Language, Cognition, and Language Acquisition: A Cross-linguistic Perspective

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Lecture 1

Introduction and overview

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Basic question for this lecture series:

- How do children learn the mappings between linguistic forms and their meanings?

(Forms: words, morphology, word order, constructional patterns, etc.)

- A thoroughly interdisciplinary question -- at the intersection of linguistics, cognition, language development, and cognitive development.
- Taking a *cross-linguistic perspective* can contribute to our understanding of the mapping process in acquisition.
 - -- Research on children's patterns of language development
 - -- Research on language structure linguistic typology, especially semantic typology

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Cross-linguistic research on children's patterns of acquisition...

- Helps us to disentangle:
 - -- Child's own contribution to the learning process: e.g., cognitive concepts, starting expections about the structure of language, general learning strategies ("nature").
 - -- Influence of the *input* language: exposure to its specific structures, more general typological properties, conventions for use, etc. ("nurture").

Example: why do children learning English use a relatively fixed word order for S, V, and O - an inborn preference or exposure to the structure of English?

Cross-linguistic research on language structure: linguistic typology...

- Information about range and nature of variation in languages provides clues to what might be innate and what must be learned; and clues to possible learning biases.
- Especially important for understanding children's form-meaning mapping: *semantic typology* – study of how *meaning* is organized in languages.
 - How are conceptual domains (e.g., space, time, causality, temporality) carved up and categorized for purposes of language?
 What is universal, what varies? Systematic patterns of variation?
 - -- How are semantic categories mapped to forms? Effect of exposure to languages with different semantic typological patterns?
 - -- Clues to forces that may shape language acquisition.

Linguistic typology, cont.

- Language acquisition research can in turn provide input to linguistics, e.g.:
 - -- Clues to what is most fundamental to language from sequences of acquisition, typical error patterns...
 - -- Clues to possible determinants of language universals –

Due to built-in cognitive/perceptual biases? (then children might well show these biases too).

Due to processing demands of rapid speech between fluent speakers? (then beginning speakers may show no sensitivity).

(Bowerman 2010)

Background: cross-linguistic research on language acquisition

- First wave of crosslinguistic research on children's language (late 1960s, early 1970s) was inspired by Chomsky's claims that:
 - -- Children learn an implicit rule system.
 - -- They are helped and heavily constrained in this effort by innate knowledge of possible language structure (UG – Universal Grammar).

- Children's capacity for language acquisition defined by Universal Grammar? If so, universals of language should be reflected in language acquisition.
 - Early crosslinguistic research was motivated by interest in this question.

Most striking finding:

Not universals of syntax, as expected, but of *meaning*.

(Bowerman 1973; Braine 1976, Brown 1973; Slobin 1973b...)

"If you ignore word order, and read through transcriptions of two-word utterances in the various languages we have studied, the utterances read like direct translations of one another. There is a great similarity of basic vocabulary and basic meanings conveyed by the word combinations."

(Slobin 1973b)

E.g., similarities across languages in the *relational meanings* expressed by early two-word utterances in languages around the world:

Pointing out, naming (*that doggie, ball there*) Agent – Action – Patient relations (*Mommy go, hit ball*) Location (*sweater chair, sit pool*) Possession (*Mommy sock, my book*) Recurrence, demand (*more juice, 'nother cookie*) Nonexistence, disappearance (*X allgone, no X*)

(Braine, 1976; Brown 1973; Slobin 1973b)

Function						
of utterance	English	German	Russian	Finnish	Luo	Samoan
Locate, name	there book that car see doggie	buch da (book there) gukuk wauwau (see doggie)	Tosya tam (Tosya there)	tuossa Rina (there Rina) vettä siinä (water there)	en saa (it clock) ma wendo (this visitor)	Keith lea (Keith there)
Demand, desire	more milk give candy want gum	mehr milch (more milk) bitte apfel (please apple)	yeshche moloko (more milk) day chasy (give watch)	anna Rina (give Rina)	miya tamtam (give-me candy) adway cham (I-want food)	mai pepe (give doll) fia moe (want sleep)
Negate ²	no wet no wash not hungry allgone milk	nicht blasen (not blow) kaffee nein (coffee no)	vody net (water no) gus' tyu-tyu (goose allgone)	ei susi (not wolf) enää pipi (anymore sore)	<i>beda onge</i> (my-slasher absent)	le 'ai (not eat) uma mea (allgone thing)
Describe event or situation ³	Bambi go mail come hit ball block fall baby highchair	puppe kommt (doll comes) tiktak hängt (clock hangs) sofa sitzen (sofa sit) messer schneiden (cut knife)	mama prua (mama walk) papa bay-bay (papa sleep) korka upala (crust fell) nashla yaichko (found egg) baba kreslo (grandma armchair)	takki pois (cat away) Seppo putoo (Seppo fall) talli 'bm bm' (garage 'car')	chungu biro (European comes) odhi skul (he-went school) omoyo oduma (she-dries maize)	pa'u pepe (fall doll) tapale 'oe (hit you) tu'u lalo (put down)
Indicate possession	my shoe mama dress	mein ball (my ball) mamas hut (mama's hat)	mami chashka (mama's cup) pup moya (navel my)	<i>täti auto</i> (aunt car)	<i>kom baba</i> (chair father)	lole a'u (candy my) polo 'oe (ball your) paluni mama (baloon mama)
Modify, qualify	pretty dress big boat	milch heiss (milk hot) armer wauwau (poor doggie)	mama khoroshaya (mama good) papa bol'shoy (papa big)	rikki auto (broken car) torni iso (tower big)	piypiy kech (pepper hot) gwen madichol (chicken black)	fa'ali'i pepe (headstrong baby)
Question ⁴	where ball	wo ball (where ball)	gde papa (where papa)	missä pallo (where ball)		fea Punafu (where Punafu)

Table 1. Functions of two-word sentences in child speech, with examples from several languages.¹

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Why are the meanings so similar? Hypothesis: *cognitive development* in young children follows a universal course. (Influence here of *Piaget*)

 "Cognition Hypothesis" - important hypothesis of the 1970s: First language acquisition is a process of mapping forms onto concepts that have already been established in the course of nonlinguistic cognitive development.

(e.g., Cromer 1974; Slobin 1973a)

"I think that the first sentences express the construction of reality which is the terminal achievement of sensorimotor intelligence...

[= Piagetian developmental stage from birth to about 24 months]

"...Representation starts with just those meanings that are most available to it, propositions about action schemas involving agents and objects, assertions of nonexistence, recurrence, location, and so on... these meanings probably are universal..."

(Roger Brown, A First Language, 1973)

Some reasons for the appeal of the "Cognition Hypothesis" approach to language acquisition (Bowerman 2000)

- it accounted for the apparent *universality* of the meanings expressed in early speech.
- it provided an explanation for *productivity:* generalization to the boundaries of cognitively pre-established categories.
- it could be hooked up to a developmental "motor" : child's desire to communicate already established meanings.
- it conformed to the intellectual Zeitgeist of the 1970s growing emphasis on *universals and constraints*.
 - -- e.g., Berlin & Kay 1969 on color terminology; Rosch 1973 on prototype structure of natural categories...

The Cognition Hypothesis was crucial to the first influential approach to the cross-linguistic study of language acquisition:

– Slobin's (1973a) "Operating Principles" approach

The basic hypothesis: Meanings emerge in the child according to a universal timetable of nonlinguistic development.

"The rate and order of development of the semantic notions expressed by language are fairly constant across languages, regardless of the formal means of expression employed."

Child's task: figure out the conventional devices used to *express* these meanings in the local language.

Different languages use different linguistic devices to express more or less the same meanings, e.g.:

English:

The cup is on the table.

Finnish:

kuppi on pöydä-Ilä.

cup is table- on

Holding meaning constant, are some devices more difficult for children to learn than others?

Gist of the Operating Principles approach:

- If we assume that learners of different language acquire the same meanings in the same order, determined by cognitive maturation, then...
- ...by studying the relative time at which different devices for the same meaning are acquired in different languages, we can learn about children's underlying preferences for language structure – find clues to the language acquisition capacity.

English:

The cup is *on* the table

Finnish: kuppi on pöydä-*llä* cup is table- on



Operating Principle A: "Pay attention to the ends of words"

Universal A1: For any given semantic notion, grammatical realizations in the form of suffixes or postpositions will be acquired earlier than realizations in the form of prefixes or prepositions.

(Slobin 1973a)

Another "Operating Principle" (OP):

OP E: "Underlying semantic relations should be marked overtly and clearly"

Universal E2: There is a preference not to mark a semantic category by a "zero morpheme".

Russian: the accusative sing. is **ø** for masc. nonhuman & neuter nouns. These nouns are first marked with the feminine accusative **-u**

Universal E4: When a child first controls a full form of a linguistic entity which can undergo contraction or deletion, contractions/deletions of such entities tend to be absent.

English: - / will instead of ////

I see a man who the boy hit instead of
I see the man the boy hit

(Initial tendency toward one-to-one mapping between form and meaning - iconicity)

- Proposals about the universal meanings children attach to linguistic forms were at first inspired by studies of children's nonlinguistic cognitive development...
- But gradually, crosslinguistic studies of *semantic structure in adult language* also came to play a role.

Children make semantic errors that are suggestive of "how other languages do it".

Interpretation: There are deep-seated cognitive / perceptual predispositions that shape both language structure and language acquisition. Children are pretuned to hypothesize *linguistically sensible meanings*.

EXAMPLE 1: Object Shape (E. Clark 1976; 2001)

Across languages, children often initially overextend object words on the basis of *shape*:

- *Round:* e.g. *ball* for a watch, clock, firehose wound on spool, bathroom scale with round dial...
- *Long, thin:* e.g. *stick* for a cane, umbrella, ruler, straight razor, long board...

The categories of shape to which children are most sensitive are the same ones that are most frequently picked out by *numeral classifiers* (e.g., "five *round.class* ball"):

- *Round:* e.g. *Laotian* - sun, plate, pot, eye;

Thai - bead, stone, seed

- *Long, thin:* e.g. *Chrau* - stick, fish, pencil, knife, snake *Trukese* - stick, pencil, tree, canoe, cigarette 19

EXAMPLE 2: Causality (Bowerman 1979)

English: A meaning distinction between periphrastic causative auxiliaries:

He made me sing. (Active causation) He let me sing. (Permissive causation)

Learners of English sometimes use the wrong auxiliary:

- I don't want to go to bed yet, don't let [=make] me go to bed.
- Make [=let] me watch it! (Begging to be allowed to watch a TV show.)

Note: Many languages have a productive causative marker that – as in these errors – *collapses the distinction* between active and permissive causation. E.g.:



EXAMPLE 3: Body parts

(Anderson 1978; Bowerman 1980)

Children learning English often overextend words for *upper limbs* to *lower limbs* and vice versa. E.g.:

hand for foot

ankle for wrist

sleeve for pantleg

kick for throw

Many languages use the same word for corresponding upper- and lower-limb body parts.

EXAMPLE 4:

Spatial words for temporal & other meanings

(a) Space for time: (Bowerman 1982)

- E 3;9 (Request to M, who is fixing dinner, to be read aloud to:) *Can I have any reading behind the dinner?* (= AFTER)
- C 6;0 How far away is my gym class? (= LONG UNTIL)
- E 4;10 (Tomorrow family will leave early on a trip:) Today we'll be packing cause tomorrow there won't be enough *space* to pack. (= TIME)

(b) Space for state-change: (Bowerman 1978, 1982)

- E 5;6 (Struggling to tie shoe laces:) These shoes just won't *come* tight! They won't *go* tight! (= GET)
- C 5;4 (After colors a skunk's stripe brown:) I *put* it brown. (= MADE)

(c) Space for comparison: (Bowerman, diary records; Clark 2001)

W 3;1 *This ear is longer from the other ear.* (= LONGER THAN)

- C 5;3 (Comparing the relative looseness of two teeth:) *They're the same length of loose.* (= EQUALLY LOOSE)
- E 5;10 Almonds and peanuts are **close together** of cracking, 'cause they both crack easy, right? (= EQUALLY EASY to crack)

Constraints on form-meaning mapping in acquisition?

- Children's "linguistically sensible guesses" about meaning suggest that children come to the language acquisition task with some built-in **biases** for form-meaning mapping.
- Many possible biases have been proposed, e.g.:
 - -- kinds of meanings children attribute to **grammatical morphemes** (prepositions, postpositions, case endings, verb inflections, etc.).
 - -- kinds of meanings children attribute to words used to refer to objects
 - -- kinds of meanings children attribute to verbs with different argument structures.

Cognition Hypothesis again...

Contemporary claims about biases and constraints in language acquisition almost all rest – like Slobin's "Operating Principles" approach – on the "Cognition Hypothesis" assumption...

... that the meanings expressed by language are established in the child *independently of language* – through nonlinguistic cognitive development, and possibly an inborn sense of "linguistically sensible" meanings –, *so these meanings are more or less universal*.

How plausible *is* this assumption?

Cognition Hypothesis again...

- Well recognized: languages differ in exactly *which* elements of a scene they obligatorily express.
- Typical assumption: each language simply makes a selection from among meanings that are *already obvious to the child* i.e., that are part of the learner's cognitive representation of the situation to be encoded. *(Slobin 1979)*

ENGLISH:	Daddy gav ACTOR ACT (PA)	ne me FION RECIPIEI ST)	the NT (DEFINITE)	<i>ball.</i> OBJECT	
GERMAN:	Der (DEFINITE) (SINGULAR) (MASCULINE) (SUBJECT)	Vater gab ACTOR ACTION (PAST) (3rd PEI (SINGU	<i>mir</i> RECIPIENT RSON) LAR)	den (DEFINITE) (SINGULAR) (MASCULINE) (OBJECT)	Ball. OBJECT
Hebrew:	Aba natan ACTOR ACTIO (PAST) (3rd PE (SING) (MASC	<i>li</i> n recipient) Erson) ULAR) CULINE)	et (OBJECT PARTIC	<i>ha</i> LE) (DEFINITE)	<i>kadur.</i> OBJECT
Turkish:	Babam ACTOR (POSSESSED BY SPEAKER)	bana RECIPIENT	topu OBJECT (DEFINITE)	verdi. ACTION PAST) . 3rd PERSON) SINGULAR) WITNESSED BY S	PEAKER)

Fig. 1: 'Daddy gave me the ball''. Crosslinguistic differences in how this proposition is typically encoded. *(Slobin 1979, pp. 91-92)*

Cognition Hypothesis again...

But systematic analyses show that it is not just a question of selecting and packaging from among a universal set of meaning elements. The *meanings themselves* – e.g., the semantic categories associated with the forms – are highly variable across languages.

Two warm-up examples....

Ex. 1: Putting things in places...







(Slobin, Bowerman, Brown, Eisenbeiss, Narasimhan, in press)







Ex. 2: Cutting things









(Chen 2008; Erkelens 2003; Majid & Bowerman 2007)

English









'*cut'*

Dutch, Mandarin - obligatory distinction:





'cut with single blade' *snijden, qie1*





'cut with double blade' *knippen, jiang3*

Summary, conclusions

Recent years: growing realization that...

- Semantic structure is more variable across languages than was previously realized. (More on this as we go along.)
- How a language organizes its meanings is part of the linguistic structure to be learned (just like phonology, morphology, and syntax).
- Thus, we can't buy an account of syntactic, morphological, and lexical development by assuming that semantics comes for free, courtesy of nonlinguistic cognitive development.

How do children work out the meanings associated with the forms of their language?

Overview of coming lectures

- Lecture 2. Spatial semantics in languages and language learners.
- Lecture 3. Mechanisms of semantic category construction in first language acquisition.
- Lecture 4. The cross-linguistic categorization of everyday events: The case of "cutting and breaking".
- Lecture 5. Special meanings for grammatical morphemes?
- Lecture 6. Noun semantics and "natural ontology" in language acquisition.

Overview of coming lectures, cont.

Lecture 7. Verb learning and argument structure.

Lecture 8. Language typology and "Thinking for Speaking".

Lecture 9. Learning about endstate entailments in German vs. Mandarin Chinese.

Lecture 10. Cross-linguistic semantic variation and the Whorfian hypothesis.