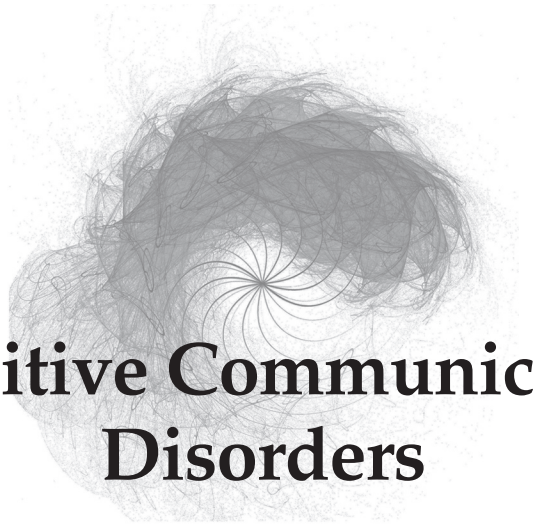

Cognitive Communication Disorders

Fourth Edition

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Typeset in 10.5/13 Palatino by Flanagan's Publishing Services, Inc.
Printed in the United States of America by Integrated Books International

Library of Congress Cataloging-in-Publication Data:
Names: Kimbarow, Michael L., 1953- editor. | Wallace, Sarah E., editor.
Title: Cognitive communication disorders / [edited by] Michael L. Kimbarow, Sarah E. Wallace.
Description: Fourth edition. | San Diego, CA : Plural, [2025] | Includes bibliographical references and index.
Identifiers: LCCN 2023024964 (print) | LCCN 2023024965 (ebook) | ISBN 9781635505115 (paperback) | ISBN 9781635504408 (ebook)
Subjects: MESH: Cognition Disorders--complications | Communication Disorders--etiology
Classification: LCC RD594 (print) | LCC RD594 (ebook) | NLM WM 204 | DDC
617.4/81044--dc23/eng/20230824
LC record available at https://lccn.loc.gov/2023024964
LC ebook record available at https://lccn.loc.gov/2023024965

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Preface

Webster defines an inflection point as a moment when significant change occurs. This is an apt descriptor of the fourth edition of *Cognitive Communication Disorders* (*CCD*). After the release of the third edition of *CCD*, I enjoyed a personal inflection point when I retired from my academic position and became an Emeritus Professor in the Department of Communication Disorders and Sciences at San Jose State University. Consequently, I recognized it was time to hand the text over to my colleagues and friends who remain active in teaching, research, and clinical service. Thus, inflection point number two. With this new edition, I welcome Sarah E. Wallace on board as coeditor of the text. Sarah brings an astounding background of knowledge, teaching, research, and editorial experience to the enterprise and will be the sole editor of the book for future editions.

The field of cognitive communication disorders continues to advance with increasing focus on evidence-based assessment and intervention approaches. Readers will note that many of the authors from previous editions of *CCD* have remained with the text, and their commitment to updating and revising their contributions is evident in this fourth edition. Updated content addresses the broader societal impact of cognitive communication disorders and the importance of being inclusive in our research and treatment with individuals with cognitive communication disorders.

As noted in the preface to the third edition, the goal in creating any new edition of a textbook is to ensure that the work remains true to its core value and to remain relevant to the reader. I am confident that once again, thanks to our outstanding roster of international (Australia, Canada, Cyprus, and the United States) contributors, that we have indeed upheld and exceeded our goal.

We are grateful to the authors who remain with the text from the third edition, Margaret Blake, Jessica Brown, Fofi Constantinidou, Heather Dial, Kathryn Hardin, Maya Henry, Nidhi Mahendra, and Sarah Villard. I'm also delighted to welcome a remarkable roster of new contributors who share coauthor credit on many chapters (Marianna Devledian, Petrea Cornwell, Eduardo Europa, Ronelle Hewetson, Kelly Knollman-Porter, Katy O'Brien, Catherine Wiseman-Hakes, Maya Albin). These new additions to the contributors list represent a third inflection point; they are the best and brightest of the next wave of teacher-scholars, and we look forward to their future contributions to the book.

The book remains organized in the familiar fashion as the previous three editions. The first three chapters cover

attention (Villard), memory (Constantinidou and Devledian), and executive functions (Purdy and O'Brien), and they provide the all-important and necessary foundational understanding of the cognitive systems that support communication. Learning how these cognitive systems work individually and synergistically is critical to understanding how these same systems are impacted by neurological damage. The book then explores the juncture between cognition and communication as manifested in right hemisphere damage (Cornwell, Hewetson, and Blake), primary progressive aphasia (Dial and Henry), the dementias (Mahendra and Europa), and mild traumatic brain injury/concussion (Hardin and Wiseman-Hakes) and traumatic brain injury (Knollman-Porter, Brown, and Wallace). The book concludes with a new chapter that addresses the challenges and considerations associated with providing care to marginalized and underserved individuals with cognitive communication disorders (Wiseman-Hakes, Hardin, and Albin).

We thank all the readers of the text for your continued support of the book. The information explosion since the first edition was released in 2011 is an imperative for ensuring that this valuable text continues to serve as an up-to-date resource for students, instructors, researchers, and clinicians. The people with cognitive communication disorders and their families deserve nothing less.

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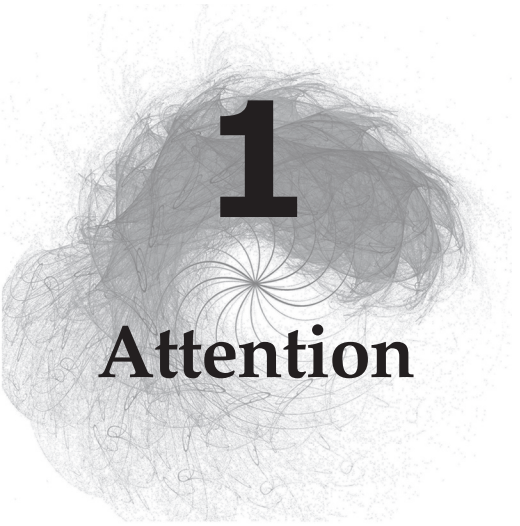

1 Attention

Sarah N. Villard

Chapter Learning Objectives

After reading this chapter you will be able to:

1. Explain why attention is relevant to assessment of language deficits in individuals with aphasia.
2. Compare the extent of attention deficits in different neurologically impaired populations, including dementia, aphasia, right hemisphere disorder, and traumatic brain injury.
3. Give examples of ways that attention can be incorporated into language treatment for patients with acquired neurological impairments.
4. Describe several tests of attention that may be used by speech-language pathologists and provide advantages and disadvantages of each.

Introduction

Interest in the cognitive skill of attention within the field of speech-language pathology has increased considerably over the past several decades, as researchers and clinicians have continued to uncover more and more about the complexity of language abilities and the ways in which they are intertwined with cognitive abilities. Attention, while not a language skill per se, is an example of an essential cognitive process that interacts with language and communication in a number of different ways. Impairments in attention have been observed in individuals with a number of different neurologically acquired and degenerative conditions, including stroke, traumatic brain injury, and various types of dementia. Even in aphasia, traditionally conceptualized as a language-specific impairment, attention deficits have frequently been noted and are becoming increasingly of interest.

Researchers in communication sciences and disorders are continuing to refine the ways in which attention can be applied to better understand neurogenic impairments, and clinicians who assess and treat cognitive communication disorders now routinely consider attention alongside other cognitive-linguistic abilities.

The aim of this chapter is to discuss the construct of attention as it relates to clinical practice in speech-language pathology for individuals with acquired and neurodegenerative impairments. In order to properly contextualize this discussion within the historical literature on attention, we will start with an overview of some basic principles of attention, as well as several major historical models and theories of attention from the neuropsychological literature on healthy populations. The discussion will then shift to the ways in which attention manifests in specific acquired and degenerative cognitive communication disorders, as well as the ways in which existing models of attention may be able to enhance our understanding of these disorders. Next, principles of assessment and treatment of attention within the field of speech-language pathology will be outlined, and some specific assessment tools will be described. Finally, a case study will be presented as an example of how these principles and tools might be applied to better understand the role of attention in the assessment and treatment of an individual patient.

Central Principles of Attention

A major challenge in studying the cognitive skill of attention is defining precisely what attention is. Most of us have a general sense of what it entails —after all, "attention" is a familiar term that occurs frequently and flexibly in everyday conversation. We may casually comment that an individual has a short or long "attention span"; we may remind someone that important information is forthcoming ("Pay attention!"); we may talk about "attention to detail" or about "drawing someone's attention" to something. We may associate the idea of attention with concepts such as distraction or multitasking or meditation, or with the feeling of suddenly realizing we have just read the same paragraph over several times without absorbing any of its content. And particularly in recent years, with the ever-increasing ubiquity of scrolling, texting, video snippets, and social media, many of us report an increasing sense of concern about whether our habit of scanning and flitting from image to image and from page to page could be negatively impacting our ability to focus on a single topic for longer periods of time.

These everyday references to attention, however, are sprawling and imprecise, and it is difficult to extract from them a definitive definition of this construct. Is attention one thing or many things? Is it about how *long* we can pay attention? Is it about how well we can pay attention? Or is it more about how many things we (think we) can pay attention to at the same time? How can we measure an individual's attention, and what does that mean? And—most importantly for our discussion here—how does attention fit into the assessment and treatment of cognitive communication disorders?

The first step in considering how attention may manifest in clinical popu-

lations will be to consider the ways in which the neuropsychological literature has defined attention in healthy people. This is no small undertaking, as a wide variety of models and theories of attention have been proposed, and each one characterizes attention somewhat differently. We will consider a number of major historical models of attention in this chapter. However, before delving into specifics, it may be useful to first outline several broad, fairly universal principles of attention that are inherent in multiple models.

The first central principle of attention is that it is always defined in relation to a stimulus: You always pay attention *to* something. A stimulus can be either external (originating from the environment) or internal (originating from within the individual). Examples of external stimuli could include a funny story your sister tells you about her dog, the rapidly falling shapes in a game of Tetris, the lyrics of "Bohemian Rhapsody," or this chapter you're currently reading. Some examples of internal stimuli are a mental grocery list, a major decision you're trying to think through, or a childhood memory. In some cases, you might also be attending (or attempting to attend) to multiple stimuli at once. For example, you might be writing an email while also watching a talk show and dividing or switching your attention between the two. The important takeaway here, however, is that in order for attention to take place, at least one stimulus must be involved.

A second, related principle of attention that relates primarily to external stimuli is that the modality of the stimulus should be identified and noted. We can attend, for example, to an auditory stimulus such as a radio news program or an intercom announcement; likewise, we can also attend to a visual stimulus such as a silent film or a chess game. Many of the objects we attend to on a daily basis consist of a combination of auditory and visual stimuli; an action film, a live dance performance, a thunderstorm, and a family member speaking to us from across the dinner table all fall into this category. Additionally, although it is common to think of attention in terms of the visual, auditory, or combined visual-auditory modalities, it is certainly also possible to attend through other modalities—reading Braille, for example, requires attention through the tactile modality. We may also attend to simple everyday stimuli such as the wind on our face (another tactile stimulus), to the smell of something baking in the next room (an olfactory stimulus), or to the taste of an apple (a gustatory stimulus).

Another notable feature of attention is that it is thought to be closely connected to other processes such as memory and executive function, as well as to the effective use of language to communicate. From a certain perspective, you might even say that attention functions as a prerequisite that must be fulfilled before certain other cognitive-linguistic operations can be successfully carried out. For example, how could you possibly recall a set of verbal directions if you were not able to pay attention to the directions when they were originally given? How could you harness executive function to create and execute a plan without directing some attention toward that plan? How could effective communication occur without attention to the topic or attention to a communication partner's message? Attention is necessary for all of these cognitive-

linguistic activities. This interconnectedness of attention with other cognitive-linguistic skills can present a challenge in studying attention in an experimental or evaluation context, as it can be difficult to cleanly separate from other processes. This issue will be further explored later when discussing the assessment of attention.

This brings us to perhaps the two most important features of attention as it is understood in the neuropsychological literature: **capacity limitation** and **selection**, concepts that are closely related to one another and should be considered in tandem. The first, capacity limitation, refers to the fact that the human attention system can only process a limited number or amount of stimuli at once. The second, selection, represents the ability of this system to focus on stimuli that are most relevant to its behavior, goals, or interests, while ignoring or filtering out stimuli that are less relevant (while continuing to monitor these less-relevant stimuli to some extent in case they should become relevant again). We can consider capacity limitation to be a weak point of the human attention system and selection to be a complementary strong point: We may not be able to attend to everything at once, but at least we can be somewhat selective about which stimuli we *do* want to attend to.

The psychologist William James, who wrote about attention in the late 19th century, summed up the ideas of capacity limitation and selection nicely in the following passage:

> [Attention] is taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence. It implies withdrawal from some things in order to deal effectively with others and is a condition which has a real opposite in the confused, dazed, scatterbrained state which in French is called distraction. (James, 1890/1950, pp. 403–404)

While James's characterization is somewhat more philosophical than evidence based, it nicely expresses the idea that in many everyday situations, a multiplicity of different stimuli compete for our attention, and if we are to "deal effectively" with any of them, we must (consciously or subconsciously) select specific stimuli on which to focus our attention and find a way to ignore the others. As an illustration, think of all the many stimuli that might bombard you as you enter a busy restaurant: the sights of tables, chairs, lights, menus, the décor, the hostess, servers, and other patrons, as well as the sounds of clinking glasses and silverware, the music, and the numerous conversations unfolding simultaneously around you. Due to capacity limitations, it would be difficult if not impossible to attend fully to all of these stimuli at once. Even in a calmer, less complicated situation, for example, if you were sitting alone on the couch reading a book, capacity limitations would likely still be at play. In this case, the multiple stimuli competing for your attention might consist of the words on the page, the feel of the book in your hand, the light in the room, the ticking clock, your occasionally vibrating phone, and the distant hum of a lawn mower or of cars going

by outside, as well as perhaps internal stimuli such as thoughts about dinner or about a conversation you had earlier in the day.

Typically, selection is based on which stimulus or stimuli are most relevant to the task or behavior we are currently engaged in. In the above example in which your chosen task is reading, presumably with the goal to finish the book, the book is the relevant stimulus and most other stimuli in your environment are irrelevant by comparison. In the restaurant example, the most relevant stimulus might be the hostess as she asks how many are in your party. Ideally, you would want to select and attend to these relevant stimuli, while ignoring or filtering out stimuli that are less relevant.

Theories and Models of Attention

Having outlined some fundamental principles of attention, we will now discuss several of the most influential theories and models of attention that have emerged in the neuropsychological literature since this cognitive skill began to be studied systematically and in depth, in the mid-20th century. In general, models of attention tend to fall into one of three categories: models that attempt to explain selection, models that focus on capacity limitations, and models that delineate different subtypes of attention. Major examples of each of these three types of models will be discussed in turn. Where relevant, important experimental findings will also be described.

Theories and Models of Selection

Much of the literature on attentional selection has been influenced by early investigations of the "cocktail party problem" in the 1940s and 1950s. The cocktail party problem, a term originally coined by Colin Cherry (1953), refers to the study of the factors and mechanisms that allow humans to selectively attend to an auditory stimulus—typically a target speech stream—in situations when other, less relevant, auditory information is also present. As the term suggests, this phenomenon is exemplified by the experience of engaging in conversation with a friend at a noisy cocktail party, surrounded by a bevy of other conversations, and trying to selectively attend to what that friend is saying while filtering out all the other audible talkers (for a review of the cocktail party problem, see Bronkhorst, 2015). Early work on the cocktail party problem sought to identify factors that make this type of selective listening more—or less—successful. An early experiment by Cherry (1953) included a dichotic listening task, in which two different speech streams were presented to a listener simultaneously, one in each ear via headphones. The listener was asked to attend to the ongoing message in one ear, repeating it aloud as it was heard (a task known as "shadowing"). It was found that when listeners were asked to shadow the message in one ear but were later asked about the voice and message played into the other, unattended ear, they were typically unable to report anything about that unattended message other than global acoustic information about the