>> Welcome to our talk about bilingualism effects and death and hearing bimodal individuals. I am Corina Goodwin, I will be presenting in English, you can see Diane who will be presenting and American sign language. He will present the same content, but in two different languages. We would like to begin by discussing some of the advantages of bilingualism. First, being able to use two different nine which is provides more opportunities to interact with different people. Bilingualism also provides multiple routes for learning , or obtaining information. There is also a lot of research which shows that children who are bilingual have advantages and metalinguistic skills, or in their ability to think about language using language. Finally, some readers even suggest that our cognitive elements bilinguals. Now, let's look at detail on how language acquisition works for bilinguals. Here we have two children, Jayden on the right left , and Amara on the right. Amara will not receive as much input in language A as Jayden does. This is because Amara total time immersed in language is a split across language A in language B. Because the total amount of time language spends immersed in language is related to the pace of language development, Amara cannot be expected to develop and language A at the same place as Jayden does. So, if you want to see how language acquisition is progressing for Amara, you need to use a different measuring stick compared to the one you use for Jayden. When you are focusing on language A, it should not be expected that outcomes will be at the same pace for bilingual and monolingual children. That is okay. But, since we may want to know whether additional language supports are needed, we need to know what the baseline might be expected to be for bilingual children. Ideally, we would have a lot of information about the development of language A and language B for many children of different ages who experience input and interaction in both languages. So, what about bimodal bilingual children? These are children who are learning both a natural saying language such as ASL, and a spoken language such as English. Unfortunately, there is not a lot of baseline information about this group of bilinguals. We are trying to solve this problem. Our project is collecting information to document the natural acquisition of both ASL and English by two groups of children. First, we are looking at deaf and hard of hearing children with death signing parents were also accessing spoken language with cochlear implants. We are also looking at hearing children with death signing parents. The children in our study operating typically in their development of ASL and is important to include measures of both languages when looking at bilingual children. However, in this presentation, we are oral only analyzing the spoken English by including both Hildred hearing and deaf children, we can find the effects of bimodal bilingualism , knowing a sign language and spoken language, and the effects of learning English using a cochlear implant. Our participants were six deaf and six hearing children from the ages of one year seven months and five years 11 months. All the children were living with at least one deaf parent and ASL was the language of the household. All six of the deaf children had two deaf signing parents, four of the hearing children had one hearing parent they use both English and ASL. All participants had exposure - - the deaf children cannot access spoken language until after they received a cochlear implant. For this group of children, cochlear implant activation occurred between 12 and 19 months of age , and all received a second implant at the same time or within two years. It is important to note that these participants had optimal input. Their families used ASL with that from birth, and they had good access English . We realize that this is not typical for deaf and hard of hearing children. Each participant has been observed multiple times by a range of ages. The are forced at the 25 observations per participant. We video recorded the children in naturalistic play sessions. The play sessions were connected with the hearing English-speaking research assistants. After these play sessions were recorded, the English was transcribed. These transcriptions were then run through program and CLAN which provides various interpretations scores language scores for interpretation . Out of all the language scores that KidEval provides, we will focus your only three measures. The first measure is vocabulary, diversity or VocD. The second measure we will look at is the mean length of utterance and morphine's or MLUm. Third we look at the index of production syntax or IPSyn, this considers how many different types of sentences a child produces. Here are the results from the bimodal bilinguals in our study for the study of vocabulary diversity or VocD. Each session analyzes represented as a dot on the scatterplots. Keep in mind that not all the dots are independent, since we had multiple observations for each child. You can see that it looks like the scores go up with age, as expected we can also see a lot of overlap in the scores of the deaf participants in yellow and the hearing precipitate in blue. We conducted a statistical analysis using a linear, mixed effects model with precipitate as a random effect and hearing status as a fixed effects. This analysis found that age was significant, but group was not significant, nor was the interaction between age and group. This means that the punishments were expanding their vocabularies as they get older with no clear differences between the deaf and hearing children. Here are the results from our measure of syntax complexity, MLUm. Again, each session analyzes represented as a dot on the scatterplot. You can again see a clear increase in scores with age. We can also against the a lot of overlap in the scores of the deaf participants in yellow and the hearing dispensed in blue. We conducted the same type of statistical analysis as for a measure of vocabulary diversity, a linear mixed effects model. Again, this analysis found that Asia was significant , but group was not significant , nor was the interaction between age and group. This means that punishments were producing longer sentences as they get older with no clear differences between the deaf and hearing children. Finally, here are the results for our measure of syntactic diversity, IPSyn. You can see that as the previous measures, the scores fill up with age and there is a lot of overlap in the scores of the deaf and hearing recipients. We again committed a statistical analysis using a linear mixed effects model . This time, there was a significant effects for age, group and the interaction between age and group. This means that scores for the deaf group did not increase as quickly as the ones for the hearing group. We just discussed how the two groups of bimodal bilinguals compare with each other, but what happens when they compare these bimodal bilingual participants to English speakers? Remember, we don't expect him to add the same pace of development in English . Since they are dividing the time to English and ASL, they have a whole additional language in the repertoire. Let's consider first some of the factors that influence development for bilingual children. First, we know that the age of exposure to each language is important. For deaf children, this will relate to their aid of age of cochlear implant activation. The amount of input they receive in each language overtime is important. We even know that the child's place in the family structure, like how many siblings they have, whether they are the first, middle or last child etc., is important. It is also important that the children are exposed to many people who use each language, so the number of people using each language with the the child matters. There is also an influence of the attitudes of the family and society more broadly towards bilingualism. The KidEval database compares participants scores from typically developing children by using standard deviations as shown on this bell curve. Most scores were far close to the mean and have a standard deviation near zero. Scores that fall below the mean may indicate that a child's language of element is slower than that of a monolingual hearing child. Of course, that is not unexcited for bilinguals, as their language input is split across two languages. For every six month age interval, the KidEval program determines up mean and standard deviation for participants in the database. We can compare the results from our participants by determining how many scores fall within one or two standard deviations from the mean of the reference group. Since there is no standardization of scores , and the measures to be used from a comparable bilingual population, we decided to focus on what percentage of scores follow less than 1.5 standard deviations for the mean of monolingual's. For monolingual's, about 67% of scores are expected to fall 1.5 standard deviations below the mean. Here we can see that for the hearing bimodal bilinguals, this is the portion falling below this point for VocD and MLUm and very close for IPSyn. However, a greater proportion of the deaf participants fall into this group for each measure. But, we can also take into consideration the hearing each of the deaf children which calculates the time since activation of the first cochlear implants. If we compare the deaf participation scores - - chronological age matches the deaf participants age, we get the results in the next slide. Taking into consideration hearing age, we see that the deaf children are within the expected distribution of scores which are less than 1.5 standard deviations below the mean. For the MLUm and IPSyn measure. For VocD, the percent of scores in this range is slightly higher, 9% versus 67%. Now, let's discuss some implications of these results. Although the group sizes are small, these results do suggest some expectations for bimodal bilinguals who have good exposures to both ASL and English. These children were learning sign language and a spoken language are bilinguals. Their language development will not look identical to that of monolingual children learning English only. Factors that are known to affect bilingual language development for much of the age of first exposure, and the total amount of exposure to each language, will be important. We also want to emphasize a specific benefit of ASL for deaf children. Sam language is accessible to deaf children from birth and may prevent some of the harms that children experience with extended period of language deprivation. But there is still a lot of work to be done on this topic. First of all, because it is important to assess a bilingual in both of the languages, more work must be done to establish clear expectations for ASL development. Our lab is working on that right now. It is also crucial to study deaf children with hearing parents were learning to sign along with the children. We are also working on this now in our family ASL project and we would love to discuss this project more with you all after the talk. To wrap up, we would like to reiterate that even typically developing hearing bilinguals may score significantly below monolingual's if one of the languages are tested. We also want to stress that deaf or hard of hearing children the use of sign language and spoken language must be seen as bilinguals. We need to adjust our expectations for the pace of language development and remember to test both languages. Finally, we want to remind us all to celebrate the many advantages of using two languages and being bilingual. We would like to thank you all for your attention and acknowledge that we are so grateful to the participant in this study and their families for their long-standing involvement and support, as well as the many research assistants will help collect the data. We also want to thank the other research assistants who transcribed the sessions following the exacting conventions required for our automated analysis. If you have any questions or comments, please reach out to us at our email address, website , or of course at the conference. Thank you.

>> If anyone would like to ask some questions, we have a little bit of time. If you want to ask your question in ASL, please come to the front. Hi there, my name is Diana, I am a teacher at a deaf school. When you look at bilingual children who are deaf and have cochlear implants, do you see a difference in their spoken language acquisition compared to their ability to read in English?

>> That is an important question, thank you for asking it. That is not part of our study at the moment, so I don't have an answer to give you. We do expect that bilingual children , and we call them , consider them to be bilingual children , we would expect that their language development when compared to other eligible children . So, we should see parallels to what we would see in our bilingual groups, but I'll have a specific answer to the question you're asking about deaf children. Other questions?

>> You talked about biological age versus hearing age , which I think is a fascinating topic. When you're looking at , but we have never talked about a child having assigning age. I've always struggled with the concept of a hearing age because it seems to be related to a specific time that seems to be salient to parents. Can you comment about the concept of a signing age and if that is appropriate to come up with?

>> Thank you for that question. I think you are right , the time in which a child is exposed to sign language , say it is that age 1.5 or age 2, is going to be very different than if a child is exposed from birth. We don't have a lot of knowledge about that particular group . There was one study from another group of researchers that looked at children who were deaf children with hearing parents where the parents started learning American sign language and elected parents to a started learning ASL before the child was six months old. They compared those children to children with deaf parents . The children who led parents who started signing after their own biological age with six months were delayed to those who were signing from birth . Thank you very much for the presentation , I am Tommy from Maryland. I grew up and the listening and spoken word environments. Our parents were taught that learning sign language later would be a detriment to my use of listening and spoken language. Unintentionally, that impacts the belief of some myths out in the world . Do you think that there is some truth to this notion that if a child were to start learning in a different modality later, that would be a detriment to the modality that they were using?

>> Thank you for that question. I feel like it depends a lot on the environments. If there is strong support for both languages, then children can thrive in both at the same time. We know that is true all over the world. Children grow up and multilingual environments all the time. They acquire them at a natural pace. The question is, is there appropriate support for the languages in the child's everyday environments? Are they interacting with , in this case, people who are using ASL and people who are speaking in English? What is important is that peers are also using these language combinations . We learned a lot of language from exposure for both adults and from children who are our peers. I researched with KODA - - more dominant in English because they go to school and develop peer groups, they are typically using English in those situations. They are fine in ASL and deaf children will be just the opposite of that. It's time up or do we have time for one more quick question? I see one in the back . If you are going to ask your question in ASL, please come to the front of the room . If you are asking in English, then please use the microphone.

>> I will take the microphone. For the purpose of the study, how much exposure to each language are you considering sufficient to consider a child bilingual?

>> You supposed to have an easy question for me at the very end. That is a very hard question, and we do not have a number that we can get to say okay, if we have this language and that language, that will be bilingual . What we have to ask parents is what kind of exposure they are able to provide ? The children had some exposure in both languages, but it is impossible for us to count every single minute of exposure they receive in each language over the course of the study. Now, if we look at a comparison to other spoken languages, studies that have happened in spoken language, this is typically about 30 to 40% of the time that is necessary for each language. Thank you very much , thank you all.