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Theory of Mind Development and Distance Learning

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Introduction

Cochlear Americas Commitment to Educational Outreach

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Carol Flexer, Ph.D., LSLS Cert. AVT

- Advocate for infants and children with hearing loss and their families
- Pediatric audiologist and LSLS Cert. AVT
- A past president of the American Academy of Audiology, Educational Audiology Association, and AG Bell Academy for Listening and Spoken Language
- Co-edited or authored 9 books and more than 150 publications
- International lecturer



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Topics to be Covered

- Definition of ToM, and relationship to child development and to children with hearing loss
- Neurological implications
- Relationship of ToM to language development, tracking of conversations, and intensity of social/language exposure
- Relationship of ToM to distance hearing and incidental learning
- Tips for Developing ToM skills

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Themes

- *Because of technology and brain neuroplasticity*, the audiologist's role has expanded in pediatric sectors.
- *Because of technology and brain neuroplasticity*, the landscape of deafness has changed.
- *Because of technology and brain neuroplasticity*, today's infants represent a new and different generation of children who are deaf.
- There are *limited data* about the social, emotional and cognitive development of today's children who are identified at birth and who have good auditory access.

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Main Idea

- Hearing is a first-order event for the development of spoken communication and literacy skills.
- Anytime the word "hearing" is used, think "**auditory brain development**"!!
- Acoustic accessibility of *intelligible* speech at soft levels and at distances is essential for brain growth and for social-emotional development.
- Signal-to-Noise Ratio is the key to hearing intelligible speech.

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It's All About the Brain

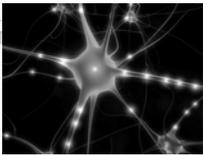
Hearing loss is not about the ears; it's about the brain!

Hearing aids, FM systems and cochlear implants are not about the ears; they are about the brain!

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NEW BRAIN RESEARCH

Basic neural research now provides data that substantiates the necessity of accessing and stimulating auditory brain centers.

There is a science behind our practice!

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How Does the "Auditory Brain" Work?

- Important changes have been shown in the higher auditory centers due to hearing loss/deafness.
- The auditory cortex is directly involved in speech perception and language processing in humans (Kretzmer et al, 2004).
- Normal maturation of central auditory pathways is a precondition for the normal development of speech and language skills in children (Sharma et al, 2007).

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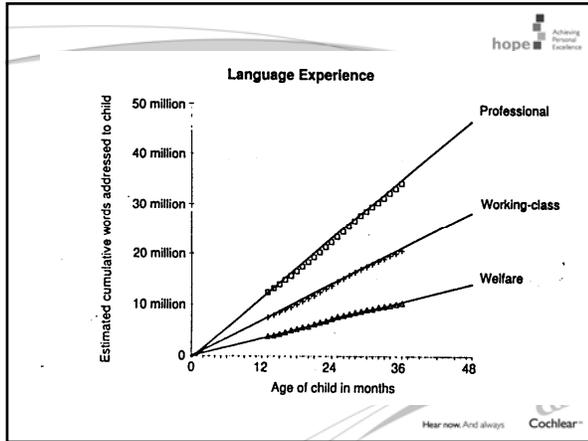



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**KEY STUDY BY HART AND RISLEY
SHOWING HOW MUCH AUDITORY
STIMULATION IS ACTUALLY NEEDED**

**Meaningful Differences in the Everyday
Experience of Young American Children**

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Therefore, early intervention is not about
the child, it is about the family.

Think of early intervention as adult education

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Intervention Models

- In today's context, we all must use a combination of models.
- **Ecological model** – Typical social-linguistic models with high expectations.
- **Instructional intensity** --- practice, practice, practice.
- Families must be involved if sufficient instructional intensity is to be obtained.

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Theory of (ToM)

“The capacity to infer other people’s mental states, and to use this information to predict behavior, is a central cognitive ability that emerges early in human development” (Pyers and Senghas, 2009).

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Definition and Description of ToM; An Aspect of Social Cognitive Development – Emotional Understanding

- A "Theory of Mind" (often abbreviated in ToM) is a specific cognitive ability to understand others as intentional agents.
- It also means one must be able to maintain, simultaneously, different representations of the world.
- ToM appears to be an innate cognitive potential in humans, but one requiring social/linguistic and other experience over many years to bring it successfully to adult fruition.
- It has been commonplace in philosophy to see ToM as intrinsically dependent upon our linguistic abilities.
- As each child's ToM matures, he or she is able to gauge others' beliefs, desires, perspectives, and intentions, and perhaps predict their behavior.

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Definition and Description of ToM -- More

- Having a ToM allows children to understand many aspects of human social life such as surprises, secrets, tricks, mistakes and lies.
- As children age and gain more social and language skills, a ToM forms the basis for inference, perspective taking, social reasoning, and empathy.
- A ToM is critical for academic development, especially in collaborative educational environments.

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ToM and Children

- A workable ToM doesn't develop before the age of 4 years; by that age, a child should be able to distinguish between what is so and what people believe is so.
- One of the most important milestones in theory of mind development is gaining the ability to attribute *false belief*: that is, to recognize that others can have beliefs about the world that are wrong.
- A new model of sex differences in the mind suggests that females, on average, show a stronger drive to empathize; empathy is broader than 'theory of mind' because it not only involves identifying the mental states of the other person, but also responding to these with an appropriate emotion.

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Theory of Mind and Children with Hearing

- The language skills in children with hearing loss are directly related to their Theory of Mind skills, however, it isn't general language skills but rather specific vocabulary skills.
- That is, if a child can understand sentences such as, "He *thought* his cake was in the cupboard," he is more likely to understand and predict behavior premised on a false belief.
- One important way that children gain an understanding of other's thoughts is by attending to the back and forth viewpoint exchange of family members; therefore, the child must be able to track multi-talker conversations – a skill that demands the maximum possible auditory access of soft speech at a distance.

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Theory of Mind and Children with Hearing Loss

- Overhearing “self-talk” (of parents, or others in the environment) such as “where are those car keys,” or “I forgot the agent’s name”, assist the child in understanding that others have a state of mind that is different from the child’s.
- Siblings in the home promote the development of ToM because there tends to be more discussions of mental states that lead to differences in behaviors – provided those discussions are acoustically available to the child with hearing loss.

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Summary Comments: ToM

- Language, not just social experience, is required for development of an understanding of false-belief.
- Nevertheless, social experiences and language likely function together to build a mature ToM.
- The child needs to **use/produce** as well as hear *mental-state verbs* (e.g. think, know) which leads to a meta-awareness of those internal processes that can affect human action.

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Incidental Learning and Distance Learning



Acoustic access at a distance and for soft speech is critical for the development of ToM!!

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Incidental Hearing

- ❖ Hearing is a distal sense
- ❖ Hearing enables us to monitor what is happening in the environment
- ❖ Hearing enables us to learn casually, incidentally, and passively
- ❖ Enables us to over-hear other's mental states e.g., where did I leave my purse?
- ❖ Hearing enables us to learn about our culture, about social conditions, about human interactions— by "over-hearing" the conversations and transactions of others.

We must extend a baby/child's distance hearing as much as possible, as often as possible to assist in the social and linguistic access and practice that is necessary for development of ToM

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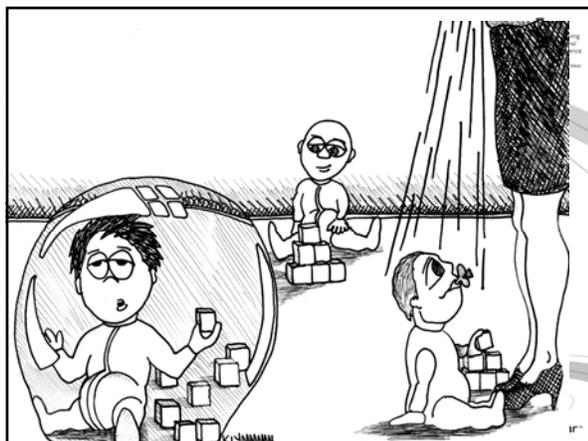
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Why extend distance hearing and "overhearing"?

Because the literature in developmental psychology tells us that about 90% of what very young children know about the world, they learn incidentally.

And, it's not just about knowledge, overhearing facilitates social/cognitive development.

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What Does “Deaf” Look Like in 2010?

- Does 1970 “Deaf” look like 2010 “Deaf”?
- We have used the same words for decades, but the context has changed, dramatically!



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HOW TO “GROW” YOUR BABY/CHILD’S BRAIN



Information to share with families of children with hearing problems of any type and degree, including ear infections and auditory processing difficulties

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Family Factors that Influence Spoken Language and ToM Outcomes

- **Parent Involvement** in early intervention programs is critical for future educational success.
- **Impact Belief:** refers to one’s belief to perform a particular task successfully, to persist until the outcome is achieved, and to ultimately make a difference.
- **Maternal Linguistic Input** (both quantity and quality) at a level appropriate for the child.

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For Parents: How to Grow Auditory Brain Centers

- Above all, **love, play, and have fun** with your child!
- Once your child receives a hearing aid or cochlear implant, make sure he/she **wears it every waking hour (at least 12 hours/day)**. The auditory brain centers need consistent access to clear, complete sound in order to develop.
- **Check** your child's technology regularly. Equipment malfunctions, often. Without auditory access, talk to the floor.

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How Can We Help Children to Learn Theory of Mind Skills?

- Pretend play and role-playing allow children to escape from the reality of objects and roles; to do this, children may need to create separate cognitive representations for what is real and what is imaginary.
- Talking about past events also has been found to be related to Theory of Mind skills in children, probably because children need to discuss decontextualized events.
- **Overhearing capabilities are critical!**

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Children's Literature and ToM

- Children's literature may be especially useful for theory of mind development in children with hearing loss.
- By reading to children, parents expose children to alternate views of the world.
- In experiencing stories, children can become cognizant of other people's thoughts, perceptions, and motivations.

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For Parents: How to Grow Auditory Brain Centers

- **Minimize background noise.** Turn off the T.V.
- **Sing** to your child! Fill their days with all kinds of music and songs.
- **Speak slowly, clearly** and in full sentences with lots of melody. Stay close!
- Focus your child on **listening**. Call attention to sounds around the room. Point to your ear. Use listening words such as “you heard that”, and “you were listening”.
- **Emphasize sound** before vision for *auditory enrichment*.

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For Parents: How to Grow Auditory Brain Centers

- **Read, Read, Read aloud** every day. Try for 10 books per day.
- Name **objects** in the environment as you encounter them in daily routines.
- Talk about and **describe** how things sound, look, and feel.
- **Compare** how objects or actions are similar and different in size, shape, smell, color, or texture.

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For Parents: How to Grow Auditory Brain Centers

- Talk about where objects are **located**. You will use many prepositions such as in, on, under, behind, beside, next to, between. Prepositions are the bridge between concrete and abstract thinking.
- **Describe sequences**. Talk about the steps involved in activities as you are doing the activity. Sequencing is necessary for organization.

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General References

- Cole, E., & Flexer, C. (2007). *Children with Hearing Loss: Developing Listening and Talking, Birth to Six*. San Diego: Plural Publishing.
- Madell, J., & Flexer, C. (2008). *Pediatric Audiology: Diagnosis, Technology, and Management*. New York: Thieme Medical Publishers.
- Robertson, L. (2009). *Literacy and Deafness: Listening and Spoken Language*. San Diego: Plural Publishing.
- *Archives of Otolaryngology – Head and Neck Surgery*. May 2004.

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References for ToM

- DesJardin, J.L., & Eisenberg, L.S. (2007). Maternal contributions: Supporting language development in young children with cochlear implants. *Ear & Hearing, 28*(4), 456-469.
- Lundy, J.E.B. (1999). Theory of mind: Development in deaf children. *Perspectives in Education and Deafness, 18*(1).
- Moeller, M.P. (2007). Current state of knowledge: Psychosocial development in children with hearing impairment. *Ear & Hearing, 28*(6), 729-739.
- Rizzolatti, G., & Craighero L. (2004). The mirror-neuron system. *Annual Review of Neuroscience, 27*, 169-92.
- Sabbagh, M.A., & Moses L.J. (2006). Executive functioning and preschoolers' understanding of false beliefs, false photographs, and false signs. *Child Development, 77*(4), 1034-1049.
- Samson, D., Apperly, I.A., Chiavarino, C., & Humphreys, G.W. (2004). Left temporoparietal junction is necessary for representing someone else's belief. *Nature Neuroscience, 7*(5), 499-500.

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Web Sites

- www.audiology.org
- www.agbellacademy.org
- www.agbell.org
- www.oraldeafed.org
- www.nciohio.com
- www.auditoryoptions.org
(A state-wide auditory initiative in Ohio)



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BRAIN, BRAIN, BRAIN!!!

The purpose of hearing aids, cochlear implants, personal-worn FM, classroom FM and IR systems, and auditory-based intervention is to access, grow and develop auditory brain centers using a cognitive/linguistic paradigm.

Upcoming Online Sessions

- **Monday, December 7, 3:00 pm ET (Adults, Teens, Professionals)**

Improving Adult Cochlear Implant Outcomes with Sound and WAY Beyond

Donna Sorkin, M.A., VP, Consumer Affairs, Cochlear Americas

Qian-Jie Fu, Ph.D., House Ear Institute

- **Thursday, January 7, 3:00 pm ET (Professionals, Parents)**

Technology to Maximize Hearing in Young Children

Janet Clarke, Au.D., and Amy Popp, Au.D., Clinical Educators, Cochlear Americas

Early Intervention Workshops Nov 2009- April 2010

•Facilitating Spoken Language Development for Young Children with Hearing Loss

•One Day Introductory Seminar for Early Intervention and Educational Professionals

•Four Sites: Kansas City (Nov 5), Norfolk, VA (Jan 26), St Paul (March 15), Portland ME (April 16)

•For more information, go to [www: regonline.com/hopeEI](http://www.regonline.com/hopeEI) or call Sarah Gard at 303.524.6848, sgard@cochlear.com


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Contact Cochlear Americas

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- For a Certificate of Participation, please send your completed Feedback Form to: hopefeedback@cochlear.com

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Questions?

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