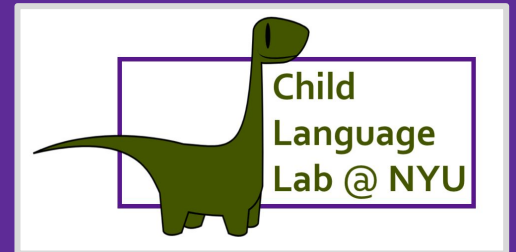


The journey, not the endstate: finding innovation in the dynamics of L1A

Naomi Lee & Ailís Cournane
New York University

<https://tinyurl.com/DIGS2019-LeeCournane>



Unraveling approaches to learning morphosyntax link diachrony and acquisition

a language's

diachronic path

towards economical

adult grammars

Unraveling approaches to learning morphosyntax link diachrony and acquisition

a language's

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adult grammars

children's

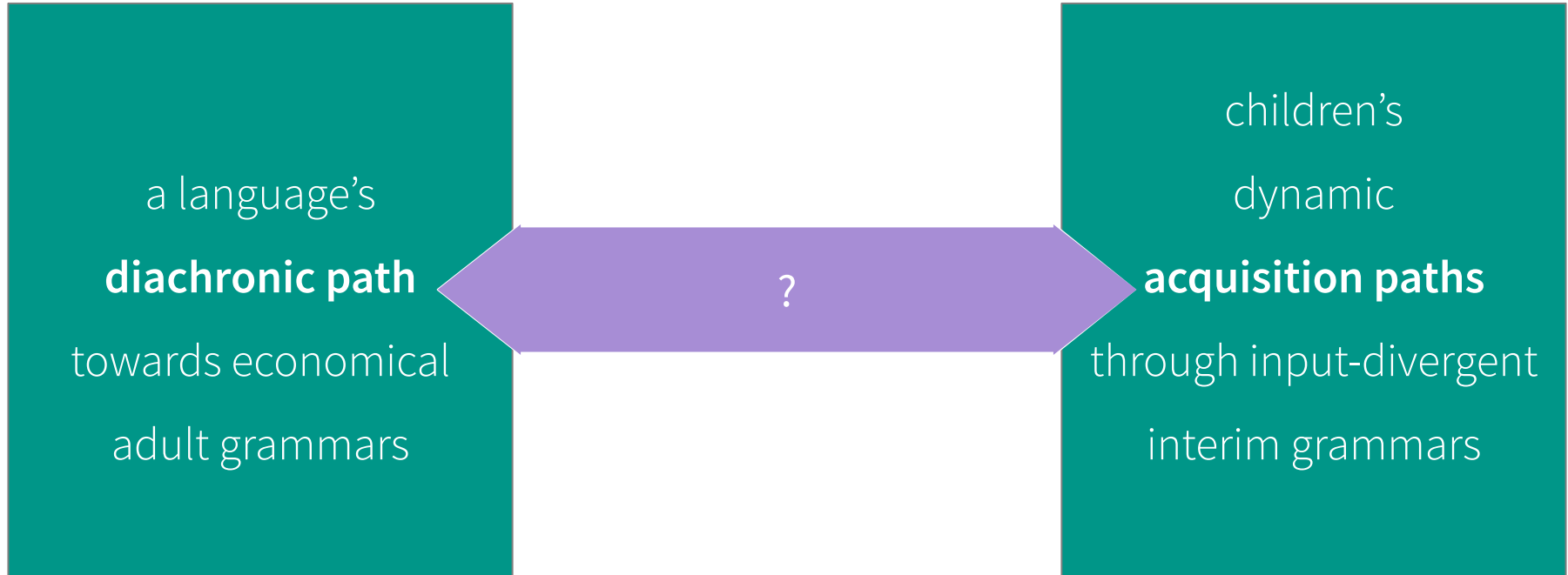
dynamic

acquisition paths

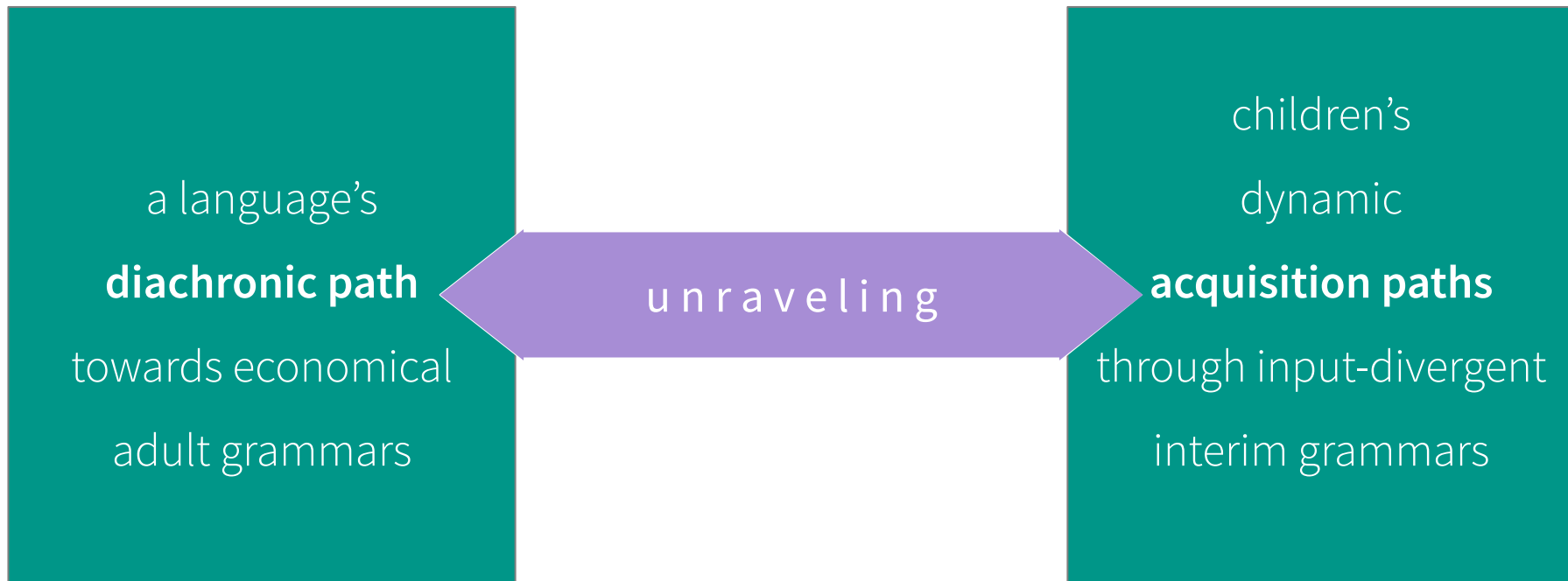
through input-divergent

interim grammars

Unraveling approaches to learning morphosyntax link diachrony and acquisition



Unraveling approaches to learning morphosyntax link diachrony and acquisition



1. Child analyses as innovations

diachrony from learning patterns,
not vice versa

Most generative approaches to diachrony implicate children as innovators

“The changes in language fulfil themselves in the **individual**...the main period for the exercise of such influence [from others] is the **time of the first acquisition - of the learning of language**”

- Paul 1920 [1880]:15

“[in a child’s] task of **acquiring its first language**... the child will be driven to a...grammar...[with] a degree of **indeterminacy [that is required by] the view of syntactic change** outlined here”

- Lightfoot 1977:194

“We assume that parameter change is an aspect of the process of parameter setting [and] **a change is initiated when (a population of) learners converge on a grammatical system which differs in at least one parameter value** from the system internalized by the speakers whose linguistic behaviour provides the input to the learners”

- Roberts & Roussou 2003:11

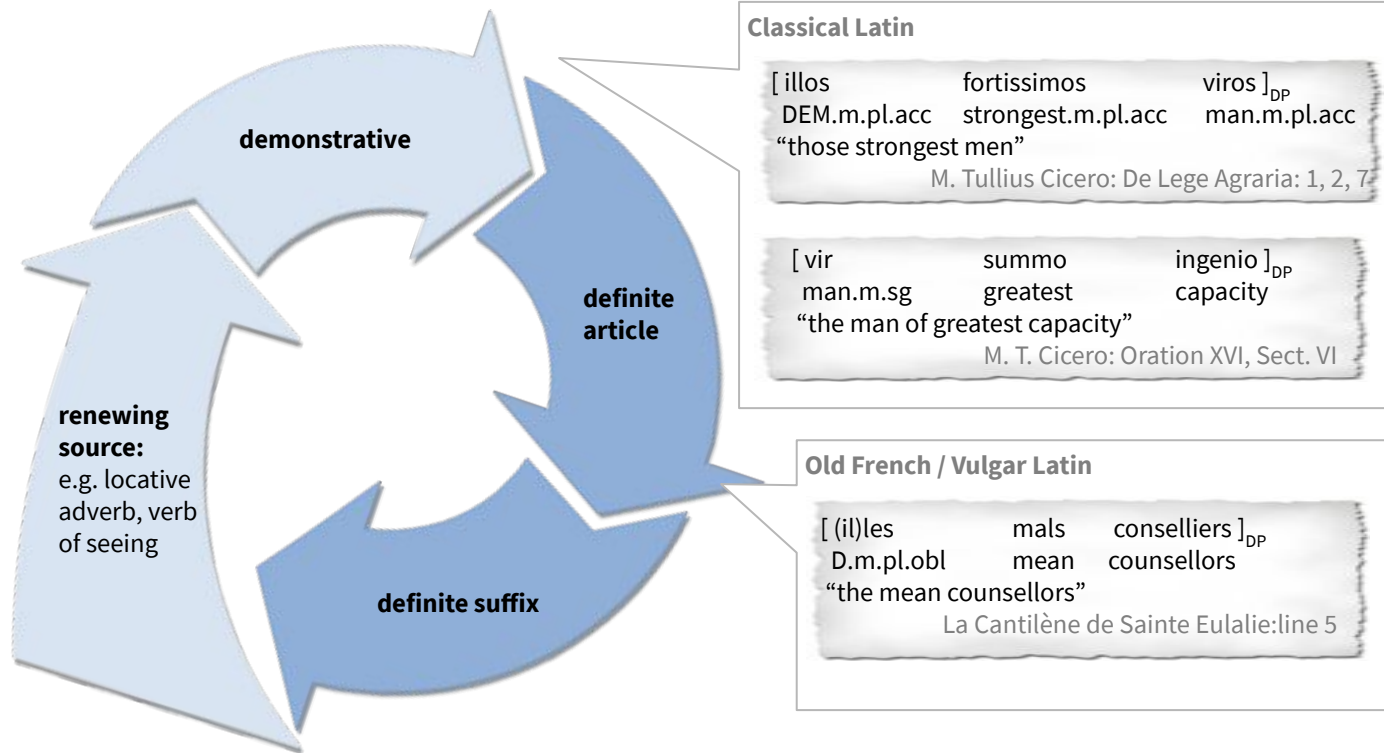
“the claim [is] that imperfect language learning, even by **children acquiring their first language** can be a source of language change”

- Kroch 2005:25

“I argue that **cycles** are the result of **reanalysis by the language learner**” and are due to “internal principles that bias the learner toward certain structures”, “emphasiz[ing] the **role of the child** learning the language”

- van Gelderen 2011: 4,6

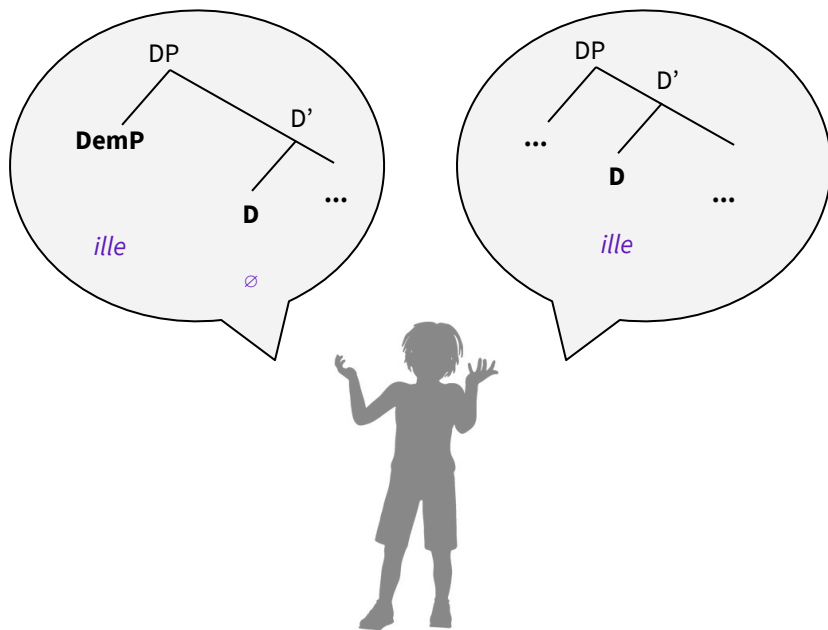
However, proposed innovations have been back-engineered by comparing adult states



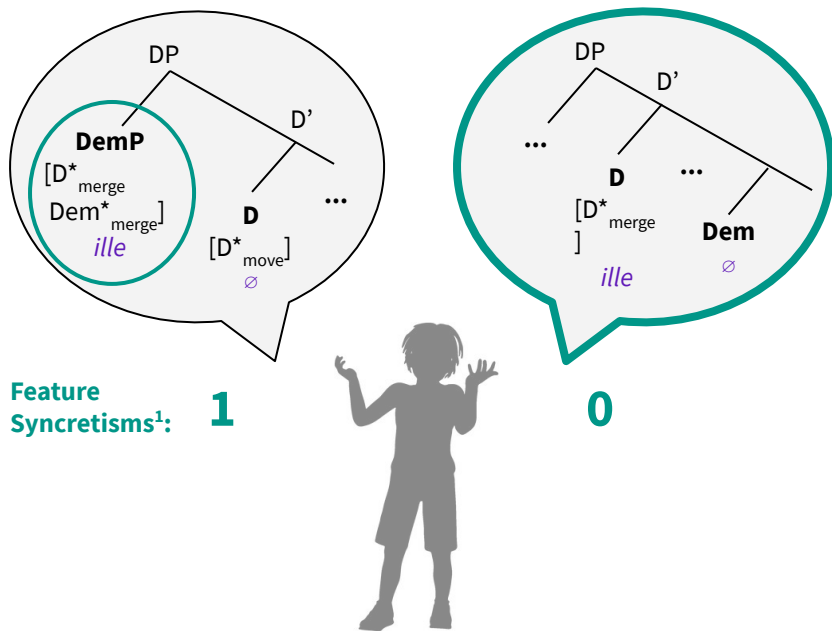
Within well-established cycles of directionally recurring changes, children are taken to **abandon ‘less economical’** (van Gelderen 2011) or **‘more elaborate’** (Roberts & Roussou 2003) **adult analyses** in reanalysis

Syntactic change is therefore credited to simplifying economy principles that direct learning...

- The economy of the “**simpler**” **adult state** is taken to drive learning and cause change:



Syntactic change is therefore credited to simplifying economy principles that direct learning...

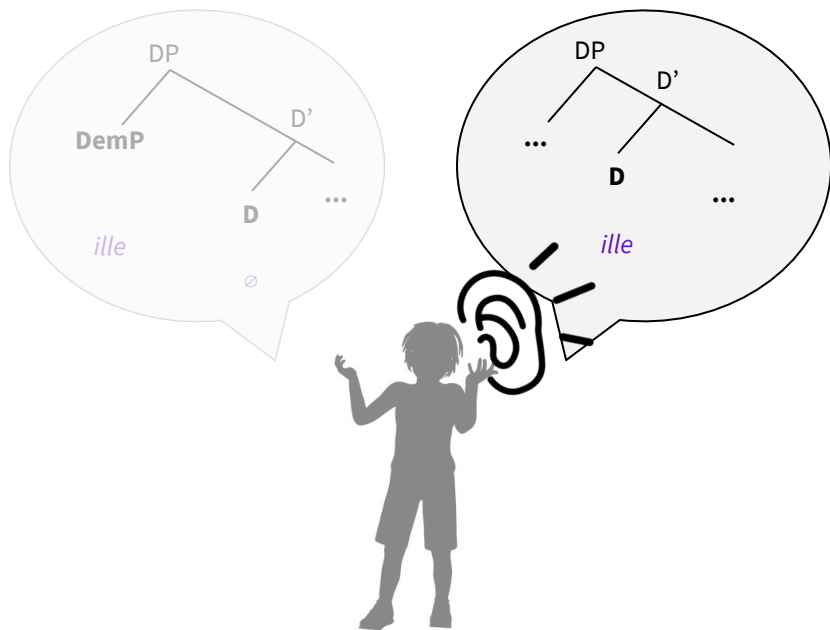


- The economy of the “**simpler**” **adult state** is taken to drive learning and cause change:
 - Maximize Featural Economy (van Gelderen 2004, 2007, 2008, 2011)
 - Minimize Feature Syncretisms (Roberts & Roussou 2003)

1. # of structural positions with PF realization of more than one formal feature

Adapted from Roberts & Roussou 2003: 135 - example (5), building on analysis given by Giusti 2001 and summarized in Roberts & Roussou 2003: 134-6

Syntactic change is therefore credited to simplifying economy principles that direct learning - that emerge under specific input



- The economy of the **“simpler” adult state** is taken to drive learning and cause change:
 - Maximize Featural Economy (van Gelderen 2004, 2007, 2008, 2011)
 - Minimize Feature Syncretisms (Roberts & Roussou 2003)
- Economical innovations arise under **exceptional, insufficient input data**
 - Relevant child is an innovator in a haystack

In fact, all children's grammars are input-divergent through the learning process

C

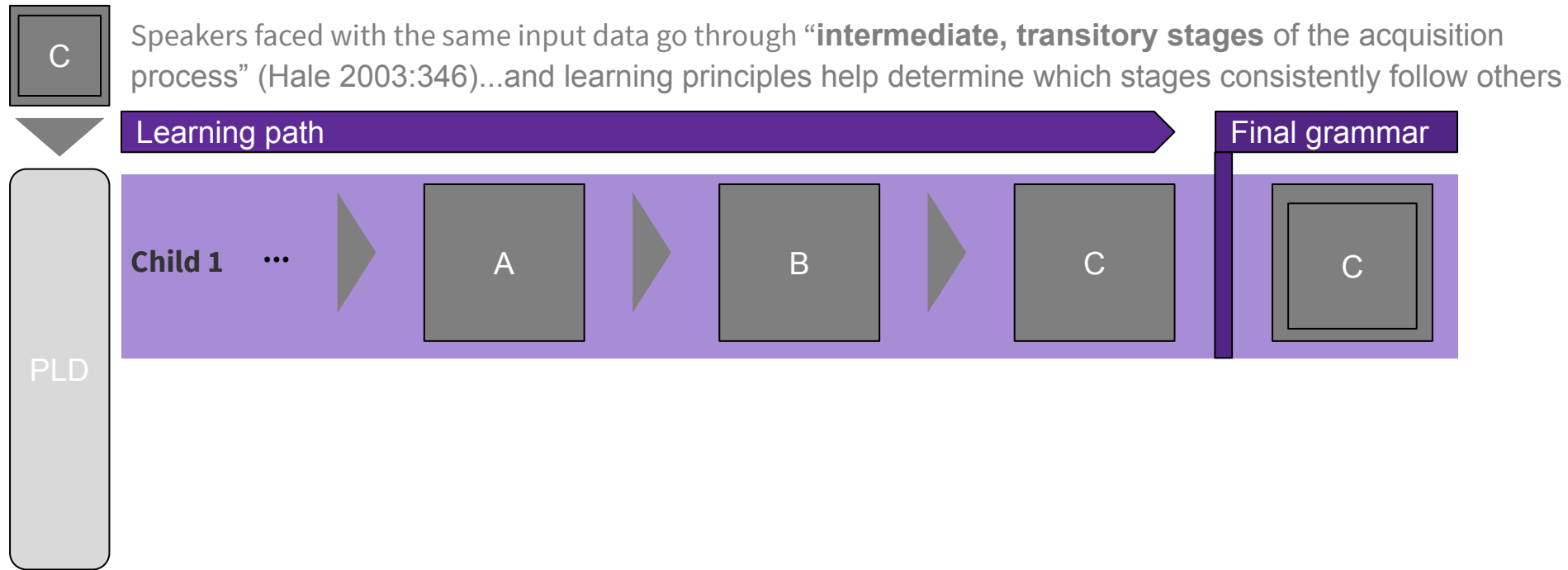
Speakers faced with the same input data go through “**intermediate, transitory stages** of the acquisition process” (Hale 2003:346)...and learning principles help determine which stages consistently follow others

Learning path

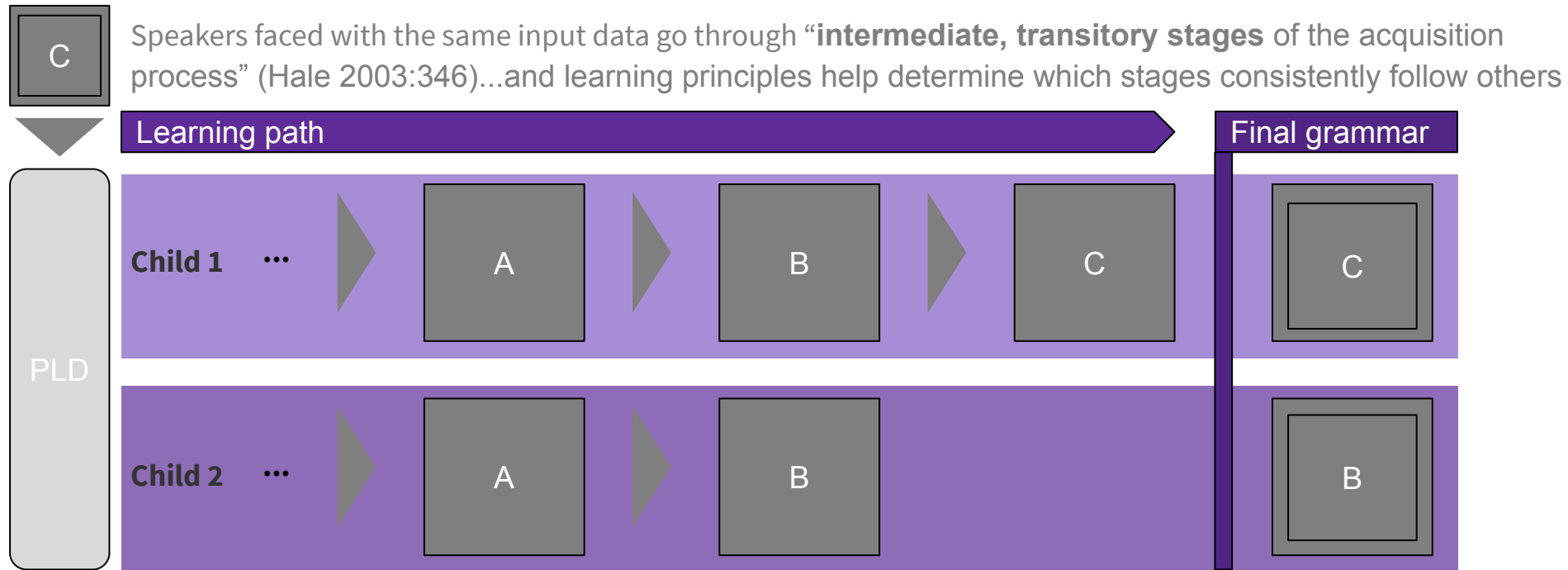


PLD

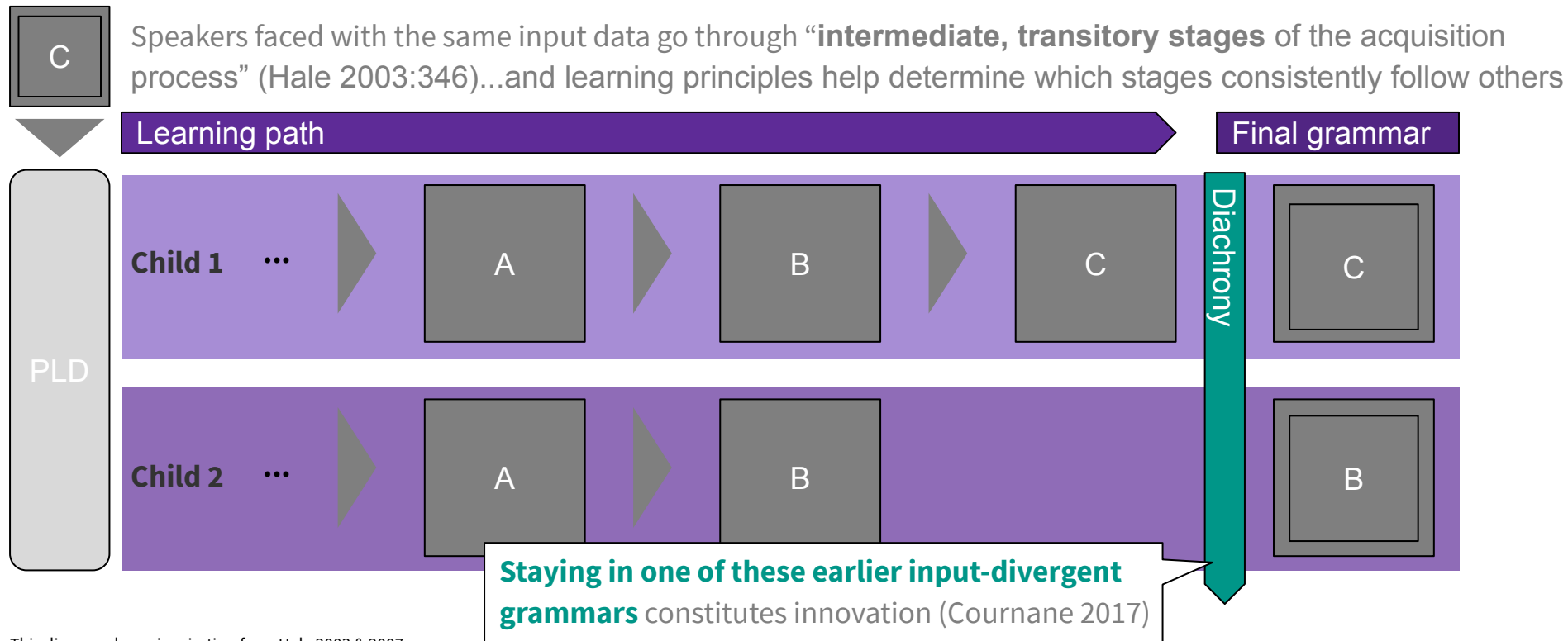
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Roadmap

1. Child-first diachrony
2. Unraveling nominal morphosyntax
3. Empirical coverage of unraveling:
 - Canonical, economical: Dem to D *Latin > Romance*
 - Non-canonical: Gender & Num *Proto-Cushitic > Somali*
4. Conclusions

2. Unraveling nominal morphosyntax

recentering the learning task

The goal of morphosyntactic learning is to map forms to meanings (Roots or features)

√ Lexical Root
■ syntactic feature

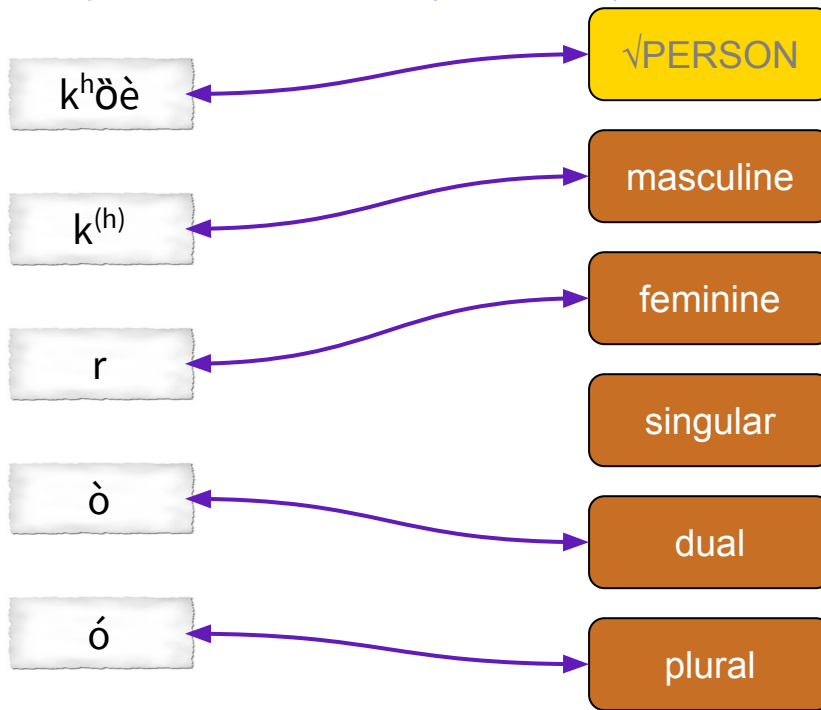
input utterances

segmentation Vocabulary Items (form-meaning mapping)

Adult Khoekhoe speaker¹



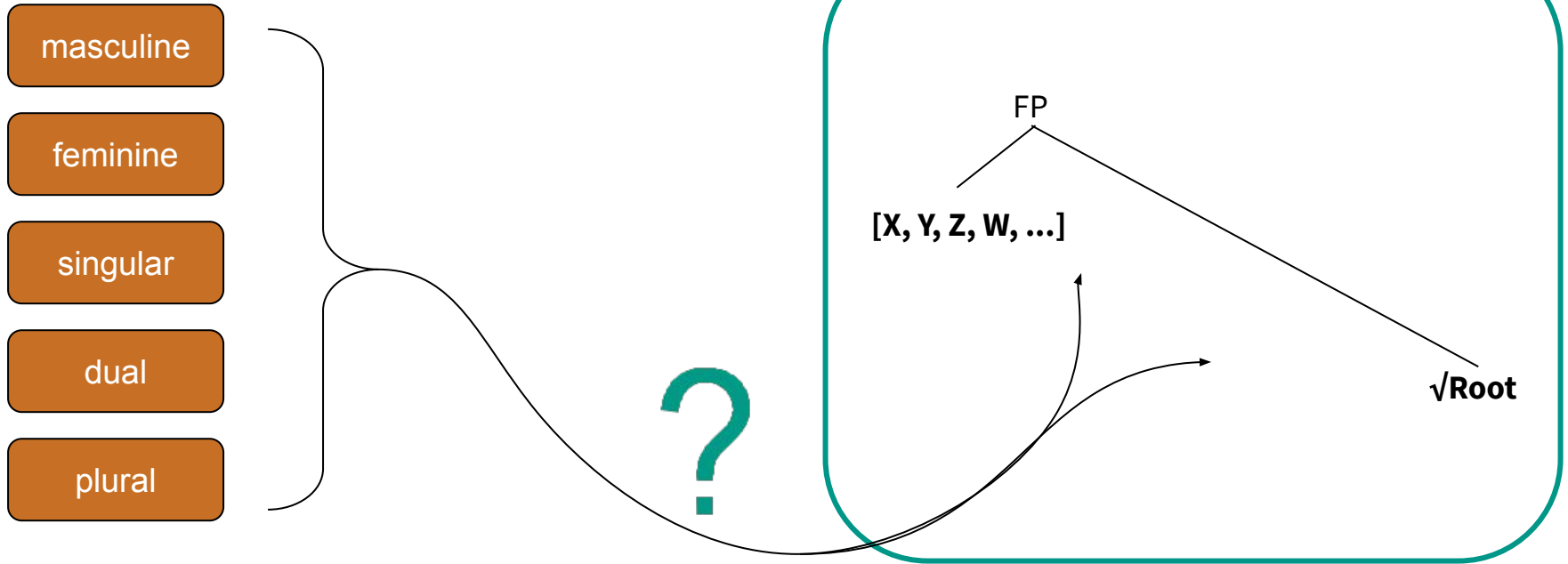
PF spellout ↔ abstract syntactic representation



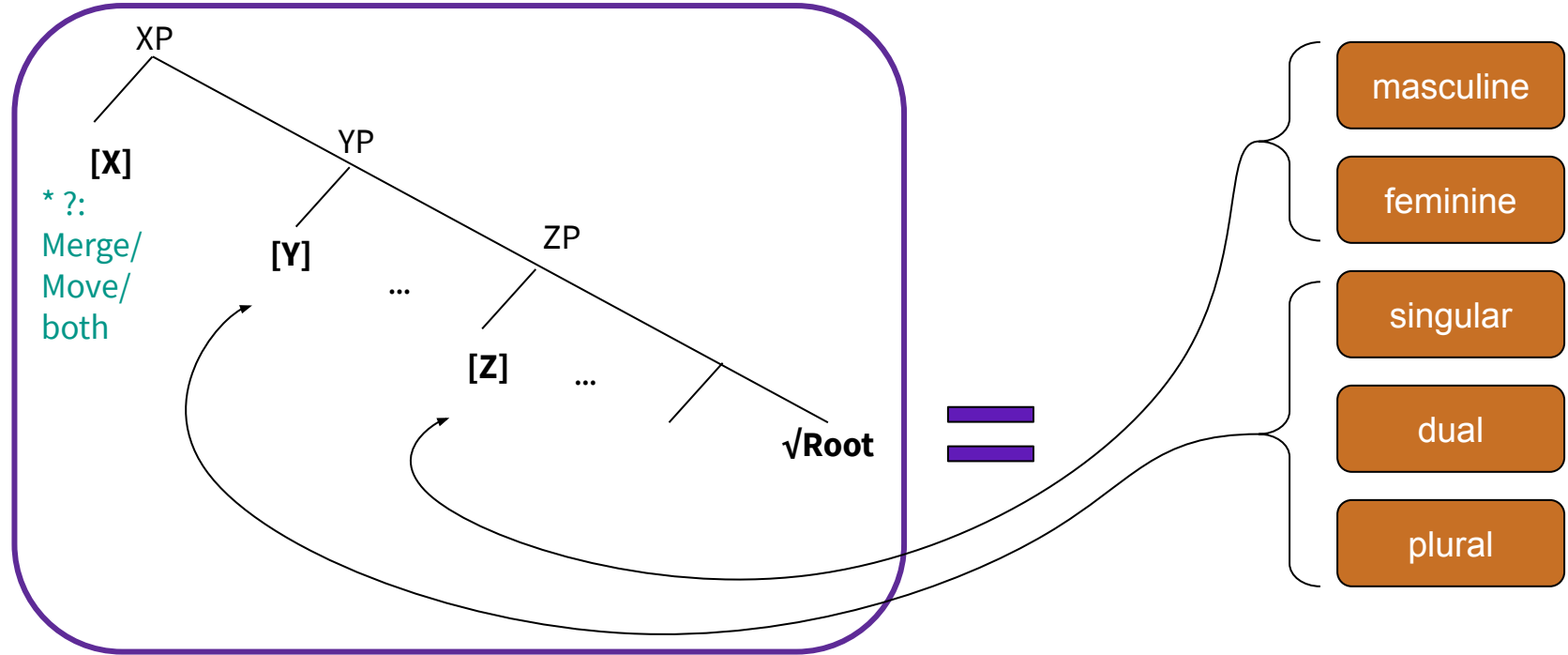
Let's take as given that Merge, “the features themselves, ...and the nature of the movement operation are innately given as aspects of UG”¹...

(even so, generative approaches to the syntactic organization of features still differ - many models exist)

The unraveling approach induces the syntactic organization of those features



..rather than assuming they exist in innately known (cartographic) structures



Less innate knowledge means the learning task determines children's interim states

Given that Merge, “the features themselves, ...and the nature of the movement operation are innately given as aspects of UG”¹...

Innatist

Inductive

How much knowledge of the syntactic organization of features does the child start with?

Full configurational knowledge

Partial knowledge

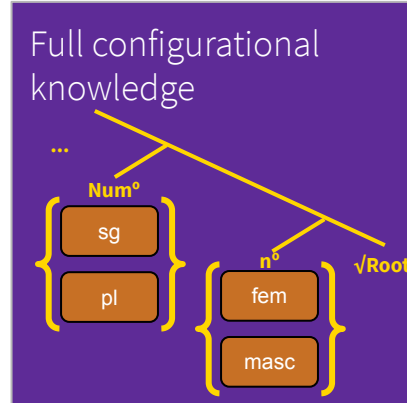
No syntactic knowledge about features

Less innate knowledge means the learning task determines children's interim states

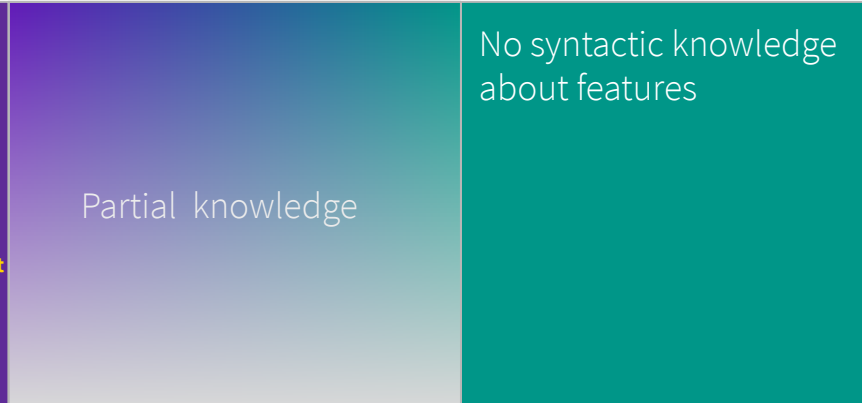
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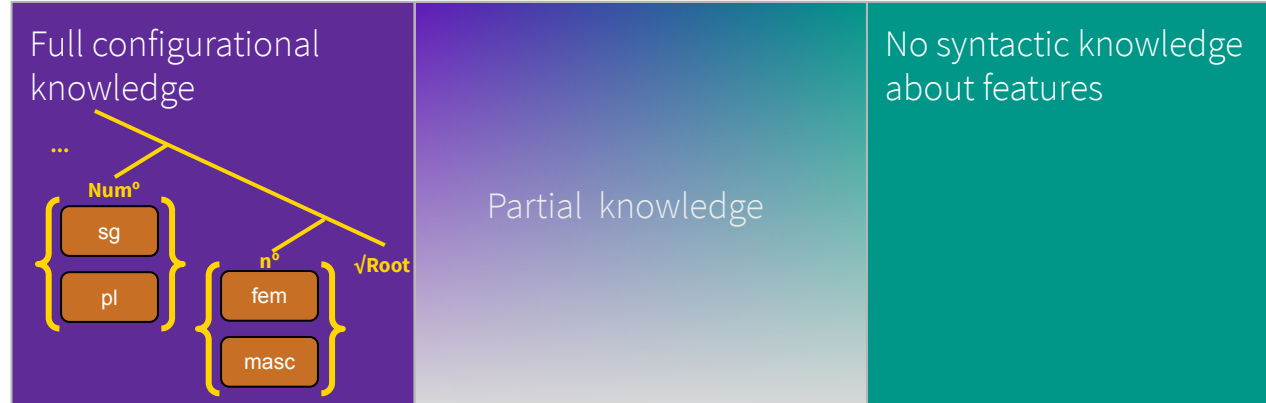
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Inductive

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What is the child's learning task?

Match a known structure to pronounced pieces

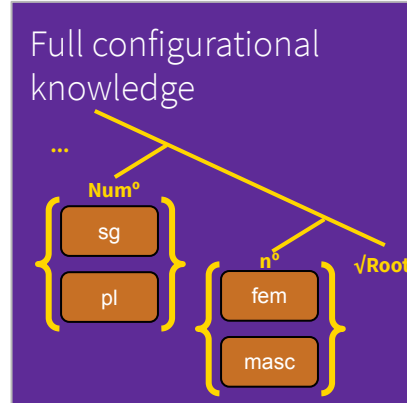
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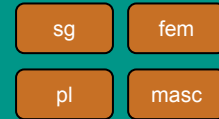
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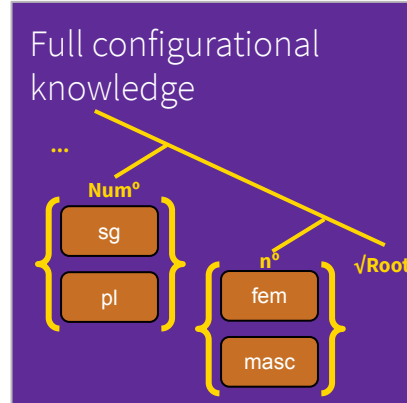
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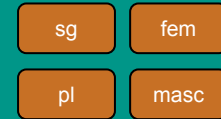
Innatist



Match a known structure to pronounced pieces

Inductive

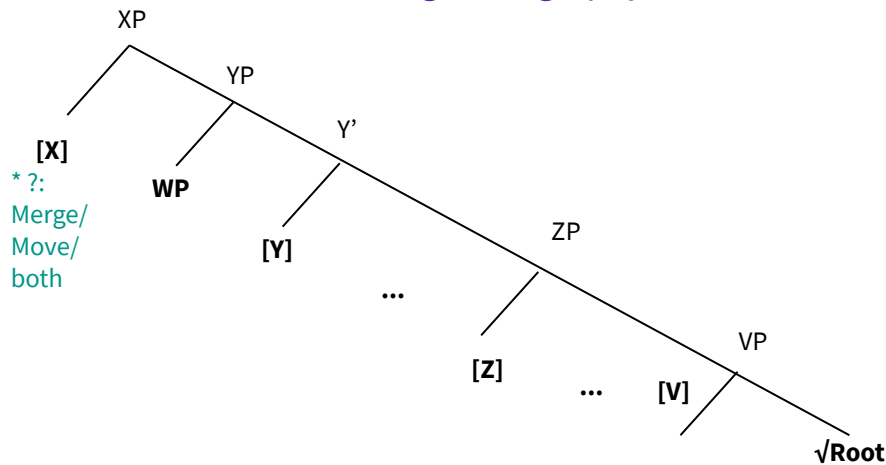
No syntactic knowledge about features



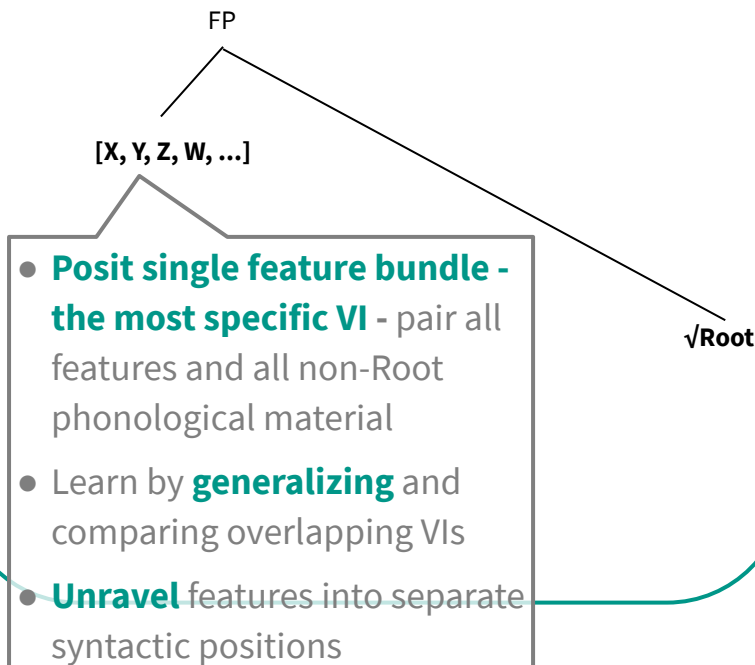
Assemble WYSIWYG syntactic structures for pronounced pieces to match

The unraveling child initially groups all features together in one syntactic position

Innatist - e.g. cartography



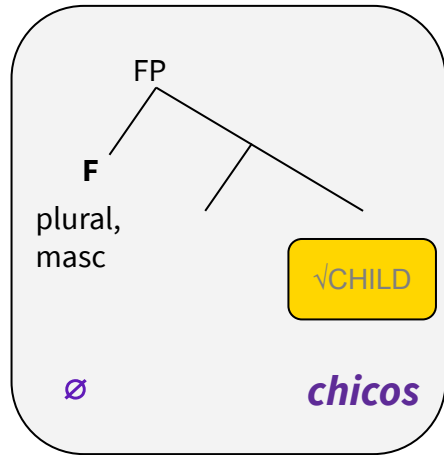
Inductive - e.g. unraveling



The child generalizes over repeated occurrences of features to unravel that initial bundle

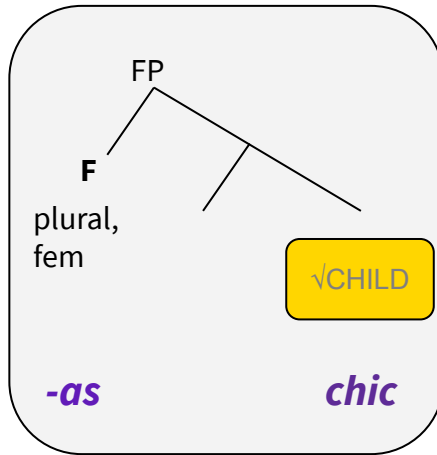
chicos

male, plural



chicas

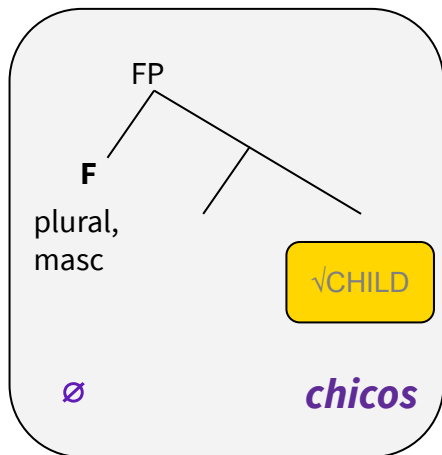
female, plural



The child generalizes over repeated occurrences of features to unravel that initial bundle

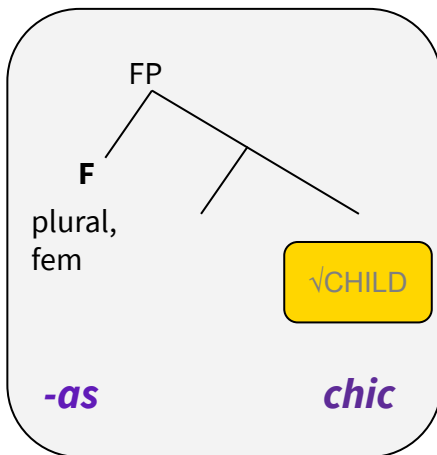
chicos

male, plural



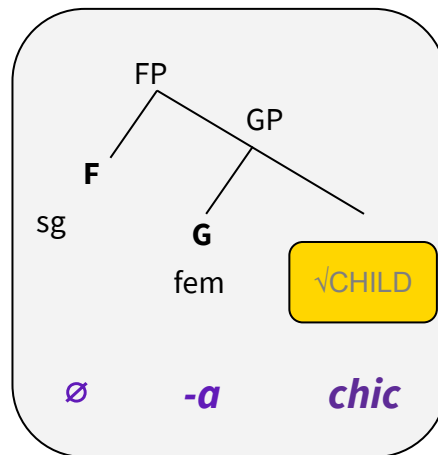
chicas

female, plural



chica

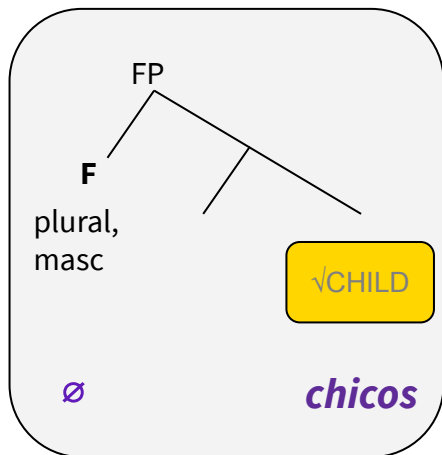
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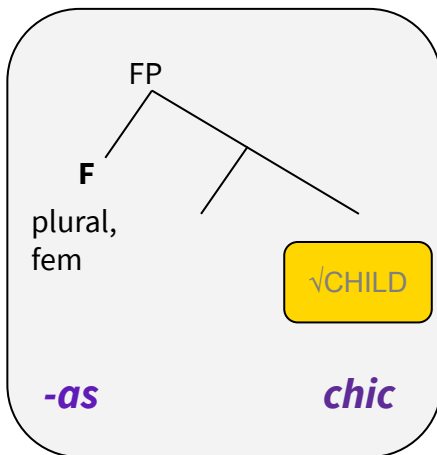
chicos

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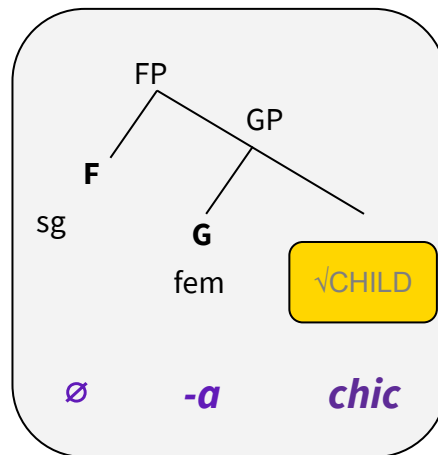
chicas

female, plural



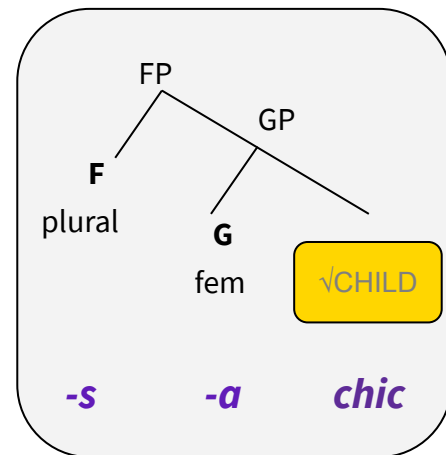
chica

female, singular



chicas

female, plural



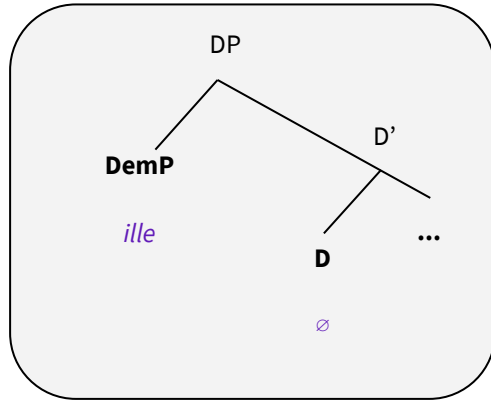
An unraveling inductive approach often predicts economical interim child analyses

- Starting with a maximally specific analysis of **non-Root lexical material as bundled features** means children **base-generate PF material “higher”** than in adult analyses (Cournane 2016)
- As a consequence of staying “earlier” along the acquisition path, changes will appear simpler and more economical because **complexity builds in acquisition**
 - Directional diachronic patterns are a product of the necessary ordering of interim grammars in acquisition

3a. A canonical case study

from demonstrative to determiner:
Spec-head reanalysis

Latin's *ille* demonstrative occupied the specifier of a D head (Giusti 1998, Lyons 1999)



[illos fortissimos viros]_{DP}
 DEM.m.pl.acc strongest.m.pl.acc man.m.pl.acc
 “those strongest men”
 M. Tullius Cicero 63 BCE: De Lege Agraria: 1, 2, 7

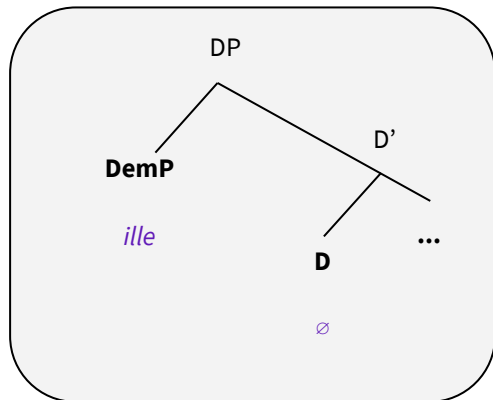
[vir ille fortissimus]_{DP}
 man.m.sg.nom DEM.m.sg.nom strongest.m.sg.nom
 “those strongest men”
 Seneca 40-45 CE: Ad Marciam de consolatione: 1.7

[vir summo ingenio]_{DP}
 man.m.sg greatest capacity
 “the man of greatest capacity”
 M. T. Cicero 63 BCE: Oration XVI, Sect. VI

“Considerable freedom of position [word order], like adjectives”¹

Occur optionally in definite contexts

Latin's *ille* demonstrative occupied the specifier of a D head (Giusti 1998, Lyons 1999)



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640/644 in Caesar

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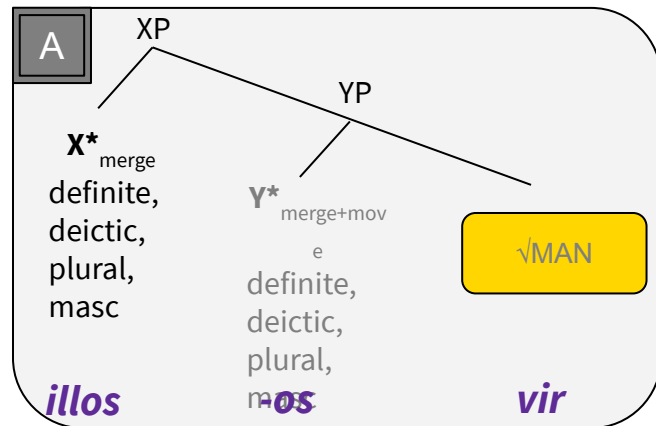
Given Latin input, an “unraveling” learner would straightforwardly posit the higher head to start

illos viros

Given Latin input, an “unraveling” learner would straightforwardly posit the higher head to start

Initially posit a [definite] & [deix]-including, fully bundled terminal in head position

illos viros

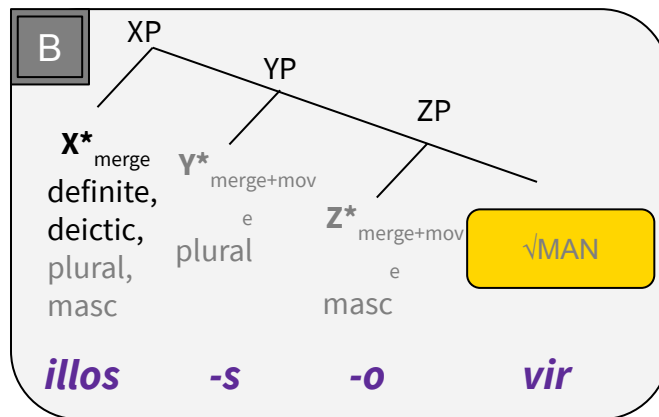
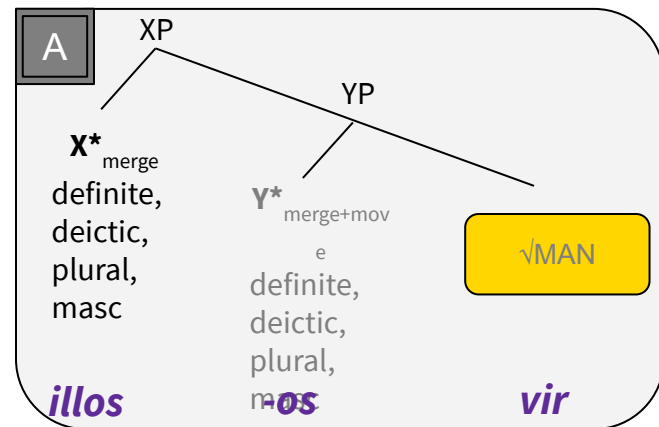


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illos viros

illi viri



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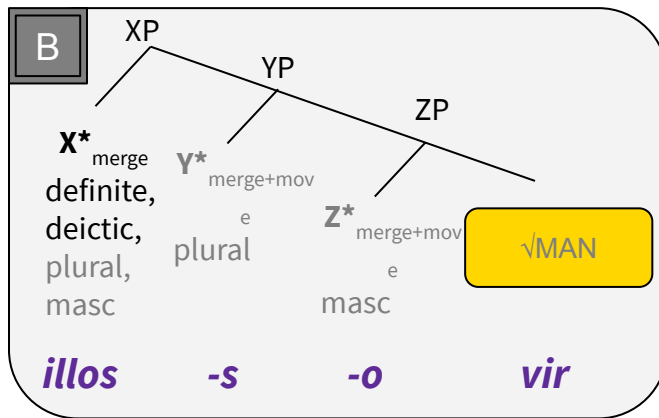
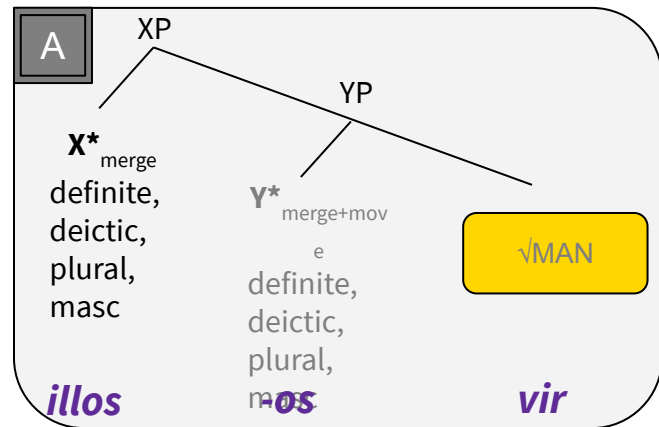
illos viros

illi viri

Later evidence required for a non-head analysis (not shown)

C

vir ille



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Initially posit a [definite] & [deix]-including, fully bundled terminal in head position

illos viros

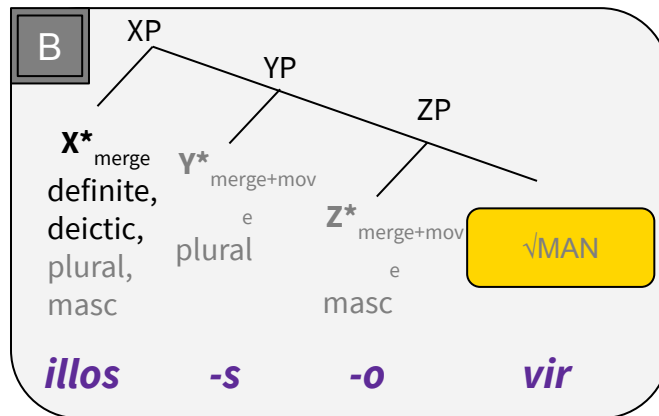
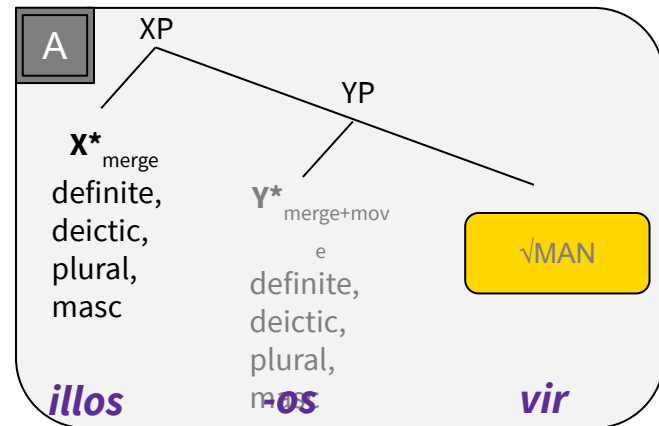
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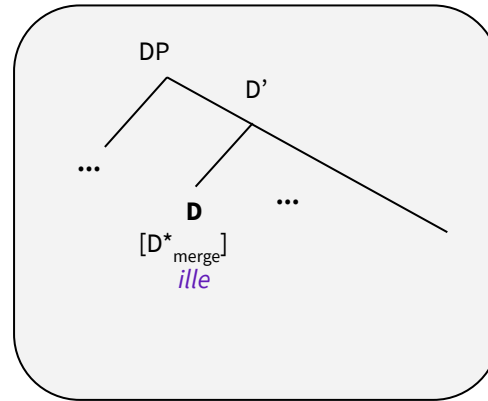
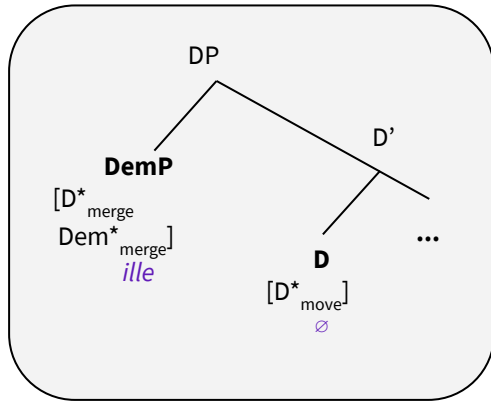
C

vir ille

- The children who innovate **do not consider and discard a more complex analysis**, but never consider it at all
- The resulting grammar is **simpler, not due to economy**, but from children’s tactics for approaching the inductive learning task



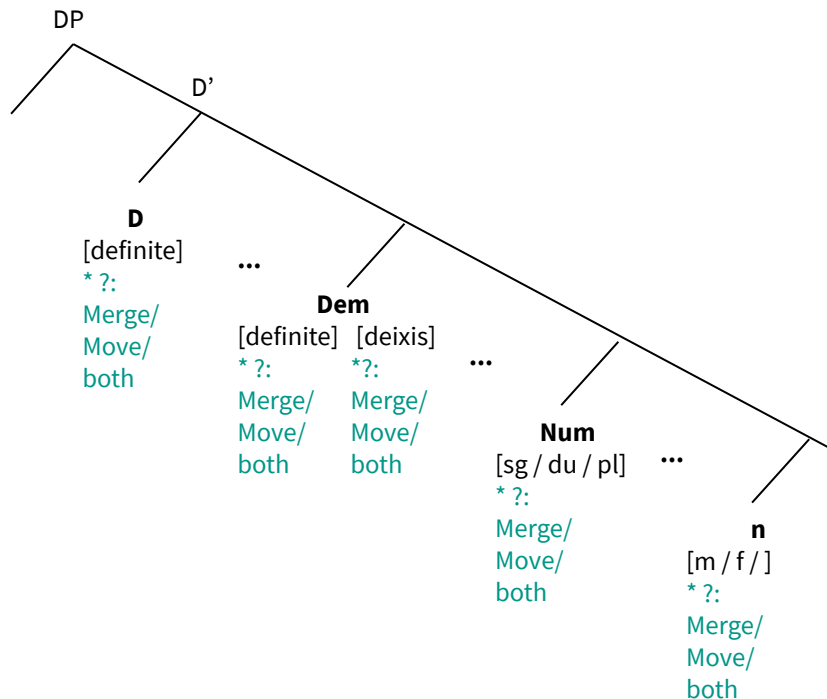
But accepted synthesis (Roberts & Roussou 2003, van Gelderen 2011) is that Dem > D was economy-driven



Descriptive characterizations of the change are ultimately **economy-driven**:

- **Merge > Move**¹: Move requires one more feature syncretism (in the base-generated position) than Merge
- **Head Preference Principle**²: specifiers acting as goals bear interpretable features, and don't keep the derivation going - that is less economical than heads with uninterpretable features

...and requires cartographic knowledge of the syntax of Dem & D heads and their defining features



- Ultimately, **economy** is calculated by **comparing derivations**
- If children's initial analyses are "economical" without transderivational comparison, their character must be due to acquisition itself

With unraveling, innovation consists of staying at a commonplace earlier analysis

Rather than comparing derivations, all children simply **proceed as best they can** in analyzing their input

Innovation is any analysis inconsistent with input basis

Actuation is the persistence of a learning phase through peer-to-peer reinforcement

With unraveling, innovation consists of staying at a commonplace earlier analysis

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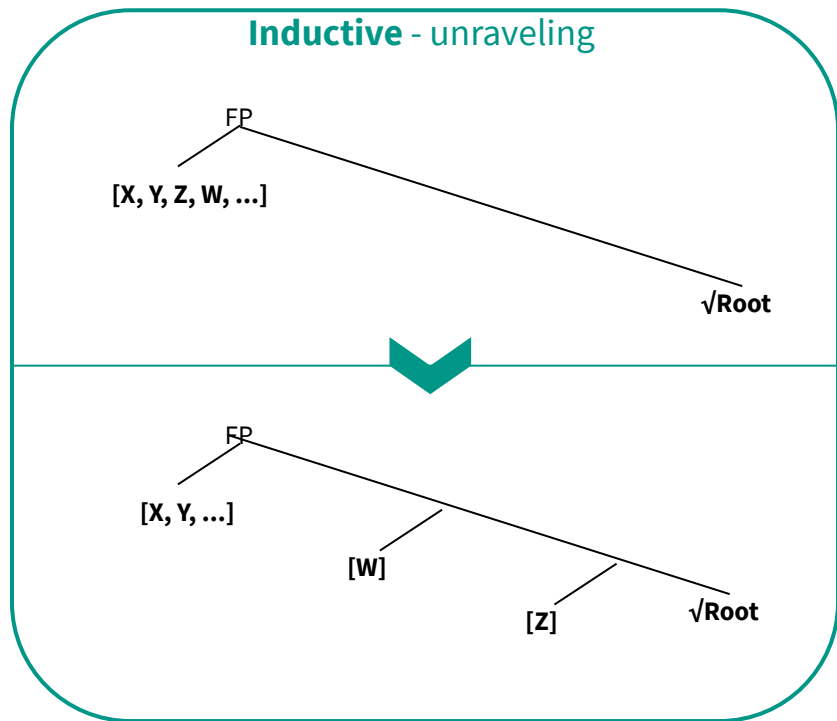
- **How can we test** our diachronic account - based on theorizing about acquisition of a dead language?
 - Language with **pre-reanalysis properties: Russian**
 - Investigate whether most children¹ learning it go through a phase representative of the “**next step**” on the cycle?: head stage

1. not just those with special exposure to specially insufficient input data

3b. a non-canonical case study

number and gender features:
never unraveled

Before unraveling, interim analyses bundle otherwise unexpected features together



- **Somali gender “polarity”**: heads bearing both number and gender features (Lecarme 2002, Kramer 2015)
- Pre-**unraveling** interim grammars **always bundle features** (of “different categories”) together
- Unraveling accounts for the possibility of the Somali system - whereas feature (syncretism) **economy should prohibit it**

Somali nouns famously exhibit so-called “gender polarity” in the plural

Gender

Singular form

Plural form

feminine definite
article: ta/da

woman **the**

naag ta

masculine definite
article: ga/ha

Somali nouns famously exhibit so-called “gender polarity” in the plural

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díbi ga

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Gender

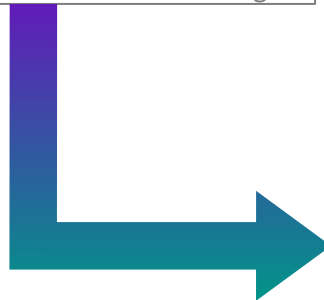
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woman **the**
naag ta



woman-PL1 **the**
naag-o ha

bull **the**
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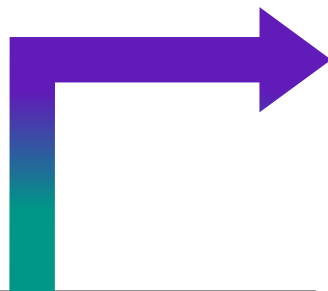
masculine definite
article: ga/ha

woman **the**
naag ta

bull **the**
díbi ga

bull-PL2 **the**
dibi da

woman-PL1 **the**
naag-o ha



However, “polarity” is better analyzed as gender specific to different pluralization strategies

Gender

Singular form

Plural form

feminine definite
article: ta/da

woman **the**
naag ta

masculine definite
article: ga/ha

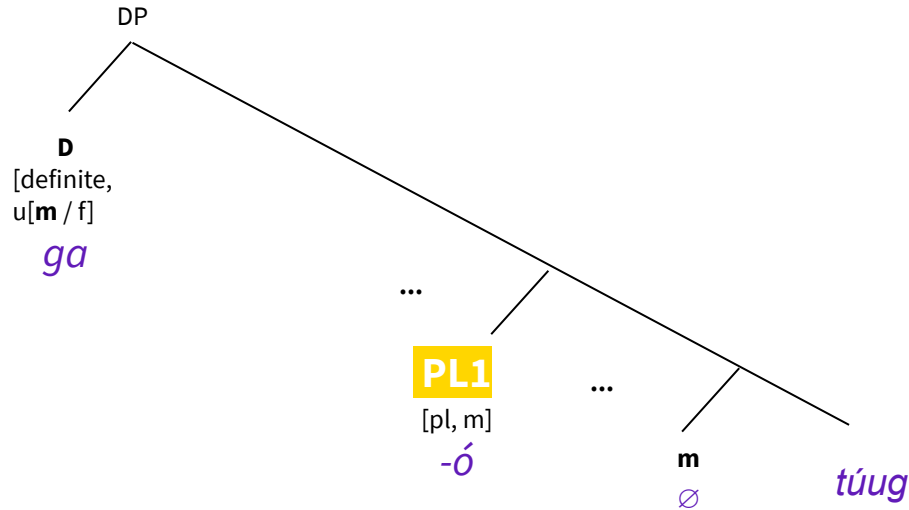
thief **the**
túug ga

woman-**PL1** **the**
naag-ó ha

thief-**PL1** **the**
tuug-ó ga

PL1 imposes
masculine gender

Somali speakers analyzed terminals as bearing both number features and gender features



However, “polarity” is better analyzed as gender specific to different pluralization strategies

Gender

Singular form

Plural form

feminine definite
article: ta/da

masculine definite
article: ga/ha

bull **the** díbi ga

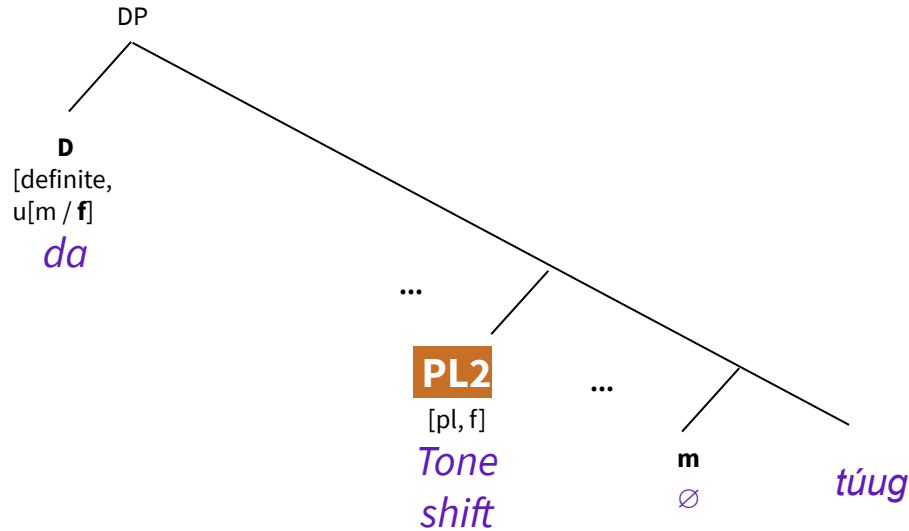
thief **the** túug ga

bull-**PL2** **the** dibí da

thief-**PL2** **the** tuúg da

PL2 imposes
feminine gender

Somali speakers analyzed terminals as bearing both number features and gender features



These innovations in Somali constitute the introduction of new overt feature syncretisms

PL1
[p, m]
-ó

PL2
[p, f]
Tone shift

- **Emerges naturally** from the bundles that **unraveling** approach starts with
- But would constitute the introduction of very **uneconomical** new feature syncretisms

5. conclusions

Finding innovation in the L1A process

Unraveling approaches to learning morphosyntax link diachrony and acquisition

- The learning model family that best unites actual learning pathways with unidirectional diachronic patterns are **unraveling models** (Pannemann 2007, i.a.), capturing:
 - canonical changes: **Dem>Det (Latin)**
 - emergence of cross-categorial bundling of features: **number-gender bundling (Somali)**
- Innovations actuate into languages when **interim analyses** > ultimate analyses
 - Later input-divergent systems, persisting to the age of peer (not parent) social alignment, are most likely actuation candidates (Cournane 2017, cf. Labov 1989, 2001)

We can and must directly study the learning process to assess explanation in diachrony

We **can** because:

- All children are innovators, and studying any child is fruitful, with our linking hypothesis:
 - ⇒ Experimental (Cournane 2014; Cournane & Perez-Leroux, in revision) and modeling (Lee 2019) studies can explore **how children's earlier analyses are actually built** and **assess diachronic directional hypotheses**

We **must** because child innovators are the explanatory core of our theory



Sources

Alexiadou, Artemis, Liliane Haegeman, & Melita Stavrou 2008. *Noun phrase in the generative perspective*. Vol. 71. Walter de Gruyter.

Brugè, Laura 2002. "The positions of demonstratives in the extended nominal projection." *Functional structure in DP and IP: The cartography of syntactic structures* 1: 15-53.

Carlier, Anne & Walter De Mulder 2010. "The emergence of the definite article: ille in competition with ipse in Late Latin." *Subjectification, intersubjectification and grammaticalization*, eds. Kristin Davidse, Lieven Vandelanotte, H. Cuyckens. De Gruyter. P241-275.

Carlier, Anne, and Béatrice Lamiroy 2018. "The emergence of the grammatical paradigm of nominal determiners in French and in Romance: Comparative and diachronic perspectives." *Canadian Journal of Linguistics/Revue canadienne de linguistique* 63.2: 141-166.

Corbett, Greville 1991. *Gender*. Cambridge University Press.

Corbett, Greville 2000. *Number*. Cambridge University Press.

Cournane, Ailís 2014. "In search of L1 evidence for diachronic reanalysis: mapping modals." *Language Acquisition* 21 (1): 103-117.

Cournane, Ailís 2015. *Modal Development: Input-Divergent L1 Acquisition in the Direction of Diachronic Reanalysis*. Doctoral dissertation, University of Toronto.

Cournane, Ailís 2016. Functional category omissions as evidence for upwards reanalysis. Toronto Working Papers in Linguistics (TWPL)

Cournane, Ailís 2017. In defense of the child innovator. In Mathieu, Éric and Robert Truswell (eds), *Micro Change and Macro Change in Diachronic Syntax*. Oxford: Oxford University Press. Pp. 10-24.

Cournane, Ailís & Ana Teresa Pérez-Leroux, in revision. "Leaving obligations behind: Epistemic incrementation in preschool English"

Giusti, Giuliana 1998. "The rise of a functional category from Latin ILLE to the Romance article and personal pronoun." *Working Papers in Linguistics* 8.2, 53-71.

Giusti, Giuliana 2001. "The birth of a functional category: from Latin ILLE to the Romance article and personal pronoun." *Current studies in Italian syntax. Essays offered to Lorenzo Renzi*: 157-171

Sources

- Hale, Mark 2003. "Neogrammarian sound change." In *The handbook of historical linguistics*, eds. Brian D. Joseph, Richard D. Janda. 343-368.
- Hale, Mark 2007. *Historical linguistics: Theory and method*. Oxford: Blackwell.
- Harris, Martin 1977. "'Demonstratives', 'articles' and 'third person pronouns' in French: changes in progress." *Zeitschrift für romanische Philologie* 93.3-4: 251-261.
- Kramer, Ruth 2015. *The morphosyntax of gender*. Oxford University Press.
- Kramer, Ruth 2015. "The morphosyntax of gender and number: converging and crossing." University of Chicago colloquium handout.
- Kroch, Anthony 2005. "Modeling language change and language acquisition." *Expansion of an LSA Institute forum lecture*.
- Labov, William 1989. "The child as linguistic historian." *Language variation and change* 1.1: 85-97.
- Labov, William 2001. *Principles of linguistic change, Vol. 2: Social Factors*. Oxford, UK: Blackwell.
- Lampitelli, Nicola 2013. "The decomposition of Somali nouns." *Brill's Annual of Afroasiatic Languages and Linguistics* 5. 117-158.
- Lecarme, Jacqueline 2002. "Gender 'polarity': Theoretical aspects of Somali nominal morphology." In *Many Morphologies*, eds. P. Boucher, M. Plénat. Cascadilla Press. 109-141.
- Lee, Naomi 2019. "Khoekhoe pronominal morphosyntax: gender on Root-attached little *n*." Talk given at LSA 93rd Annual Meeting, New York.
- Lee, Naomi 2019. "Architecture and acquisition: a generalizing learner of DP morphosyntax." Qualifying Paper, NYU.
- Lightfoot, David 1977. "Syntactic change and the autonomy thesis." *Journal of Linguistics* 13.2: 191-216.
- Lightfoot, David 1979. *Principles of diachronic syntax*. Cambridge University Press.
- Lyons, Christopher 1999. "Chapter 9. Diachronic Aspects." in *Definiteness*. Cambridge University Press.
- Pannemann, Maren 2007. *DP Acquisition as Structure Unraveling*. Doctoral Dissertation, University of Amsterdam.

Sources

Paster, Mary 2018. "Gender instability in Maay". In *African Linguistics on the Prairie: Selected Papers from the 45th Annual Conference on African Linguistics*, eds. Jason Kandybowicz, Travis Major, Harold Torrence, Philip T. Duncan. Language Science Press. 205-218

Paul, Hermann 1920 [1880]. *Prinzipien der Sprachgeschichte*.

Pei, Mario A. 1936. "Old French Demonstratives." *Language* 12.1: 47-51.

Roberts, Ian & Anna Roussou 2003. *Syntactic change: A minimalist approach to grammaticalization*. Vol. 100. Cambridge University Press.

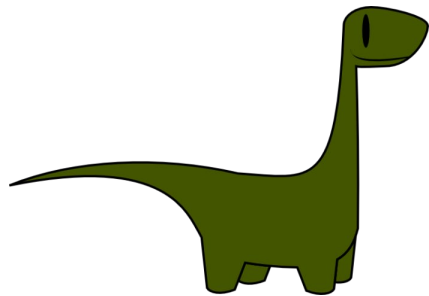
Van Gelderen, Elly 2004. *Grammaticalization as economy*. John Benjamins.

Van Gelderen, Elly 2007. "The definiteness cycle in Germanic." *Journal of Germanic Linguistics* 19.4: 275-308.

Van Gelderen, Elly 2008. "Linguistic cycles and economy principles: The role of universal grammar in language change." *Grammatical change and linguistic theory. The Rosendal papers*: 245-264.

Van Gelderen, Elly 2011. *The linguistic cycle: Language change and the language faculty*. Oxford University Press.

Thank you!



Please reach out!

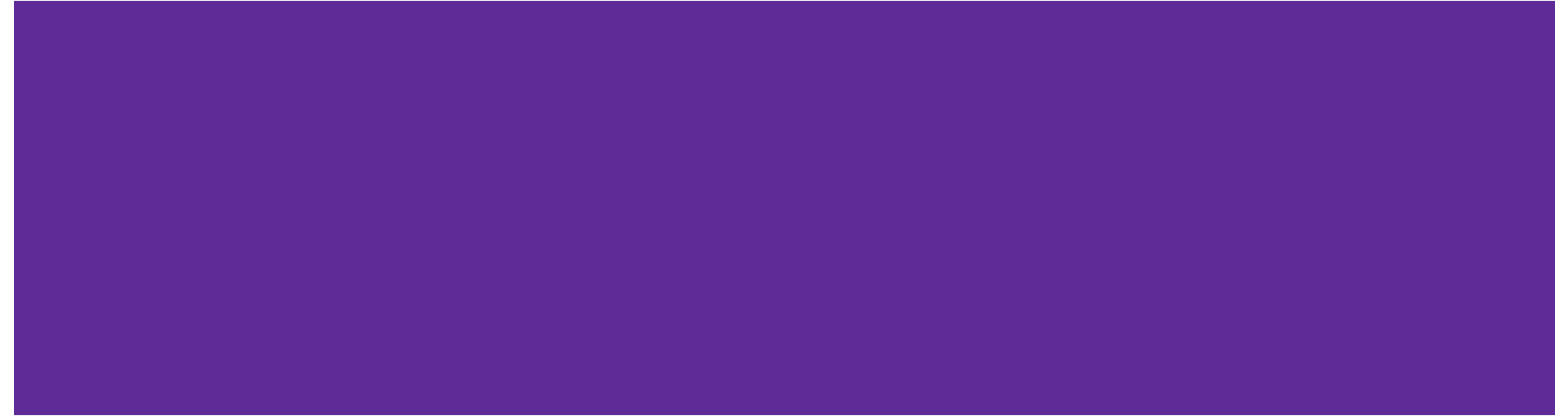
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<https://tinyurl.com/DIGS2019-LeeCournane>

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appendix

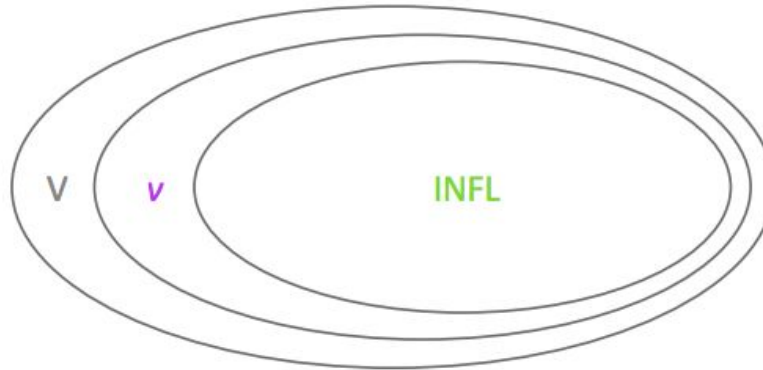


Modal Mappings in L1A

MaxCat1st Modal Mapping would proceed as follows:

Initial setting: All verbal expressions are INFL*

- Search for evidence of mapping rules:
- **may**: $\text{may}_w \leftrightarrow \text{INFL}$
- **going**: $\text{going}_w \leftrightarrow \text{INFL}$ $\text{going}_w \leftrightarrow v$
- **want**: $\text{want}_w \leftrightarrow \text{INFL}$ $\text{want}_w \leftrightarrow v$ $\text{want}_w \leftrightarrow V$
-

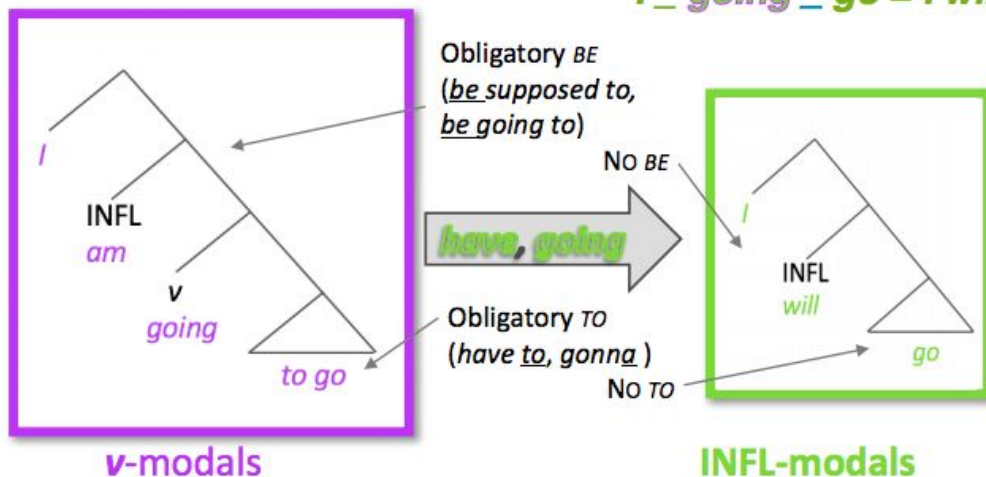


But if you miss the target...

Your analysis will be UP; with BE and TO omitted, V/*v*-modals look like INFL-modals:

I am going to go

I _ going _ go = I will go



MaxCat1st: Omission patterns reveal child **representations** that diverge from the input grammars in an upward manner

Case Study: Modal Omissions

“Sarah” (Brown 1973). 2;03 to 5;01. 37,021 utterances

Extracted all utterances with **INFL** or **v** modals, and **V_{want}**:

- 1215 INFL-modals (**INFL**) *better, can, could, may, might, must, shall, should, will, would*
- 621 functional-modals (**v**) *got, have, ought, be+going, be+supposed*
- 503 instances of premodal (**V**)*want* (only VP/clausal complements)

Coded all complements

- bare V (*have go*), infinitival V (*have to go*), infinitival_reduced V (*hafta go*), or clausal (*want Daddy go*)

Case Study: Modal Omissions *Results 1*

Figure 1: Complements of *want* (V)

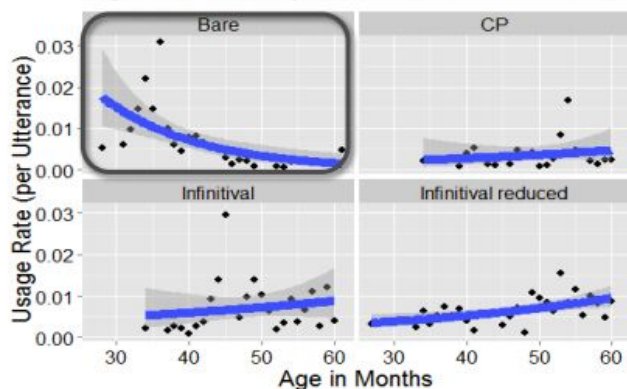
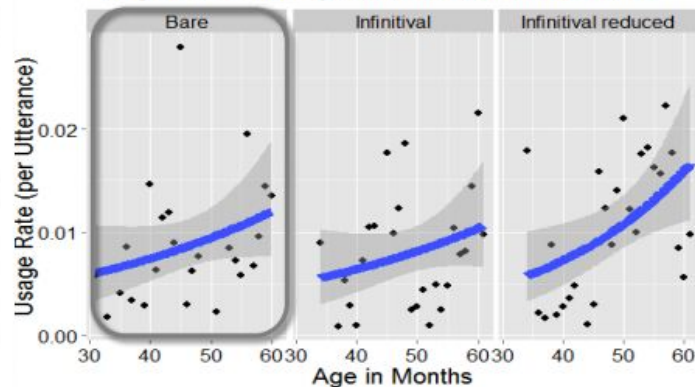


Figure 2: Complements of *v-modals*

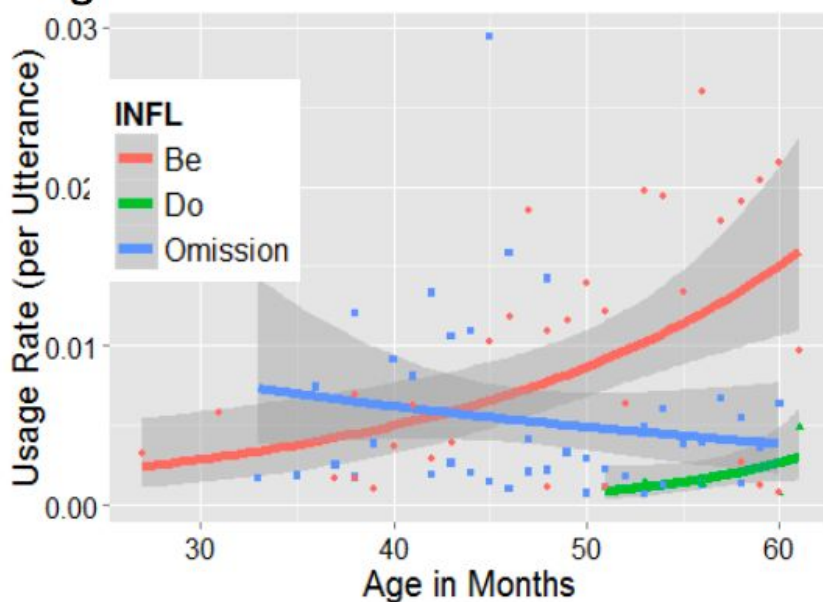


Infinitival TO omissions disappear for **V-modals**, but persist past 5yrs for **v-modals**. Sarah's **v-modals** pattern with input **INFL-modals** (“*I have go*”)

Case Study: Modal Omissions

Results 2

Figure 3: BE-omissions with **v-modals**

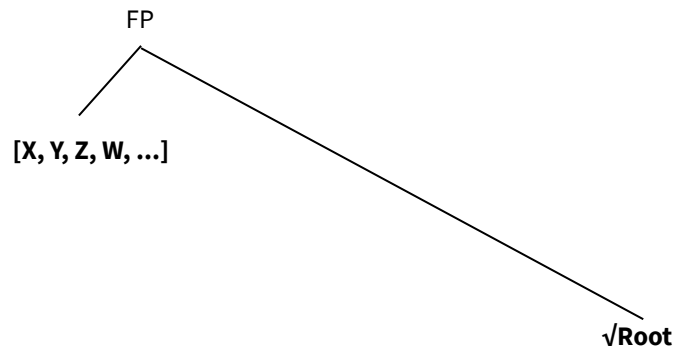


BE-omissions with **v-modals** persist longer than other instances of BE-omissions in child language (Brown, 1973; Becker, 2002).

Ongoing computational modeling demonstrates efficacy of an unraveling inductive learner (Lee 2019)

kida	CHILD	one	female
kido	CHILD	one	male
kidas	CHILD	many	female
kidos	CHILD	many	male
siba	SIBLING	one	female
sibo	SIBLING	one	male
sibas	SIBLING	many	female
sibos	SIBLING	many	male

Inductive - e.g. unraveling



Ongoing computational modeling demonstrates efficacy of an unraveling inductive learner (Lee 2019)

