The Late Eight

Third Edition

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Preface

The first edition of *The Late Eight* provided clinical resources to help clinicians and students evaluate and treat late-acquired sounds. I likened the resources to all-purpose tools— the clinical equivalents of a carpenter's hammers, screwdrivers, bolts, paintbrushes, and ladder. The third edition keeps (and slightly modifies) the clinical resources while expanding the tool kit to include new essential clinical concepts, including evidence-based practice, Spanish-influenced English, the curriculum, and a new treatment model. Chapter 1, *A Late 8 Update*, offers short question-and-answer sections on 18 clinical topics, ranging from practical issues (*Any suggestions for practicing speech?*) to thoughts on current controversies (*Do the Late 8 belong in school? Is there a best age to begin speech treatment?*). Chapter 2, *Using Evidence to Guide Clinical Practice*, describes tools to discover the evidence base for evaluating and treating late-acquired sounds. Chapter 3, *Late Eight en español*, is the first chapter in our professional literature to focus exclusively on late-acquired sounds in Spanish-speaking students. Chapter 4, *Speech Sound Disorders, Literacy, and Curriculum*, demonstrates the importance of speech treatment in school settings. Chapter 5, *Motor Learning Guided Therapy,* which appeared in the second edition, shows principles that underlie decisions within an exciting new clinical approach. Along with the new chapters, the third edition replaces the CD of previous editions with an expanded and flexible interactive companion website. The authors of the third edition hope you find these changes beneficial in your clinical work with your students.

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Chapter Two

Using Evidence to Guide Clinical Practice: Considerations for the Late Eight

Lauren K. Nelson

Introduction

Using evidence to guide practice has been a part of academic and clinical education in speech-language pathology for many years. The need for an evidence-based approach to decision making became even more prominent in the mid-2000s (American Speech-Language-Hearing Association [ASHA], 2004, 2005). This greater emphasis occurred in part because of increased reliance on evidence in the field of medicine (ASHA, 2004). These changes in the field of medicine have carried over to other health care fields. The greater emphasis on evidence also occurred because of input from speech-language pathologists (SLPs) in clinical practice. SLPs in both health care and school settings experienced increased pressure to document that the services they provided had supporting evidence.

When you consider the term "evidence," perhaps the first thing that comes to mind is research evidence. The use of reliable research evidence is an important component of evidence-based practice (EBP). However, you might better think of EBP as a decision-making process that incorporates the best available research evidence, the SLPs' own expertise, gained through

both their educational and clinical experiences, and the input from the client and/or his/her family (ASHA, 2004; Fey, Justice, & Schmitt, 2014). Dollaghan (2007) used the phrase "external evidence" to refer to research evidence and noted that the other sources, the SLP, client, and family, provided valuable evidence as well. The focus of this chapter is on finding, evaluating, and using external evidence, but we will keep in mind the equal importance of evidence from clinical practice, the client, and family.

The Phrase "Evidence-Based Practice"

You might have noticed I avoided the phrase "evidence-based practice" (EBP) in my opening paragraph. That was deliberate. EBP is a decision-making process that encompasses using research evidence, but also using SLPs' knowledge and experience, as well as the client's and/or family's input. The phrase "evidence-based practice" tends to highlight the research evidence and obscures the importance of the SLP, client, and family in making decisions about clinical services.

Speech-language pathologists generally agree that using research evidence to support their clinical decisions is a reasonable idea. They also generally agree that finding time to engage in EBP is a significant challenge (O'Connor & Pettigrew, 2009). Thus, our first consideration in looking at EBP for the Late Eight consonants is to identify approaches that yield meaningful results in a time-efficient way. Our second consideration is to accept the fact that the research base in speech-language pathology has limitations. You rarely find research evidence that exactly matches the characteristics of your client or clinical setting. To test this statement, I conducted a search using the term *evidence* combined with *"late 8" or "late eight"* using a few of the most popular search engines for the field of speech-language pathology. This search yielded one published article (Shriberg et al., 2005). This implies that to find research evidence that supports clinical decision making for children with errors on the Late Eight consonants, we need to dig a little deeper into the research literature.

EBP Resources

One option for identifying research evidence in an efficient way is to utilize evidence reviews developed and distributed by another person or group. One such group is the ASHA's National Center for Evidence-Based Practice in Communication Disorders (N-CEP). Groups such as N-CEP search the research literature in a systematic way, carefully critique the studies they find,

and publish the results for others to use in the form of an "Evidence-Based Systematic Review." You can find a list of N-CEP's systematic reviews at the following website: http://www.asha.org/Research/EBP/EBSRs/. Unfortunately, N-CEP had not published any systematic reviews that address children with speech sound disorders (SSDs) at the time this chapter was written.

Evidence Maps

A second option from the ASHA website was more helpful. ASHA's Evidence Maps included the topic "Speech Sound Disorders" (http://www.asha.org/Evidence-Maps/). These evidence maps comprised information for all three components of EBP: research evidence, clinician expertise, and the client and family perspective. If you go to this website and select the topic "Speech Sound Disorders" and then select "External Scientific Evidence," you will find at least 20 sources, most of which are systematic reviews. Two articles from this list stood out, a narrative review of research evidence for treatment of children with SSDs (Baker & McLeod, 2011a) and a systematic review on the topic of treatment intensity for children with SSDs (Kaipa & Peterson, 2016). We will explore the Baker and McLeod article in greater depth in a later section of this chapter. If your client with an SSD had a specific diagnosis, you might consider another topic, such as "Apraxia of Speech (Childhood)," "Cerebral Palsy," or "Cleft Lip and Palate" (http://www.asha.org/Evidence-Maps).

Speech Pathology Database

A second tool for efficiently identifying research evidence in the field of speech-language pathology is the Speech Pathology Database for Best Interventions and Treatment Efficacy (speechBITE). The speechBITE database has a specific focus on intervention studies in speech-language pathology. Speech-language pathologists at the University of Sydney started this database and their effort has ongoing support from many organizations (http://speechbite.com). A unique feature of speechBITE is that all the research articles, except systematic reviews, undergo a rigorous review before they appear in the database. A review of a research article includes such information as the description of participant eligibility, assignment of participants to groups (random or nonrandom), participant follow-up, the quality of the data analysis and report, and whether or not participants, therapists, or those administering pretests and posttests were aware of group membership (i.e., blinding).

Another feature of speechBITE is that articles with the best available evidence appear first on the list. One of the primary factors in critiquing research articles is the level of evidence of the study. For treatment studies, levels of evidence from highest to lowest are: (1) systematic reviews and meta-analyses, (2) randomized control trials, quasi-experimental group studies, and

quasi-experimental single subject experimental designs, (3) nonexperimental designs including nonexperimental case studies, and (4) expert opinion. If you are already familiar with the differences among these kinds of studies, you can skip the next paragraph.

A systematic review is a special type of literature review based on a carefully defined search and critique of research articles. Authors of systematic reviews conduct a thorough search of the literature and filter and critique the articles, using a predefined set of criteria. A meta-analysis is similar to a systematic review but also employs statistical tools to analyze the data from the studies in a collective way. A randomized control trial is a group study with comparisons of treatment and no-treatment groups, or with comparisons of two different treatments. As the name implies, another feature of randomized control trials is that participants are assigned to their groups in a random manner. Quasi-experimental design studies involve comparisons of treatment and no-treatment conditions or comparisons of alternative treatments. In a quasi-experimental group design, the researchers study different treatment conditions using preexisting groups. An example of this would be comparing two different classrooms, one that receives an experimental treatment and one that receives a control treatment. In single subject experimental designs, the person receiving treatment participates in both the treatment and control or baseline conditions. Sometimes single subject experimental designs have replications across several participants, so the term does not literally mean a study has just one participant. In nonexperimental studies, researchers carefully observe and gather data in naturally occurring circumstances. One example of a nonexperimental study is a case study during which the researchers observe and gather data from a

What Articles Should I Read First?

As students, many of us wrote lengthy papers on topics related to speech-language pathology. Often our goal was a thorough and somewhat lengthy review of the literature. Practicing speech-language pathologists seldom have time to read and synthesize all of the research literature on a topic. SLPs need a strategy for prioritizing their reading. Once you identify relevant articles, you might use the "level of evidence" for the articles to prioritize your reading. Using this strategy, your highest priority would be systematic reviews and meta-analyses. For treatment research, your second priority would be a randomized control study. If you cannot find any articles at this level, research from lower levels of evidence—such as single subject experimental studies or treatment comparisons without random assignment to groups—is still useful.

single person. The lowest level of evidence occurs when empirical evidence on a topic is lacking and individuals with strong credentials related to the topic generate guidelines based on their collective expertise.

SpeechBITE Search Strategies

When you search for research evidence using speechBITE, I suggest you try the easy to use advanced search option. Using this advanced search option, you can specify the area of practice (e.g., speech, language, swallowing); the type of intervention (e.g., speech/articulation/phonological therapy, language therapy, fluency/stuttering therapy), population (e.g., autism spectrum disorder, speech sound disorder [developmental], traumatic brain injury), age group, and service delivery method (e.g., individual, group, parent). You also have the option of skipping some of the options. For an initial search on our topic of SSDs and the Late Eight consonants, you could try *speech/articulation/phonological therapy* and *speech sound disorder (developmental)* and *children.* This search turned up 105 articles and that would be an overwhelming number to read through. Seven of those articles were systematic reviews, so a good starting place would be to focus just on those seven articles. This search yielded the same 2 articles we identified from the ASHA evidence maps search: Baker and McLeod (2011a) and Kaipa and Peterson (2016).

Among the randomized control trials, two somewhat recent studies stood out, a treatment study in which intelligibility was an outcome measure (Lousada, Jesus, Hall, & Joffe, 2014) and a study of the effectiveness of treatment delivered in a typical clinical setting (Broomfield & Dodd, 2011). These latter two studies were of interest because they were relatively recent and were not included in the Baker and McLeod narrative review.

Learn by Doing

If you have waited to try some of the searches covered in the previous section, now would be a good time to stop reading, get out your favorite device for browsing the Internet, and try a search. First, type "http://speechbite.com" to get to the speechBITE website. Then, just under the search box, select the advanced search option. You should see a series of drop-down boxes. Let's try the following options: (1) for Type of Intervention select Speech/Articulation/Phonological Therapy; (2) for Within This Population, select Hearing and Visual Impairment; and (3) for Age Group. select Children. This search yielded 17 articles, 2 of which were systematic reviews.

From our initial search, we identified two promising articles at the highest level of evidence, a broad, carefully constructed narrative review by Baker and McLeod (2011a) and a more focused systematic review on the topic of treatment efficacy by Kaipa and Peterson (2016). Baker and McLeod identified 134 intervention studies from 1979 to 2009. These studies covered the full range of evidence from systematic reviews/meta-analyses, to randomized control trials, to quasi-experimental studies, to nonexperimental studies including case studies. These authors found that the majority of studies were at lower levels of evidence; 56 were single subject experimental designs (level IIb) and 43 were nonexperimental case studies. Baker and McLeod did find studies at the highest levels of evidence, including 2 systematic reviews as well as randomized control trials (19 studies) and quasi-experimental control trials without random assignment (13 studies).

As Baker and McLeod (2011a) noted, the body of evidence largely supported the effectiveness of treatment for children with speech sound disorders. The authors also noted some limitations in the available evidence. The vast majority of studies were conducted in university or other research settings and only a few studies took place in a typical clinical environment such as a school or a treatment center. Researchers in our field have investigated many different treatment approaches, meaning that the research evidence in support of any one approach often is limited. Only a few approaches had supporting evidence from multiple researchers working in different research settings (Baker & McLeod, 2011a). Baker and McLeod concluded that the field of speech-language pathology needs "to encourage greater collaboration and the publication of replication intervention research by investigators other than and/or in addition to the proponents of a particular approach" (p. 116).

Clinical vs. Research Settings

Baker and McLeod (2011a) reported that the typical treatment schedule across the 134 research studies they reviewed consisted of 30- to 60-minute sessions, occurring two to three times per week. In regular school settings or other treatment centers the typical treatment schedule may be less than this. One of the challenges in using research evidence to support clinical decision making is that the parameters for treatment in research studies are not always a good match for clinical settings.

Kaipa and Peterson (2016) conducted a focused systematic review to identify evidence about treatment intensity. The authors identified seven

studies that compared different treatment intensities. Only one of these studies focused on treatment of SSDs. The other studies included participants with dysarthria (n = 2), acquired apraxia of speech (n = 1), and childhood apraxia of speech (n = 3). Overall Kaipa and Peterson determined that four of the seven studies showed that treatment outcomes improved with greater treatment intensity. The research of most interest for treatment of SSDs was a study by Allen (2013). Allen identified children with SSDs and randomly assigned them to a 1× per week treatment group, a 3× per week treatment group, and a control group. This study showed that children who received more treatment performed significantly better at 8- and 24-week posttests, and both the 1× and 3× per week treatment groups made gains over a 6-week follow-up period after treatment was discontinued.

Our search of ASHA's evidence maps website and speechBITE yielded two additional articles of interest. Broomfield and Dodd (2011) investigated the effectiveness of speech and language treatment in a typical clinical setting that served preschool and school-age children. These researchers conducted a randomized treatment and control group study to determine the effectiveness of the speech and language services that children usually receive. Broomfield and Dodd included 730 total participants in their study. Of these children, 220 were preschool children with speech disorders and 100 were school-age children with speech disorders. The other participants had receptive and expressive language disorders. Broomfield and Dodd randomly assigned their participants to one of three groups: (1) one group that received intervention in the first 6 months of the study and no intervention in the next 6 months; (2) a second group that received no intervention in the first 6 months but did receive intervention in the next 6 months; and (3) a third group that received intervention for all 12 months. All of the participants completed a pretest and a posttest at the midpoint of the study. Broomfield and Dodd compared the performance of the two groups that received treatment during the first 6 months to that of the group that did not receive treatment until the second half of the study, i.e., a no-treatment control. The children in the treatment groups received the amount and type of therapy that SLPs in the agency usually recommended. These researchers found significant differences between the treatment and control group for children with receptive and expressive language disorders, as well as children with speech disorders (Broomfield & Dodd, 2011).

The study by Lousada et al. (2014) was interesting because the researchers used an outcome measure, speech intelligibility, that has functional significance for children. Further investigation of this article indicated that the study would not provide relevant evidence for children whose primary language was English. The study was conducted in Portugal and the children who participated in the study spoke Portuguese. The consonant system in Portuguese includes only four of the Late Eight: /s, z, l, ʃ/ (International Phonetic Association, 1999), making this study less useful for our purposes.