Language Transfer in ASL/English Bimodal Bilingual children with CIs

Language of presentation: English and ASL

The languages of bimodal bilingual children and adults may influence each other; sign may take on structural properties of speech, and vice versa. Here, we investigate the potential linguistic transfer of structure between English and American Sign Language in one special group of bimodal bilinguals: children who are born deaf to deaf parents, receive cochlear implants, and continue with regular exposure to both sign and speech. While these children are rare among cochlear implant users overall, they can be considered an ideal case of language learning among children with CIs due to their uninterrupted access to sign language from birth ([1][2]), much like hearing kids of deaf adults ('kodas'). On the other hand, kodas experience spoken language input from birth, but access to spoken language is different for CI users. Our study examines the development of ASL and spoken English under such circumstances. To the extent that English is non-adult-like, we ask whether this may be due to influence from ASL, to typical developmental stages, or to CI-specific factors, by examining how syntax and pragmatics are influenced by language environment in comparison to age-matched peers.

We coded language produced during free-play sessions for two balanced bilingual CI children (ELI, 3;00; GIA, 6;02), one koda (BEN, 3;00), and one English-speaking monolingual (JOY, 3;00) (Table 1). For syntactic analysis we focus on one area of potential cross-linguistic transfer: omitted determiners in English noun phrases (DPs). ELI and BEN omitted determiners in 10-15% of required cases in English target sessions, but 48-73% in ASL target sessions. We take the latter to be an indication of strong ASL influence, as most of both children's English utterances were bimodal (88-94% of all English utterances), much more than in the English sessions (9-15% bimodal). ELI's and BEN's target English sessions were comparable to that of the monolingual English child JOY, who omitted 13%. The older balanced bimodal CI child, GIA, omitted only 4% in the English session and 66% in the ASL session. These results suggest that both cross-linguistic influence and ongoing language development affect determiner usage.

Speakers must also adhere to specific pragmatic conditions in noun phrase use (e.g. definite articles for familiar referents). We found that even among syntactically well-formed DPs, pragmatically appropriate use showed effects of cross-linguistic influence and development. ELI and BEN used pragmatically inappropriate noun phrases only 3-6% in their target English sessions, comparable to JOY's 3%, while GIA used none; yet ELI used 16% in his target ASL session (BEN was at 4%) (Table 2). As in syntax, pragmatics shows considerable variation in stages of language development, and influence of ASL was strong in ASL sessions, suggesting sensitivity to the linguistic environment, but potential early effects of CI usage as well.

Overall, our findings indicate that when children with CIs are given full access to sign from birth, they may show linguistic development comparable to age-matched bimodal bilingual peers, showing effects of development and cross-linguistic influence, in addition to potential CI effects.

(498 words)

Tables

Table 1: Omitted determiners in children's English speech. Target English sessions were free-play with native English speakers; Target ASL sessions were free-play with a deaf parent and native signing experimenter.

	Session length coded	**Total English DPs requiring determiners**	**Omitted required determiners**	**Percentage required determiners omitted**
ELI (CI) 3;0, Target English	33 mins	46	5	10%
ELI (CI) 3;0, Target ASL	21 mins	41	20	48%
BEN (KODA) 3;0, Target English	20 mins	88	13	15%
BEN (KODA) 3;0, Target ASL	15 mins	33	24	73%
JOY (MONO), 3;0, English	29 mins	38	5	13%
GIA (CI) 6;2, Target English	51 mins	69	3	4%
GIA (CI) 6;2, Target ASL	51 mins	18	12	66%

Table 2: Pragmatically appropriate use of English noun phrases

	Total English DPs (excluding pronouns)	**Pragmatically inappropriate English DPs (syntactically adult-like)**	**Percentage pragmatically inappropriate DPs**
ELI (CI) 3;0, Target English	70	2	3%
ELI (CI) 3;0, Target ASL	76	12	16%
BEN (KODA) 3;0, Target English	118	7	6%
BEN (KODA) 3;0, Target ASL	47	2	4%
JOY (MONO) 3;0, English	61	2	3%
GIA (CI) 6;2, Target English	69	0	0%
GIA (CI) 6;2, Target ASL	18	0	0%

References

[1] Giezen, M. (2011). *Speech and Sign Perception in Deaf Children with Cochlear Implants*. LOT: Netherlands Graduate School of Linguistics.

[2] Hassanzadeh, S. (2012). Outcomes of cochlear implantation in deaf children of deaf parents: comparative study. *The Journal of laryngology and otology*, *126*(10), 989–94.