

Aphasia

and Related Neurogenic Communication Disorders

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Preface

INTRODUCTION

Scientific fields constantly evolve. Keeping pace with the new developments in aphasiology and related neurogenic communication disorders is a challenge for clinicians and clinicians-in-training. The purpose of this text is to offer a state-of-the-art overview of our field by emphasizing important recent advances and presenting clinically relevant information. We trust that this volume provides a practical clinical resource for professionals as well as an informative learning tool for clinicians-in-training.

The contents of a text reflect, in part, the priorities of its editors. This volume is no exception and, as such, represents our attempt at an overview of neurogenic communication disorders with emphasis on the elements that we view as crucial for clinicians. Because we deem important that any analysis of a professional issue be illuminated by diverse points of view, we strive to include contributors from all over the world and encourage experts from different continents or countries to collaborate to offer an international perspective on all topics discussed. Because boundaries between disciplines blur and as technology facilitates exchanges between professionals worldwide, a true global perspective was a necessity in the development of this volume. The quality of a text is also a function of the expertise of its contributors. We are extremely grateful that each

chapter is authored by expert clinicians and researchers who are able to present both theoretical information and clinical issues clearly and competently. We owe them a debt of gratitude.

Another important element in our view is to include the major recent developments in the area of neurogenic rehabilitation, such as the recent emphasis on psychosocial/functional approaches and evidence-based practice (EBP). The field of communication disorders and sciences has never been static. It is always in a state of flux because of theoretical, clinical, or technical innovations, or even the occasional expansion of scope of practice. However, it seems that in the past few years, the winds of change have been blowing from a variety of directions with a compounding effect. Among those, the World Health Organization developed a new disability scale putting additional emphasis on social communication and quality of life. Our specialty of neurogenic communication disorders has been naturally affected by these changes: for example, the concept of “functional therapy” (born in the 1960s and 1970s) recently blossomed into a full-blown philosophy of rehabilitation focusing on psychosocial issues and the person-centered approach to aphasia therapy. A recent publication (Martin, Thompson, & Worrall, 2008) contrasts the philosophical differences between expert clinicians applying the more traditional neurolinguistic (i.e., impairment-based) approach with those planning therapy from a more functional-social

(i.e., consequence-based) perspective. The common thread in Martin et al. is that those two approaches share the same goals and, although they may differ in the means to achieve the goals, they are indeed complementary rather than antagonistic. It is with the same frame of mind that both the more traditional neurolinguistic approach of speech-language therapy as well as the more recently developed psychosocial/functional approach are covered in the present text. Another major advance in the field is the clinical application of EBP, a trend that is also noticeable in other countries. We believe that it is absolutely essential that future clinicians be exposed to EBP, both as a philosophy of rehabilitation and as a skill to apply in everyday clinical practice. In each chapter, the pertinent literature is reviewed critically and its relevance for best clinical practices is addressed. Last but not least, advances in the fields of neuroscience, neurophysiology, and neuroimaging have contributed to our knowledge of the dynamic mechanisms at work as the brain reorganizes language following an insult and have opened a window on how these mechanisms can be influenced by therapy processes.

Further, we tailored the depth of coverage to include a thorough literature review as well as practical clinical applications. This reflects our view that clinicians (and clinicians-in-training) need practical information but also must understand the underlying theoretical issues to provide therapy based on critical thinking and EBP. We also believe that the illustrative case studies included in all clinical chapters can facilitate readers' understanding of the concepts. Finally, the Future Directions section in each chapter provides a glimpse of where the field may be headed. Based on their thorough knowledge of their topic, the authors have anticipated the issues that are likely to be addressed in the near future so that readers are given a "heads-up" to follow the development of each topic area.

We purposefully avoided organizing chapters based on aphasia type. This should not be taken to imply that we find no value in aphasia classification per se, but rather that students should be trained to make symptom-specific clinical decisions rather than be influenced by a diagnostic label. The first part of the text covers aphasiology and the second part addresses related disorders. In Chapter 1, Chris Code provides an overview of the history of aphasiology. All the major contributions are highlighted, which should help the reader understand aphasiology and aphasia rehabilitation as an evolving area of study. In Chapter 2, Constantin Potagas, Dimitrios Kasselimis, and Ioannis Evdokimidis offer clinically relevant information on neuroanatomy

and neurophysiology of stroke and describe the typical symptomatology and lesion location of the major aphasia types. In Chapter 3, Ilias Papathanasiou, Patrick Coppens, and Ana Inés Ansaldo review the principles underlying poststroke language reorganization. This topic takes on renewed importance now that imaging technology allows us to observe firsthand the processing changes associated with speech-language therapy. In Chapter 4, Laura Murray and Patrick Coppens provide theoretical and very practical information about the linguistic, cognitive, and psychosocial measurement tools available; their properties and use; and the formal and informal assessment and baselining procedures. In Chapter 5, Linda Worrall, Ilias Papathanasiou, and Sue Sherratt, describe the therapy process and its context, such as the timing of therapy and the setting of clinical goals. They further emphasize the complementary character of the psychosocial and neurolinguistic rehabilitation approaches. In Chapter 6, Julie Morris and Sue Franklin address a specific aphasia symptom: impaired auditory comprehension. They review the language decoding stages and pair each level with appropriate therapy options. In Chapter 7, Nadine Martin discusses the ubiquitous aphasia symptom of anomia. She delineates the current models of word production and associates naming errors with specific stages of the model. This strategy allows clinicians to identify the underlying nature of the naming deficit and to develop clinical objectives accordingly. In Chapter 8, Elynn Riley and Diane Kendall outline the various types of acquired alexias and analyze their respective symptomatology in light of the current dual-route model. They further critically review the therapy techniques available for each alexia type. In Chapter 9, Ilias Papathanasiou and Zsolt Cséfalvay provide the same thorough overview for the agraphias. In Chapter 10, Jane Marshall presents the theoretical constructs underlying sentence production and the therapy strategies to remediate sentence-level disorders. In Chapter 11, Elizabeth Armstrong, Alison Ferguson, and Nina Simmons-Mackie examine language with yet a wider lens. They focus their analysis at the level of discourse, conversation, and narrative, which includes communicative context and psychosocial issues. In Chapter 12, Katerina Hilari and Madeline Cruice provide an overview of the impact of aphasia on an individual's quality of life, review many specific measurement tools, and offer some strategies for clinicians to include quality-of-life concerns in clinical decisions. In Chapter 13, Bronwyn Davidson and Linda Worrall discuss client-centered aphasia assessment and intervention. This approach sensitizes clinicians to recognize that a traumatic event such as aphasia has an

impact on a person's identity and has repercussions on a host of psychosocial issues. In Chapter 14, José Centeno and Ana Inés Ansaldo address the important topic of bilingualism and multilingualism but also aphasia in a multicultural world. Because a majority of individuals around the globe speak more than one language, many clinicians will be likely to encounter bilingual individuals with aphasia in their practice. The remaining chapters cover associated populations, which required the authors to expertly summarize in one chapter a large body of work. In Chapter 15, Connie Tompkins, Ekaterini Klepousniotou, and April Scott review the cognitive-linguistic symptomatology and the assessment tools and procedures for individuals who suffered a right hemisphere stroke. In Chapter 16, Connie Tompkins and April Scott outline in detail the best practices of rehabilitation for each major symptom in the right-hemisphere-disordered population. In Chapter 17, Fofi Constantinidou and Mary Kennedy offer an overview of communication and neuropsychological disorders associated with traumatic brain injury. They discuss principles of rehabilitation as well as specific therapy techniques supported by evidence-based practice. In Chapter 18, Nidhi Mahendra and Tammy Hopper describe the cognitive and

communicative difficulties in persons with dementia. They further detail the assessment process, the intervention principles, and review the available rehabilitation techniques. In Chapter 19, Nick Miller and Julie Wambaugh present a similarly thorough overview of the symptomatology, differential diagnosis, assessment, and rehabilitation of individuals with acquired apraxia of speech. Finally, in Chapter 20, Bruce Murdoch discusses the acquired dysarthrias, their symptomatology, and the sometimes difficult differential diagnosis. He further describes the major neurological disorders typically associated with dysarthria and provides a detailed overview of assessment techniques and rehabilitation approaches specific to each subsystem.

The editors wish to thank all the chapter authors for their splendid contributions and hope that our choices and preferences in developing this text meet with the reader's expectations.

REFERENCE

Martin, N., Thompson, C. K., & Worrall, L. (2008). *Aphasia rehabilitation: The impairment and its consequences*. San Diego, CA: Plural Publishing.



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Aphasia and Related Neurogenic Communication Disorders: Basic Concepts and Operational Definitions

Ilias Papathanasiou and Patrick Coppens

The main objective of this book is the study of aphasia and aphasia rehabilitation. Throughout this volume, aphasia is approached from a variety of perspectives, including neurological, linguistic, neuropsychological, and psychosocial. Each chapter further seeks to provide practical clinical applications supported by evidence-based practice principles to link theoretical models to clinical practice for researchers, clinicians, and clinicians in training. Because these important basic concepts permeate all chapters, it is imperative that we define and explain them at the outset. This introduction, therefore, defines aphasia, describes the basic evidence-based practice principles, and reviews the evidence on the efficacy of aphasia therapy.

WHAT IS APHASIA?

Many definitions of aphasia have been proposed during the history of aphasiology. These reflect the theoretical constructs and concerns of their time, and there is no reason to believe that any current definition will necessarily withstand further scientific developments. Still, generating an operational definition of aphasia is a necessary, albeit challenging, task because it is a multidimensional concept. From a neurological perspective, aphasia is an acquired language impairment resulting from a focal brain lesion in the absence of other cognitive, motor, or sensory impairments. This language impairment can be present in all language components (phonology, morphology, syntax, semantics, pragmatics), across all modalities (speaking, reading, writing, signing), and in the output (expression) and input (comprehension) modes. Describing the language symptoms of a given individual with aphasia may help identify a particular lesion location and possibly suggest a specific brain pathology (Damasio, 1992; Goodglass & Kaplan, 1993). From a neurolinguistic perspective, aphasia is a breakdown in specific language domains resulting from a focal lesion (Lesser, 1987). From a cognitive perspective, aphasia is considered the selective breakdown of language processing itself, of underlying cognitive skills, or of the necessary cognitive resources, resulting from a focal lesion (Ellis & Young, 1988; McNeil, 1982). Finally, from a functional perspective, aphasia is a communication impairment masking inherent competence (Kagan, 1995). So, through the years, these different schools of thought have led researchers to generate many different definitions of aphasia.

Regardless of the perspective one espouses, most researchers agree on common elements in any definition

of aphasia: aphasia (1) is a language-level problem, (2) includes receptive and expressive components, (3) is multimodal in nature, and (4) is caused by a central nervous system dysfunction. The first element seems obvious, but some authors do use the label *aphasia* to refer to acquired language impairment secondary to cognitive difficulties (following closed head injury or dementia, for example). Although it is possible for a closed head injury to cause damage to the language areas of the brain, the symptomatology is usually difficult to classify using the aphasia taxonomy because most of the communicative difficulties are caused by cognitive dysfunction (Wiig, Alexander, & Secord, 1988). On the other hand, it is not the case that the aphasic symptomatology displayed by a stroke victim is the consequence of cognitive impairments. We argue in favor of using the term *aphasia* exclusively for acquired focal lesions in the language-dominant hemisphere. Therefore, the first part of this volume covers *aphasia*, and the second part addresses *related disorders*.

Whereas most definitions of aphasia center on the acquired neurological impairments impeding language function, the World Health Organization's International Classification of Functioning, Disability, and Health (ICF; WHO, 2001) focuses our attention on the consequences that these impairments have on the person's communicative and social functioning and quality of life (Martin, Thompson, & Worrall, 2008). Therefore, an up-to-date working definition of aphasia should include all these elements.

For the purpose of this book, we operationally define *aphasia* as *an acquired selective impairment of language modalities and functions resulting from a focal brain lesion in the language-dominant hemisphere that affects the person's communicative and social functioning, quality of life, and the quality of life of his or her relatives and caregivers*.

WHAT IS EVIDENCE-BASED PRACTICE IN APHASIA THERAPY?

Clinicians have an ethical responsibility to treat their clients to the best of their ability, using the best available rehabilitation approaches. Evidence-based practice (EBP) helps provide quality control. EBP is an approach to decision making in which the clinician uses the best evidence available, in consultation with the individual with aphasia, to select the best treatment option.

There are three prongs to EBP (Dollaghan, 2007): best available (external) evidence, client/family input

and context, and clinical expertise. The clinician is required to integrate all three aspects of EBP to maximize quality of services (e.g., American Speech-Language-Hearing Association, 2005). It is beyond the scope of this volume to analyze each component of EBP in depth; however, because each subsequent chapter provides the best available evidence to support clinical approaches, we need to describe how good scientific information is developed and how professional peer-reviewed publications are evaluated.

The process of developing a novel therapy approach is a scientific endeavor that unfolds over time. This process, based on a medical model, is described as the “five-phase” model. In essence, it starts with a small-scale study testing a new treatment idea, but the proposed treatment further needs to be investigated in a larger sample with better control measures, applied to everyday clinical practice, and finally refined for maximal efficiency. In the context of speech-language pathology, *efficacy* refers to the fact that a treatment works in ideal conditions for a population; *effectiveness* refers to the fact that the treatment works in everyday clinical practice for individuals; and *efficiency* refers to the most efficient way to apply the treatment program. Any published study reporting results, regardless of what stage of the model it addresses, must be evaluated on its own merits. A “levels of evidence” scale was developed for this purpose. The five-stage model and the levels of evidence scale are described in detail in the following subsections.

Five-Phase Model of Outcomes Research

Phase I is designed to develop the research hypotheses, to establish the safety of the treatment, and to detect potential treatment effects in case studies, single-subject experiments, or small group experiments (e.g., Robey & Schultz, 1998; Wertz, 2000).

Phase II is undertaken if the results of Phase I are positive. This phase seeks to control variables more carefully, to optimize and standardize the treatment, to try to explain why the treatment works, to develop outcome measures, and so forth. Again, case studies, single-subject experiments, and small group experiments with or without a control group are appropriate for Phase II.

Phase III is the efficacy phase. This “clinical trial” phase requires a large sample size, strict experimental controls, and random group assignment. A multi-center research effort is often necessary to complete a Phase III study.

Phase IV is the effectiveness phase. This phase applies an efficacious treatment (according to Phase III) in clinical practice with typical patients under typical conditions. During this phase, the treatment may focus on a specific type of client (e.g., with Broca’s or Wernicke’s aphasia). A large sample size is again required, but control groups are not mandatory.

Phase V is the efficiency phase. This phase focuses on the cost-benefit ratio of the treatment as well as the general value of the treatment (e.g., consumer satisfaction, quality of life, value to society). Treatment variations are explored experimentally (intensity, length, delivery mode, cost, etc.) while maintaining the effectiveness level of Phase IV.

Levels of Evidence Scale

There are several versions of the levels of evidence scale, but all are designed to evaluate the published evidence of a given topic. This implies that not all evidence is created equal and that some publications should be given more weight than others when investigating a specific approach or treatment. The scale also uses Roman numerals but should not be confused with the preceding phase model.

Level I is used for meta-analyses or multiple randomized control trials (RCTs are considered the “gold standard” for medical evidence). Level Ia corresponds to one RCT. Level II and IIa are quasi-experiments because groups are not randomized. Level III is used for nonexperimental studies, such as descriptive case studies or correlation studies. Level IV includes nonempirical information, such as expert opinion and committee reports.

It is important to realize that within each level of evidence there are good studies and poor studies. There are very good level III studies as there are very poor level I studies. The study’s experimental design should not be the only factor of quality; a clinician should also consider other factors, such as internal validity threats and significance of the hypothesis (Dollaghan, 2007).

DOES APHASIA THERAPY WORK?

Early group studies looking at aphasia therapy efficacy report contradictory results, but in general, their research methods and/or designs were weak. Sarno, Silverman, and Sands (1970) report no difference between treated and untreated individuals with severe aphasia whereas several other group studies argue that speech-language

therapy yields significant improvement (Basso, Capitani, & Vignolo, 1979; Butfield & Zangwill, 1946; Poeck, Huber, & Willmes, 1989; Shewan & Kertesz, 1984; Vignolo, 1964; Wertz et al., 1981). Although the positive results predominated then, an overall conclusion cannot be drawn confidently because of the weakness of the evidence. At that time, only two studies used random group assignment, and the results were again contradictory. Lincoln et al. (1984) observe no significant outcome differences between treatment and no-treatment groups, whereas Wertz et al. (1986) find that individuals with aphasia who were treated by a speech-language pathologist made significantly more improvement than did untreated individuals or individuals treated by a family member at home. When comparing the scientific value of these two studies, it is clear that the former has a much weaker design and weaker methods than the latter. For example, Lincoln et al. (1984) include individuals with multiple strokes, and fewer than 30% of the treatment group individuals received the prescribed amount of treatment. It is only more recently, with an increased awareness and understanding of statistical methods, that the weight of the evidence tips the balance positively.

Single-subject designs cannot address efficacy (Robey & Schultz, 1998), and RCTs are difficult to design in our field because random assignment to groups is problematic (one cannot ethically assign an individual with aphasia to a no-treatment group). Therefore, researchers have recently started generating meta-analyses and computing effect size to provide more reliable evidence. A meta-analysis is a compilation of many similar studies for the purpose of combining the reported treatment effect in one large statistical analysis. An effect size is a simple computation of the magnitude of the effect observed (Schiavetti, Metz, & Orlikoff, 2011). Effect size can be calculated in single-subject or group designs and can also be combined into a meta-analysis for a specific therapy approach (Beeson & Robey, 2006).

Three meta-analyses (Robey, 1994, 1998; Whurr, Lorch, & Nye, 1992) of clinical outcomes in the treatment of aphasia have been reported. Whurr et al. (1992) conclude that there was not enough information in the literature to draw a definite conclusion on aphasia treatment efficacy. However, there are some statistical limitations to their analysis (Robey, 1994). Robey (1994), on the other hand, concludes that when treatment is initiated in the acute stage, the treatment effect is medium to large, which is double that of spontaneous recovery, and that when treatment is started in the more chronic stage, the effect is small to medium. Robey (1998) essentially replicates the

previous meta-analysis with a larger sample of studies and the results are very similar. Therefore, we can reasonably conclude that the answer to the title question is “yes” and that “on average, treatment for aphasic persons is effective” (Robey, 1998, p. 181).

This positive (and reassuring) conclusion does not mean that we can rest on our laurels, however. Now that we know that aphasia therapy works, we need to ascertain whether specific treatments work and for whom. The American Speech-Language-Hearing Association (ASHA) and the Academy of Neurologic Communication Disorders and Sciences (ANCDS) have been spearheading this effort in recent years. ANCDS is developing and disseminating EBP guidelines for a range of neurological conditions, and ASHA is building the Compendium of EBP Guidelines and Systematic Reviews, which is a searchable repository of information on a wide variety of topics, including neurogenic communication disorders, as well as developing “evidence maps” that provide evidence for all three prongs of EBP given a specific topic. The interested reader is referred to these associations’ respective websites for a perusal of this valuable information.

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