

Transcript

Karen Gordon

Hello and welcome to the award-winning Hear Here podcast. I'm Karen Gordon. I'm an audiologist and scientist at the Hospital for Sick Children in Toronto, Canada, and I'm delighted to introduce our season five. You'll be hearing episodes hosted by our Hear Here Podcast Team. They are an amazing group of individuals who have experience living with hearing loss themselves or with siblings who have hearing loss. So you'll be hearing from Maria Khan, Nimrat Chani, Sofia Olaizola, Annika Gasse, May Wang, and Maryam Othman. In season five, we recognize the contributions that many families have made to our research conducted at Archie's Cochlear Implant Laboratory here at the Hospital for Sick Children. We discuss the findings of studies that often take many, many years and represent so many hours that children and their caregivers and loved ones spend with us and we really appreciate them and all of this contribution they've made.

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Annika Gasee

All right, so welcome back to season five of the Hear Hear Podcast. My name is Anika.

Nimrat Chani

And my name is Nimra.

Annika Gasee

And we are super excited to be hosting our episode about memory and learning in children with hearing loss and we have some super special guests here today. So Claire, why don't we start with you?

Claire McSweeney

Hi, everyone. I'm Claire McSweeney. I did my master's with Dr. Gordon looking at effects of hearing loss on memory, learning and balance. It was a while ago, 2017 to 2019. I've kind of shifted focus, and now I'm doing general surgery residency in the States. Not totally still in the hearing loss world, but I'm here to talk about our research today.

Annika Gasee

Very nice. We're excited to have you, Naureen.

Naureen Sohail

Hi, I'm Naureen Sohail. I was a doctor in Pakistan, and my son's diagnosis of hearing loss brought me and my family here to Canada many, many, many years ago. He is now a young adult, and I work as a listening and spoken language therapist with the cochlear implant program at SickKids.

Annika Gasee

Very nice. Thank you. Anna.

Anna Ishchuk

Hi, everyone, my name is Anna. I'm a second year master's student in Archie's cochlear implant lab working with Dr. Gordon and my research is looking at spatial hearing, specifically how kids with cochlear implants can localize sound and if we're able to improve their sound localization abilities with audiovisual training. And I'm excited to be here today.

Annika Gasee

Yeah, we're excited to have you.

Karen Gordon

Yeah, I'm going to jump in to say hi It's Karen [laughs] And it is a pleasure to see everybody. I mean, it is important for me to interact with all of you because we are learning so much about learning and memory and how this all comes together and sometimes how tricky it is, how hard it is just to keep paying attention and learning and striving for listening through these devices and I think that's what brings us all together to talk about this.

Annika Gasee

All right, I'll pass it to Nimrat.

Nimrat Chani

Hi, guys, my name is Nimrat. I am a third year student at University of Waterloo. I'm doing public health honors. The reason why I joined this lab because I myself is bilateral cochlear implants. I am from India, which caused my family and I moved here to get a surgery for cochlear implants and my own audiologist at the second hospital inspired me to pay a forward kindness to the future kids. I hope I can do the same thing. And pretty much that's I always had interest in hearing loss and which is why I'm also taking courses in neuroscience. Hopefully I can help and learn more about the hearing loss industry.

Annika Gasee

And I'm Anika. I'm currently in my third year studying health science at Wilfrid Laurier University. And my connection to Archie's cochlear implant lab is that my brother has hearing loss. He has a cochlear implant and a hearing aid, And I want to learn more about his condition and how I could best support him.

Anna Ishchuk

So right now I'm in my second year of my master's, so about the halfway point. So my project really focuses all on sound localization. So we know that kids with hearing loss unfortunately have a hard time localizing sound and really understanding where a sound source is located, whether that's in a classroom, in a playground. And we're trying to see if we can improve their sound localization abilities with audio-visual training. So during my testing, we basically pair a light and a sound from a speaker. We pair these two together. We're trying to see with about 20 minutes of training, are there any improvements in their sound localization responses. So the participant pretty much sits in like a dark sound booth, and there's a speaker moving with this light, and the speaker arm moves anywhere from the left side to the right side, and the child indicates the position of the speaker using a laser pointer and with this training, we're trying to see is there any acute improvement, even with just about 15 to 20 minutes of training.

So it's been really interesting and amazing to work with all these kids and see how this training is impacting their sound localization and that really relates to their learning abilities and if they're able to kind of understand the task better with the training. I was really interested in learning more about hearing, seeing if I can support children with hearing loss and improve their quality of life in any way, shape, or form, even with this acute short-term training. Hopefully it could build into something more later in the future.

Annika Gasee

Yeah, thank you. So you did a thesis on spatial awareness and navigation deficits in children, how would you say that spatial awareness and navigation deficits influence children's ability to upturn and maybe obtain information more specifically in a classroom setting?

Claire McSweeney

I think it's really important. Like one of the things that I realized after doing this study with Dr. Gordon is my mom has been a teacher, like my whole life, she's an educator and as soon as I talked to her about this, she's like, I knew it. I knew these kids, like they have so much difficulty in the classroom, they can't focus and it like impacts their learning so much. So once we did our study, like the real world ramifications were just so obvious. But

I think in a classroom, especially now, like there's tons of kids in the classroom, if they have difficulty localizing, as Anna's talking about, it can impair their ability to focus on the teacher, focus on what's going on around them and spatially as well, there's so much going on in the classroom with playing and learning and all the interactive and like multimodal learning we do now, I think that space part is just that much more important.

Karen Gordon

So I don't know if we really expected to see what Claire saw in her study. I think we were really inspired by Naureen and the therapy that happens that, you know, it is amazing to see children learn language with all of the support and all of the effort that the parents put into it. And we just wanted to know, like, how close are we getting to having age-appropriate skills, right? In real life, you know, as you go into school and as you, you know, think and learn. You know, sometimes things come easily and then there are other, you know, as you get to the next stage, it might take a little longer and then things pick up. And I guess that's kind of what we saw, Claire, right, that there was this age, you know, as children aged and grew, they were so good at improving. It's just those gaps that were there from the beginning were really hard to overcome.

And that's, you know, so it is so important that Claire came from a teaching background in the sense of, you know, just learning from her mom about, you know, what might look like in the classroom. And to see those, you know, the teachers were seeing those real life difficulties. But I think, for me, the question is about what do you do? Like how does a teacher try to intervene?

Naureen Sohail

In regular teachers college, we don't teach how to manage special needs kids. So it's only the teachers who are interested who do these, you know, extra courses and so they study about and briefly about all different kinds of special needs and how to manage them. So it's the itinerant teachers who actually do the work and it's so hard because they're scarce and the kids are in growing number and on face value, we don't see their needs.

Karen Gordon

Do you want to talk about the group therapy that we did in the summer?

Naureen Sohail

It was beautiful. It was beautiful. And it was, you know, not that I didn't know how difficult it was, to hear in noise and with the movement and action and whatnot. I knew all of that, but you sort of forget, right? Because I've been working at SickKids for 18 years and I work

in a quiet setting. I work one-on-one now, so I sort of forgot how difficult it was for these kids and I could see some of the kids, one of the activities that we did was we would blindfold the the child, one of the kids, and Marco Polo, maybe you guys know the game. And people would say, the child who's blindfolded would say Marco, and the other kids would say Polo and he had to reach out and find where other people are and touch them. So it was so difficult and for some kids, they couldn't even move one inch. They were so fearful, they were afraid they would either fall or lose their balance and whatnot and it was hard. It was hard. I really remembered my school days when I used to teach. And I was like, how are these kids going to function in this world? It's so noisy.

Karen Gordon

Nimrat, what do you think, does that ring any, you know, does it, can you think of any experiences that may be different, maybe similar to that?

Nimrat Chani

I mean, in my case, when I was in elementary school or middle school, I was the only one who was struggling to, you know, adapt with my classmates. As well, I would have like two teachers, like I would have speech integrity as well, HOH, hard of hearing teacher, where when I was in grade three and four, I was put in a program, HOH, I don't know if you were familiar with that. So it's like a HOH program where those program is only filled with hard of hearing or any student who has speaking problems. And that kind of put me up, but like, you know, that lost all of my motivation, all of my, you know, focus in studying as well. So kind of drifting my part in learning as well, connecting with my peers and my adults as well.

Karen Gordon

Yeah, that's, the environment and who you're with is really important. If we think about those.

Annika Gasee

Yeah, so Dr. Gordon, yeah, just a question to bounce off of what you were just saying for Naureen. So Naureen, what outcomes comes out of like a group therapy session versus just doing a one-on-one session? Like why is that group therapy beneficial for learning and memory in children with hearing loss as just compared to one-on-one?

Naureen Sohail

And I feel that, you know, one-on-one therapy, because it's in a quiet setting, we introduce new words, we give them the confidence to listen, and we give them the language to communicate with their peers, and then send them over to group therapy where they can

communicate with their peers, listen to them in a noisy environment, in a classroom setting, or in other groups, extracurricular activities and whatnot. So I don't know what we found yet because it's still, the analysis is ongoing. But what I observed was that it was really hard for them to listen in a group setting. So if we were to teach them new vocabulary in that group setting, that's literally impossible. So it's a big support that the itinerant teachers come and that connection that the itinerant teachers. Make with the classroom teachers and have that vocabulary list to practice and some of the language that is ongoing in the classroom to practice all of that. It is really helpful for these kids when they come back to the classroom to hear those words in a noisy setting, then they don't have to put their attention, like they don't have to really intently listen. They can overhear the teacher or the peers and understand what's going on. And of course, these are smart kids, so they miss words here and there, but the brain fills in the gaps.

So in summary, they understand what's being said. I completely agree that the language has to come and that has to be in quiet settings and so forth.

Karen Gordon

I think that for me, I've started to think about this as language is the what, the meaning of information, right? So, and you have to have that. You can't have hearing without asking, wait, what did I hear? And what should I do with that information, right? But there's also the where, and that's the spatial stuff that Anna and Claire worked on in the lab. And the where, I think, gets missed because it is a struggle and we don't really focus on it very much. So that's where the group therapy came in. So I think for me, one of the most fascinating parts of what Claire found is that the what pathways may be struggling in lots of different ways.

Claire McSweeney

Big things from our studies that there weren't, in terms of some of the deficits, there weren't a ton of differences between the kids who had two cochlear implants and those with the unilateral hearing loss. So we think that just because children have one normal hearing ear, we don't need to worry about the other one, what we do. And that speaks so much to the spatial part because they don't have those binaural cues, they don't get that spatial awareness. And beyond the hearing part, it affects language, learning, memory, their spatial awareness, moving through the world, it can affect balance as well. So I think that spatial part is huge.

Karen Gordon

Yeah, and I think that the crazy thing was that we saw that in the dot matrix. So just watching where dots are and telling us, remembering those locations and putting them back. That's an interesting part for what we found with a different study that was Melissa Hazen's work, where doing a video game. What we saw with children with cochlear implants was that they had a hard time in this video game that was just remembering different symbols on a wall and in a video game trying to figure out where they were in the start and trying to get back there if they were moved in the video game to a different place. It was really interesting to see how those were similar to what, you know, those results were similar to what you had, Claire, but what was different in that study is that they did the video game over and over again, over day one, day two, day three.

They were at a summer camp. They did it five days in a row and they got better. They got really good at that video game. And so it's not that, that they can't learn. So in therapy, they can learn if they're given the right kinds of places to learn and the right ways to learn, the spatial things will come. It's just, it may not have occurred to them how to use that information. So that kind of goes to Anna's study and, you know, what do you think of using vision. Does it work, Anna?

Anna Ishchuk

Yeah, so the audio visual training, I think it's, we're seeing improvement in all three of our hearing groups. So we're seeing that children with cochlear implants, bilateral cochlear implant users, and bimodal hearing users, they are improving with the audio-visual training. So I think that's very helpful and sometimes it's hard to imagine like a 20-minute training having any effects just because it is so short-term. But we are seeing improvement in their response. I will say, compared to children with normal hearing, the kids with hearing loss do need a little bit more reassurance. Sometimes they'll have to sit in the sound booth with them, just kind of guide them a little bit more. So it might take some extra steps, kind of simplifying the instructions and providing a little bit more guidance compared to a child with normal hearing. But regardless, they are improving. So I think that's good to get to know.

Annika Gasee

Yeah, for sure. And I was wondering, like how what you're researching right now, how this would translate into like a classroom setting or even maybe a social setting, and kind of if there are any improve overall outcomes for children who are learning in like a classroom setting or whether it's in like a social setting or extracurriculars.

Anna Ishchuk

Yeah, so I think with my research, we're starting to see that pairing auditory and visual cues has a positive impact. So I'm thinking in like a classroom setting, using more visual cues to guide those students and help them understand instructions more. So whether it's bigger signs, using hand gestures, facial expressions, something that the child can pick up on rather than words alone. I think would be really beneficial just because children with hearing loss do heavily rely on their vision a lot of the time. And I think that's something we can incorporate more into classrooms just using more visual aids, bigger text, more signs, more colors maybe.

Karen Gordon

Something that was said there that I wanted to ask you guys. Nimrat, Annika, everybody, is about the confidence. That's something that Anna talked about, and I wondered what you have to say about that.

Annika Gasee

We've touched on this a little bit in our previous season, season four. If you guys haven't listened yet, you for sure should, a big part is kind of finding a community within the hearing loss or for peers who have hearing loss. So even like Naureen, your program, like I'm not sure if you guys have any preliminary results yet, but maybe just being in an environment with other children who share, you know, maybe similar struggles or you share that when they meet other people who are similar to them, it can kind of help build up their confidence because I don't know how common it is, I think in a past episode was talking about how like she would go to her-- with her special teacher, she would be the only one. And that was a bit difficult for her, being called out of class. But when she's around other peers who are more similar to her, it builds up that confidence. So I wonder if a social atmosphere like Naureen's can help build that confidence between peers who share. For sure that condition.

Naureen Sohail

All that, all the support in therapy, the celebration, every time they do something, you know, they go up a level, that helps them build the confidence. And the same thing happens with itinerant teachers, you know, when they are proficient in something, a vocabulary list or, you know, spelling list or a concept or whatnot, and when they come with their peers and they're practicing and they're showing off what they've learned, they feel so much more confident, right. Now they know they can do it. But if they're you put them there without any prep, then they're lost.

Anna Ishchuk

Yeah, and building off of community, I think this podcast is a great example of community just hearing from people who are a little bit older who have cochlear implants, how they navigated school and just work life balance. I think it's reassuring for parents and might take away some of their doubts with their child and when they develop. So I think it's a really great project you guys have going on here.

Nimrat Chani

It really does depend because kids always wanted to be liked by the other kids. You know, we always had a face to be liked by everyone, always had a face like no one would want to hate us or judge us. Because of that, people with hearing loss, we would always have to be sitting in the back of the class so we won't feel noticed.

So I feel like this podcast is a really good thing, especially for me, because I gained a lot of confidence here. There's so many other girls like me going to a medical field who has cochlear implants. So I'm hoping this can do more for future girls, especially.

Karen Gordon

So it's really a pleasure to be in this community with everybody, because we're all learning together. And that's what we're talking about, is just how to foster it. So I would put that back on everybody. Like, what should we do to foster that confidence?

Naureen Sohail

I think that idea of building a community, I think that's a very good idea. And I think we should do more. So I know school boards have like a annual picnic where they have all these kids come in and meet each other, but usually it's the deaf and hard of hearing classes who come in. The regular mainstream kids, they sometimes come, or more often they don't come. But other than that, I don't think that these mainstream kids see another child with cochlear implant. If anything, they see someone in the waiting area when they come for their mapping, right? But they don't, they've never befriended someone with a cochlear implant or a hearing loss, so that's something that. We can certainly, we can work in therapy also, encourage parents to have that connection for their kids. But also, I don't know, as a program, as a group, if we can foster something to help them out. But that community certainly helps with confidence building, that understanding that I'm not alone.

Annika Gasee

The question for everyone like, is there a specific way the parent can best support their child while completing the homework or while learning, like learning doesn't always have to

be with school. It can be in any type of context, but I'm just giving helping with homework as an example.

Naureen Sohail

I can certainly speak to that. I've got a gazillion hours sitting with my son helping him with homework and other learning experiences. I feel like, but if there is a visual in front of them. So anytime that I was telling him about a new concept, I would draw something in front of him. Either even if it is a flow chart with some writing saying this leads to this and this leads to this. And often I would have printed some pictures to show him what the ultimate, you know, thing looked like. And if I knew another like new vocabulary that I was introducing, then I would, you know, print pictures of the scenario or, you know, somehow or the other, I would find ways to explain it. So I feel like if whenever I told him anything just auditorily. It was very easy. It's not that he didn't understand. He would hear, he would understand, but it was very easy for him to forget about it. Whereas if I put it down in writing, if I wrote down a few words, made a picture in front of him, made a flow chart or something like that to show him what I mean to say, then it would stay in the retention was better then. So I feel that the connection between auditory and visual is very important.

Annika Gasee

Yeah, for sure and I'm not sure if you're aware of something that's called like VARK learning, but it stands for like visual, oral, read, write, and kinesthetic. So from what I'm hearing, it sounds like the visual is the strongest. like a mode of learning for children with hearing deficits But do you know anything about like kinesthetic learning? Like would that also be a beneficial way of learning?

Naureen Sohail

Certainly in the classrooms. So I'm talking about the deaf and hard of hearing classrooms. We used to, let's say if we read a story, we would then make picture formats for the story. And so visually we will connect it and then the final culminating activity for that story would be that we'll role play and present that story. So in that aspect, it was, you know, a special kinesthetic and they would understand it better with the role-playing and the dialogue delivery and all of that.

Karen Gordon

So going back to, you know, we're trying to do individual therapy, an individual learning that might translate to broader, more complex places, right? So a lot of what research is doing is trying to take complex things and put it into something that we can test, right? So when we're doing this learning, like what Anna's doing, is really testing one task over and over

with vision to see whether that works. And so that's a good concept for, oh yeah, okay, somebody can learn in this way. Or the same thing, Naureen, when you're doing language, we are, looking at one setting, a quiet setting, but how does it then translate. I think we need to go beyond that is how do we pull those little pieces in very specific things into a general, how do you navigate in a larger sense, right? So maybe, my thought is that maybe if you do all of these things in specific areas, that the child will have that foundation by which to then go into larger, you know, more difficult situations.

Claire McSweeney

I feel like we're teaching these kids, like all these different strategies, and then they have a toolbox, and then we're sending them out into the world. And it's like, hey, these are your tools that you know how to use. Like, how can you apply them to all these different scenarios? Because like, Naureen, I'm sure you're doing like amazing work, but the group settings are like amazing for teaching, but then they're going to be, as you said, like in a restaurant, in a classroom, all these different environments, and they're going to have to adapt what they're learning with you to all these different environments. So I think just like exactly what you're doing, like you're teaching them, okay, these are the strategies you can use and like, this is how you apply them.

Karen Gordon

Maybe that's the link that, you know, you got to have the foundational things within different kinds of tasks and learning where you gain the confidence to move into independence, right? So, you know, I'm a parent and I probably am too hovering over my own kids, right? But that independence is really what we're trying to, that's what we really want. All of you guys are models of independence here. And I think that's what we need to learn is, you know, what your experiences were that helped you to do those things, helped you to succeed and get to where you are in terms of wherever that may be, socially, academically, professionally, whatever.

Naureen Sohail

It's also, Karen, that they need to be, so yes, I'm giving them the toolbox, right. They have all those strategies, but they need to have opportunities to use that toolbox, right? So if they don't go to, let's say, an after-school club, they're not going to meet new people. They're not going to, if they don't go to a library, they won't be able to understand, you know, how to check out a library book, be able to communicate, use that language, right, or find a certain book. So all that exposure needs to happen and so as a therapist or a teacher, it is hard for us to, provide that opportunity. So that, and I feel, not I feel, research tells us that parents are the strongest variable of a child's success, right?

Another thing that I want to talk about is the ease of hearing, right? When you when you are You're trying to filter all this background noise, and you're trying to focus what the teacher is saying and here are your other friends who are either under the table or behind your chair or taking things out of their backpack, and they can still hear, whereas you have to stay focused to listen to what the teacher is saying. And for some kids, due to various reasons, it's harder than for other kids. And I feel like, you know, kids with severe loss and hearing aids, it's harder. And kids who have who have been implanted late, it's harder.

Annika Gasee

Yeah, that's totally understandable.

Naureen Sohail

That's also takes away from the learning because all that energy is burnt in focusing and attention and trying to listen, whereas that energy should be used for retaining the information.

Claire McSweeney

You know, that's one of the things we found in our studies, like memory was really affected by hearing loss. And that's so key in order to encode any information, but especially in the classroom. So these kids are already exhausted by just trying to hear and understand what the teacher, whoever's saying, and then they have to remember, encode it, and then continuously build on that. And it just, it's so much more difficult.

Karen Gordon

I think that for me was really the major take home is that, you know, these are not, these devices don't give normal hearing. It is phenomenal what the children do with them. Like what you guys do with these very rudimentary inputs that are being provided through the devices is a testament to everybody, the community, the parents, the brain, all of it working together. I think the toolbox that we're talking about is just trying to alleviate a little bit of stress in the areas that we can provide the support so that you can move along with a little less effort, because we are worried about that listening effort, you know, when we get into older people, is related to dementia. We don't really understand how yet but there is something about that fatigue of listening that we want to, we just want to support and make easier, right? And that's, for me, the research that's showing, yeah, they can learn. it's not, you can learn and that toolbox will be there.

So you just grab, just any, little support like that, hopefully if we build all these things up together, that will create and ease any, improvement in that effort or any release of that

load on the cognition would really help and whatever that takes, technology, support, people, family, putting yourself into different situations. I guess using vision, all of that, that's really where we're trying to, that's where we're trying to go to is what works the best and for who. I love the toolbox idea. I think we'll just keep that we'll just make a big toolbox that you could take around and navigate through.

Annika Gasee

Yeah, for sure. And we talked about so many great things today and we kind of had like a powerful outlook on like how this confidence will help children just with learning and like getting through different challenges that they may encounter, especially with like bridging those communication gaps, whether it be between peers or telling their peers, you know, about how they learn best in front of the class or about talking to their teacher and yeah, I think this concept of the toolbox is so amazing and as research progresses, and Naureen, when your groups, when you start to get more data on your group and the effects that it has on memory and learning, I think it will definitely have a big impact on learning and memory in children. And I'm definitely looking forward to seeing how all this research progresses.

So thank you so much, Naureen. Thank you so much, Anna. Thank you so much, Claire, for coming today and sharing with us about your expertise and experience about working in the hearing loss industry and yeah, I'm sure like all the listeners today, whether you're a sibling or a friend or a parent, or whether you have hearing loss yourself, I'm

I'm sure you definitely took something valuable out of our episode today, and we're looking forward to many more.

Naureen Sohail

Thank you for having us.

Annika Gasee

Thank you. Yeah, that was awesome. Thank you, so great.

Karen Gordon

Thanks for this opportunity. Thank you.

[MUSIC]

Thank you for listening to our award-winning Hear Hear Podcast. Thank you again to children and their families who have spent their time and energy with us in Archie's Cochlear Implant Laboratory. Thank you also to our Hear, Hear podcast team and a special

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