

# Advanced Language Development

MORPHOLOGY: What is a grammatical morpheme?

Brown (1973) and his colleagues published several studies of inflectional development that have influenced the field of language acquisition for decades.

He referred to inflections, prepositions, etc. as **grammatical morphemes** and claimed that they

... seem to 'tune' or 'modulate' the meanings associated with the contentives in the sense that the modulation is inconceivable without the more basic meanings. Thus 'a' and 'the' make the thing referred to by a noun specific or nonspecific (253).

Brown found that the three children he studied began producing morphological inflections at Stage II when their MLUs reached 2.0.

Linguistic features of grammatical morphemes:

1. They belong to small, closed classes, e.g., articles, plural, past tense, prepositions, pronouns
2. They are much more frequent than words from open classes
3. They have meaning in relation to words from lexical categories and are more complex semantically
4. They serve syntactic functions and, therefore, are more predictable than lexical words
5. They have less perceptual salience, i.e., they are unstressed and may not constitute full syllables
6. They show tremendous cross-linguistic variation, e.g., tense versus aspect, case versus agreement, head-marking versus dependent-marking

Upper Chehalis (Salish)

ni7-su7-sú7u7t'=lqs

in\_hair/bushes-out\_of\_control-stretch=nose

'elephant'

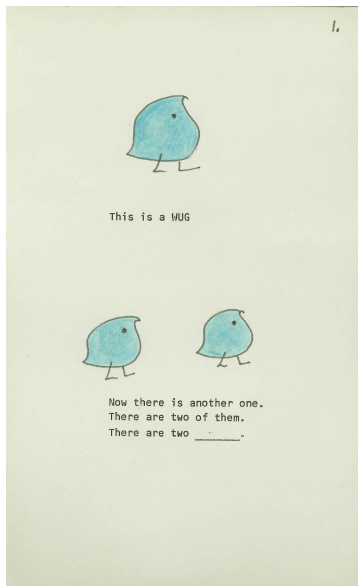
Why study grammatical morphemes?

1. Their predictability makes it possible to accurately assess their acquisition by children
  2. They provide further evidence for the development of linguistic rules
  3. They provide evidence on the relative contributions of semantics, syntax, phonology, morphology and input frequency to language development
  4. Their cross-linguistic variation provides a test for the role of Universal Grammar
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## Early Studies

### A. Berko (1958)

Berko used a set of drawings to elicit children's productions of nonsense words with their inflections. Her most famous drawing featured a bird-like creature she named a 'wug'. Berko used the following protocol to elicit the plural form for wug:



This is a wug.

Now there is another one.  
There are two of them.  
There are two \_\_\_\_\_

Berko elicited forms with the following inflections:

plural (with three allomorphs [s], [6z], [z])

possessive (with three allomorphs)

past (with three allomorphs [6d], [t], [d])

progressive /-ing/

agentive /-er/

comparatives /-er/, /-est/

compounds

She tested 19 children between 4 and 5 years old and 61 children between 5½ and 7 years old

Results (percentage of correct productions, Table 9.3, p. 441)

Nouns			Verbs		
<i>Plural</i>			<i>Past</i>		
glasses	[əz]	91	binged	[d]	78
wugs	[z]	91	glinged	[d]	77
luns	[z]	86	ricked	[t]	73
tors	[z]	85	melted	[əd]	73
heafs	[s], [z]	82	spowed	[d]	52
cras	[z]	79	motted	[əd]	33
tasses	[əz]	36	bodded	[əd]	31
gutches	[əz]	36	rang		16

kazhes	[əz]	31			
<i>Possessive</i>			<i>3<sup>rd</sup> singular</i>		
nizzes	[əz]	28	loodges	[əz]	56
bik's	[s]	87	nazzes	[əz]	48
wug's	[z]	84	<i>Progressive</i>		
niz's	[əz]	49	zibbing		90

The children had more correct responses with:

1. The single consonant allomorphs [s], [z], [t], and [d]
  2. Real words, e.g., 'glasses', 'melted'
  3. The progressive
  4. They did better with the possessive and 3<sup>rd</sup> singular [əz] than with the plural [əz]
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### B. Fraser, Bellugi & Brown (1963)

This study compared children's imitation, comprehension and production of 10 grammatical contrasts.

Contrasts (Table 9.6)

- |                                                          |                                                                                                              |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 1. Mass noun / Count noun                                | Some mog / A dap<br>Some pim / A ked                                                                         |
| 2. Singular / plural, marked by inflection               | The boy draws / The boys draw<br>The kitten plays / The kitten plays                                         |
| 3. Singular / plural, marked by 'is' and 'are'           | The deer is running / The deer are running<br>The sheep is eating / The sheep are eating                     |
| 4. Present progressive / past tense                      | The paint is spilling / The paint spilled<br>The boy is jumping / The boy jumped                             |
| 5. Present progressive / future tense                    | The girl is drinking / The girl will drink<br>The boy is sitting / The boy will sit                          |
| 6. Affirmative / negative                                | The girl is cooking / The girl is not cooking<br>The boy is sitting / The boy is not sitting                 |
| 7. Singular / plural, of 3 <sup>rd</sup> person possives | His wagon / Their wagon<br>Her dog / Their dog                                                               |
| 8. Subject / object, in the active voice                 | The train bumps the car / The car bumps the train<br>The mommy kisses the daddy / The daddy kisses the mommy |
| 9. Subject / object, in the passive voice                | The car is bumped by the train / The train is bumped by the car                                              |



present tense

past tense

Cazden developed four measures of inflectional use:

Sc: 'supplied correctly', e.g., 'two dogs' in reference to two dogs

Sx: 'supplied in inappropriate contexts', e.g., 'one dogs' in reference to one dog

O: 'omitted', e.g., 'two dog' in reference to two dogs

OG: 'overgeneralized', e.g., 'two foots' in reference to two feet

These measures give rise to several proportions of inflectional use:

Proportion of correct use =  $Sc / (Sc + O)$

Proportion of inappropriate use =  $Sx / (Sx + Sc)$

Proportion of overgeneralization =  $OG / (Sc + Sx)$

A high proportion of correct use may not be related to the child's inappropriate or overgeneralized use of a morpheme.

The proportion of overgeneralization should be examined. Alternatives include:

1.  $OG / (Sc + OG)$  This is the most frequently used measure of overgeneralization
2.  $OG / (OG + O_i + S_{ci})$  Ingram's suggestion
3.  $OG / (OG + S_{ci})$  This measure only includes the irregular forms the child produces

The proportion of inappropriate use should also be reexamined.

Cazden used the following contexts to determine the obligatory contexts for the plural inflection:

1. Following a number, e.g., 'two \_\_\_\_'
2. Following certain modifiers, e.g., 'more', 'some'
3. Following a reference to a plural reference, e.g., 'What are those?'
4. Reference to items that are normally plural, e.g., 'stair', 'scissor'
5. Routines with a plural in them, e.g. 'Make penny Ema' Hall' (He's making pennies in Emerson Hall')

It's much easier to determine obligatory contexts for plural nouns than for definite determiners.

Cazden defined four periods in the development of each inflection:

- A The time before the first use of the inflection
- B The time of the first use of the inflection, with no errors
- C The time of widespread use of the inflection, with the appearance of errors and overgeneralizations
- D The proportion of correct use reaches 90 percent

These three divisions do not have the same status. The break between C and D is clearly an arbitrary imposition. The meaning of the break between A and B, signaling the onset of inflection, is unclear. But the break between B and C represents a significant developmental phenomenon, because systematic errors and overgeneralizations provide convincing evidence that the child has a productive rule. (Cazden, 228)

Period	Prop. of correct use			No. of inappropriate use			No. of overgeneralization		
	Adam	Eve	Sarah	Adam	Eve	Sarah	Adam	Eve	Sarah
A	---	0.00	---	---	0	---	---	0	---
B	0.36	0.15	0.13	0	0	0	0	0	0
C	0.68	0.86	0.86	25	10	4	2	8	0
D	0.94	0.98	0.98	54	1	28	40	7	23

Ingram suggests children acquire a large number of inflected words before they learn a productive rule for inflection. This change didn't occur until period D when the children used 927, 217, and 722 regular plural tokens.

He suggests that the children's production of inappropriately inflected forms in period C is due to a lexical error that results from the confusion of two semantically related words, e.g., 'dog' and 'dogs'. Some cases of inflectional omission could be due to the same confusion or retrieval error.

Cazden reports that the children initially used irregular forms correctly before they produced any overgeneralized forms. When the overgeneralizations appear, they do not replace the correct uses.

Ingram outlines the following three periods in the acquisition of inflection:

1. Acquire the inflected words as separate lexical entries, e.g., 'come', 'came'
2. Acquire a general rule for regular inflection and use it to weed out the inflected lexical entries for regularly inflected pairs while retaining the irregular pairs with exceptional marking.
3. Strengthen the retrieval for the irregular lexical entries.

Cazden also tied a difference in the children's language development to two different approaches: *macrodevelopment* and *microdevelopment*.

'Macrodevelopment refers to the elaborateness of the semantic plan for speaking, while microdevelopment refers to the successful execution of whatever plan has been executed.'  
(233-4)

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#### **D. Brown (1973)**

Brown produced the definitive study of morphological development in English. He used a methodology that was similar to Cazden's to analyze the development of 14 grammatical morphemes. He determined the children's order of morpheme acquisition by using the percentage of obligatory morphemes supplied by the children.

Results (Table 9.10, p. 453 from Brown, Figure 14)

**Ages and morphemes at each stage**

Stage	Adam	Eve	Sarah
I	2;3	1;6	2;3
1.0	(none)	(none)	plural [-s]
II	2;6	1;9	2;10
2.0	progressive [-ing] 'in' 'on' plural [-s]	progressive [-ing] 'on' 'in'	'in', 'on' progressive [-ing] past irregular possessive [-s]
III	2;11	1;11	3;1
2.5	uncontractible copula <i>be</i> past irregular	plural [-s] possessive [-s] past regular [-ed]	uncontractible copula <i>be</i> articles 'the, a'
IV	3;2	2;2	3;8
3.0	articles 'the, a' 3 <sup>rd</sup> person irregular possessive [-s]	(none)	3 <sup>rd</sup> person regular [-s]
V*	3;6	2;3	4;0
4.0+	3 <sup>rd</sup> person regular [-s] past regular [-ed] uncontractible auxiliary <i>be</i> contractible copula <i>be</i> contractible auxiliary <i>be</i>	uncontractible copula 'be' past irregular article 'the, a' 3 <sup>rd</sup> person regular [-s] 3 <sup>rd</sup> person irregular uncontractible auxiliary <i>be</i> contractible copula <i>be</i> contractible auxiliary <i>be</i>	past regular [-ed] uncontractible auxiliary <i>be</i> contractible copula <i>be</i> 3 <sup>rd</sup> person irregular contractible auxiliary <i>be</i>

\*These are listed in order of their decreasing percentages of obligatory occurrence

The children acquired the 14 morphemes in a statistically similar order

**Explanation**

**A. Input frequency**

Table 53 (p. 358) Acquisition order (children's) and frequency rank orders for the 14 morphemes in the three sets of parents





## Assessment

Brown's results are important in demonstrating a regular order for morphological development. The factors that determine this order remain a mystery.

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### Crosslinguistic Studies

K'iche' (Pye 1980)

Grammatical Morphemes in K'iche'

Progressive (ka)tajin(ik): **tajin** ketz'anik (They are **playing**)  
**prog** they-play

Preposition pa: k'oo **pa** lee atem (It is **on** your chair)  
exist **in/on** the your-chair

Plural taq: saq lee **taq** jah (The houses are white)  
white the **pl.** house

Completive aspect x: x-in-el-ik (I left)  
**Comp**-I-leave-TERM

Positional k'oolik: **k'oo** pa lee jah (It **is** in the house)  
**exist** in/on the house

Determiners: k'ax **lee** b'eh (The road is difficult)  
hard **the** road

Negative ma ... taj: **ma** niim **taj** lee lo?ch' (The baby is **not** big)  
**neg** big **neg** the baby

Perfective: at r-il-**om** (S/he has seen you)  
you s/he-see-**PERF**

Proadverb of place: pa lee ja? xuriq **wih** (In the stream is where she found them)  
in/on the stream she-found **PROADVERB**

### Examples of Morpheme Acquisition from Crosslinguistic Studies

K'iche' (Pye, Language 1983)

Verb Morphology

k-at-e:-in-q'al-u:j

Aspect-ABS2-GO-ERG1-HUG-Derivation

'I'm going to hug you'

x-at-wa'-ik  
Aspect-ABS2-EAT-Term  
'You ate'

What children produce:

A: la: utz kawiloh  
Al Tiya:n (2;2): jah, loh (= jah, k-inw-il-oh 'huh, I see it')

A: kawarik  
Al Tiya:n: lik (= ka-0-war-ik 'he/she sleeps')

Al Cha:y (2;9): loq' ech wa7 (= ka-0-qa-loq' q-e:ch wa7 'Can we buy it ourselves?')

Al Cha:y: paj weh (= a: ka-0-a-sip-a:j chi-w-eh 'Will you give it to me?')

Inuktitut (Shanley Allen 1989)

illu-juaq-raaluk-mut-ur-lang-sima-nngit-nama-littauq  
house-big-very-ALL-go-PAST-PERF-NEG-1sS.PERF-but\_also  
'but also, because I never went to the really big house.'

Jaaji (1;9, MLU 1.3) produced nouns—for people and animals  
uuta-up  
rhoda-3ERG  
'Rhoda's'

at 2;1, MLU 1.9 increased from 11 to 44 verb types; verb inflections increased from 2 to 34  
haanta-langa-vita                      Sikituuq-nuguaq-ga  
honda-FUT-1pP.INTERR                skidoo-toy-my  
'Are we going to ride the Honda?'    'My toy skidoo'

Juupi (2;2)  
kunik-jau-guma-nngit  
kiss-PASS-want-NEG  
'(I) don't want to be kissed'

Many affixes became productive at 2;5 (including the participative, indicative, perfective)  
Imperative was productive at 2;1

Turkish (Ayhan Aksu-Koç & Dan Slobin 1985)

Children acquire agglutinative affixes very early

2;1 getir-me-di-n  
bring-NEG-PAST-2sG  
'You didn't bring'

2;4 ağla-dI-lar  
cry-PAST-PL  
'They cried'

Evidence of productive use of some inflections by 15 months  
bit-ti  
finish-PAST  
'All gone'

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## Current Approaches to the Acquisition of Morphology

Pinker (1984; 1999)

How do children identify morphemes and their functions?

Why past tense rather than completive aspect, animacy, control, degree of certainty, etc.?

### A. Exhaustive Hypothesization

Children first attach all possible meanings to the inflection

Then they eliminate the meanings that are incompatible with the morpheme's context

Problems:

1. The method requires too much memory (and be discontinuous with adult grammar)
2. It falsely predicts that children will acquire fusional inflections faster than isolating ones, e.g., German article *die* (which marks gender, number and case) before English *the*
3. It falsely predicts that children will not overgeneralize inflections

### B. Hypothesis Sampling

Children test selected meanings for inflections from a weighted list of all possible meanings

They gradually eliminate the incompatible meanings and test new meanings

Advantages:

1. The method predicts that children will acquire isolating morphology faster than fusional
2. It predicts that children will first attach a single function to morphemes
3. It predicts that children will acquire common inflections (aspect) before uncommon inflections (Navajo shape classifiers)

Problems:

1. The method does not provide an account of the segmentation process
2. It cannot account for the acquisition of zero morphemes: I/you walk- $\emptyset$ , s/he/it walk-s
3. It cannot account for the acquisition of arbitrary inflectional classes, e.g. gender
4. It cannot account for overlapping inflections (i.e., syncretism), e.g.,  
Masc. Nom. agricola  
Masc. Gen. agricolae  
Masc. Dat. agricolae
5. The model predicts that English-speaking children will test a Navajo classifier system
6. The model does not explain how children eliminate overgeneralized forms

### C. Paradigm Construction (Pinker's solution)

Children first construct word-specific mini-paradigms for fully inflected words by choosing a

‘linguistically relevant feature’ as a basis for the paradigm  
 Children add new dimensions to their paradigms to resolve feature conflicts, e.g.,

		Nominative	Genitive	Dative
Masc.	agricolae	agricolae		
Masc.	agricola	agricolae	agricolae	

Once children construct a number of word-specific paradigms they extract general paradigms

		Nominative	Genitive	Dative
Masc.	-a	-ae	-ae	

Finally, children can construct a morphological template:

[<sub>x</sub> Stem + affix ( + affix + . . . )]  
 DIM-1 DIM-2

Advantages:

1. It solves the syncretism problem by adding new dimensions to resolve feature conflicts
2. It accounts for the acquisition of arbitrary inflectional classes—adds a new dimension
3. It solves the problem of learning rare inflections by highlighting formal distinctions
4. It solves the segmentation problem through specific and general paradigms
5. It uses the uniqueness principle to constrain overgeneralization

Problems:

1. The model still relies on children’s ability to choose ‘linguistically relevant features’
2. The model builds paradigms for *walk-wade* as easily as *walk-walks*
3. The model does not account for morpheme acquisition orders

Assessment

Pinker provides a thorough discussion of major issues relevant to the acquisition of morphology. The paradigm construction model is a refined version of Maratsos & Chalkley’s distributional learning model, but restricted to the acquisition of morphology.

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#### **D. Single and Dual Mechanisms (Rumelhart & McClelland 1987; Marcus et al. 1992)**

Rumelhart & McClelland proposed a pattern association model for the acquisition of past tense that used a single learning mechanism for regular and irregular forms. Their model generalized past tense forms on the basis of verb type frequencies in the input.

Pinker and his coworkers proposed a dual mechanism model for the acquisition of past tense morphology in English.

1. Regular past tense involves the acquisition of a rule that is generalized to all verbs.
2. Irregular past tense requires the storage and retrieval of irregular forms that block the application of the regular past tense rule.

Both models attempt to explain the **U-shaped development curve** for the irregular past tense.

Single mechanism: input frequencies of regular and irregular verbs.

Rumelhart & McClelland started with 10 frequent verbs, 8 were irregular past tense verbs  
They next fed in 410 verbs, 80 percent were regular past tense verbs

Dual mechanism: acquisition of regular rule followed by strengthening of irregular retrieval.

Marcus et al. report that the average overgeneralization rate was 4 percent.

Overgeneralization errors were evenly distributed across the children's irregular verbs.

Overgeneralization rates were inversely proportional to the verbs' input frequencies.

Children's overgeneralization errors replace omission errors rather than correct forms.

Overgeneralization was not related to the density of regular phonemic neighbors

Overgeneralization was inversely related to the density of irregular phonemic neighbors

## Assessment

Research on overgeneralization errors has been invaluable in revealing the development of association patterns and rules for inflection. Two limitations are apparent in this work:

1. A focus on the use of a single inflection in isolation from the rest of the grammar.
2. A focus on English, which makes a simple division between regular and irregular forms.
3. The dual mechanism model doesn't account for overgeneralization errors among the irregular past tense forms (Bybee & Slobin 1982).

The second limitation has been addressed to some extent by work on German.

German has five plural forms: -en, -s, -e, -er, and  $\emptyset$ ; three of these also appear with umlaut

$\emptyset$	der Daumen	die Daumen	thumbs
umlaut + $\emptyset$	die Mutter	die Mütter	mothers
-e	der Hund	die Hunde	dogs
umlaut + -e	die Kuh	die Kühe	cows
-er	das Kind	das Kinder	children
umlaut + -er	der Wald	die Wälder	forests
-en	die Straße	die Straßen	streets
-s	das Auto	die Autos	cars

The German plural paradigm contains several subregularities:

-en is the usual plural for feminine nouns and masculine nouns with genitive sing. -en

-e is used with nouns that end with a sibilant

-s is used when none of the other endings apply; it serves as the 'default' form of the plural.

Marcus et al. (1995) claim that association learning accounts for the subregular patterns, but a rule accounts for the -s plural even though it is only used with 4 percent of German nouns.

Behrens (2002) found that German children overgeneralize several plural forms, not just -s.

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### **E. Prosodic Constraints (Demuth 1994; Gerken 1991; Pye 1983; Slobin 1973)**

Children's difficulty in using grammatical morphemes is tied to their difficulty in producing the morpheme. English-speaking children are more likely to produce either stressed words or parts of words with a trochaic foot (a strong-weak stress pattern). Children tend to omit the initial unstressed syllable of iambic feet (with a weak-strong stress pattern), or unstressed syllables preceding a trochaic foot (Demuth 1994):

stressed monosyllabic foot	[s]	ball
trochaic foot	[s w]	dolly
iambic foot	[w s]	the ball
trochaic foot + pretonic syllable	w [s w]	the dolly

English auxiliaries typically appear as unstressed syllables before the main verb, and are therefore likely to be deleted by children:

We **have** séen that.

What **is** máking that noise?

K'iche' places the main stress on the final syllable of words. K'iche' children tend to omit the initial syllables of words. They will produce the verb k'oo-l-ik (exist-positional-termination) as lik. Adults drop the final syllable of the verb when the verb is followed by a particle such as the one for negation (k'oo taj 'It is not there'). In the same contexts, K'iche' children also use the initial syllable of the verb and produce k'oo taj. Thus, K'iche' children actually know and produce both syllables of the verb, but omit the initial syllable of words with an iambic foot.

Forms of *k'oolik* in the children's early language samples (number of tokens)

	Clause-medial			Clause-final		
	∅	k'oo	lik	k'oo	lik	k'oolik
Al Tiyaan	26	12	2	0	20	7
Al Chaay	65	16	6	0	16	6
A Carlos	13	30	0	0	8	30

Leonard, Bortolini, Caselli, McGregor & Sabbadini 1992 analyzed the acquisition of morphology by children learning English, Italian and Hebrew. They found that children acquired specific morphemes earlier in Italian and Hebrew:

	English	Italian	Hebrew
Articles	62	83	
Third person present	59	93	79
Plurals	96	89	74

Advantages:

1. The model predicts morpheme omissions and morpheme acquisition orders
2. It accounts for the gradual increase in morpheme use
3. It can be applied cross-linguistically and is supported by data from various languages
4. It assumes that children already know most of the features of the morphemes they use

Problems:

1. The model still lacks a complete account of the relative contributions of stress patterns, syllable structure, utterance position, etc.
2. The model cannot account for the use of filler syllables that children produce in various languages, e.g., Inuktitut -mi (Crago & Allen 1996:268).

Assessment

Any account of morpheme acquisition will have to consider how production difficulties constrain children's use of inflection. The prosodic constraints hypothesis provides a limited account of production constraints, but lacks a complete theory of how specific features interact to constrain production. The prosodic constraints model also lacks an account of how production constraints interact with children's grammars although it predicts that children will use inflections accurately from the beginning of inflectional development.

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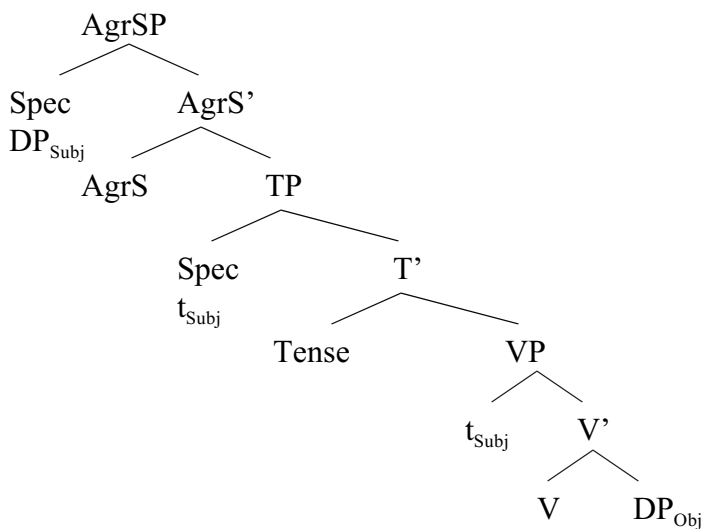
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## F. Root Infinitives (Wexler 1994, 1996, 1998)

Wexler (1994, 1996, 1998) accounts for the lack of tense and agreement inflections by assuming children lack the ability to 'check' inflectional features for subjects. Wexler assumes that subject noun phrases move to Spec IP to check their features against the head of the inflectional phrase.

(1) Inflectional structure for English



The subject checks its 'D-feature' in both Tense and AgrS by moving to the Specifier position in these phrases. The verb's features may be checked by moving the verb to the head of the corresponding functional projections (Tense and AgrS). Wexler (1998) assumes that initially children can only check the subject's D-feature once. Since the D-feature must be checked twice in English, this limitation prevents children from producing a finite form of the verb. Instead, children use an infinitive verb form in the root clause (hence the term root infinitive).

E.g., Dis go right here (Adam 3;3)

Predictions from the Root Infinitive Hypothesis:

1. Children will use infinitive verb forms as a default in simple sentences
2. Children will sometimes omit auxiliary and copular verbs that only carry tense features
3. Children will inflect auxiliary verbs in moved positions, e.g. yes-no questions, negation



4. Children will use non-nominative subject pronouns with root infinitives
5. Children learning languages with overt verb movement will only inflect moved verbs

E.g., French (Pierce 1992)

[ + finite ]		[- finite]
Patsy est pas là-bas		pas manger la poupee
Patsy is not down there		not eat the doll

Children's data

	+ finite	- finite
pas Verb	11	77
Verb pas	185	2

6. Children acquiring languages with 'rich' inflection (Spanish, Italian) will not use root infinitives since they only need to check the subject's D-features once.

Advantages:

1. The theory makes specific predictions about the interaction of morphology and syntax
2. It predicts a link between subject use, case and agreement
3. It makes predictions for languages with 'rich' inflection and verb movement

Problems:

1. The theory does not define 'infinitive'

Many languages lack an 'infinitive' and use deverbal nouns:

K'iche' x-θ-u-chap (u)-b'iin-eem  
 compl-3Abs-3Erg-begin (3Erg)-travel-nominal  
 'He/she began (his/her)-traveling.'

2. The theory does not define 'rich' inflection

Danish has distinct present tense, past tense and infinitive verb forms:

infinitive	køb-e	'to buy'
imperative	køb	
present tense	køb-er	
past tense	køb-de	

Danish also does not permit subject drop:

??? har ikke købt bogen  
 has not bought the book

Despite these features, children acquiring Danish only begin using infinitives AFTER their finite verb morphology becomes productive (Plunkett & Strömquist 1990).

3. English-speaking children use *don't* with third person subjects (Sano 1999),  
 E.g., he don't use your eyes (Nina 2;1.29)
4. The theory does not account for morpheme acquisition orders

5. The theory does not account for the other missing elements in children's sentences, e.g., verbs
6. The theory does not account for the gradual increase in morpheme use (Brown 1973).

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## G. Truncation (Rizzi 1993/4)

Rizzi accounts for the missing elements in children's sentences by assuming that they do not produce complete tree structures. In particular, root infinitives lack the Tense projection.

### Predictions:

1. The temporal interpretation of root infinitives is fixed by the context of the utterance
2. Auxiliary verbs cannot occur in root infinitives
3. Wh-questions cannot occur with root infinitives
4. Pronoun case would not be checked in root infinitives
5. Children's sentences may have null subjects, but not null objects

### Problems:

1. The theory assumes a discontinuity between child and adult grammars
2. The theory does not account for morpheme acquisition orders
3. The theory does not account for the gradual increase in morpheme use
4. The theory does not account for the other missing elements in children's sentences, e.g., verbs

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## H. The Comparative Method (Pye In press)

Studies of morphological development to date have focused on the morphology of a single language or morpheme realization in unrelated languages. This method invites superficial comparisons across languages which minimize fundamental differences in morpheme form and function. For example, a comparison of agreement morphology acquisition in English and K'iche' disregards:

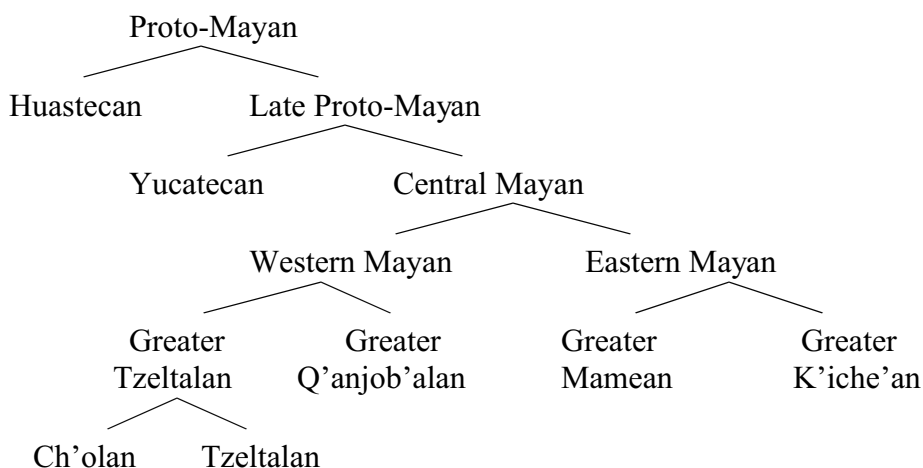
1. differences in affix position — prefix versus suffix
2. differences in morphological type — fusional versus agglutinative
3. differences in agreement type — accusative versus ergative
4. differences in the inflectional paradigm — rich versus nonrich inflection
5. differences in phonetic forms — syllabic versus nonsyllabic
6. differences in function — pronominal versus nonpronominal

The comparative method provides the means to reduce superficial crosslinguistic comparisons. Linguists have used the comparative method for hundreds of years to reconstruct historical changes among language families. The method can be applied to the study of language acquisition to restrict the superficial comparison of language features and provide a historical context for the study of language acquisition. Linguistic history shows how a language has changed in the past, and thus reveals natural fracture points where children acquiring the language today must learn from adult input.

#### Acquisition of Agreement in the Mayan Languages

The Mayan language family contains some 30 separate languages with over seven million living speakers. The languages fall into four main historical subdivisions: 1. Huastecan, 2. Yucatecan, 3. Western and 4. Eastern.

Genetic classification of Mayan languages (Kaufman 1974, 1990)



Mayan languages have a largely agglutinative morphology with an ergative type of crossreferencing verb inflection (Kaufman 1990). The ergative inflections cross-reference the subjects of transitive verbs and nominal possessors. The absolutive inflections cross-reference subjects of intransitive verbs, direct objects of transitive verbs and subjects of non-verbal predicates.

There are distinct forms of the ergative markers for words that begin with consonants and vowels. Nominal arguments for subject and direct object are only used for emphasis or to

disambiguate the reference of the pronominal cross-reference markers on verbs and nouns.

Kaufman (1990) reconstructs the Protomayan agreement system as:

Person	Ergative		Absolutive
	Before V	Before C	PM
1	*w-	*nu-	*iin
2	*aaw-	*aa-	*at
3	*r-	*u-	*∅
4	*q-	*qa-	*o'ŋ
5	*eer-	*ee-	*ix
6	*k-	*ki-	*eb'

Since the time when the Protomayan language began splitting apart (approximately 4,000 years ago), significant changes have occurred to the original agreement system:

1. The Pokom, Yucatecan and Cholan languages developed a 'split ergative' agreement system in which the ergative markers were extended to intransitive verbs in embedded clauses.
2. The Western Mayan languages replaced the third person plural forms with the third person singular form and an added plural suffix. Pokom extended this pattern to the second person plural, and the Yucatecan and Tzeltalan languages have extended the pattern to all the plural forms.
3. A subset of the Eastern Mayan languages added the third person ergative marker \*r- to the third person ergative marker \*u- to produce \*ru-.
4. The Yucatecan and Tzeltalan languages shifted the position of the absolutive affixes from an enclitic on the first word in the predicate to the postpredicate position. Tzotzil retains both systems.
5. The Western Mayan languages replaced the original first person singular marker with the first person plural marker, which was reinterpreted as a singular marker.
6. In Tzeltal, Tzotzil and Tojolab'al, the first person singular form before consonants changed from \*ka- (originally PM \*qa-) to j-.

#### 4. Ergative prefix sets (V - vowel initial; C - consonant initial)

Person	K'iche'		Tzeltal		Tzotzil		Yukatek	
	V	C	V	C	V	C	V	C
1	inw	in	k	j	k	j	iNw	iN
2	aw	a	a'w	a'	av	a	aw	a
3	r	u	y	s	y	s	uy	u
4 incl.	q	qa	k	j ... tik	k	j ... tik	k	k ... o'on
4 excl.	q	qa	k	j ... jo'tik	k	j ... tik	k	k ... o'on
5	iw	i	a'w	a'... ik	av	a ... ik	aw	a ... é'ex
6	k	ki	y	s ... ik	y	s ... ik	uy	u ... ó'ob'

## 5. Absolutive affix sets

Person	K'iche'	Tzeltal	Tzotzil	Yukatek
1	in	on	on	en
2	at	at	ot	ech
3	∅	∅	-i	∅
4 incl.	uj	otik	otik	ó'on
4 excl.	uj	on jo'tik	on jo'tik	ó'on
5	ix	ex	oxuk	é'ex
6	e:	ik	ik	ó'ob'

### Incompletive Verb Forms

Yucatec (Bricker et al. 1998:331)

k **u** wen-el  
INC **ERG3** sleep-NF  
'he/she sleeps'

Chol (Gutierrez 2005:42)

mi **k**-jul-el  
INC **ERG1**-arrive-NF  
'I arrive'

Q'anjob'al (England 1992:125)

ch-**in** way-i  
INC-**ABS1** sleep-STATUS<sub>IV</sub>  
'I sleep'

Mam (England 2001:71)

n-**chin** tze'ne'  
INC-**ABS1** laugh  
'I laugh'

K'iche'

k-**in**-ul-ik  
INC-**ABS1**-arrive-STATUS<sub>IV</sub>  
'I arrive'

### Progressive Verb Forms

Yucatec (Bricker et al. 1998:331)

táan **u** wen-el  
PROG **ERG3** sleep-NF  
'he/she is sleeping'

Chol (Gutierrez 2005:46)

chonkol **k**-majl-el  
PROG **ERG1**-go-NF  
'I am going'

Q'anjob'al (Mateo 2005:6)

lanan **hin**-way-i  
PROG **ERG1**-sleep-STATUS<sub>IV</sub>  
'I am sleeping'

Mam (England 2001:71)

n-chin tze'ne'  
INC-**ABS1** laugh  
'I am laughing'

tajin k-**in**-tze'n-ik  
PROG INC-**ABS1**-laugh-STATUS<sub>IV</sub>  
'I am laughing'

## 4. Aspectual Adverb Constructions

Q'anjob'al

amank'wan **hin**-lo-w-i  
fast **ERG1**-eat-DER-STATUS<sub>IV</sub>  
'I eat fast.'

Mam (England 1983:269)

pal-alaan **t**-iky' nimaal ich'  
lying\_down-af **ERG3**-pass\_by dem rat  
'Floating, the big rat went by'

Yucatec (Bricker et al. 1998:242)

sáan jí'-ik-∅ h wàan  
already go-SUBJ-**ABS3** CL John  
'John went a while ago'

K'iche' (Ajpacaja Tum et al. 1996:226)

noojiim k-∅-b'iin lee nima winaq  
slowly INC-**ABS3**-walk the old man  
'The old man walked slowly'

Table 4. Mixed Ergative Structures in Five Mayan Languages

	Yucatec	Ch'ol	Q'anjob'al	Mam	K'iche'
Progressive	Ergative	Ergative	Ergative	Absolutive	Absolutive
Incompletive	Ergative	Ergative	Absolutive	Absolutive	Absolutive
Adverb	Absolutive	Absolutive	Ergative	Ergative	Absolutive

The following aspectual adverb example was produced by a Q'anjob'al child who was two years and three months old.

5. wak kokuyi.  
 = watx' ko-kuy-\*w-i.  
 ADV **ERG4**-study-DER-STATUS<sub>IV</sub>  
 'good we study'

Current acquisition theories cannot explain the historical changes that have taken place within the Mayan agreement complex. We can compare changes in acquisition with processes of historical change to determine the extent of the relation between these two processes of language change. This research shows:

1. Children learning Q'anjob'al and Yucatec do not regularize the split ergative systems, while children learning K'iche', Tzeltal and Tzotzil do not produce a split ergative system.
2. Children acquire the plural forms after they acquire the singular forms.
3. Children acquiring K'iche' sometimes produce the double marked ru- form.
4. Children produce the absolutive forms in the proper position, but sometimes use a post-predicate independent pronoun in place of absolutive (and ergative) agreement.
5. Children do not substitute plural forms for singular forms.
6. Children's agreement forms follow their phonological development.

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