

Sign Language Acquisition by Deaf and Hearing Children

**Deborah Chen Pichler, Marlon Kuntze, Diane Lillo-Martin,
Ronice Müller de Quadros, and Marianne Rossi Stumpf**



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Chapter 5 L1 Development: 18–36 Months

Overview of Chapter 5

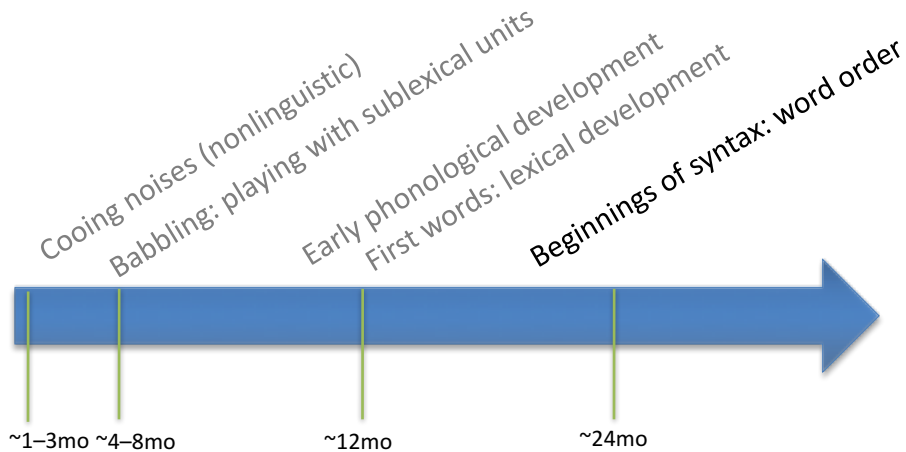
- Continued examination of L1 acquisition of SL, focusing on 18 to 36 months old
- Rapid and continuing expansion of the **lexicon** (section 5.1)
- **Grammar explosion** with more complex **syntactic** structures, including grammatical use of space (sections 5.2, 5.3)

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5.1 Later Lexical Development

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Rough Milestones for Acquisition of Sign and Speech



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Sign Lexical Development in ASL (Anderson & Reilly 2002)

- Increase in **ASL** vocabulary over time:
 - 8 to 12 months: 2–17 signs
 - 12 to 17 months: 7–107 signs
 - 18 to 23 months: 39–348 signs
 - 24 to 29 months: 102–417 signs
 - 30 to 35 months: 249–518 signs

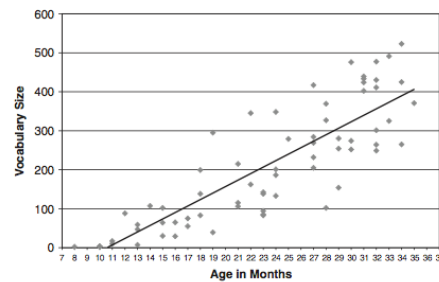


Figure 5.1. Development of productive vocabulary from 8 to 30 months. Reprinted by permission of Oxford University Press from Anderson and Reilly (2002, fig. 1).

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Measuring Vocabulary Development (Fenson et al. 1994)

- MacArthur Communicative Development Inventory (CDI) for English:
 - a parental checklist used with 2,000 American English learners to determine what words children understand and/or use
 - includes 396 words grouped semantically (ex., foods, social words, animals, etc.)
 - has been adapted into many other languages including ASL (Anderson & Reilly 2002) and [BSL](#) (Woolfe et al. 2010).

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ASL Lexical Development

- [Expressive vocabulary](#) is initially greater for sign languages than for spoken languages, but the difference disappears around 2;00.
- Early vocabulary categories are remarkably similar to spoken language.
 - All babies learn words for people, animals, things to eat, greetings, clothing, etc.

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ASL Lexical Development

- Most of a child’s sign vocabulary is made up of nouns until the child has about 200 signs, then the number of **predicates** (verbs) increases dramatically.
 - The proportion of predicates in early ASL is nearly double that of early English.
 - Early ASL verbs are highly gestural/**iconic** (ex., CLAP, BATH/WASH).
 - These differences may be a typological difference from many spoken languages; more focus on verbs (Hoiting 2006).

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ASL Lexical Development Summary (Anderson 2006)

Table 5.1. Timetable of ASL Lexical Development

Age	Vocabulary range	Wh-forms	Negatives	Emotion signs	Cognitive Verbs
<18 mos	<150 signs		NO	SLEEPY, HUNGRY, THIRSTY	
18–21 mos	150–250 signs	WHERE, WHAT	DON’ T-WANT, NONE	CRY	WANT
21–24 mos	250–350 signs	WHO, WHICH, FOR-FOR	DON’ T-LIKE, DON’T-KNOW, NOT-YET	SAD, HAPPY, SCARED	LIKE
30–35 mos	>350 signs	HOW, WHY, DO-DO	CAN’ T, NOT	ANGRY	THINK

Note: Table excludes concrete verbs and nouns.

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BSL Lexical Development (Woolfe et al. 2010)

- The UK has developed standardized sign language (SL) testing for Deaf children, including the CDI.
 - A large segment of the Deaf population has been tested to identify children with **language delays** and **language disorders** (see chapter 11).
- Demographic data from parents revealed significant associations between lexical growth and mothers' training in BSL.

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BSL Lexical Development (Woolfe et al. 2010)

- The progress of BSL production was similar to that of ASL:
 - 8 to 11 months: 0–30 signs
 - 12 to 15 months: 1–100 signs
 - 16 to 19 months: 2–239 signs
 - 20 to 23 months: 7–338 signs
 - 24 to 27 months: 28–501 signs
 - 28 to 31 months: 97–480 signs
 - 32 to 36 months: 124–517 signs

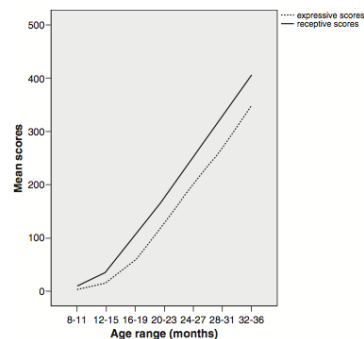


Figure 5.2. Mean expressive receptive scores by age range. Reprinted by permission of John Wiley and Sons from Woolfe et al. (2010, fig. 1).

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BSL-English Bilingual Comparisons

- Woll (2013) administered both the BSL CDI and British English CDI to Deaf bilinguals and found that
 - there was no significant difference between English and BSL in either receptive or expressive skills
 - children who understood more BSL also understood more English
 - children who produced more BSL also produced more English
 - children's first 50 BSL signs included action words, but first 50 English words did not.

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Polymorphemic Signs (Kuntze 2011)

- Vocabulary studies, including the CDI, do not include **polymorphemic** signs that are modified to provide extra information, such as
 - repetition to express plural or continuous activity
 - number incorporation
 - **depicting signs**, or **classifiers**, to describe objects and/or their movements (see also chapter 6).

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Polymorphemic Signs (Kuntze 2011)

- Kuntze (2011) examined the vocabulary used by 5 children (ages 3;09 to 4;03) during two hours of different school activities.
- **Morphologically** complex signs constituted about 13% of their overall production.
- This suggests that static vocabulary measures underestimate the child's lexical knowledge.

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Acquisition of Fingerspelling (Padden 2006)

- **Fingerspelling** is very common in ASL, even in input to young children.
- Acquisition of fingerspelling begins early, but lasts for several years.
- There are two stages of fingerspelling:
 - learning how fingerspelling is used in ASL
 - learning associations between fingerspelling and written English.

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First Stage of Fingerspelling Acquisition (Padden 2006)

- Children must
 - recognize fingerspelled words as single units
 - learn the types of words likely to be fingerspelled (ex., proper names).
- Children as young as age 2
 - spontaneously try to fingerspell common words (ex., I-C-E, T-V)
 - capture the “movement contour” of fingerspelled words even if letters are incorrect (ex., D-L-L for D-E-E) (Akamatsu 1982).

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Video Example Fingerspelling

- BEN 2;00
Ben is looking at a school newsletter with his mother and tries to copy the names that she fingerspells. He uses typical movement contours but not accurate handshapes for each letter.




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Second Stage of Fingerspelling Acquisition (Padden 2006)

- The second stage of fingerspelling starts as a result of learning printed English.
- Children begin to realize that fingerspelling is composed of individual letters.
- However, children do not immediately see the connection between fingerspelling and print.
 - ex., Children may ask, “How do you spell B-U-S?” (Kuntze et al. 2014)

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Fingerspelling and Reading

- The order of letters in fingerspelled words may often still be incorrect, even after a child begins learning to read.
 - ex., Y-P-E-W for *yellow* (Padden 1991)
- Sometimes a child employs a strategy of “first **handshape** = first letter.”
 - ex., Y-O-B for *airplane* (Padden 1991)
 - ex.,  (O) handshape for *home* (Schleper 1994)

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Fingerspelling and Reading (Padden & Ramsey 1998)

- The ability to comprehend and write down a fingerspelled word correlates with reading skill.
 - In this study, children watched signed sentences with an embedded fingerspelled word, then wrote down that word.
 - Children's spelling accuracy correlated with their reading comprehension skill (SAT score).

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Fingerspelling and Deaf Education

- Fingerspelling should be introduced early, before reading even begins.
- Effective strategies for presenting fingerspelling need to be investigated.
 - ex., sandwiched or chained structures of a sign + fingerspelled word such as LIPSTICK + C-H-A-P-S-T-I-C-K

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5.2 Development of Syntax

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Early Sentences at 18 to 24 Months

- At this age, most children can combine two words to make simple sentences.
- **Function words** and morphology is often missing (“telegraphic speech”).
- Meaning is clarified by context and intonation. For example,



Mom sock!

= That's mom's sock.
= Mom, put the sock on me.
= Mom has socks on.

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Syntax and Word Order

- Syntax determines the structure of clauses and sentences.
- Word order in English and ASL is important for understanding meaning. For example,

English: **The dog** **bit** **Bob.** ≠ **Bob** **bit** **the dog.**

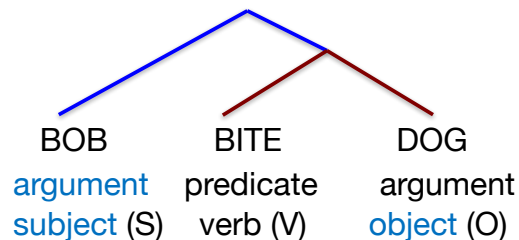
ASL: **DOG** **BITE** **BOB** ≠ **BOB** **BITE** **DOG**
S V O S V O

- Around age 2, babies start producing two-word combinations—their first sentences.

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Hierarchical Structure

- To acquire syntax, babies must know that linear sentences have **hierarchical structure**.
- In the sentence below, BITE and DOG form a unit that then combines with BOB.
- This structure tells us that Bob is the one biting the dog, not the other way around.



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Word Order in Child Production

- At the two-word stage, children have to express their desired meaning with only two words.
 - ex., BOB COOKIE could mean:
 - Bob has a cookie.
(S-O, or argument-argument structure)
 - Bob ate my cookie.
(S-O, or argument-argument structure)
 - That's Bob's cookie.
(Possessor-O structure)
 - etc.

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Word Order in Child Production

- How can a baby's message be clear when morphology and function words are missing?
For English, we rely on
 - context
 - strict word order rules; listeners use their knowledge of English word order rules to interpret a baby's sentences.
- What if the target language does not have strict word order (like ASL)?

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Word Order in ASL

- Word order is fairly rigid in English (SVO), and babies use SVO order early and often.
- ASL has much more flexible word order than English does.
 - BOB LIKE ICE-CREAM (SVO)
 - ICE-CREAM, BOB LIKE (OSV)
 - BOB LIKE ICE-CREAM IX(Bob) (SVOS)
 - LIKE ICE CREAM IX(Bob) (VOS)
 - etc.

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Word Order Variation in Early ASL (Chen Pichler 2001, 2008)

- Basic or **canonical word order** in ASL is SVO, like in English (and many other languages).
- However, Deaf children learning ASL use more than just basic SVO in their early sentences.
- They also use **noncanonical word order** variation that is grammatical in adult ASL.

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Video Examples Noncanonical Verb-Subject Order

- **Subject pronoun copy** puts a subject at the end of the sentence, in the form of a pronoun (point), resulting in noncanonical (S)VS word order.
 - IX(boy) WET IX(boy)
'The boy (in the picture) is wet' SAL, 2;02
 - PULL-ON-SHIRT CAN IX(mother)
'You/I can pull on a shirt' SAL, 2;02



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Video Examples Noncanonical Object-Verb Order

- **Aspect OV**
 - LETTER LETTER WRITE-[aspect]
'He's writing a letter.' SAL, 1;08
- **Spatial OV**
 - HAT BRING-[here] FS(OK)
'I'll bring the hat here, ok?' SAL, 2;02
- **Handling classifier OV**
 - g(hey)[+] BAG IX(bag) PICK-UP-[by handle]
'Hey, pick up that bag.' SAL, 2;02



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Summary of Early Word Order in ASL

- English and ASL share the same basic word order (SVO), but ASL allows more variation.
- English speakers lock onto SVO early, while ASL signers learn both SVO and other permissible variations (VS, OSV, OVS, etc.).
- When ASL children use noncanonical word orders, the sentences tend to be grammatical.

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Early Word Order in Libras (Lemos Pizzio 2006)

- This case study of one **DCDP** named Leo (from age 1;08 to 2;05) found that
 - 56% of all utterances conformed to (S)V(O) canonical order
 - noncanonical VS order occurred with subject pronoun copy
 - noncanonical OV order occurred with the use of space, topic, or **focus**.
- Like the ASL studies, this Libras study indicates early control of word order.

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Later Developments: 24–36 Months

- Children make huge leaps in syntactic development between 24 and 36 months old.
- They can produce long sentences with **conjoined** and **embedded clauses**.
- They develop complex structures like questions and focus.
- They develop an understanding of morphology, sometimes displaying **overgeneralization**.

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Position of WH-words in ASL and Libras

- In ASL and Libras **WH-questions**, **WH-words** may appear
 - at the end of questions: MOM WHERE
 - at the start of questions: WHERE MOM
 - at the start and end of questions (**doubled**):
WHERE MOM WHERE
- Children must learn that all these options are permitted.
- When do they start using each one?

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Acquisition of WH-questions (Lillo-Martin & Quadros 2006)

- This study focused on two DCDPs learning ASL and two DCDPs learning Libras, all between the ages of 1;07 and 3;00.
- The children interacted naturally and spontaneously with signing parents and/or researchers.
- Researchers analyzed the data for the age of first and then repeated use of each type of WH-question.

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Acquisition of WH-questions (Lillo-Martin & Quadros 2006)


Table 5.2. Age of Acquisition of WH-questions

Language	Child	WH at end (WH-final)	WH at start (WH-initial)	Doubled WH
ASL	Aby	1;09	1;09	2;01
ASL	Sal	1;07	1;08	1;08
Libras	Ana	1;10	1;08	
Libras	Leo	1;09	1;10	

- All three categories of WH-questions were used from a very early age by all the children.

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Examples of Early WH-questions

- WH-initial question
 - WHERE STOVE
'Where's the stove?' Libras, LEO1;09
- WH-final question
 - MOM WHERE
'Where's Mom?' ASL, ABY1;10 
- WH-double question
 - WHERE CHAIR WHERE
'Where's the chair?' ASL, SAL1;08

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Summary of WH-question Development

- Deaf children with Deaf, signing parents learn early about the various options available for WH-questions in their target language.
- However, children don't always use the expected **nonmanual signals** (NMS) with their WH-questions (see chapter 6).

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Sentence Structures to Express Focus

- To answer a question, new information (focus) can appear sentence-initially.

Mom: WHERE GRANDMOTHER WHERE?

‘Where’s grandma?’

Aby: BABY IX(grandmother)

‘With the baby, she is.’

- For emphasis, a focused word can be repeated (doubled) sentence-finally.

Aby: NO YOU GO NO

‘Don’t leave!’

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Acquisition of Focus (Lillo-Martin & Quadros 2005)

- This study looked for the earliest use of focus structures by two DCDPs learning ASL and two DCDPs learning Libras, between the ages of 19 and 36 months.
- The children interacted naturally and spontaneously with signing parents and/or researchers.
- The data were analyzed to identify various types of focus structures.

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Acquisition of Focus

(Lillo-Martin & Quadros 2005)

- Children used the beginning of the sentence for new information from as young as 18 months (the first session).
- Children used doubling structures for emphasis beginning a few months later, between ages 1;09 and 2;01.
- Acquisition of these structures was part of the grammar explosion stage.

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5.3 Spatial Syntax

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Spatial Syntax

- Sign languages use spatial locations to refer to people, things, and places.
- These locations can be used with nouns, adjectives, and verbs.
 - BOOK-[loc-a] PAPER-[loc-b] PEN-[loc-c]
 - BLUE-[loc-a] BLUE-[loc-b] BLUE-[loc-c]
 - READ-[loc-a] WRITE-[loc-b] DRAW-[loc-c]

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Spatial Syntax

- To use spatial locations correctly, a child must set them up, remember where they are, and locate signs there appropriately.
- This is a sophisticated procedure that takes a long time to develop fully, although it starts early.

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Previous Research on Verb Agreement

- Studies of children's use of **verb agreement** or spatial locations of verbs have mostly reported relatively late acquisition of SL verb agreement.
- For example, in a study of ASL, Meier (1982) found some verb agreement used at the earliest stages:
 - errors of **omission** until after age 3
 - occasional errors of **commission**.
- Morgan et al. (2006) reported similar results for BSL.

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Contrary Findings on Verb Agreement

- Two recent studies, Quadros et al. (2001) and Quadros & Lillo-Martin (2007), reported earlier acquisition of verb agreement than previous studies.
- These were **longitudinal** studies focused on three DCDPs learning ASL (Aby, Jil, and Sal) and two learning Libras (Ana and Leo).

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Early Acquisition of Verb Agreement (Quadros et al. 2001, Quadros & Lillo-Martin 2007)

- Overall, **plain verbs** are used more frequently than **inflected verbs** (including person and location agreement).
- Agreeing verbs are used less frequently than other types of verb inflection (like locative agreement), but when children use them, they are correctly marked.
- Obligatory verb agreement is almost always produced.

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Video Examples of Early Verb Agreement

- [you]-COME-[here]
PRAY BLESSING PRAY IX(picture)
'Come here, we will pray for blessings.'
Libras, LEO 1;09
- MOTHER [I]-GIVE-[mother]
'I want to give this to Mom.'
ASL, ABY 1;10



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Verb Agreement Summary

- Previous research suggested numerous verb agreement errors in SL acquisition.
- More recent studies by Quadros et al. find no use of uninflected forms where an inflected form is required.

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Verb Agreement Summary

- Nevertheless, differences in findings from previous and recent studies highlight important factors to consider.
 - Many verbs allow optional marking. Where is agreement obligatory?
 - Location agreement is more common than person agreement.
 - Children may use some kinds of agreement but still be inconsistent in associating a particular referent with a location.

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