

EC Podcast #6 “Teaching Vocabulary to Preschool Children with Hearing Loss,” Emily Lund, *Exceptional Children*, 83, pp. 26–41.

Lorraine: Welcome to this Exceptional Children podcast. I'm Lorraine Sobson, publications manager for the Council for Exceptional Children. Today, I'll be talking with Emily Lund, an assistant professor at Texas Christian University. Emily co-authored with Michael Douglas an article in *Exceptional Children* entitled “Teaching Vocabulary to Preschool Children with Hearing Loss.”

Welcome, Emily! Thanks for joining me today.

Emily: Thank you. I'm happy to be here.

Lorraine: Now, children with hearing loss tend to have deficits in vocabulary. Can you tell us more about those deficits and why they're so important?

Emily: Sure. Children with hearing loss, even those who are considered very successful language users, tend to have lower vocabularies than their peers who have normal hearing. That deficit starts early and, according to the best evidence that we have right now, continues on through college. This is important because vocabulary knowledge is really directly later linked to academic success and to professional success. You're more likely to earn good grades if you have a high vocabulary knowledge and you'll also like do a little better professionally if you have a high vocabulary knowledge.

Lorraine: What are some of the reasons behind this poor vocabulary development for children with hearing loss?

Emily: The way I see it, children with hearing loss are faced with two problems kind of out of the gate. First, there are a lot of children who don't have access to speech sounds until they acquire some kind of amplification device. That could be hearing aids or it could be something like a cochlear implant. Although we can fit hearing aids on very small babies, we can't according to those FDA indications fit cochlear implants on children until those children are at least 12 months old.

We also know that children who have normal hearing start listening in the womb between 20 and 27 weeks. Even if I can get a hearing aid on a child at a very young age, a child with hearing loss has missed out on some opportunity to listen and to learn about the world and language. That's kind of the first problem we face.

Second, hearing aids and cochlear implants are not like glasses. If you wear glasses, you know that when you put them on the world instantly becomes clearer or at least that was my experience. The same is not true of a hearing aid or a cochlear implant. The auditory signal that gets communicated to the brain is still a little bit distorted by those devices. Children with hearing loss end up in this position where they have to put forth

more effort to learn words—and on top of that, as I said with the first issue, they have less experience doing so. It just creates this “perfect storm” for poor vocabulary development.

Lorraine: Now, you just mentioned that children with hearing loss have to put forth more effort—and I think in the article, you also say that they have to actually learn words at a faster rate to catch up or keep up with their peers. Why is that, and how did that play into your research?

Emily: Because—like I said—children with hearing loss start listening at a later age than children with normal hearing, they start out a little bit behind their peers in terms of vocabulary knowledge even in the very best-case scenario. I think any educator knows, you're almost never starting out in the best-case scenario. If my goal is for a child with hearing loss to obtain the same level of vocabulary knowledge as his or hers peers, that child has to actually learn words faster than the peer. Vocabulary is something that grows throughout your lifetime and so it's kind of hard to catch up. If you can imagine running a race where someone else gets a head start, you recognize that as the second runner, you have to a run a little bit faster than that person if you're ever going to catch up.

What we actually know about children with hearing loss is that they tend to learn vocabulary more slowly than their peers with normal hearing, too. It involves more effort. If we want to close that vocabulary–knowledge gap, as educators we have to make sure that we are teaching vocabulary words in the most effective and efficient way possible.

When Michael and I decided to conduct the study, we really wanted to address the first part of that question: What is the most effective way to teach words to children with hearing loss?

Lorraine: To follow on that, what do we already know about teaching words to children with hearing loss?

Emily: Unfortunately, not as much as you might hope. The literature that evaluates vocabulary teaching methods for children with hearing loss is pretty sparse. We know that children with hearing loss need lots of repetition and we know that they can get better at word learning when they practice pretty often. That's mostly what we can take away from the literature. Despite this lack of research literature, a lot of recommendations are made to educators about teaching vocabulary to children with hearing loss. Some of those recommendations are contradictory.

For example, some schools of thought say that an initial period of explicit instruction and kind of that drill-like structure is really important. Then, others say you never, ever use drill with this children and instead you should only input words very naturalistically. There is also this idea out there right now kind of in the popular press that we just need to talk more to children, including children with hearing loss, and that that will fix the problem of vocabulary knowledge. We could just expose these kids to more language

and then they can use their cognitive resources to close that gap. It's really kind of a confusing place to be.

Lorraine: Now, I'd like to talk about your study. What is an adapted alternating treatment design, and why did you choose this method?

Emily: An adapted alternating treatment design is a form of single-subject design. It's one of my favorite things to talk about because it allows you to do two things. First, this design in particular lets you compare two or more treatments, which clearly we wanted to do here. Second, it lets us compare those treatments within subject—that is, using every participant as his or her own control group. A lot of people think of research as involving only group design, which is great when you're talking about a group of children who are not very diverse in presentation. However, children with hearing loss really have a large variety of different profiles and the beauty of using a single-subject design is that you can let the child serve as his or her own control group rather than worrying about trying to ferret out two groups of children who present in exactly the same way.

Lorraine: How did you determine what words to teach during this study?

Emily: We created lists of 10 words for each condition, and we repeated each condition about six times. We balanced those lists of words for things that we know affect word learning in our kids with hearing loss. Things like the type of word, a noun, a verb, an adjective, etc., the number of high-frequency sounds in a word, the phonotactic probability of those words and the length of the word, so like the number of syllables. We also checked all of our words at the beginning of the study to make that the participants did not start the study knowing any of the words that we were teaching. That's kind of how we ended up with our word lists at the end.

Lorraine: How often did the children participate in an intervention and how often were they exposed to each of the three conditions you studied?

Emily: Children were in the interventions 4 days a week, if a school week is 5 days and each condition occurred each day. There was an opportunity for each child to learn up to 30 words in a week., [essentially] three interventions ... a day. Then, on that last day of the week, Friday, we tested which words the children had acquired.

Lorraine: I'd like to talk about these different conditions and interventions. Can you tell us about the direct instruction intervention? How does that differ from follow-in labeling?

Emily: Sure. In our direct instruction condition, we adapted a Moog and colleagues protocol; we taught words in three phases. First, the word was introduced very directly and discussed relative to other information about that word. So, if the teacher was introducing the word *ice* for example, she would also talk with the children about how ice is cold. Then after all 10 words had been introduced for that week, the participants practiced pointing to pictures of the new words or objects as the case may have been and finally they practiced naming the new word. It's a very structured condition and had very explicit demands placed on the children.

In the follow-in labeling condition, we used a very controlled environmental set up to promote learning, but it was child-driven. The child at any given time had access to two objects or pictures that represented two of the new words. When the child starting interacting with an object or a picture, the teacher would map the new word to the item, or say the name of the item and prompt the child to repeat that word at least once. Then, when the child used the word, the teacher would expand the child's utterance. Again, if had a situation where a child picked up a piece of ice and the teacher said, "Oh, that's *ice*." The child might then say, "*ice*." The teacher would expand by saying, "Oh, yes, ice is cold." So the child could engage with each item as long as he or she wanted. Then, when the child was finished, the teacher would replace that item with another item. Again, it was structured but much more child-driven.

Lorraine: How does incidental exposure, the final condition, work?

Emily: Incidental exposure was a tricky one but we wanted to test whether children were learning words by hearing them environmentally. Teachers placed pictures or objects representing the word in this condition around the room and were instructed to provide information about those items daily—but they were also instructed not to directly engage the child in learning about the item or repeating the name. For example, the teacher might walk by a picture of say, a barn, and say, "Oh look, that's a barn. Animals live there." Then, kind of move on. There was no really prescribed teaching pattern. The children didn't have to repeat the word. They didn't practice identifying the word. It was really just about inputting the word to the child.

Lorraine: How did you measure results? For example, what if a child remembered a word but mispronounced it?

Emily: We decided to measure learning with a naming task. It is possible that children were learning some words receptively and understanding them but [were] not yet able to actually produce the names. That's a potential limitation of this study, because we decided to look at word learning through naming. Naming is a pretty direct way of verifying word learning. The child had to name the picture or object that he or she had seen all week. If the child mispronounced the word, we took his or her articulation patterns into account.

We had extensive data, being speech language pathologists, on each child's articulation pattern and we were able to give credit for those sounds that a child might routinely mispronounce. For example, if a child used /wa/ for the /er/ sound, we still gave him or her credit for pronouncing a word like *rabbit* as *wabbit*.

Lorraine: What did your results show regarding direct instruction compared to the other two conditions, follow-in labeling and incidental exposure?

Emily: For all of our children, direct instruction was the most effective teaching condition, which really surprised us. Comparative designs like this are rarely that clear. Children still learned quite a bit in the follow-in label condition, too, which is important and it's also notable that some of our best word learners were actually learning up to say 18

words in a week, which sometimes sounds like a lot when you're used to targeting fewer. Both of these conditions, the direct instruction and follow-in labeling, were clearly superior to that incidental exposure condition where even our children who had really high levels of vocabulary learned almost no words.

Lorraine: How do your findings compare to other research in this area, and what are [your] recommendations for future research?

Emily: As I said before, there isn't a ton of research literature on vocabulary teaching to children with hearing loss. Relative to those recommendations people make to educators, this had some important implications. If explicit teaching is the most effective, we probably shouldn't advise educators to avoid it. Drill learning, at least in this population, probably has its place for teaching words. We also need to consider that children with hearing loss may not be very likely to learn words through incidental exposure. Just getting parents and teachers talking more is not necessarily going to be helpful for closing that vocabulary-knowledge gap.

This finding is also pretty interesting in comparison to the research literature we do have on other populations with disabilities. For example, we know that follow-in labeling is particularly affective for children with autism spectrum disorder. That makes sense because a hallmark deficit of autism spectrum disorder is poor joint attention development. That isn't a particular deficit of children with hearing loss. It's possible that we can't infer that the intervention would work the same way for these two groups. In this case, it's helpful to have data specifically on children with hearing loss to think about the predictions we can make about learning.

In terms of future research, I would say we need to extend this even farther and think about testing these interventions in larger groups or considering maybe whether direct instruction versus follow-in labeling also promoted generalization of word knowledge. If the child knows the word in reference to naming an object, can that child also use the word later on in conversation? Those are some potential directions we can head.

Lorraine: You mentioned that both the direct instruction and the follow-in labeling were very successful. What are some take-aways from your study that you would recommend for teachers?

Emily: I would say if you're teaching children with hearing loss, trust in the effectiveness of direct instruction. Vocabulary instruction, even if it just occurs for a few minutes a day, can be really helpful to these children with hearing loss who sometimes need you to make that really explicit connection between the thing that you're talking about and what you want them to learn. Also, we as field probably need to realize that simply talking to children with hearing loss without being very purposeful in teaching is not likely to be super effective. Exposure to new words and concepts probably isn't enough. It's focusing on the teaching that's really important here. I think that is what I would walk away with. Be willing to teach explicitly and know that that is far more effective than just giving a child passing exposure to something. There's no simple solution.

Lorraine: Thank you for talking with me today, Emily.

Emily: Happy to do it. Thank you.

Lorraine: Emily's article, "Teaching Vocabulary to Preschool Children with Hearing Loss," is published in Volume 83 of *Exceptional Children*. *Exceptional Children* is a publication of the Council for Exceptional Children. To learn more about CEC, visit cec.sped.org.