


BSL Acquisition and Assessment of Deaf Children- Part 1: Language development in BSL

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Brief introduction

Research Interests

- 
- Individual differences in language acquisition
 - Context of language learning
 - Parallels between deaf and hearing populations
 - Language assessment

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Deafness Cognition and Language Research Centre

Welcome to the Deafness Cognition and Language (DCAL) Research Centre, based at University College London and funded by the Economic and Social Research Council (ESRC). DCAL brings together leading Deaf and hearing researchers in the fields of sign linguistics, psychology, and neuroscience.

DCAL started its research in 2006 and is funded by the ESRC until December 2015. It is the largest research centre in this field in Europe with nearly 40 staff and research students, about 1/3 of whom are Deaf. You can read about our research team and many research projects by clicking on the links at the left of this page.

The vast majority of research studies on language and thought are based on languages which are spoken and heard. DCAL's research provides a unique perspective on language and thought based on Deaf people's communication.

DCAL places sign languages and Deaf people in the centre of the general understanding of how language and communication work within linguistics, psychology and child development. Deafness is an important model for exploring questions in linguistics, cognitive sciences and in neuroscience, and this is now much more widely recognised (thanks in large part to DCAL's research efforts over the last five years).

Clinical developments in relation to hearing intervention, especially cochlear implantation, are also changing the experience of deafness and consequently our research programme.

The two overarching themes that drive our research are:

- » **How is communication shaped by deafness and the use of sign language?**
- » **How does deafness and early language experience impact on cognitive functions beyond language?**

For both themes our strategy is:

- » to consider the effects of deafness, delayed language development and sign language use across the life span by studying children, adolescents and adults including those with impaired signing;
- » to investigate similarities and differences between groups of individuals (e.g., native signers and late learners) at both behavioural and neural levels. In our research the views of professional groups who work with d/Deaf individuals as well as organisations of and for the d/Deaf have been taken into account to ensure that this practical impact will continue.

Tweets

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UCL Life Learning @UCLLifeLearning 14 Aug
Great work by DCAL, inspiring their Tweet to @DCAL_UCL



BSL acquisition of Deaf Children

Topics

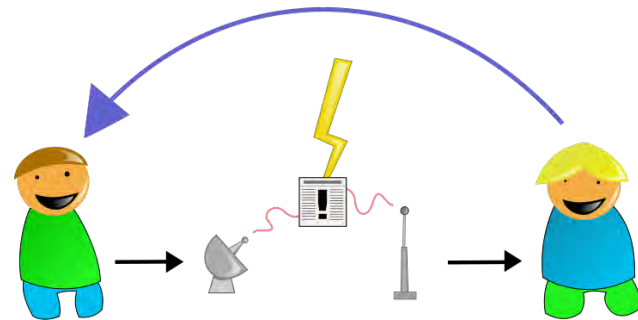
- + Similarities and differences between signed and spoken language acquisition
- + Ages and stages of language acquisition, and the affect of late language development
- + Implication of language input
- + Sign language and CI
- + Sign bilingualism

Some statements to get things started..

- + BSL is like pantomime
- + BSL is spoken English conveyed through signs
- + BSL is purely iconic (e.g., HOUSE, EAT, CAT)
- + All BSL users sign the same way

How is BSL different from English?

- + Different set of articulators
- + Different sensory system to receive language
- + Distinct grammatical structure
- + Lack of written form



How is BSL similar to English?

- + Complexity and expressiveness
 - + Convey subtle, complex, and abstract ideas. Signers can discuss philosophy, literature, politics, education, and sports
 - + Sign language poetry
- + Steadily growing vocabulary
- + Dialects and accents

What is and is not BSL/sign language

- + Gesture
- + Cued speech
- + Signed English/Sign Supported English
- + Fingerspelling



Evidence that BSL is a real language

- + Has a grammar just as good as English
- + Has a lexicon just as good as English
- + Different word order than English

(Sutton-Spence & Woll, 1990)



Signed English

- + Uses basic BSL signs in English word order
- + Has sign markers to show English grammar (articles + past tense)
- + Very slow
- + Not used in everyday communication
- + Teaching tool for English
- + No one-on-one match between BSL and English, e.g., *open*

Signed Supported English

- + Key words in a sentence are signed while person speaks
- + Main vocabulary comes from BSL
- + Much of grammar is English
- + Easy to learn for English users (e.g., parents)
- + Allows some communication/access to signing
- + Limited information on grammar (aside from lip-reading)
- + SSE does not refer to a single way of communicating!

The Structure of BSL

+ Just as with spoken languages, the scientific study of sign language involves several levels of organization:

+ Phonology

+ Morphology

+ Syntax

Phonology in BSL

+ Parameters:

- + Handshape
- + Movement
- + Location

+ Simple/ complex structures:

- + Unmarked/ marked handshape
- + Path or hand-internal movement versus both ('movement cluster')



Morphology in BSL

+ Negation

+ Reversal-of-orientation

+ DON'T LIKE

+ DON'T KNOW

+ DON'T WANT

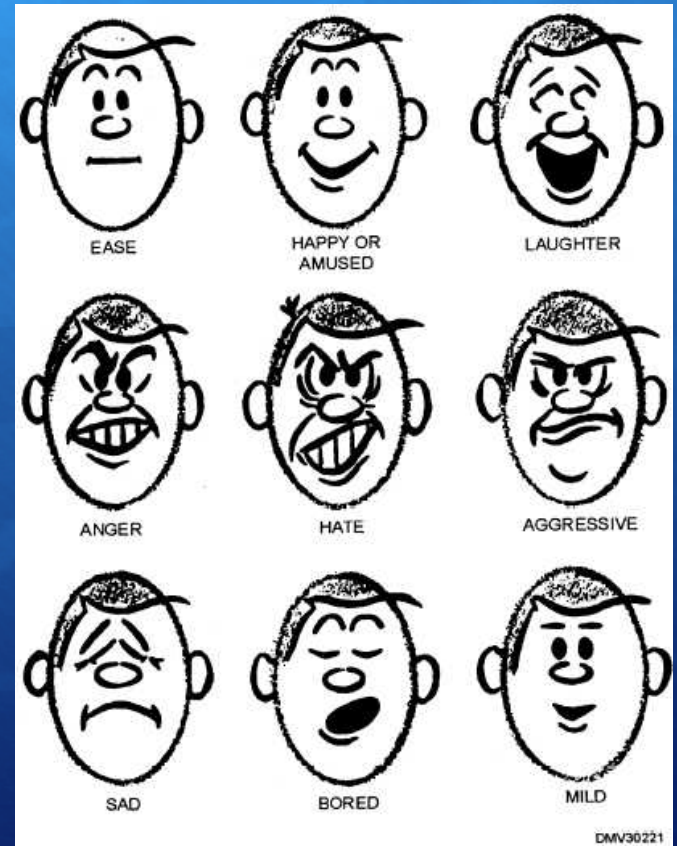
+ Use of space to mark pronouns

+ 1st vs. 2nd person: *palm orientation*

+ Singular vs. plural number: *movement*

Facial expressions

- + Carry linguistic meaning
 - + Yes-No questions
 - + Brow raised, widened eyes, tilt head forward
 - + WH-questions
 - + Draw brows together, tilt head back
- + Negations
 - + Shaking head from side to side



Syntax in BSL

- + Use of space to mark subject, object, etc. via
 - + referents (e.g., pronoun)
 - + predicates
 - + classifiers
- + Sign order (e.g., SVO for English)

Example from BSL



TABLE

TWO

GIRL

cl-FLAT-OBJ

cl-SMALL-ANIMATE

Translation: Two girls hide under the table.

Time line in sign language

- + Tenses (past, present and future) are indicated by the position of the sign in front of the body
 - + Present tense: use of space in front of the body
 - + Past tense: backwards movement
 - + Future tense: forward movement



Variability among language users

- + Hearing children can produce very simple English or they can produce sophisticated English and it's the same with BSL

Anecdote from BSL Productive Skills Test

- + "Boy get spider"
- + "the boy was very crafty, he knew the girl didn't know, he put the spider carefully and quickly into the sandwich"



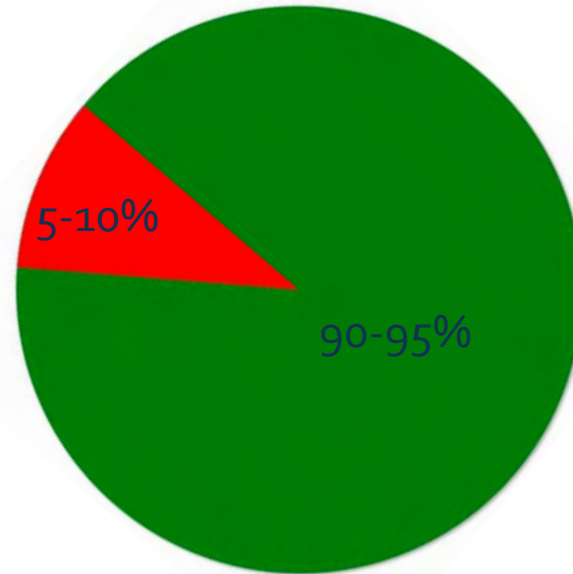
How do researchers study
BSL acquisition?

Typical developmental patterns

- + Need to look at children in deaf families, who have:
 - + Exposure to BSL from birth
 - + Predictable patterns of development
- + Deaf children in hearing families have:
 - + Later exposure to BSL
 - + Less exposure to good language models
 - + Less opportunity to use BSL at home and 'oversee' other people use BSL
 - + Higher variability in language development

Deaf population

Children with
deaf parents



Children with
hearing parents

- Hearing loss
- Amplification
- Language
- Additional needs

=> Diverse individual language profiles

Ages and stages of development

Research on deaf children with deaf parents shows..

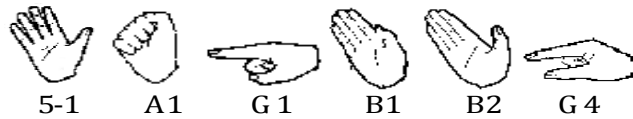
- + striking similarities between language development in signed and spoken languages
- + same types of mistakes and overgeneralisations
- + (Bellugi, 1988; Lillo-Martin, 1999; Meier, 1991; Newport & Meier, 1985; Schick, 2003).

Early developmental milestones for language

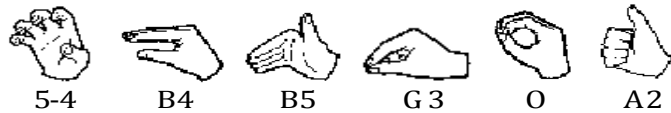
- ▶ 0-12 months: analysing the surrounding language for patterns in rhythm and structure
- ▶ From 6 months: early babbling (or 'mabbling') (Pettito & Marentette, 1991)
- ▶ 12 months: First signs and words (signs emerge slightly earlier at 10 months)
- ▶ 18 months: Vocabulary spurt
- ▶ 24 months: Two sign combinations (Morgan et al., 2008)

Development of BSL handshapes

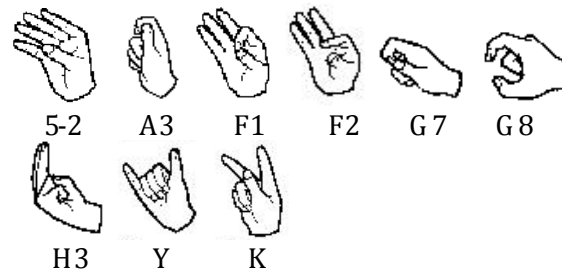
1;10:



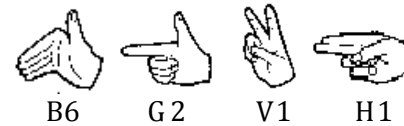
2;2:



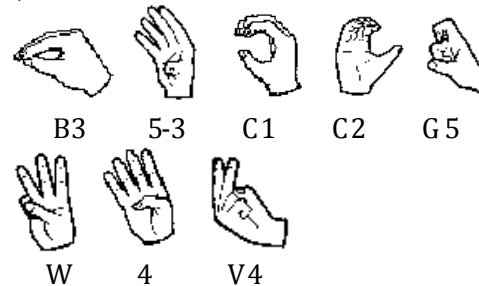
2;6:



2;8:



2;9:



3;0:



The first signs of language

- + By 24 months, children still find some words or signs harder to say than others – complex sounds or handshapes
- + 3 years: vocabulary reaches at about 500 signs (Morgan et al 2008)
- + Grammar starts to develop and continues developing throughout school years



Implications on language input:
different signing populations

Different signing populations

- + Most studies distinguish between
 - + children exposed to sign language by the age of 4 (native or early signers)
 - + children exposed to sign language following failure to acquire a spoken language as a first language (SL as a late L1)
 - + children who learn a sign language following acquisition of a spoken language (SL as an L2)

- + Course of language acquisition remarkably similar for children developing a signed or spoken language for native/early learners despite the modality differences
- + However, consistent differences exist between native and late L1 learners
- + Evidence for existence of a *sensitive* or *critical* period for sign language acquisition (similar to spoken language)

Timing of language acquisition

- + A 'sensitive period' is a period of time during which the development of a particular brain function is very sensitive to external input (Knudsen, 2004)
- + Critical Period (Lenneberg, 1967)
 - + Language acquisition linked to brain maturation (neural plasticity)
 - + Ability to acquire a language to a period during childhood
 - + Childhood = 'window of opportunity' for learning language
- + Exposure to an accessible language on a regular and frequent basis before 5 years of age to develop native-like language competence
- + Deprivation of external input during a sensitive period will prevent typical development of neural circuitry for the particular function

Effects of late development of language – signed or spoken

Deaf children may only be exposed to a sign language after failing to acquire a spoken language and this late exposure to an accessible first language generally results in long-term language deficits, including

- + less proficiency in the language
- + delay in knowledge and understanding of the world
- + delayed theory of mind
- + social isolation

Late vs native signers

- + Slower at recognising signs & need more visual information (Emmorey & Corina, 1990)
- + Less sensitive to errors in verb agreement & classifier usage (Emmorey *et al* 1995)
- + Reduced comprehension and use of morphology (Newport 1990, Galvan 1989)
- + -Critical factor=age of onset of ASL, not the number of years of practice

Study 1: Cormier et al., 2012 (UK)

- + Native/Early/Late signers see different pairs of sentences in BSL and have to judge which ones are grammatically correct
- + Accuracy of grammaticality judgments for sentences of BSL decreases as age of sign language acquisition increases
- + Significant L1 age of acquisition effect when age of acquisition is between birth and around 8 years of age
- + No such effect for late learners (>8 years)

Implications

- + Successful early acquisition of a first language is crucial, whether that language is a natural signed language such as BSL or a spoken/written language such as English
- + Early exposure to accessible language is much more likely to result in successful language acquisition than later exposure

Mayberry, 1993 (USA)

- + Research with 36 ASL late learners (adults), comparing late learners born deaf vs late learners who lost their hearing in late childhood after acquiring English
- + Measuring ASL sentence processing by recall of long and short sentence + short term memory for signed digits
- + Results: learners with ASL as 2nd language outperform ASL first language (late) learner (acquisition at same age)

Implications

- + Long term effects on delay in 1st language acquisition more detrimental than effects of acquiring 2nd language late in childhood

Mayberry & Locke, 2003 (USA)

- + Fifty-four adults with contrasting types of language experience in early life complete different tasks, including
 - + 1. grammatical judgment task to assess knowledge of selected English structures
 - + 2. Sentence-to-picture matching task to assess comprehension of grammatical rules in English
- + Results: Early language learners perform at near-native levels regardless of whether language is spoken or signed
- + Poor performance by late learners with no early language experience (9-13 years)

Implications

- + Onset of language acquisition in early human development dramatically alters the capacity to learn language throughout life, independent of the sensory-motor form of the early experience.

Importance of Critical Period for deaf children

- + Great variability in deaf children's early language experience with many children arriving at school without proper language
- + If deaf children are not exposed to a visual language *early in life*, it is likely that these children will *miss* part of the sensitive period for language learning, which may contribute to poor language outcomes
- + Skilled comprehension + production of language in adulthood dependent on age of exposure during development (i.e., the earlier the better)



Sign language and CI

Advancing technologies

- + More opportunities for deaf children to acquire spoken language than ever before (Knoors & Marschark, 2012)
 - + Early infant hearing screening
 - + Amplification technology
- + Children who receive implants in early childhood (<3 years) develop speech processing abilities, often far in advance of those predicted for a deaf child without a CI

Research on CI

- + Wide range of findings, with some evidence for superior performance in spoken language for children in oral communication programs, but this is not consistent nor by far is it the only or primary factor affecting outcomes
- + Only a small subset of signing children in CI studies received sign language input at a very early age (e.g., in the first 6 months or first year of life).
- + Even those who do receive early exposure frequently are exposed to some form of signing – SEE, etc – but not to a natural sign language, e.g., ASL or BSL (Davidson et al., 2014)

Children with CIs



- + Require intensive rehabilitation throughout childhood to learn to communicate orally.
- + Even with this training, some children become better oral communicators than others
- + Mixed findings regarding the ability of children with CI to “catch up” to typically hearing peers’ level of vocabulary knowledge
- + No studies that looked at visual language acquisition in the pre-implanted child

Study 1: Hassanzadeh, 2012 (Iran)

- + Comparison of CI outcomes in 7 deaf children with 7 deaf parents and deaf children with hearing parents
- + Measures of participants' speech perception, speech production and language development at different time points (1st fitting, 6 mth, 12 mth, final test)
- + Results: both groups of children showed auditory and speech development
- + Deaf children/deaf parents outperform deaf children with hearing parents in CI performance

Implications

- + Encouraging deaf children to communicate in sign language at a very early age, before CI, improves their ability to learn spoken language after implementation

Study 2: Davidson et al., 2014 (USA)

- + Investigation of the *spoken English* language skills of 5 children (4-8 years) with CIs who also had deaf signing parents (CI between 16-35 months)
- + 20 Hearing children (4-9 years) with deaf parents (Cudas) as controls + norms for monolingual hearing children
- + Completed several standardized tests for English (vocabulary, syntax, articulation)
- + English performance comparable with Cudas/hearing peers
- + Scores above results predicted for oral-only children with CIs

Implications

- + Without a period of language deprivation *before the implantation* of the CI, children with CIs can develop spoken language skills appropriate for typically hearing children of the same age
- + Sign language input to a deaf child does *no harm* nor prevent subsequent spoken language development after he/she receives a CI and might well lead to greater success with such development



Sign Bilingualism

What is bilingualism?

- + Quick brainstorm
- + Bilingualism means being fluent in two or more languages
- + This means being able to understand and use two languages i.e. read, write, have conversations etc
- + It depends on the age of acquisition!

Are deaf children bilingual?

- + Most deaf signers particular those in Western and urban societies are bilingual to some degree as they may be exposed to signs while, at the same time, acquiring the spoken language of the linguistic majority
- + Bilingualism in hearing families is difficult as both the child and the parents are learning a new language

Benefits of bilingualism

(From Bilingualism Matters - www.bilingualism-matters.org.uk)

- + Better at multitasking
- + Better at focusing attention
- + More flexible thinking
- + Able to code switching
- + Better readers
- + Find it easier to learn other languages
- + More aware of different cultures, other people and other points of view

Study 1: Rinaldi et al., 2013 (Italy)

- + Study of lexical comprehension and production in ISL by 8 deaf signing toddlers (2-3 years) who were exposed to sign language since birth
- + Hearing control
- + Participants complete a picture-comprehension/naming task
- + Comprehension > production in both groups
- + Deaf = Hearing on comprehension
- + Gap in lexical production (Hearing > Deaf)

Possible reasons for lower productive performance by deaf participants

- + Amount of language input available to a deaf child more restricted than the language input to which a hearing child has access from his/her hearing parents and from the broader speaking environment (incidental learning)
- + Early lexicon of (deaf) bilinguals distributed between their two languages with few equivalent labels.
- + Test used in the study was originally developed for spoken language (cultural factors)

Study 2: Mann, Sheng, & Morgan (USA)

(under review)

- + Investigation into deaf sign bilinguals' organization of their mental lexicon in signed and spoken language
- + 12 deaf native signers (6-10 years) + 49 hearing monolinguals
- + Use of word association tasks
- + Examining deaf participants' responses in L1 (ASL) and L2 (English)
- + Comparing their performance in both languages to hearing monolinguals' performance in English

Findings

- + 1. Deaf ASL vs. Deaf ENG: ASL = ENG
- + 2. Deaf (ASL) vs. Hearing (ENG): ASL = ENG
- + 3. Deaf vs. Hearing (ENG): Hearing > Deaf

Implications

- + Deaf and hearing children are using similar age-appropriate organizational principles to structure their mental filing systems
- + Smaller number of responses in English may be explained by deaf children's lack of exposure and smaller vocabulary
- + Less than 10 % overlap in deaf children's responses for each language which supports the idea of two separate vocabularies



Things to consider when working with deaf children

Access to language

- + Deaf infants need exposure to good signing models, not just to good speakers
- + Various combinations of speech, gestures, and rudimentary signing can help in family communication, and such systems often have some structural similarities to natural language
- + However, these systems are no substitute for bona fide language, nor do they allow the child to communicate with others outside the family

Quantity vs quality

- + Quality of the (hearing) family's signing far less important than the fact that the family communicates with the child
- + Deaf children who sign with their hearing mothers show early language expressiveness similar to hearing children of the same age despite variability in the mothers' signing skills
- + Benefit of exposing deaf children to the signing community (more experienced/native signers)
- + This behavior allows the adult and child to interact in a more sophisticated way; deaf children of deaf parents quickly learn to alternate their gaze between a parent and a book or object, thus enhancing comprehension

(Mellon et al., 2015)

Important to remember

- + Children do NOT get confused if they are exposed to two or more languages
- + There is NO evidence that learning sign language affects the acquisition of speech
- + If anything, it is more likely to enhance the acquisition of speech because of the strong understanding of language structure
- + More than 50% of the world are bilingual

Childhood bilingualism – what should I know?

Childhood bilingualism is complicated as its nature is influenced by:

- + 1. amount of exposure to both languages
- + 2. quality of exposure to both languages
- + 3. use of either language in the school
- + 4. use of either language in the wider community
- + 5. age at which the child is exposed to either language

Useful references

- + Lauchlan, F. & Carrigan, D. (2013). *Improving learning through dynamic assessment. A practical classroom resource*. London: Jessica Kingsley Publishers.
- + Mellon, Nancy K., John K. Niparko, Christian Rathmann, Gaurav Mathur, Tom Humphries, Donna Jo Napoli, Theresa Handley, Sasha Scambler, and John D. Lantos. Should All Deaf Children Learn Sign Language? *Pediatrics* 136, no. 1 (2015): 170-176.
- + Sutton-Spence, R., & Woll, B. (1999). *The linguistics of British Sign Language: an introduction*. Cambridge University Press.
- + www.bilingualism-matters.org.uk
- + www.bslvt.net
- + www.ucl.ac.uk/dcal
- + www.ucl.ac.uk/HCS/research/EBSLD/

- + Asad, A. N., Hand, L., Fairgray, L., & Purdy, S. C. (2013). The use of dynamic assessment to evaluate narrative language learning in children with hearing loss: Three case studies. *Child Language Teaching and Therapy*, 29(3), 319-342.
- + Cormier, K., Schembri, A., Vinson, D., & Orfanidou, E. (2012). First language acquisition differs from second language acquisition in prelingually deaf signers: Evidence from sensitivity to grammaticality judgement in British Sign Language. *Cognition*, 124(1), 50-65.
- + Davidson, K., Lillo-Martin, D., & Pichler, D. C. (2013). Spoken English language development in native signing children with cochlear implants. *Journal of deaf studies and deaf education*, 18(4), 445-455.
- + Hassanzadeh, S. (2012). Outcomes of cochlear implantation in deaf children of deaf parents: comparative study. *Journal of Laryngology and Otology*, 126(10), 989.
- + Mann, W., Peña, E., & Morgan, G. (2015). Child Modifiability as Predictor of Language Abilities in Deaf Children who use American Sign Language. *American Journal of Speech-Language Pathology*.
- + Mann, W., Peña, E. D., & Morgan, G. (2014). Exploring the use of dynamic language assessment with deaf children, who use American Sign Language: Two case studies. *Journal of communication disorders*, 52, 16-30.
- + Mayberry, R. I. (1993). First-Language Acquisition After Childhood Differs From Second-Language Acquisition The Case of American Sign Language. *Journal of Speech, Language, and Hearing Research*, 36(6), 1258-1270.
- + Mayberry, R. I., & Lock, E. (2003). Age constraints on first versus second language acquisition: Evidence for linguistic plasticity and epigenesis. *Brain and language*, 87(3), 369-384.
- + Rinaldi, P., & Caselli, M. C. (2014). Language development in a bimodal bilingual child with cochlear implant: A longitudinal study. *Bilingualism: Language and Cognition*, 17(04), 798-809.

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+ Thank you!

