

Psycholinguistics

Introduction and Applications

SECOND EDITION

Lise Menn

With contributions by

Nina F. Dronkers



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Psycholinguistics

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Second Edition

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With contributions by Nina F. Dronkers, PhD



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Foreword

Psycholinguistics can be defined as the psychology of language, but this definition is deceptively simple. Psychology, as the study of behavior, is an ever-expanding field, embracing new theories, research methods, and data of many kinds. The formal study of language is rooted in linguistics, one of the oldest domains of scholarship and one that is continually renewed by efforts to understand the structure of language. Psycholinguistics is the hybrid offspring of psychology and linguistics, and, like many hybrids, it is vigorous and fruitful. A proper understanding of psycholinguistics requires a deep knowledge of its parent fields, but it can be a daunting effort to gain even a basic understanding of either psychology or linguistics, let alone their dynamic intersection. The challenge to the learner is clear. Fortunately, the answer to that challenge is clear as well.

This remarkable book lays out the field of psycholinguistics like a feast on the table of knowledge. As it moves deftly between theory and experiment, this text reviews contemporary understanding of basic questions on the use of language, such as: How do we acquire a first or later language? How do we understand and produce sentences? How do our brains process language? What causes errors in language production and what do these errors tell us about the neural organization of language? How do neurologic disorders such as stroke lead to impairment of language?

Deep knowledge of the subject matter is beautifully matched with eloquent but straightforward expression to produce a book that is inviting and rewarding to read. Above all, Lise Menn and Nina Dronkers carry the reader along a journey that explores the excitement of research in psycholinguistics, marking the way with signposts of scientific accomplishment and pointing out pathways of potential discovery. Readers who may have been frustrated in previous attempts to fashion an understanding of psycholinguistics from other books or a collection of journal articles are well advised to read this book for a clear and comprehensive account of the field. Readers who know little about either psychology or linguistics should not be intimidated, as this book will escort them

through the forest of theories, hypotheses, and discoveries, culminating in a satisfying assessment of what is known and how it came to be known. Instructors who seek a book that will both encourage and educate their students will find this one to be a most worthy candidate. Readers of diverse backgrounds and levels of expertise will enjoy this book as a trustworthy and entertaining companion. This second edition retains the considerable strengths of the first but offers several enhancements to make the book even better.

Psycholinguistics: Introduction and Applications, Second Edition is authoritative in its command of information and enjoyable in its exquisite use of words to talk about words. What better way to learn about psycholinguistics?

—Raymond D. Kent, PhD
Professor Emeritus
University of Wisconsin–Madison

Introduction

Psycholinguistics and What It's Good For

- 0.1** The Plan of This Book
- 0.2** What's the Difference Between Linguistics and Psycholinguistics?
- 0.3** A Few Examples of What Psycholinguistics is Good For: Language Problems
- 0.4** A Psycholinguistic Explanation of a Language Problem
- 0.5** In Defense of My Writing Style: *Apologia pro stilo suo*

0.1 The Plan of This Book

Because people studying psycholinguistics have many different backgrounds, this book introduces the basics of language and linguistics in Chapter 1, the brain in Chapter 2, and the methods of experimental psychology (as part of the presentation of the key findings of experimental psycholinguistics) in Chapter 5. If you are already acquainted with one or more of these areas, you can probably skim the corresponding part of the book. If you have a good background in experimental psychology, you will probably prefer to read the condensed presentation of experimental psycholinguistics in the online workbook on the companion website instead of the version in the text.

We start covering the most important findings of psycholinguistics in Chapters 3 and 4. Chapter 3 explains why psycholinguists think that the concepts in our minds are linked by a huge, mostly subconscious

network of similarities and information about whether things are close or far apart in real or imagined worlds of space and time.

In Chapter 4, we present evidence to support the statement that this huge, subconscious network also links the words in your mind not just by what they mean and how they sound, but also by their grammatical properties—because grammar, like a set of blueprints for construction, is what organizes a sentence and specifies the proper place for each of its words.

The second half of the book is about the applications of psycholinguistics to understanding language learning and some of the most important kinds of language problems. Chapter 6 presents the spoken language of people with the rather common and often disabling language disorder called **APHASIA**, and shows how what we've learned in the first five chapters can help us to understand their problems. Chapter 7 looks at what has been discovered about how children learn to speak their first language, starting from before they are born.

In Chapter 8, we study what our minds do when we are reading, and what that implies for how reading should be taught, and in Chapter 9, we explore some of the similarities and differences between learning a first language and a second language, and why a learner's age affects how quickly and how well they learn a second language. Finally, in Chapter 10, we show how thinking about language and communication psycholinguistically can help in the language classroom and the clinic.

In the online workbook, you will find exercises based on clinical and/or language classroom situations so that you can get practice in applying your new concepts to analyzing real-world language behavior.

The text has a glossary; all words and phrases that are printed like **THIS** in the text are defined there.

On the companion website, in addition to the workbook, you'll find audio and video materials that will help you get closer to the experience of being an observer or a participant in an experiment, suggestions for further reading, links to other useful web sites, and, for most chapters, an optional Challenge section with additional material and exercises for advanced and ambitious readers.

0.2 What's the Difference Between Linguistics and Psycholinguistics?

The boundary is fuzzy, but basically, **linguistics** is about how to describe languages, dialects and speech styles accurately and in detail: the different kinds of speech sounds, how the sentences are put together, the

kinds of meanings the words have, how the speakers make new words, the differences between formal and informal language, the changes in rapid and casual speech, their relationships to one another, and how they change over historical and even pre-historic time. Linguistics also gives us the concepts and vocabulary that we need to describe language problems accurately. It also lets us catalogue the differences and similarities between languages or dialects in ways that don't make (or thinly conceal) value judgments.

PSYCHOLINGUISTICS, in contrast, tries to discover how we manage to actually DO all the things that go into speaking and understanding, reading and writing. How do sound waves hitting your ear become, in less than half a second, your understanding of what another person means? How, in speaking a modest two-second sentence, have you managed to find the dozen or so words that you need to express your meaning out of the tens of thousands of words stored in your mind, put them in the right order so that they make sense, and get them all pronounced clearly enough for your hearer to understand, even though, in order to do this, your tongue and lips had to perform a complicated ballet involving hundreds of individual movements? Psycholinguistics uses experiments and intense laboratory observations to break into these incredibly fast, highly skilled language performances and to study the accumulation of the experiences that have built up those unconscious skills over our lifetimes. It also integrates the current findings of **NEUROLINGUISTICS** about how language is remembered and deployed by our brains; that is the subject of Chapter 2.

0.3 A Few Examples of What Psycholinguistics is Good For: Language Problems

Think about language problems: What comes to mind? If you are a clinician or a language teacher, or a close relative of someone with a language disorder, or if you are studying or working outside your home country and still stressed by understanding the language around you, most of your everyday life probably floods into your mind at the thought of language problems.

If you are not in one of those situations, language problems may be a more remote idea; probably, you will think of children or foreigners struggling to be understood. Or, perhaps, of yourself trying to remember words in a technical course or foreign language, or the names of people and places in an unfamiliar or imaginary world. Perhaps you may think of older people trying to remember names of people, places,

or even fairly common objects, like *pliers*; parents calling children by the name of their brother or sister, or even the name of a pet (children do not find this amusing). Accidentally blending two things you wanted to say at the same time: for example, saying “everything under the world” when you wanted to say “everything under the sun” or “everything in the world” (a real example from a published collection of speech errors). Words that you are looking at on a computer screen can sneak into what you are saying if you are talking on the telephone at the same time (*Do you have time to go to a carpet sale—I mean a movie—tomorrow?*). Hearing somebody say something that, in fact, is not what they said; misconstruing unfamiliar words in titles, song lyrics, or prayers (*Do you know who painted the ceiling of the sixteenth chapel?*).

All of these are “normal” language problems. Much worse are the problems of people who have had strokes or other injuries affecting the language areas of the brain, and the problems of children with developmental language disorders. In this book, we develop the descriptive and conceptual tools for understanding how these language problems seem to happen. Gradually, we see how those tools can help with the design of second language curricula and programs or with language testing and therapy, and how they can simply provide us with a feeling of insight into our own language behavior and that of people around us—insight that will help us deal with everyone’s language problems with as much grace and humor as possible.

0.4 A Psycholinguistic Explanation of a Language Problem

We haven’t yet developed our promised tools, so I can’t give you a completely worked out example of a psycholinguistic explanation of a language problem; but here’s a sketch of one (which I hope you haven’t run into personally). Imagine that your new sweetheart, Chris, suggests that the two of you eat dinner at a restaurant that you used to go to with your previous partner, Sam, and you accidentally say, *Sure, Sam, I’d love to!* How did the wrong name get in there? And how did it get into the exact place in the sentence where a name belongs, instead of perhaps replacing the verb, making you say, *Sure, Chris, I’d sam to?* And why was it “Sam” rather than the name of someone else, and why was it a personal first name rather than any of the dozens of other kinds of words that are stored in our minds?

Chris naturally feels that you made this mistake because you still have Sam on your mind as a romantic partner. That’s possible, but it doesn’t

have to be true. However, even an anxious or angry Chris knows that you haven't confused the *people*; you've just confused their *names*. This makes one of our first psycholinguistic points: Words (including names) are not the same mental objects as the things or people they refer to. Yes, the word and the person or thing that it refers to are usually closely connected in your mind. However, the connection between them can be weak (maybe you just met the person at a party) or nonexistent (you never heard the name in the first place). That's fairly obvious. What is less obvious is that the name of someone you know can come into your conscious mind when you are not consciously thinking of the person—or that the name can come to awareness first, dragging the concept of the person behind it. In Chapter 3, we present some evidence supporting these ideas.

A psycholinguistic explanation of a “wrong name” error has to start from two basic theories: first, a *general psychological theory* of how information is stored in your mind and retrieved when you need it and, second, a *specific psycholinguistic theory* of how sentences are formed in your head before they are spoken, and how the words in those sentences get put in the right order and given the right emphasis to convey what you meant by saying them.

0.5 In Defense of My Writing Style: *Apologia pro stilo suo*

I have written this book in the plainest English (although I'm sure there's still room for improvement). I'm not doing this to be cute or folksy, but on psycholinguistic principles. Understanding a description or an explanation means building a clear mental model of it. Passive voice, nominalizations (like the word *nominalization* itself) instead of clauses with real subjects and verbs, and terms that make readers go back to see what they mean (like *the former* and *the latter*) all add to the mental processing load. Extra work figuring out what the writer means interferes with building mental models of the new information being conveyed.

Real or realistic examples are essential for building a clear mental model of what the writer is trying to communicate; questions, names and a few exclamation points help to keep readers alert and focused. Personal pronouns also encourage sharper mental model building, I think. I don't have hard evidence for that claim, but there are plenty of hints in the mental-model and **MIRROR NEURON** literature that we understand what others are doing by subconsciously imagining doing something of the sort ourselves. By saying *The tip of your tongue* instead of *The tip of the tongue*, I'm trying to jump-start that process.

Letting readers know what a barrage of new information is good for gives them not only a reason to care about learning it, but a way to remember it when the time to use it finally arrives. We don't have to teach the "pure" science in a vacuum and then teach its applications separately. And after 40 years in the profession, most of them working in interdisciplinary settings, I find that combining linguistics with its applications invigorates it as well as making it more understandable, because applying any science to the real world challenges its theoretical assumptions and demands accountability.

Unfortunately, the habit of reading and writing in standard disembodied academic style is so deep that some people think it is unscientific and less rigorous to write simple active declarative sentences like *We asked 10 people with aphasia to name these pictures than Ten aphasic persons were instructed to label the stimuli*. Why do some people think that sentences that are easier to understand are not scientific? Partly because they are used to scientific writing that is loaded with sentences in academic style, and partly because, as cognitive scientist Dan Sperber (2010) says, "All too often, what readers do is judge profound what they have failed to grasp."

And someplace we researchers also got the idea that descriptions of research should contain as few references to human beings as possible, as if science were untouched by human hands or minds. But good professional science journalists (and researchers who write well) know that science is created by people, even if a few of them hide behind wizards' masks, and that people who are learning science deserve to know where knowledge comes from, so that they don't feel betrayed when new discoveries upset what they learned previously.

I have also avoided peppering the text with distracting citations. References are in the text when I describe a major finding in detail, but otherwise they are postponed to the end of the chapter. Specific references for the material in each section of each chapter are in the supplementary online materials, including the Instructor's Manual and the Student's Workbook.

If you're not comfortable with this writing style, I hope you will be by the time you're a few chapters into this book.

Reference

Sperber, Dan (2010). The guru effect. *Review of Philosophy and Psychology*, 1, 483–592.

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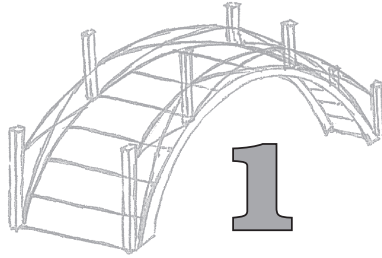
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*For Bruce, Audrey, and the Fellowship of the Wug Mug
– and now for Bix and Marisa, too.*



Basic Linguistics: How to Describe Language Use and Language Knowledge

1A. INTRODUCTION, PHONETICS, AND PHONOLOGY

- 1.0 Terminology: Strategy for Learning about Language**
- 1.1 Divide and (More or Less) Conquer: Levels of Spoken Language**
- 1.2 The Level of Speech Sounds: The Sounds of Spoken Words**
 - 1.2.1 What's Wrong with Letters for Describing Speech Sounds?**
 - 1.2.2 How Speech Sounds are Made: The Vocal Tract**
 - 1.2.3 Families of Speech Sounds: Sound Features and Sound Waves**
 - 1.2.4 The Sonorant Sounds and /h/**
 - 1.2.5 Contrasting Classes of Sounds: Phonemes and Minimal Pairs**
 - 1.2.6 Special Sounds in Unskilled and Disordered Speech**
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As adults, we usually take our first language for granted, and the effort of describing it in detail seems like a waste of time. If you already know how to speak English, why should you worry about whether *on* is a preposition or an adverb, or whether *hot dog* (the sausage) is one word or two?

On the other hand, maybe you've had some experience with language problems like the ones discussed in the Introduction. Perhaps you've tried to explain to someone who is not a native speaker of English why you say *on the 20th of February* but *on 20th Street* (rather than *on **the** 20th Street*), or you've tried to help an elderly friend who has had a stroke find a needed word. In that case, you might feel that language is so hopelessly complicated that it's not possible to learn a useful amount about how it works in a reasonable amount of time. And if you've taken an ordinary linguistics course, it might have seemed very far removed from what you would need for language teaching, international web page design, or speech-language therapy.

The terminology may have been a barrier, too. In this book, I will keep linking the materials on linguistics and psycholinguistics to examples of real-world language problems so that they can help us understand the technical terms. I will also define technical terms as we need them for describing real or realistic examples of language problems: normal slips of the tongue, children's errors, second language learners' errors, aphasic errors, and so on. We'll start by introducing basic linguistic terms in this chapter because they are key tools for describing language as it is produced by skilled as well as

unskilled or disabled speakers and hearers. (Most of the ideas here are also applicable to signed languages.) The terms that are presented in **BOLDFACE SMALL CAPITALS** are also defined in the Glossary. If you run into any technical term that you're not sure of, check the Glossary or the Index.

1.1 Divide and (More or Less) Conquer: Levels of Spoken Language

The usual way to organize language is by the size of the pieces it can be divided into, from small to large. The small units that we'll start with are the sounds that make up spoken words or the letters that make up written ones. Then we'll go on to bigger units: **WORDS, PHRASES, SENTENCES**, and **PARAGRAPHS** (for written language) or **CONVERSATIONAL TURNS** (for spoken language).

As you've just noticed, some of these terms (word, phrase, sentence) are used for both written and spoken language, but others can only be used for describing writing or only for describing speaking. In particular, people speak in *sounds*, not letters, so we will always talk about someone trying to say a speech sound, never about someone saying a "letter." The most important reason for doing this is that the letters of the English alphabet are a poor tool for describing any kind of speech, so you should start thinking in terms of sounds (and stop thinking in terms of letters) as soon as possible. Section 1.2.1 and related exercises in your online workbook will get you started in the right direction. Another reason to focus on speech sounds is that they are related to each other like nodes in a network; they aren't just items in an alphabetical list. Understanding the relationships among speech sounds is the key to understanding, for example, why people have foreign accents and why children make characteristic errors in learning to speak and to read. More about that soon, in section 1.2.4.

Our list of levels of language skipped some important items. **SYLLABLES** in spoken language, **SYLLABARY** symbols in Japanese and several other written languages, and **CHARACTERS** in written Chinese and Japanese are some that you may have thought of. Another important level for language teaching and error analysis is one that doesn't have a common name; it's the one involved in errors like *I was get innin the car*. Here, it looks like the speaker has treated the construction *get in* as if it were a verb, right? The whole **PHRASE** *get in* seems to have slipped

into a **SLOT** where just the verb *get* should have gone, just before the *-ing* ending. We'll get to these errors in Chapter 4.

1.2 The Level of Speech Sounds: The Sounds of Spoken Words

People who are interested in language rarely start out with an interest in the level of **SPEECH SOUNDS**—also called the **PHONETIC** level—because it seems so mechanical and so detailed. But it's "where the rubber meets the road." If someone's speech articulation is poor, or if they can't distinguish the sounds of speech reliably, it doesn't matter how brilliant they are; they are cut out of full participation in spoken conversation. Speech is our basic tool for connecting with friends and family, except in Deaf communities that use a signed language fluently. Because social isolation is deadly for mental and even physical health, the quality of speech matters.

Phonetics is often seen as a difficult subject for two reasons: You are supposed to learn to make and hear unfamiliar speech sounds, and you have to learn a new writing system, the **INTERNATIONAL PHONETIC ALPHABET (IPA)**, in order to write down and discuss even the sounds of languages that you know. Learning the IPA is mostly a matter of practice. If you've ever studied a spoken language other than your native one and learned how to write and pronounce it more or less correctly, you have already done the same kind of thing: learning that, for example, in French, the letter combination *eau* is pronounced close to American *oh*, but without pulling your lips into a *w* at the end of it the way Americans do. Or learning that in Russian, the letter Я is pronounced *ya*. But learning to make and hear unfamiliar speech sounds correctly can indeed be a real challenge. Understanding why this is hard will lead us from linguistics to psycholinguistics, and also (in Chapter 7) to the study of how speech sound perception develops in young children.

1.2.1 What's Wrong with Letters for Describing Speech Sounds?

1.2.1.1 Inconsistency of English Spelling

As you know, the English spelling system is not user friendly. Here's an example that makes this point, the first 10 lines of a comic poem called "The Chaos."