbelief of this observation or with a falling tone to just give information about the observation. Furthermore, changing the stress pattern within a word can alter the meaning entirely. For instance, the word class and meaning of the word "record" change when the stress is moved from the first syllable ([REcord]: noun.) to the second syllable ([reCORD]: verb).

Context. The meaning of a word may also change depending on the social and linguistic contexts. Social context means how people use language, and linguistic context refers to the surrounding words that can help determine word meaning and interpretation. For example, the phrase "kick the bucket" can be interpreted both literally and figuratively. When it is interpreted figuratively, all three words must be interpreted together because an idiom phrase is considered a giant lexical unit (Nippold, 1985).

Similarly, words with multiple meanings also make the process of understanding word meanings challenging. For example, the word "arm" presents very different meanings in the following two sentences: (1) "I have a mosquito bite on my *arm*" versus (2) "It's important to *arm* yourself with knowledge." Therefore, speakers must know not only the word meaning and word class but also the appropriate context to use the word. In the next section, we will attempt to answer a seemingly simple question that remains difficult to answer: What is lexicon?

What Is Lexicon?

Lexicon, also known as vocabulary, means a broader understanding of words, including usage, categorization, and the association between words and phrases. Lexicon is a broad, complex, and multifaceted concept. In this book, we use the terms *lexicon* and *vocabulary* interchangeably. Words are learned when both form (phonological representations) and meaning (semantic representations) are acquired and accessible to the person (Swingley, 2009). More specifically, ***lexical learning*** refers to the ability to acquire phonological representations (e.g., /kæt/ for the word "cat") and semantic representations (e.g., color, shape, pattern, and animacy) of a word (Nation, 2014). The learning process begins by recognizing the word and then mapping it to the conceptual referent. The word meaning is continuously refined based on linguistic context (other words that surrounding the intended word can help determine its interpretation) and social context (how people use the word in a given language) (He & Arunachalam, 2017). Learners use the information gained from linguistic and social contexts to gradually derive the meaning. The elaborated discussion about the process of mapping concepts to word form and meaning is in Chapter 3. Once a word is learned, it is stored in long-term memory and becomes part of one's mental lexicon for later use.

Mental lexicon is a mental dictionary that contains information about the meaning, pronunciation, usage, and grammatical features of a word. The structure of the mental lexicon is more complex than a physical dictionary because it is not

organized in alphabetic order like a typical dictionary. Instead, words in the mental dictionary are interconnected and categorized like a spider web-like network without following a predetermined set of rules (Aitchison,1994). Additionally, how a word is related to other words and how frequently a word is used can impact how well the word is stored. The frequency of a word is being retrieved (used) can enhance the storage power of the word. ***Lexical storage*** and ***lexical retrieval*** influence each other because how well words are stored in long-term memory will have an impact on how easily the words can be retrieved.

Lexical access, the act of **lexical retrieval**, is the ability to access the mental lexicon. Specifically, it involves the selection of semantically-specified and syntactically-specified lexical representations and the corresponding phonological representations (Caramazza, 1997). For example, when retrieving the word "dog," several features can be activated, such as basic semantic features (e.g., fur, bark, four legs), superordinate features (e.g., animal, mammal), subordinate features (e.g., golden retriever), phonological representations (/dɔg/), and orthographic structures (d-o-g). A detailed discussion of lexical processing models that involves the different levels of lexical selection is presented in Chapter 2.

How words are stored, organized, and retrieved has been discussed extensively in the literature of neuroscience, linguistics, and psychology. Word learning is a continuous process throughout the lifespan as we continue to add new words to our mental lexicon through experiences. In the next section, we provide an overview on how someone develops lexical knowledge and how to evaluate lexical competence.

Lexical Knowledge and Lexical Competence

Lexical (word) knowledge is acquired through three processes proposed by Aitchison (1994), including labeling/mapping, packaging, and network building. The *labeling/mapping process* is the first step in developing word knowledge. People connect the new word to its referent or concept by matching the sounds to the referent. Children first link a specific sound combination to