Science AMA Series: I am Wyatte Hall, Ph.D., a Deaf scientist studying how early language exposure can affect health outcomes. Ask me anything!

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Abstract

Hi Reddit! I am a postdoctoral researcher at the University of Rochester Medical Center. My background is in clinical psychology and Deaf mental health. I am currently studying how early language exposure (or lack thereof) can affect medical and behavioral health outcomes. My research is supported through a joint program for deaf postdocs at the University of Rochester and the Rochester Institute of Technology. I'll be back at 1 pm ET (10 am PT, 6 pm UTC) Ask me anything about my research, or what it is like to be a Deaf scientist! EDIT: Hi r/science (and Reddit), I am here! WOW, there are some great questions here. I intend to answer as many as I can, keep them coming! EDIT 2: It is now 3pm EST, I need to bike home (yes, I winter-bike!). I am enjoying your questions and I plan to continue answering questions tonight. EDIT 3: I need to take a break for the night! I plan to continue answering questions tomorrow, and the rest of the week until I get to everyone! Feel free to ask something, I will get to it!

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REDDIT

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WYATTE_HALL R/SCIENCE

ABSTRACT

Hi Reddit!
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Dr Hall, My cousin and his wife have implemented a sign language system with their twin boys. They are now a little over 2 years old, and do not speak a word. Is there any known link between teaching young children sign language and the delay of speech? Thanks

CrazedWalnut

There is no evidence that teaching sign language is linked with speech delays. In fact, the opposite may be true for deaf children -- not teaching sign language may contribute to speech delays. A study of deaf children with cochlear implants, who were taught American Sign Language as their first language by deaf parents, found the implanted children's English (AND SPEECH) skills to be similar to hearing children.

http://jdsde.oxfordjournals.org/content/early/2013/10/16/deafed.ent045.short

Perhaps off topic, but does your research address children whose early language exposure was interrupted? I'm thinking along the lines of children who are born into one language but are moved into another language due to immigration, displacement, adoption etc.

shiny_brine

This is a very interesting concept, my research is primarily focused on deaf children and adults. I do know of research that looks at outcomes of babies who are first raised in orphanages before adoption, they generally can show some similar negative consequences of deprivation that we may see in deaf children.

The reason why a first language is so critical is because it provides a way of comprehending the world. Learning a second language is reliant on "mapping" to the first language -- for example, 'hello' to 'bonjour'. If you are a baby when this 'interruption' occurs, you will likely still be in the critical period of language acquisition and appear if not native, very fluent in the new language. If this is after the critical period, you ideally already have a first language to learn the new language.

High school special ed teacher: I have witnessed better reading in students with cochlear implants. Are the implants available to all children with need? How much is that changing your culture?
How early is needed for language? If the child is a year or two late, does all language delay that much?

SonicGal44

I have witnessed better reading in students with cochlear implants.

Cochlear implants are not a hearing loss cure in the sense of restoring hearing to the point of spoken English being reliable as a first-language foundation. They do seem to provide more auditory access than hearing aids, which is where you may be seeing the better reading skills develop. This may mean you are seeing improvement from a low baseline, but it does not necessarily mean you are seeing the best possible reading skills from your students.

Are the implants available to all children with need?

I am not qualified to answer this in-depth but a colleague of mine is a pediatrician doing research with implanted individuals. His recent research study (not published yet) seems to suggest that the implant is very available to many people from different socioeconomic backgrounds, but that better post-implantation services are predominantly more accessible to people from higher socioeconomic backgrounds.

How much is that changing your culture?

Implanted people are still deaf. I know many culturally-Deaf individuals who have implants. I would say the 'change' in culture is recognizing that the implant, like hearing aids before, are simply tools to interact with the predominantly-hearing world. The issue many Deaf people have is how these tools are represented by the hearing world, and then potentially mis-used.

How early is needed for language?

From birth! A language foundation needs to be established before the Critical Period of language acquisition (a brain-development phase) is over. The Critical Period is approximately the first five years of a child's life.

If the child is a year or two late, does all language delay that much?

A year or two is already significantly delayed. However, everyone is different. Some children may catch up, or appear near-native, if they are given accessible language before the Critical Period is over, some may not.

Good morning, Dr Hall!

This is my first year working as an ASL interpreter, so I'm glad to see some Deaf Studies on the front page of reddit. Thank you for doing this.

My question is about written language. I've noticed that many Deaf people generally don't like to read books as much as hearing people do. I've always assumed this is because it's in written English and there is no such thing as "written ASL" (outside of linguistic research). What do you think is the best way to teach Deaf children to read more enthusiastically? I ask as a lover of ASL and an avid reader.

And just for fun, what is something really fascinating that you have learned in your studies?

Thanks again for doing this AMA!

DLumps09

My question is about written language. I've noticed that many Deaf people generally don't like to read books as much as hearing people do. I've always assumed this is because it's in written English and there is no such thing as "written ASL" (outside of linguistic research). What do you think is the best way to teach Deaf children to read more enthusiastically? I ask as a lover of ASL and an avid reader.

I think this issue goes beyond deafness, I believe it really relates to parenting and teaching style. As a kid, I was addicted to books and this was especially encouraged by my parents -- they would always be willing to buy me a book (and not always the videogames I wanted!).

However, I would also add that for many deaf children (or even hearing) who may not have a strong first-language (or English second language) foundation -- they are not going to enjoy reading. It will be tedious because of their language skills not enabling understanding of the stories. The first four years of elementary school are largely 'learning to read" -- after that, you are expected to 'read to learn'. If you have not successfully reached 'reading to learn' after fourth grade, you will fall behind very quickly (which adds a whole layer of teachers often passing children 'forward' despite not being academically ready).

And just for fun, what is something really fascinating that you have learned in your studies?

Probably the most fascinating - and depressing - thing I have learned is that not having a language foundation after the critical period of language acquisition (approximately first five years of a child's life) will permanently change brain structure development. I believe this likely explains a lot of the issues that are historically described as "problems of deafness," rather than "problems of language deprivation" that may be a more accurate label.

When you say early language exposure, does that also include sign language? What I'm trying to ask is, children normally develop their own way of communicating with their parents even before verbal communication is an option, kids with compromised hearing also develop their own way of letting their parents know what they want..so does exposing them to a structured or established method of communication for e.g. ASL, make a difference?

thesparkleninjafairy

so does exposing them to a structured or established method of communication for e.g. ASL, make a difference?

YES! The primary difference between sign languages such as American Sign Language, and other communication methods, is that ASL was developed by deaf children, and then used by deaf adults, over many generations. It is a fully naturalized language with its own grammar structure and linguistic rules.

Communication methods often break these rules. Simultaneous Communication (using both spoken

English and ASL signs at the same time), has been described as "ungrammatical" due to not following either English or ASL rules. http://petitto.net/wp-content/uploads/2015/04/1979_MarmorPetitto_SLS.pdf

I was recently applying to veterinary schools, and was surprised to see that schools considered the ability to hear to be required for admission. Has being deaf affected your career options in science?

Tre2

Has being deaf affected your career options in science?

There is both a simple and complicated answer to this.

Simple: Yes.

Complicated: Minorities, in general, are underrepresented in science. This is why the National Institutes of Health gave money to University of Rochester and the Rochester Institute of Technology specifically to help develop deaf scientists. I am in the joint post-doctoral program, but there is also the Bridges to the Doctorate program that helps deaf students get their Master's and successfully apply for a PhD (www.deafscientists.com). There is currently another grant proposal that will be submitted to help develop *undergraduates* to successfully apply for an MA. UR and RIT have essentially committed to developing a pipeline of deaf scientists, beginning at the time they are accepted into college.

Now, an example from my personal experience: A year-long clinical internship is required to graduate with a clinical psychology Ph.D. There is currently too many intern applicants and not enough American Psychological Association-approved internship sites. When I was applying, there were only two sites that offered clinical work with deaf people (one site has since shut down due to money issues). Because of the internship site issue, I applied to 10 but realistically only expected to get two interviews. I already knew that I would likely not be offered an interview from the 8 sites that do not work with deaf clients, and therefore have essentially no understanding of deafness or desire to see me in person first. I only got two interviews.

There is significant social stigma and bias attached to deafness, perhaps more so than any other "disability" (I do not personally subscribe to the deafness = disability perspective). Because spoken languages are not accessible and therefore we are "deaf and dumb." When encountered by deafness, many people appear to simply freak out and do not want to "deal with it."

As a (hearing) Teacher of the Deaf in a self-contained TC program I'm curious as to your own educational background. If you don't mind getting personal could you tell us a little more about your own experiences? Are you from a Deaf household? Are you implanted? Did you attend an oral, TC or manual program during grade school? Which would you advocate for now and have your personal views changed (or been affirmed) due to any of your research?

I look forward to any deaf education resources that spring from this AMA! Thank you so much for posting!

Mar_lee_

I am the only deaf person in my family, and we do not know why I am deaf. I was born in the 80s before hearing tests were given at birth. My mother discovered my deafness at approximately 2 1/2 by accidentally dropping a pot behind me in the kitchen. I am not implanted, but my mom has said I would have been if the technology was more mature when I was a child.

Before entering kindergarten, testing suggested I was about 1.5 years behind my peers in terms of kindergarten readiness. My parents claim I "caught up" in 6 months, I suspect I am still catching up! I was in a total-communication program within a larger public school. From elementary through high school, I had a deaf resource room but my classes were with all the hearing students, along with a sign language interpreter.

On a personal note, in terms of social development, I wish I had been placed in a deaf school. The social isolation of mainstreaming had a tremendous negative impact on me growing up-- it was not until I went to college (at RIT/NTID) that I finally felt "not alone" and found my own community of peers.

In terms of oral/TC/manual programs, I am not an educational researcher so I will mainly dodge the question and raise another point! To date, we really still do not know how to teach deaf children. Cultures all around the world have developed their own ways of teaching children successfully, but deaf people have not been allowed to develop their own pedagogy for deaf children -- despite being the people that would know exactly what works and does not work through their own experiences in the deaf education system. From my own experiences, I would suggest that 1. Visual language is critical, 2. Social development is just as important as academic development.

I am very interested in CODA children -- do they experience in any sort of similar way the (slight) speech development delay that verbal bilingual children do? It's my understanding (from my undergrad in english and linguistics) that the source of the delay is from the brain "sorting" which grammar rules and vocab go into which "pot" (and after that sorting finishes, the child suddenly is talking everyone's ear off! :)). I'm curious if this is the same when a child is learning a sign language and a verbal language -- does the brain still need that time to "sort" the grammar into separate languages, or, does the difference between signing vs verbal help get things sorted way quicker?

Thank you! :)

rdmhat

I am not entirely familiar with the CODA literature. In general, bilingual kids will seem delayed compared to monolingual kids until they are older. Sign language in the brain will activate many similar brain-processing areas as spoken language (this is over-simplifying), so I imagine it will be similar for CODAs (maybe there are some lurking around here that can tell their own experiences). I have seen young CODAs that will confuse spoken English and ASL, signing with hearing people and speaking to deaf people for example, until they "figure it out."

Somewhat strange question:

Background: I am currently pregnant with my first child. My husband and I are both scholars and both in touch with our ethnic backgrounds. We are planning to expose our baby to the English, Russian, and Greek alphabets, and casually use those three languages and Hungarian in the house.

Question: will our kid's brain recognize that it's learning several languages, or will it simply be learning the PW Kid's Language? (If that makes sense outside my head) should we be concentrating on English first, and then the other languages? Thank you!

Palewisconsinite

The other answers given to your question are great ones! I personally think it is awesome that you are exposing your children to so many languages.

What is the most extreme case of a lack of early language exposure that you have come across? How did this effect the family?

mistah_legend

Neil Glickman is a psychologist in Massachusetts. He has also published the most to date on lack of early language exposure, language deprivation, from his experiences on a deaf inpatient unit.

He described a story of a language-deprived deaf patient on his unit who was admitted because of extreme paranoid behavior. It turned out that his parents were hiding strong psychoactive drugs in his food and he was becoming violent when his mother attempted to give him his food. Of course, the parents did not tell any of the mental health professionals up to that point about the medication until Dr. Glickman did extensive work with the patient to piece together the story.

Extreme language deprivation is heart-breaking to witness. I have seen one inpatient who was institutionalized when she was a child and cannot have a conversation with anyone because no one signed with her growing up. Of course this leads to significant behavior problems, because if you cant express your feelings or tell someone you need to go to the bathroom -- you will act out.

What is unfortunate is that these language-deprived people are admitted into the mental health system, despite technically not having a mental illness per se. Patricia Black and Dr. Glickman did a review of their own deaf inpatient unit, finding that the majority were language dysfluent (75%) and *not psychotic*, while hearing inpatients were primarily admitted for psychotic reasons.

http://jdsde.oxfordjournals.org/content/11/3/303.short

CODAs are often the forgotten members of the deaf world. What early language development research is most pertinent to better understand their typical language development?

sjgw137

Bilingualism research since they are learning ASL as their first language and spoken/written English as their second language!

Does your research cover the hard of hearing. I have terrible hearing but it was never addressed until I was an adult. I think I slipped under the radar mostly because people figured I was just a poor student. I found that once it was addressed my academic performance improved greatly. Unfortunately I think my social skills have been stunted because I was just never able go through the social development processes and experiences the way normal children do.

AssWormJim

Research on hard of hearing people is extremely limited. Researchers love having a big, and uniform, population to study -- hard of hearing people are the opposite of that as there is so much variation in what hard of hearing is.

So much of social skill development comes from incidental learning, being around other people and seeing how they interact in situations that do not happen in a structured classroom. I am sure you missed out on some things, just like deaf children may not be able to access situations that happens in non-signing families. Missing an opportunity to see an argument be peacefully resolved, or overhearing your parents discuss how to pay the mortgage -- these add up and by the time someone is an adult, a person may be lacking a lot of general understanding about how the world works.

Hi there! I've heard that Deaf culture often does not support cochlear implants. What is your stance?

Scire_tacere

From my perspective -- the underlying controversy of cochlear implants, if you peel back the layers, seems to be that the implant is represented as a hearing loss cure (when it is not), and then justified to exclude sign language as an option for deaf children. Deaf adults are the people who have to live on a daily basis, and live alongside other people, with the consequences of decisions made by medical professionals who only see them at a young age.

I personally believe the CI can be a useful tool for some people, but it should be questioned whether invasive brain surgery is truly worthwhile. The technology is not at the point where a child is not at risk for language deprivation by excluding sign language. Dr. Tom Humphries from UCSD has a wonderful publication on this: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4237221/

Dear Dr. Hall.

When I was a baby I suffered significant cranial trauma (I was dropped by the nanny)

I was then deaf for the next five years, until grommets sorted me out. I've always wondered if this is at all connected to my dyslexia, dyspraxia and ADHD (early social problems sort of go without saying)?

joerootisnickcage

I am sorry to hear about your trauma. Unfortunately it is impossible to know what may be related to the deafness, and/or the trauma, or anything else! We do not have the ability to open up your head and see what is ticking inside or why it is the way it is. This is why research conclusions need to be based on the strength of having a lot of subjects -- because that will smooth out the individual variation of everyone's different life experiences.

I have been wondering about how brain activity and picking up ambient sounds is related. I had a thought that a lot of brain activity can be de-noised, and possibly understood better, by studying the brain activity of deaf and blind patients and comparing them to those who can hear/see properly. Any value to this thought?

diff2

The issue with your thought is that brain development is fundamentally impacted by being deaf, being blind, being hearing, growing up in America, growing up in Russia, etc.

The deaf brain will organize itself differently from the hearing brain and language experience will further organize that brain (http://www.pnas.org/content/95/3/922.short). I am not a brain researcher but I do know that when they research how a specific task is presented in the brain, they will do it many times and "average" out the brain activity to remove all the extra stuff that happens around that specific brain result they are looking at.