Profile of a Family's Bimodal Bilingual Development

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Background

The Family ASL project documents hearing parents' development as M2L2 signers (the sign language is an L2 in a modality that differs from that of their previously acquired language(s)) and examines how these attempts affect their children's development in sign and/or speech (Lillo-Martin et al. 2021). Here, we summarize one family's journey over the course of their year-long participation in our longitudinal study.

Research Question

What is the effect of parental attempts at learning a sign language on their children's linguistic development in sign and/or spoken language?

Methods

This parent and child dyad is the first of multiple families to complete our longitudinal study. Families met with a deaf ASL specialist on Zoom over 50 weeks, developing their ASL through lessons, discussions, reviews, etc. During this time, two types of data were collected (see supplemental handout for additional results and details):

Weekly 30-minute spontaneous language samples, analyzed for:

- Proportion of use of ASL vs. English (modality)
- Syntactic diversity of mother's signing (ASL-IPSyn)
- Syntactic diversity of child's spoken English (Eng-IPSyn)
- Syntactic complexity of child's spoken English (Eng MLUm)

Periodic experimental tasks include:

Parent and child:

- ASL vocabulary knowledge (ASL CDI)
- ASL phonological accuracy at feature level (ASL PET)

Child only:

- English vocabulary knowledge (Eng CDI)
- General communicative skills (VCSL)

Participants

Child

- Profoundly deaf
- Received bilateral cochlear implants at 1;8 and used them consistently
- Was 2;0 upon entering this study

Parent

- Hearing
- Began learning ASL prior to joining this study

Results (parent measure / child measure)

		Child's age												
TASK	**Domain**	**2;00**	**2;01**	**2;02**	**2;03**	**2;04**	**2;05**	**2;06**	**2;07**	**2;08**	**2;09**	**2;10**	**2;11**	**3;00**
ASL IPSyn (146 max)	**Syntactic diversity**		57				66							81
ASL PET	**Phonological accuracy**		94%					91%						95%
ASL CDI (/100)	**Vocabulary knowledge**			94						93				93
Modality (proportion)	sign/speech/ bimodal				2/34/ 64		3/26/ 71		0/24/ 76		0/60/ 40			99/0/ 1
ASL PET	**Phonological accuracy**		69%					80%						86%
ASL CDI (/100)	**Vocabulary knowledge**			75						92				93
VCSL (scaled)	**Visual communication**	62								65				69
Eng IPSyn (118 max)	**Syntactic diversity**		29	15	21	26		19	35	31				41
Eng MLUm	**Syntactic complexity**		1.5	1.7	1.6	1.7	2.0	2.1	2.2	1.9				3.9
Eng CDI (/100)	**Vocabulary knowledge**				47					86				100
Modality (proportion)	sign/speech/ bimodal				2/50/ 48		18/16/ 56		10/28/ 62		0/91/ 9			14/56/ 30

Results

Child: Language and cognitive development was similar to that of bimodal bilingual children with access to ASL from birth (Goodwin & Lillo-Martin 2023). Over the year, both ASL and English skills increased steadily. Modality was mostly speech only or bimodal.

Parent: High scores for vocabulary and phonology, with grammar scores increasing over time. Modality was mostly speech only or bimodal, but final sample was nearly all sign-only.

Discussion

The parent already had conversational proficiency upon entry to our study, so scores for vocabulary and sign form (phonology) began and remained near ceiling; ASL grammar scores increased over time. Child's ASL and English scores suggest that home ASL input was sufficiently rich to support the child's ASL development, which did not prevent English development (cf. Pontecorvo et al. 2023). For both parent and child, utterances involving signing (sign+bimodal) consistently made up the majority of analyzed sessions, confirming previous reports that hearing parents committed to a bimodal bilingual approach can sustain a home environment conducive to their deaf child's early ASL and English development, even as L2 signers (Lu et al. 2016, Caselli et al. 2021, Lieberman et al. 2022, Chen Pichler 2021).

This case study strengthens existing arguments that early access to ASL for deaf children from hearing parents supports successful bimodal bilingual development.

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See handout for References cited and full table of results.

Table of Results

TASK	Child's age												
	2;00	2;01	2;02	2;03	2;04	2;05	2;06	2;07	2;08	2;09	2;10	2;11	3;00
ASL IPSyn (146 max)		57				66							81
ASL PET		94%					91%						95%
ASL CDI (/100)			94						93				93
ASLPI (0-5)												2	
ASL-CT (/30)						19						18	
Modality (proportion)				2/34/64		3/26/71		0/24/76		0/60/40			99/0/1
sign/speech/bimodal													
ASL PET		69%					80%						86%
ASL CDI (/100)			75						92				93
VCSL (scaled)	62								65				69
Eng IPSyn (118 max)		29	15	21	26		19	35	31				41
Eng MLUm		1.5	1.7	1.6	1.7	2	2.1	2.2	1.9				3.9
Eng VOCD (raw score)		44.4	36.9	28	28		33.2	37.7	34.4				21.9
Eng CDI (/100)				47					86				100
Eng PPVT-5 (scaled)							102				106		
DAYC-2 Cog (scaled)						113						116	
DAYC-2 SE (scaled)						130						124	
Modality (proportion)				2/50/48		18/16/56		10/28/62		0/91/ 9			14/56/30
sign/speech/bimodal													

Key to Assessments

Parent / Child measures

ASL PET ASL Phonological Elicitation Task - requires repetition of ASL signs and scored for phonological accuracy at feature level; overall percent accuracy reported

ASL CDI ASL Communicative Development Inventory (Caselli et al. 2020) - a measure of vocabulary knowledge ('understands and signs'); 100 sign version

Modality Proportion use of sign, speech, or bimodal utterances in a 15-minute language sample

Parent measures

ASL IPSyn ASL Index of Productive Syntax (Lillo-Martin et al. 2017) - a measure of syntactic diversity; maximum score 146

ASLPI Proficiency Interview administered by testers at Gallaudet University and scored on a 0-5 scale

ASL-CT ASL Comprehension Test (Hauser et al. 2016) - multiple choice online comprehension test

Child measures

VCSL Visual Communication and Sign Language checklist (Simms et al. 2013) - general communicative skills; results presented as scores scaled 0-100 (Allen & Morere 2022)

Eng CDI MacArthur-Bates Communicative Development Inventory - Short form (Fenson et al. 2000) - a measure of vocabulary knowledge

Eng PPVT-5 Peabody Picture Vocabulary Test - 5 (Dunn 2019) - Vocabulary comprehension task

The following 3 measures are scored using KidEval (Ratner & MacWhinney 2016)

- **Eng IPSyn** Index of Productive Syntax (Scarborough 1990) - a measure of syntactic diversity; maximum score 118
- **Eng MLUm** Mean length of utterance in morphemes,
- **Eng VOCD** A measure of vocabulary diversity (McCarthy & Jarvis 2007)

DAYC-2 Developmental Assessment of Young Children - 2 (Voress et al. 2012) - Cognitive and Social/Emotional scales

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