Improving Speech Intelligibility in Adults

Clinical Application of Evidence-Based Strategies

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Preface

The most important gift we give our clients is the ability to be understood, to have their thoughts and requests heard. I've had the idea for this book in my heart and my head for many years. My interest in intelligibility began with a client who had a diagnosis of Amyotrophic Lateral Sclerosis (ALS). He was a big, tough biker with a large beard that covered much of his face. While he looked intimidating, he was a gentle giant. In dealing with his disease, he was frustrated by people not understanding him. I noticed I found him easier to understand on the phone than in person. This was near the time I began my doctoral studies, so I began questioning whether visual information was helpful when it comes to intelligibility in our clients.

When I started my doctoral program at the University of Arizona, I enrolled in courses and research experiences to learn as much as possible about speech perception and intelligibility. One semester, I worked in a psychology lab, running participants through a study of the McGurk effect, where the visual and auditory stimuli do not match. Listeners often have a different perception than what they are hearing based on the visual information. The McGurk effect is so strong that even if you are aware of it and know the stimuli don't match, it still influences your perception. I found this fascinating but had struggled to understand how it applies to our work with clients. But it brought me back to the client who I understood better when I wasn't looking at his face. I selected this topic for my dissertation research.

Once I dived into the literature on this topic, I was overwhelmed by the amount of research in the fields of speech-language pathology and audiology devoted to speech intelligibility. There are so many studies with different populations, including non-disordered speakers, speakers with hearing impairment, and speakers with dysarthria. It was difficult to make connections between studies because so many different measures and methods were employed. I completed my dissertation, which examined

contributions of visual information to speech intelligibility in individuals with Parkinson's disease. It was a solid start to the rest of my career, in which my research and clinical work focused on improved intelligibility.

Soon after I presented my dissertation research at the Annual Convention of the American Speech-Language-Hearing Association in 2005, I was asked to present a session on intelligibility at the South Carolina Speech-Language-Hearing Association Convention. I decided the best way to present information on intelligibility to clinicians was to tie the research we have to what they are actively doing with clients. I used the studies on intelligibility and tied each section of my presentation to how clinicians could use the evidence from research to connect with best practices for their clients. This session was well-received, and I have presented it for many other state SLP associations as well. I found it very gratifying to speak with clinicians from all over the country about their adult clients with reduced intelligibility. I will never forget an SLP who approached me after my presentation in Ohio and told me he was glad I had given him strategies to use other than non-speech oral motor exercises. He told me he didn't really know there was anything else besides those exercises to help with intelligibility. That surprised me, but I realized that if SLPs don't know about the research on intelligibility, they may feel like they have few options for treating clients with reduced intelligibility. My goal with this book is to help bridge the gap between factors that influence intelligibility that we've learned from research and what works best clinically. I hope this book will provide clinicians with many suggestions and solutions, and induce more questions and thoughts on the topic.

This book allows for use of evidence-based practice by joining what we've learned from research to clinical judgment of SLPs and what works best for individual clients. There are literally thousands of research studies on intelligibility. I will not refer to them all, but I have shared topics you can use daily with your clients. I think it is common for SLPs to tie use of strategies and behavioral changes to clients when assessing and treating reduced intelligibility. While this book covers speaker factors thoroughly, my goal is to expand SLPs' thinking into other areas. Listeners or communication partners can also change behaviors and use strategies to ensure the message gets through. Even the environment where the communication takes place impacts intelligibility. We know about speaker, listener, and environmental factors from research, but don't always apply them to working with clients. Many of our clients may not be able to change their speech, but communicative partners can take some of the work involved to improve communication. And both partners can make changes to the environment to facilitate better exchange of information.

Chapter 1 introduces the components of intelligibility, including the triad of speaker, listener, and communication environment. Related concepts,

including comprehensibility, efficiency, and speech naturalness are defined. Discussion of evidence-based practice in assessment and management sets the foundation to tie research into clinical work as explored in the other chapters.

In Chapter 2, the idea that both voice and speech disorders can reduce intelligibility is introduced. Disorders, signs, and symptoms related specifically to the speaker or client are described, along with the impact on reduced intelligibility. A subsystems approach is used to organize the information.

Chapter 3 considers the use of evidence-based practice to assess the structures and functions of our clients. Practical measurements of respiration, phonation, articulation, resonation, and prosody are described. Optimal recording methods are presented, including the best ways to record remotely for SLPs using telepractice with their clients.

The focus of Chapter 4 is on common-sense ways to most effectively and accurately measure intelligibility in adult clients. This chapter will provide SLPs with a clear idea of how to consider factors that can influence intelligibility measures they may use with clients. A checklist to remind SLPs of factors to consider when assessing intelligibility is included.

Management of the speaker's disorder through a subsystem approach is covered in Chapter 5. Supporting evidence is tied to strategies and tasks to improve intelligibility by altering the client's behavior.

Chapter 6 focuses on management based on strategies specifically found to improve intelligibility and comprehensibility. Practical suggestions and a checklist for speakers are provided.

Chapter 7 describes strategies that listeners can use to better understand speakers with reduced intelligibility. There is an emphasis on the speaker and listener working together. A checklist is provided for listeners along with suggestions for SLPs to work with both communicative partners, based on research findings.

Chapter 8 contains basic ideas about how the communication environment affects the ability of a listener to understand a speaker's message. Strategies for solving challenges related to the communication environment that can be detrimental to intelligibility are presented. Information related to use of face masks is discussed and a checklist is included to remind both communication partners to modify the environment for optimal communication.

Being understood is everything to our clients.

CHAPTER 6

Speaker Management Strategies to Improve Intelligibility and Functional Communication

Key Points:

- Clients can improve intelligibility using strategies for slow and clear speech.
- The speaker's message can be altered to increase intelligibility by modifications such as using predictable, common words and including written cues and gestures.
- Speakers can learn to use strategies such as getting the listener's attention before speaking and watching for signs that their message has been understood.
- If face masks are worn, speakers should use more effort to use loud, clear speech to ensure they are better understood.
- SLPs can bring their client's communication partners into therapy sessions to practice how to repair communication breakdowns.

Using the ICF model to plan treatment allows us to consider functional aspects related to each client's communication (World Health Organization, 2001). The previous chapter focuses on intervention aimed at the impairment level, as well as activity limitations. This chapter will continue with speaker-related strategies to improve activity limitations and participation restrictions. Activity and participation are related, however, activity refers to execution of tasks, and we define participation as involvement in life situations (Yorkston et al., 2010). Answering a question is an example of a task and returning a call to a friend represents participation. The perception of reduced intelligibility can lead to lower levels of communicative participation in functional life situations (McAuliffe et al., 2017). Clinicians can work together with their clients to plan treatment that will increase activity and participation by utilizing strategies to improve intelligibility.

Intelligibility and comprehensibility are related but should be clearly defined; allowing clinicians to understand how management planning can be accomplished in different ways to best meet the client's needs. Intelligibility involves what the listener understands from the acoustic signal (Duffy, 2019). Comprehensibility includes what Lindblom (1990) describes as "signal-complementary information." Comprehensibility allows the listener to take advantage of cues from the speaker, the message, and the way communication takes place. For a speaker with reduced intelligibility, listeners may need to rely on these cues that are not part of the acoustic signal.

It's critical to consider important differences between what we do when we measure intelligibility versus when we are working with a client to improve their intelligibility. We learned in earlier chapters that many factors can influence an intelligibility score. When we measure intelligibility, we try to control these factors, such as what the speaker says (e.g., word predictability) and how they say it (e.g., speech only, no visual cues or gestures). However, during management, we can use those aspects to the advantage of the speaker.

This chapter focuses on strategies that speakers can use to enhance what listeners understand. Strategies used to improve comprehensibility will improve intelligibility and vice versa. We can group these strategies into four categories, including speaker-related, message-related, communication-related strategies, and strategies that involve interaction between speaker and listener. The listener is an active communication partner who shares responsibility with the speaker for the exchange of information.

SPEECH-RELATED STRATEGIES

In an ideal world, the techniques discussed in Chapter 5, which focused on reducing or eliminating the impairment, would allow speakers to communicate effectively. Besides setting intervention goals focused on the

impairment, speakers can use compensatory strategies and other interaction strategies to allow for active participation in communication. Speakers with reduced intelligibility can use strategies to help listeners get a better understanding of the spoken message. Clinicians should consider the abilities and challenges of clients when determining which strategies might be most useful. Clients who have moderately to severely reduced intelligibility may be the ones who need the extra signal-enhancing information, as opposed to someone with a mildly reduced intelligibility. Yorkston and her colleagues (1996) suggest that clients with language or other cognitive problems may not learn or generalize the strategies easily.

Slowing Speech Rate

Chapter 5 lays out the case for reducing rate of speech to increase intelligibility and various ways to help clients change rate. Clark (2019) suggests pausing between words, not separating syllables within words, including every syllable, as well as every word when using slow speech. She also suggests that maintaining intonation, which may require even slower speech, may be helpful.

Making Speech Clear

Using clear speech directions can help our clients with various speech disorders have increased intelligibility. Chapter 5 contains various directions for using clear speech and a summary of different clients that this strategy may assist. Tjaden and colleagues (2014) suggest directing your client to imagine speaking to someone who is hard of hearing, or someone who doesn't understand the language; this would mean to over-enunciate and speak clearly. Clinicians may find that different clients have more or less success with these directions, so change what works best for each client and their communicative partner.

MESSAGE-RELATED STRATEGIES

Speakers can modify messages in order to assist listeners in understanding the meaning. Chapter 4 introduces the idea that factors related to the message itself can influence intelligibility. In that chapter, we discussed measurement and how to control or keep those factors similar between measures. In management, we can think about the best ways to use the influence of those factors on intelligibility. We can now instruct the speaker how to change their message slightly to increase intelligibility.

Using the Most Effective Message Length and Type

Clinicians may want to select certain types of messages, based on factors related to the severity of a client's intelligibility. Speakers who have mild intelligibility impairment have higher intelligibility scores on sentences than on single words (Hustad, 2007; Yorkston & Beukelman, 1971, 1978). If you are working with a client with mild intelligibility impairment, listeners may use context cues from the other words in the sentence to figure out unintelligible words. Instructing your client to use complete, simple sentences may be the most effective type of message (Carter et al., 1996). Using shorter sentences increases speech intelligibility in adults with advanced dysarthria associated with amyotrophic lateral sclerosis (Allison et al., 2019).

Use of expected words and sentence structure can help listeners to greater understanding. Yorkston and colleagues (2010) suggest that clients avoid using telegraphic utterances to allow listeners' use of syntax to provide more information. For speakers with more severe dysarthria, letting the listener know what word class (noun, verb, adjective) may assist listener understanding (Beliveau et al., 1995). Clients can accomplish this verbally, in writing, or using a communication or alphabet board.

Choosing Predictable Messages

Predictable sentences result in higher intelligibility than those that are unpredictable (Boothroyd & Nittrouer, 1988; Duffy & Giolas, 1974; Garcia & Cannito, 1996a). This happens when listeners who do not understand what a speaker says may "fill in the blank" if a word or two are missing. Teaching our clients to use predictable words and sentences can assist listeners in correctly guessing at words they do not understand. Sentences that are related to each other result in higher intelligibility than unrelated sentences (Drager & Reichle, 2001; Hustad & Beukelman, 2002). Clinicians should instruct clients to keep sentences related to each other and not change topics without informing their communicative partner.

COMMUNICATION-RELATED STRATEGIES

Many useful strategies to improve intelligibility can enhance the communication experience provided by the speaker to the listener. The suggestions in this section align with comprehensibility because the extra information provided to the listener does not come directly from the acoustic signal of the speaker's words. Most of these strategies are common sense and some may work better than others, so it's a good idea to customize what you select for your client's needs and abilities.

Gaining Listener Attention Before Speaking

Listeners who are provided with both auditory signals and visualization of the speaker generally have higher intelligibility scores than those who are not given visual information (Barkmeier, 1988; Evitts et al., 2009; Evitts et al., 2016; Hunter et al., 1991; Hustad & Cahill, 2003; Keintz et al., 2007). Because listeners should be fully attending to understand a speaker with reduced intelligibility, gaining the listener's attention is a great place to start. A listener may miss important information and understand even less if they were not aware the speaker was going to talk. Alerting the listener to an upcoming message can enhance communication exchanges. Speakers can gain the listener's attention in several ways. Verbal signals might include, saying the listener's name, or "excuse me," or somehow indicating they are going to be sharing information. Nonverbal signals might include gently touching the listener, gesturing, or making eye contact. The speaker should be sure the listener is watching their face before speaking (Clark, 2019).

Setting Ground Rules for Communication

Our clients should learn to share strategies for how they want communication to occur (Duffy, 2019). Speakers and their communicative partners should establish a set of rules about how to proceed during communication and breakdowns in communication. This is a very personal choice, and a client may have different preferences for various listeners. Speakers should discuss with listeners how they want to be told if they are not understood. Rules to set might include how a listener will indicate if communication has broken down. For example, should the listener interrupt verbally, use a gesture, or wait until the speaker checks on comprehension? Some speakers may be comfortable having a listener interrupt mid-sentence whereas others may not. If both partners agree on the ground rules, breakdowns will be easier to identify and repair. For clients with severely reduced intelligibility, explaining that the goal is for the listener to get the meaning, but not necessarily to understand every word may be useful (Clark, 2019).

Providing the Topic of Conversation

Speakers with reduced intelligibility can provide information to listeners by letting them know the topic they will be discussing. We call this topic knowledge "semantic context" in research. Having semantic cues allows listeners to predict what the speaker might say and to rule out words that will not be expected. Categories are a useful way for a speaker to provide semantic cues to the listener. A speaker could point to the overhead