

24.904

Language Acquisition

Class 10: Syntax: Root Infinitives

Components of a linguistic system

- **Primitive elements** (listemes, grammatical formatives)
- **A system of rules and procedures** that puts primitive elements together to form larger units (e.g. Merge) = **narrow syntax**
- **Interface systems** that interpret the output(s) of the recursive procedure:
 - ▶ A phonological system, which relates the output of the recursive procedure to the articulatory/perceptual systems
 - ▶ A semantic/logical system, which relates an output of the recursive procedure to conceptual/thought system

Last class

- syntactic knowledge might be useful for things like extracting meanings of content words => bootstrapping
- + a bit of syntax skepticism: how much syntax can a 2-year-old know anyway?

Today and the next few classes

- How much syntax can a 2-year-old know anyway?
- How does syntax acquisition proceed?
 - ▶ How much variation is there? How do learners navigate the space of possible variation?
 - ▶ What is the evidence that learners make use of? How do learners extract the relevant information from the available evidence?
 - ▶ Are there primitives that are there from the get-go? Is there grammatical maturation?

Properties of the system

- ▶ Structure-dependence
- ▶ Proprietary elements, rules and operations

Properties of the system

- ▶ Structure-dependence
 - Rules that are operative in natural language syntax cannot be defined over strings
- ▶ Proprietary elements, rules and operations
 - c-command, agreement
- Do child grammars show these properties?

Structure Dependence

- Rules that are operative in natural language syntax cannot be defined over strings
- You need a hierarchical representation that linguists call a “tree”

Structure Dependence

- Evidence that sentences are not an ordered sequence of strings
 - ▶ cannot capture the intuition/fact that not all substrings of a sentence are “created equal” (constituency)
 - ▶ The cheetah killed the gazelle
 - the gazelle
 - killed the

Structure Dependence

- Evidence that sentences are not an ordered sequence of strings
 - (1) The man is smoking.
Is the man smoking?
 - (2) The man who is smoking is tall.
Is the man who is smoking tall?
*Is the man who smoking is tall?

C-command

- (1) **Maša_i** думае, што **она_{i/j}** очен' умнаја
Masa thinks that she very smart
'Masa_i thinks that she_{i/j} is very smart.'
- (2) **Onam_i** думае, што **Maša*_i** очен' умнаја.
she thinks that Masa very smart
'She_i thinks that Masa*_i is very smart'
- (3) (To,) што **onam_i** не sdala ekzamen, **Mašu_i** razdražaet.
that that she not passed exam, Masa bothers
'That she_i failed the exam really bothers Masa.'

➔ The rule for when a pronoun and a name can refer to the same entity makes reference to structure and is constrained under c-command

other proprietary things

- An example: subject-verb agreement
 - ▶ A syntactic operation involving one element (the subject) redundantly expressing its features on another (the verb)

- (1) a. I/you/they climb.
b. He/she/it climbs.
c. *He/she/it climb

- (2) a. laRka chĩk^{aa} th^{aa} [Hindi]
boy sneeze.MSg. past.MSg.
b. laRkii chĩkⁱⁱ thⁱⁱ
girl sneeze.FSg. past.FSg.
c. laRkiyaa chĩk^{ĩĩ} th^{ĩĩ}
girls sneeze.FPl past.FPl.

other proprietary things

- Agreement
 - ▶ not readily explainable on semantic/interpretive fronts
 - ▶ e.g. in English and lots of languages, only finite/tensed verbs agree and even then, not for all subject types
 - (1) a. Martin wants to climb the tall mountain.
b. *Martin wants to climbs the tall mountain.
 - ▶ not limited to SV-agreement
 - ▶ across languages, we find agreement between the object and the verb, between possessor and possessee, between adjectives and the nouns they modify, between the complementizer and the subject, etc.
 - ▶ the cases we've seen are among the simplest of agreement systems...

The child state

Early sentential structure

- Around 2-yrs children start to combine words.
- At first sight, the syntax seems rudimentary at best ("telegraphic "), e.g. no functional elements
- However, even their telegraphic productions reveal a surprising amount of target language properties
 - ▶ Head-directionality: VP, IP/TP, CP, DP
 - ▶ Negation
 - ▶ Post-verbal subjects
 - ▶ ...

Accurate productions

- Head-Directionality: VO vs. OV
 - ▶ English acquiring children produce (1a) but never (1b)

(1) Her have a big mouth (Nina 2;6)
*Her a big mouth have
 - ▶ In contrast, Japanese acquire children never produce a sentence of the form in (1a)

Accurate productions

- Position of subjects
 - ▶ French acquiring children produce sentences like (2), where the subject appears post-verbally.
 - ▶ Post-verbal subjects are licit in French.
- (2) Dormir petit bébé. (Daniel 1;11)
Sleep-INF little baby
‘The little baby is sleeping’
- ▶ English acquiring children never produce analogous forms

Accurate productions

- Position of negation relative to main/auxiliary verbs
 - (1) Kann **ikke** see (Anne, 2;0)
can not see
 - (2) Hij doet 't **niet** (Hein, 2;4)
he makes it not
 - (3) I can't see you (Eve, 1;10)
 - (4) Unobserved: *I see not you

Very Early Parameter Setting

- Many of these properties vary across languages, i.e. they have to be learned (they can be thought of as language-specific “parameters”)
- Since kids seem to set these parameters correctly **before** they produce utterances which can be corrected, learning here cannot be supervised learning, i.e. no negative evidence (Wexler and Hamburger 1973)
 - ▶ Negative evidence - being told that sentence is ungrammatical
 - ▶ NB: Parents and others don't correct kids for grammatical errors to begin with (Brown and Hanlon 1970)

Omission of functional categories ("Telegraphic style")

- **At the same time, children's early productions are non-adult in specific ways**

- ▶ Inflectional morphemes: 3rd singular *-s*, past tense *-ed*, ...

- (1) a. Papa have it. (Eve 1;6)
- b. Cromer wear glasses. (Eve 2;0)
- c. Marie go. (Sarah 2;3)
- d. Mumma ride horsie. (Sarah 2;6)

- ▶ Auxiliaries: perfective *have*, progressive *be*

- (2) a. Eve [has] gone. (Eve 1;6)
- b. Eve [is] cracking nut. (Eve 1;7)
- c. Mike [has] gone. (Sarah 2;3)
- d. Kitty [is] hiding. (Sarah 2;10)

Omission of functional categories ("Telegraphic style")

- **At the same time, children's early productions are non-adult in specific ways**

- ▶ Copular *be*

- (3) a. That [is] my briefcase. (Eve 1;9)
 - b. You [are] nice. (Sarah 2;7)

- ▶ Dummy *do*

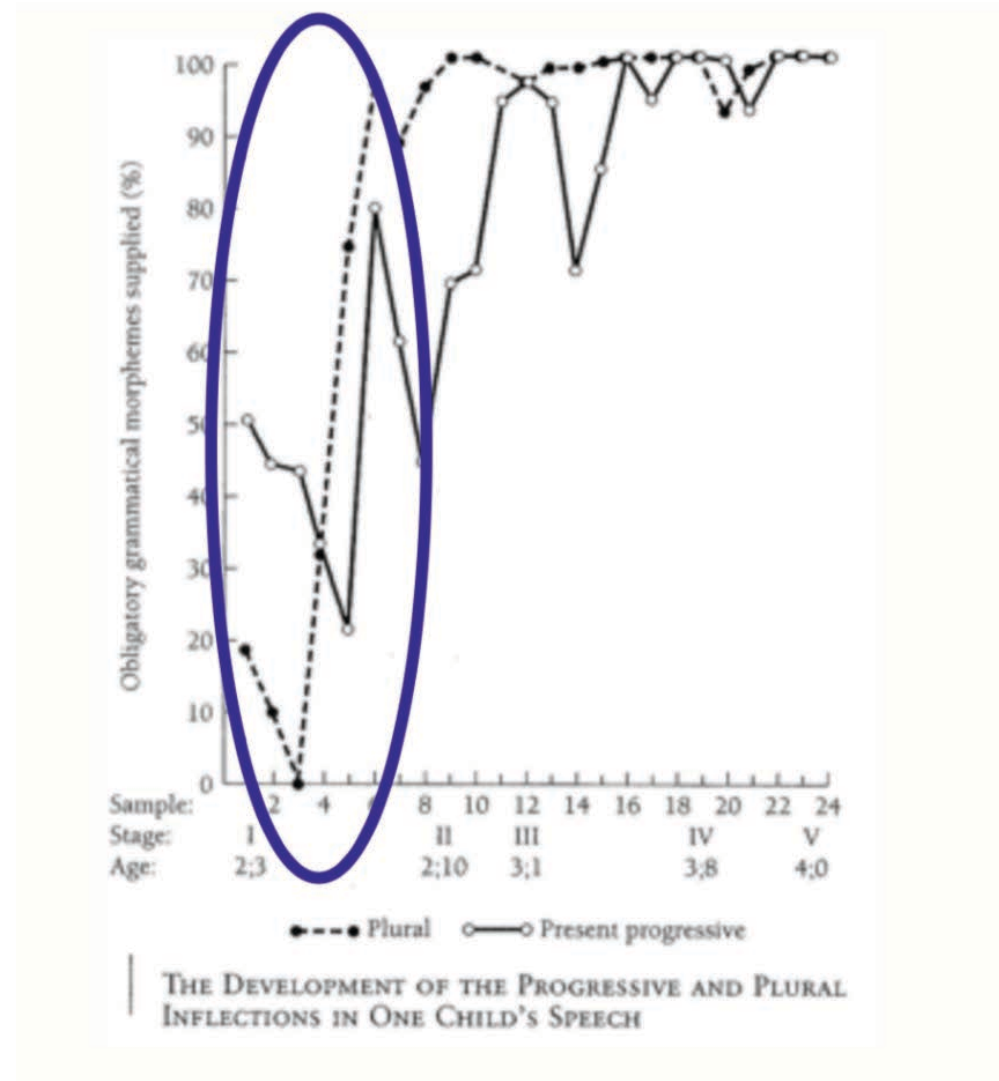
- (4) a. Fraser [does] not see him. (Eve 2;0)
 - b. He [does] no[t] bite ya. (Sarah 3;0)

- ▶ Articles: *the*

- (5) Where [did] [the] ball go? (Adam 2;3)

Developmental trend

- English acquiring kids start adding functional elements, esp. bound morphemes, to their speech between 2-3yo



How much syntax?

- What characterizes this early stage of syntactic development?
- Do these child productions have the same functional architecture as clauses in the adult grammar? How can we tell?

Content elements > Functional elements

- Interpreted for a long time as showing that English-acquiring children don't have command of the inflection for verbs and of functional morphology more generally.

But...

- Omission is selective/purposeful
 - ▶ Gerken, Landau & Remez 1990: in an imitation task 2-year-olds omitted functors (e.g. -es in Pete bounces the ball), but not prosodically matched nonsense functors (e.g., -a in Pete pusha ko truck)

Another variant of the idea

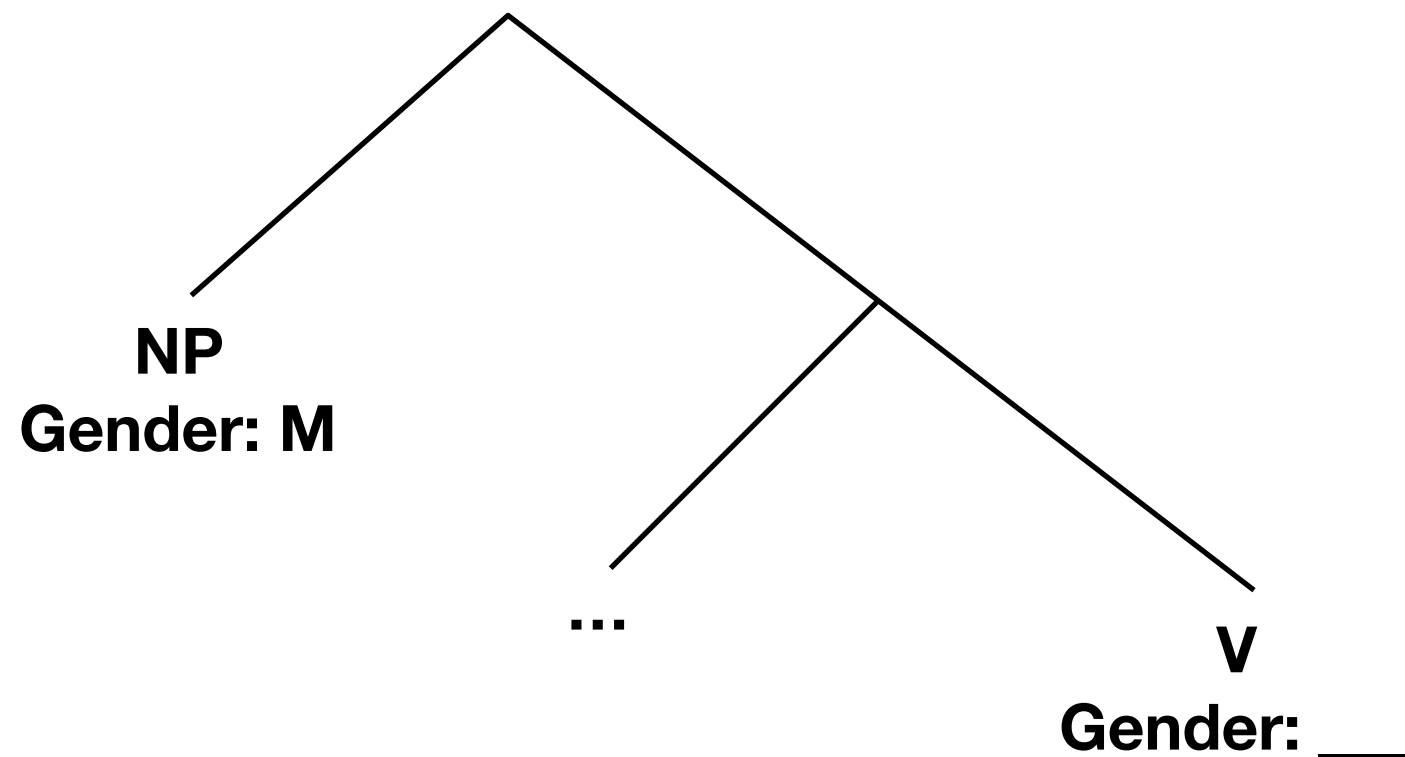
- Perhaps kids know (some) functional morphology after all, but...
- Given that you can communicate quite well without the more “grammatical” categories and utterance planning and production might be costly for the young speaker, they choose to skip some of these
- If so, comprehension should reveal competence

Knowledge of SV-agreement

- Recall: A dependency between the subject and the verb of a sentence, wherein certain features of the subject NP is represented on the verb
- (1)
- a. I_{1-Sg} am_{1-sg} a linguist.
 - b. Adele-Sg is_{3-sg} a linguist.
 - c. We_{1-Pl} are_{1-pl} linguists.
 - d. Which student_{3-Sg} am_{1-sg} I going to call on?

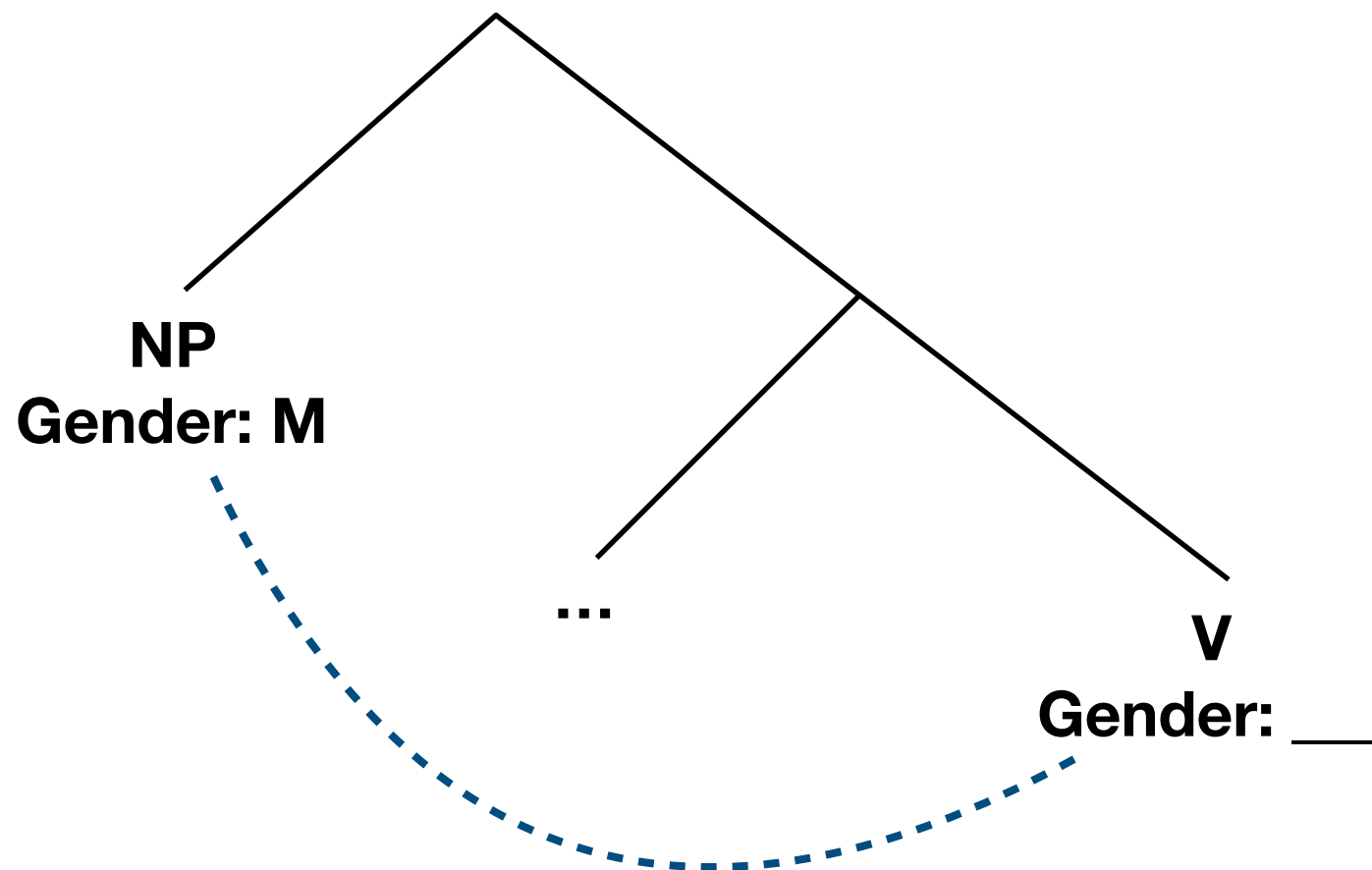
Structure-dependence and S-V-agreement

- An over-simplified picture of S-V agreement



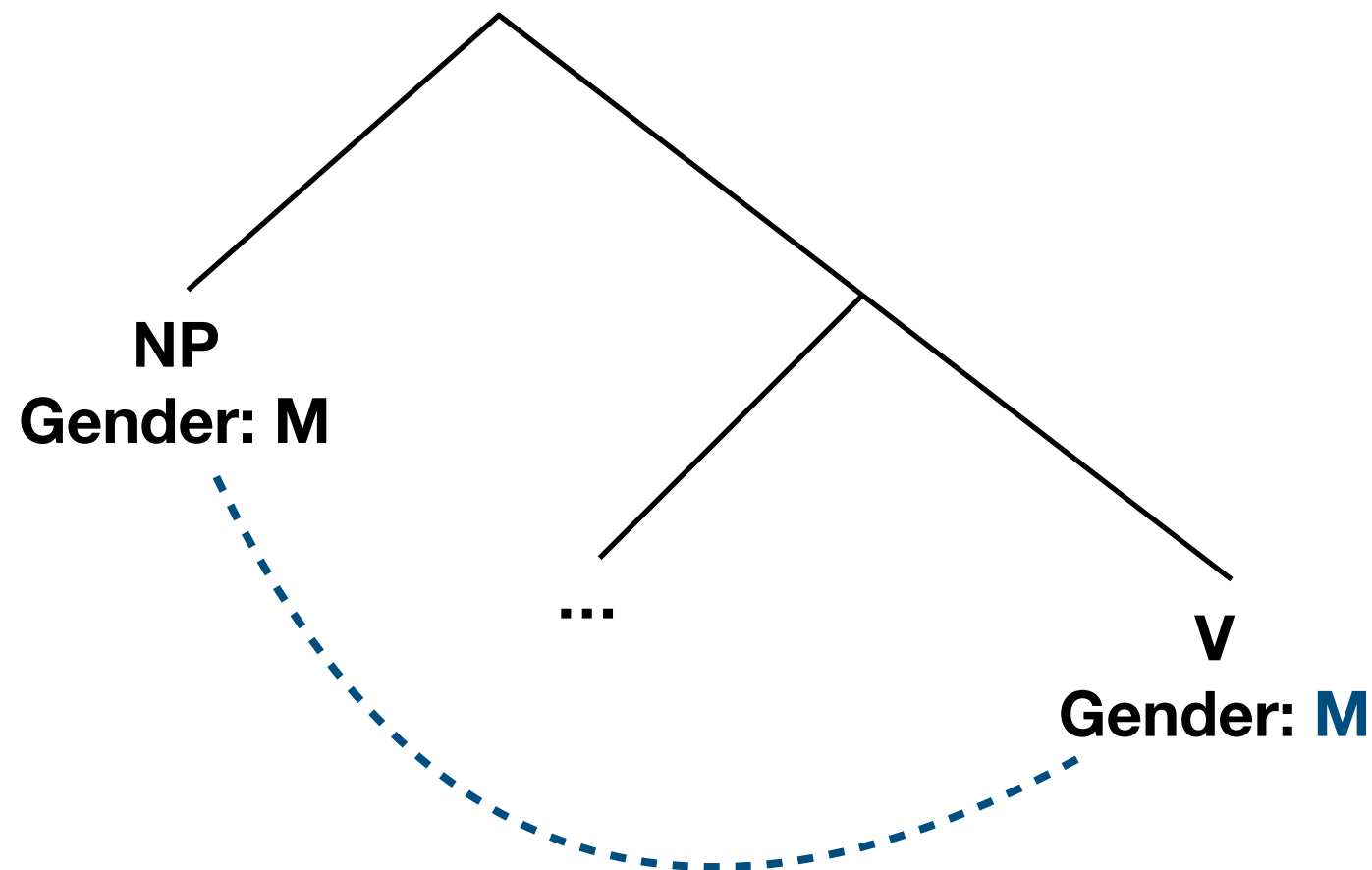
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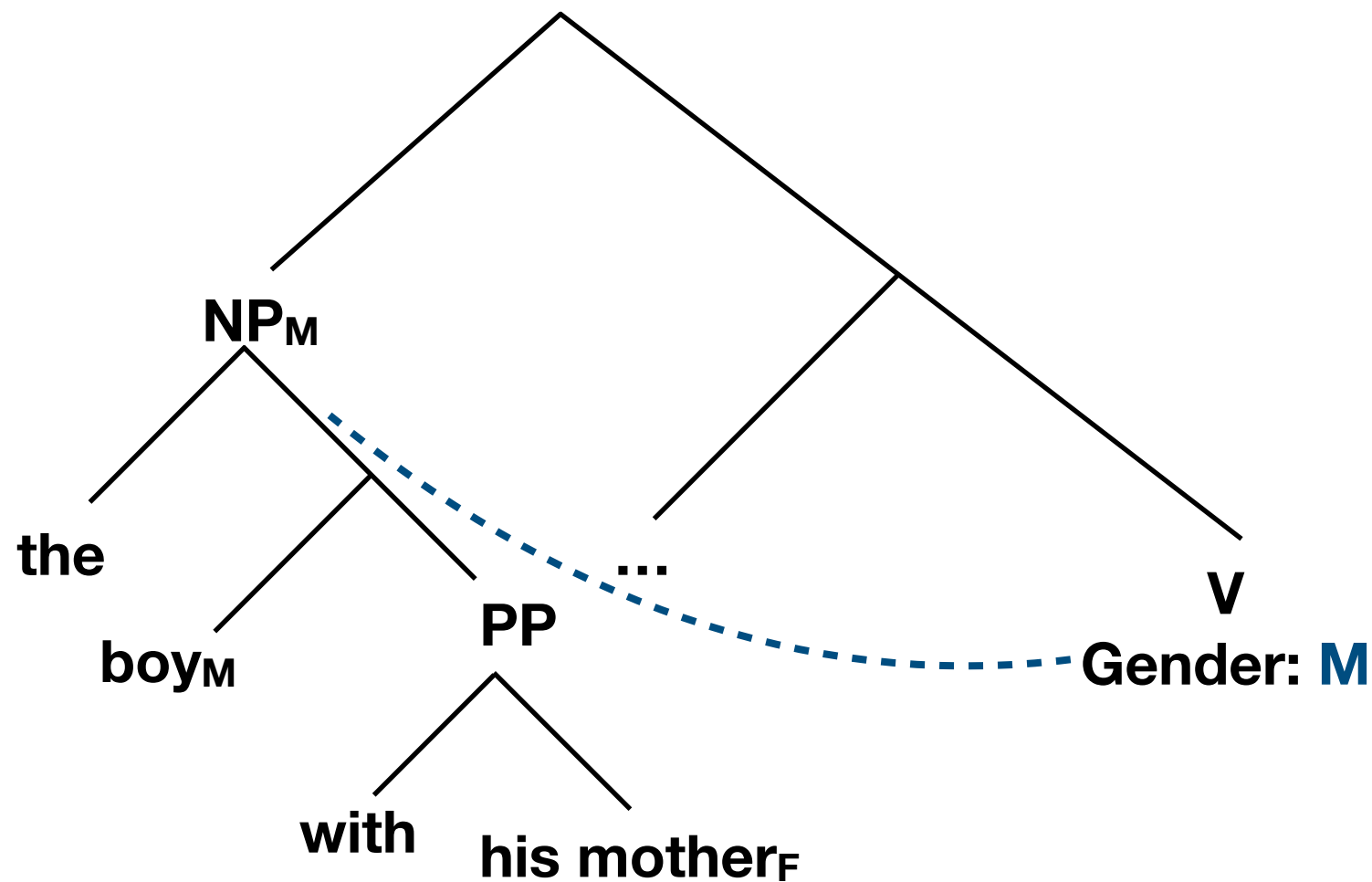
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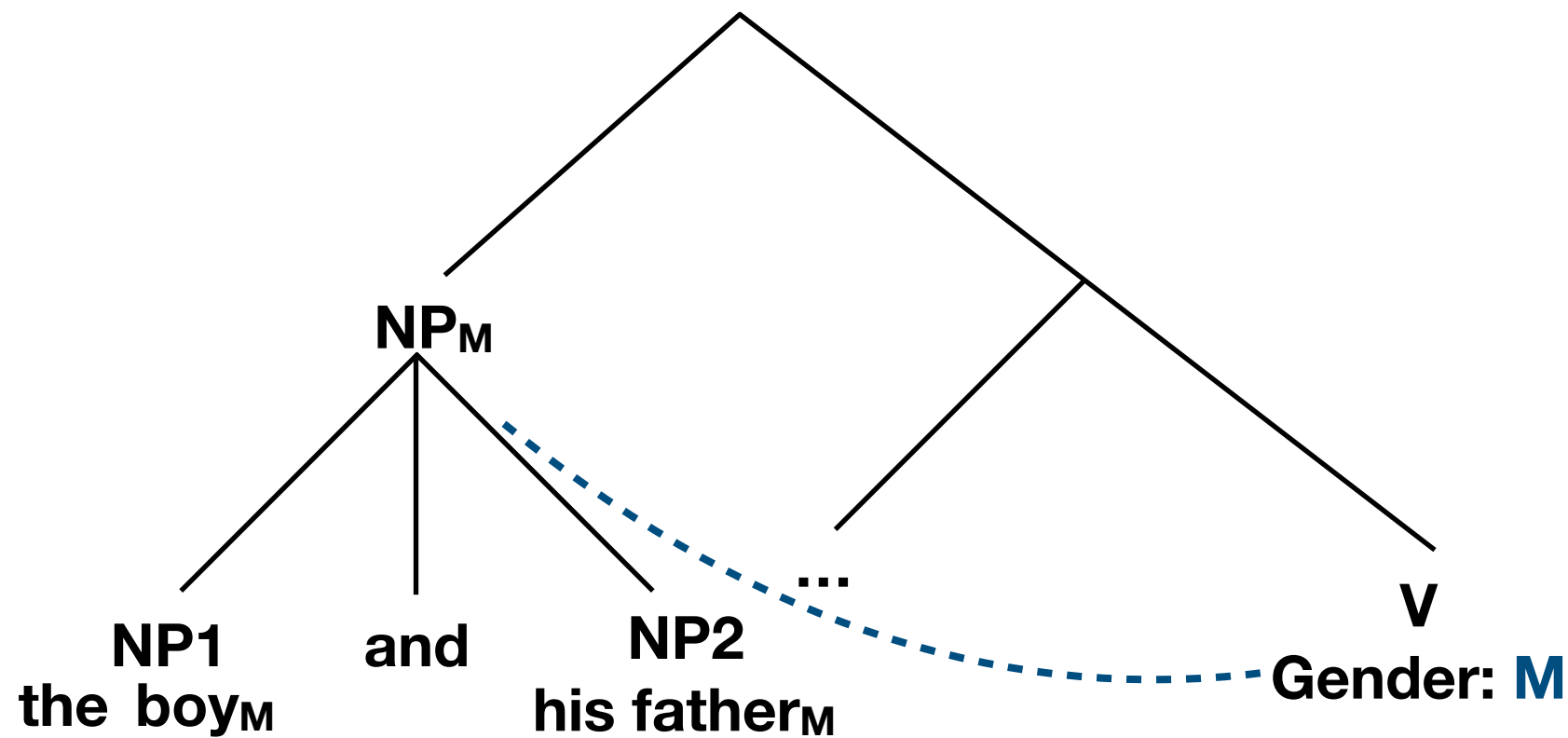
Gender agreement in complex NPs

- V inherits features of head noun



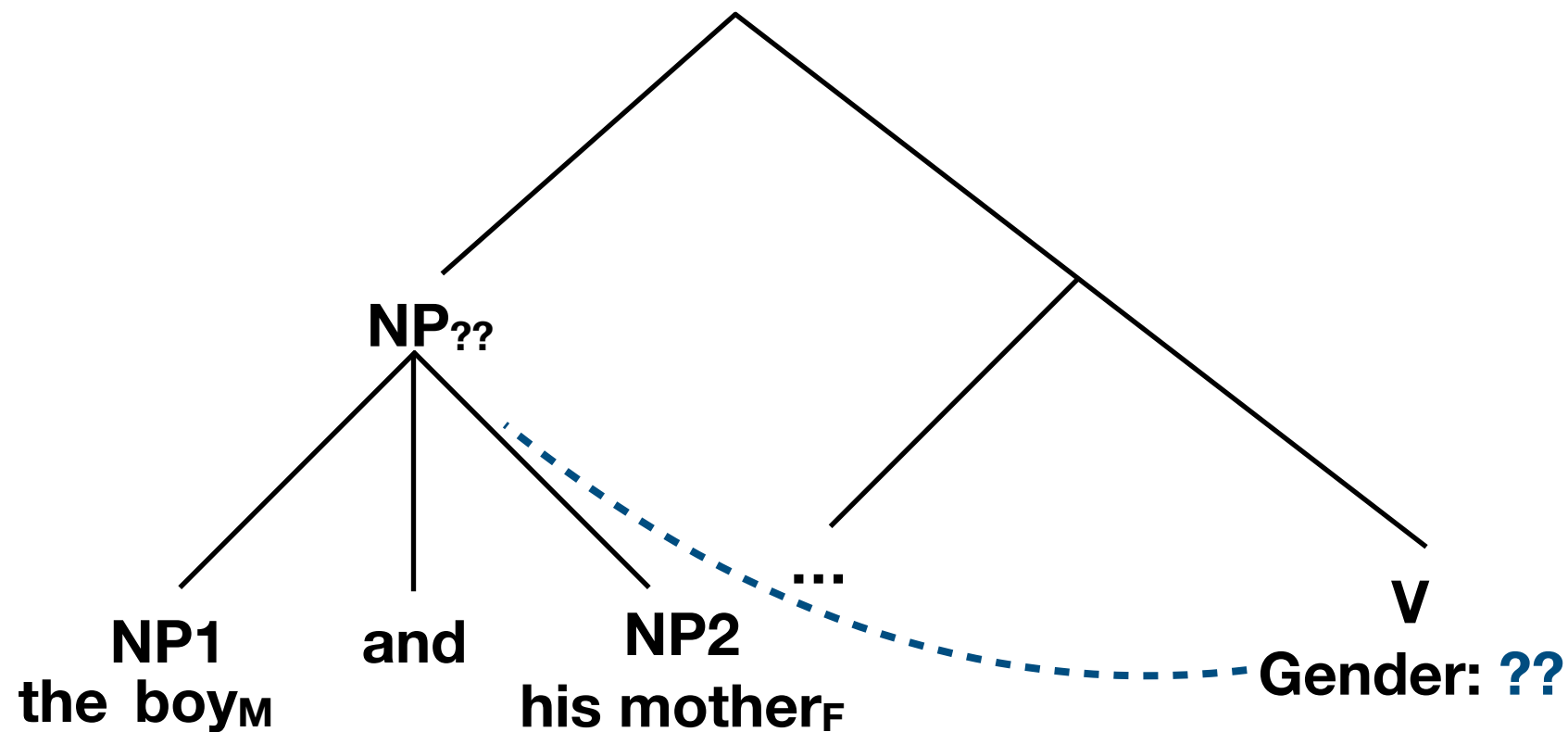
Gender agreement in complex NPs

- V inherits features of head noun



Gender agreement in complex NPs

- what about...



S-V Agreement and mismatching conjuncts

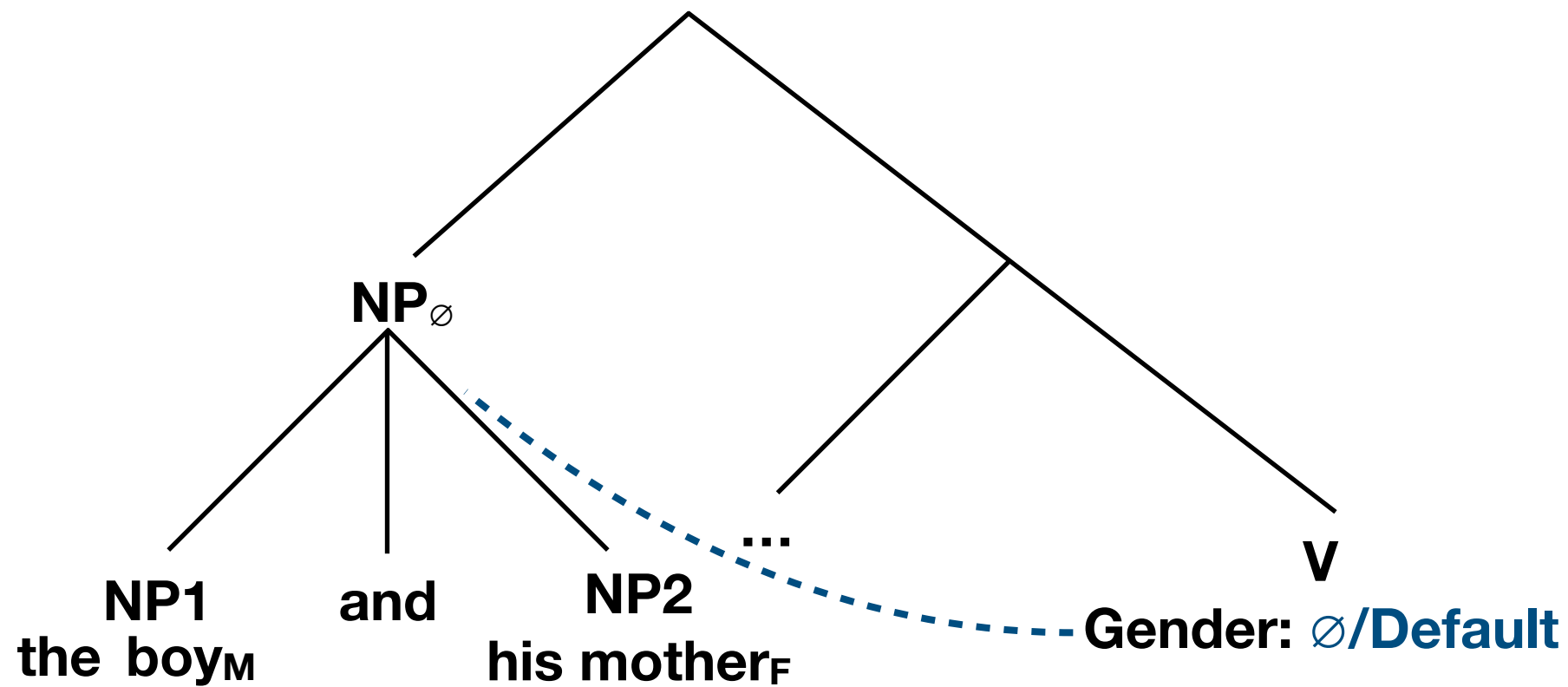
- Sometimes S-V-agreement involves a linear component, but it tends to be a last-resort
- French vs. Hindi

(26) [la garçon_M et sa soeur_F]_∅ sont compétents_M/*compétentes_F
 [the boy and his sister] are competent

(27) main-ne [ek chaataa_M aur ek saaRii_F]_∅ khariid-ii_F
 I-SUBJ [an umbrella and a saaree] buy-PAST

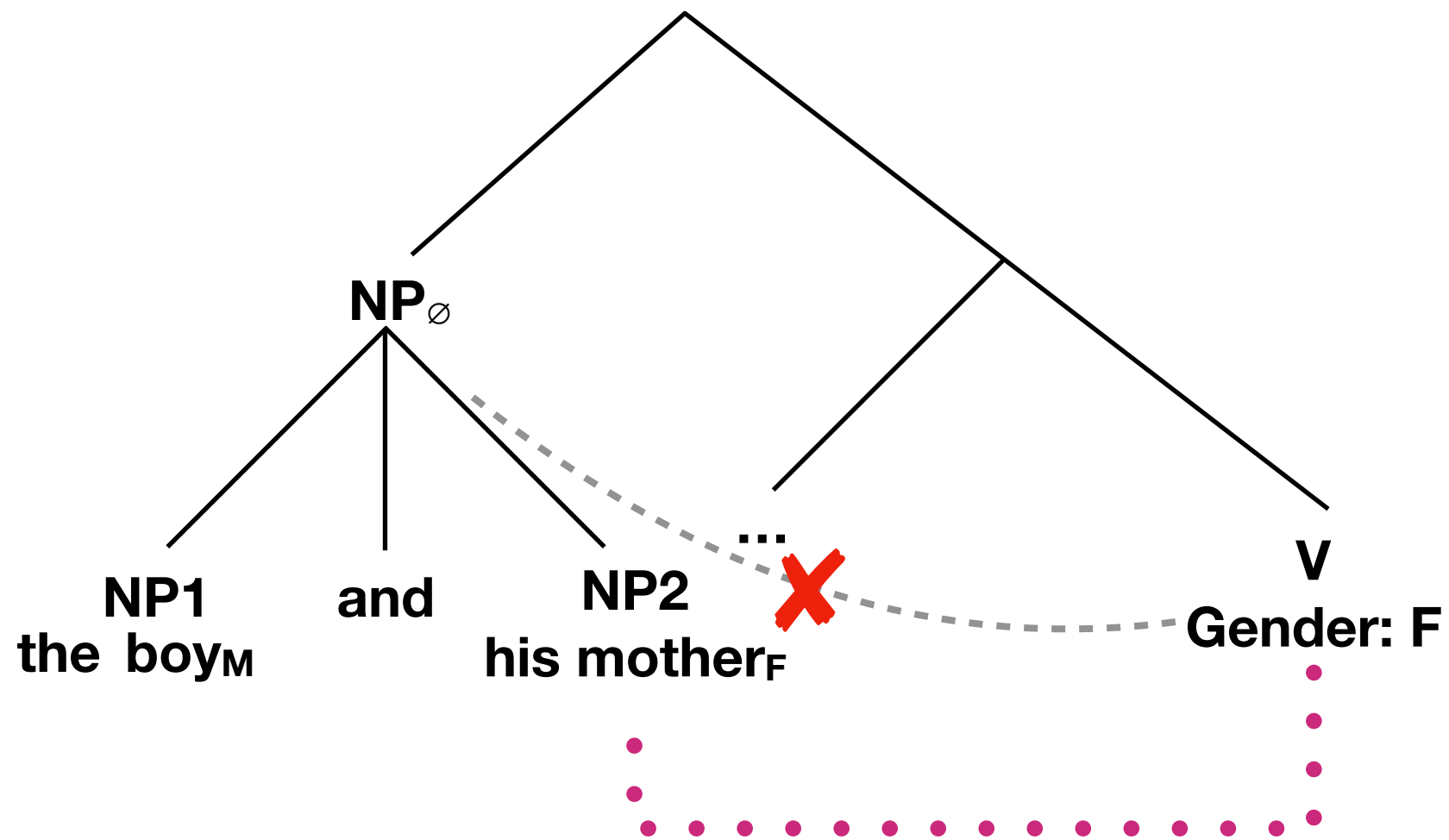
French

- V inherits features of head noun



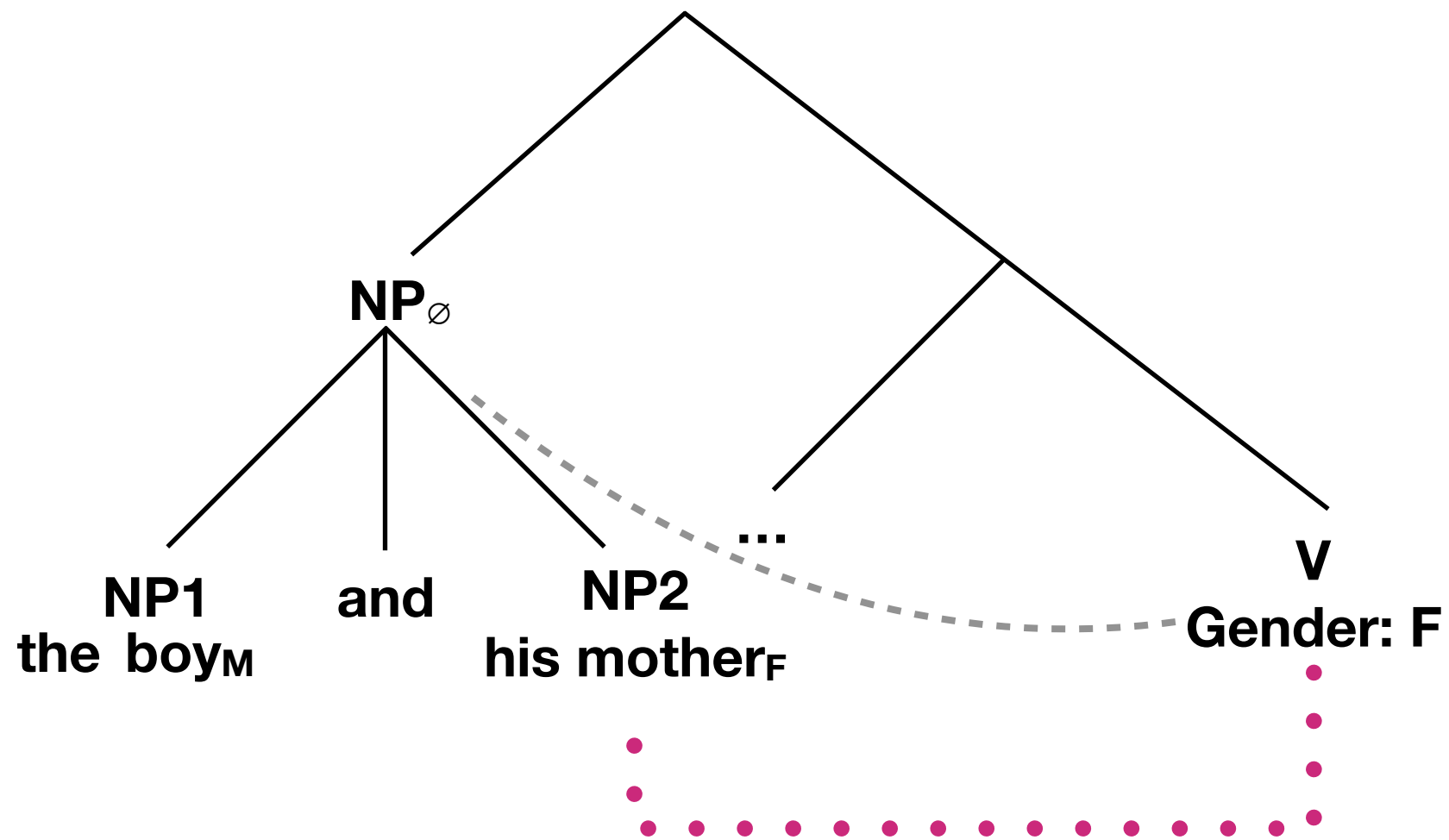
Hindi

- Linearly closest conjunct!



Hindi

- Linearly closest conjunct!



NB: Hindi does not allow this with “the boy with his mother”!

Agreement dependencies w/ complex NPs

- Shi et al. 2020
- French-acquiring 17- and 30-month-olds
- Procedure: visual fixation

Agreement dependencies w/ complex NPs

- Subject-doubling constructions with 2 kinds of complex NPs:

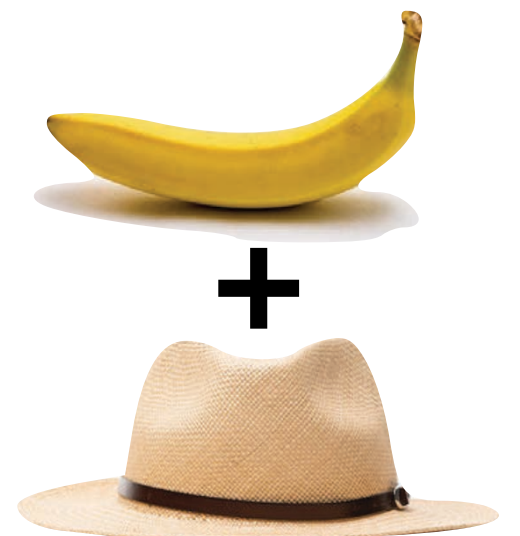
(i) NP1 in NP2

La banane_F dans le chapeau_M, **elle_F** VP
the banana in the hat, it VP



(ii) NP1 and NP2

La banane_F **et** **le chapeau_M**, **ils_{M/Def}** VP
the banana and the hat, they VP



Predictions

GROUP 1

Grammatical: NP1 in NP2

La banane_F dans le chapeau_M, **elle_F** VP
the banana in the hat, it VP

Ungrammatical: NP1 and NP2

La banane_F et le chapeau_M, elles_F VP
the banana and the hat, they VP

GROUP 2

Ungrammatical: NP1 in NP2

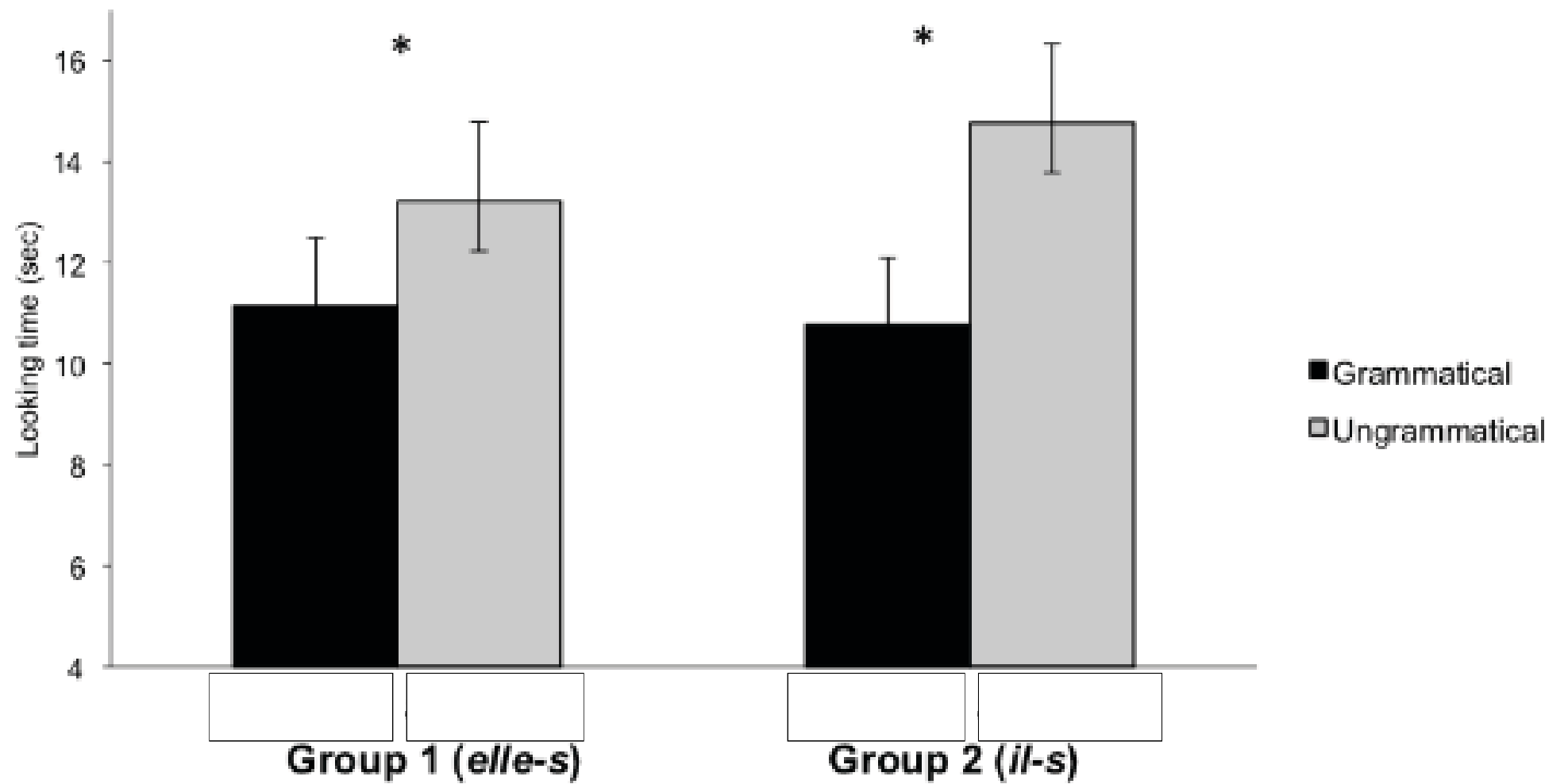
La banane_F dans le chapeau_M, **il_M** VP
the banana in the hat, it VP

Grammatical: NP1 and NP2

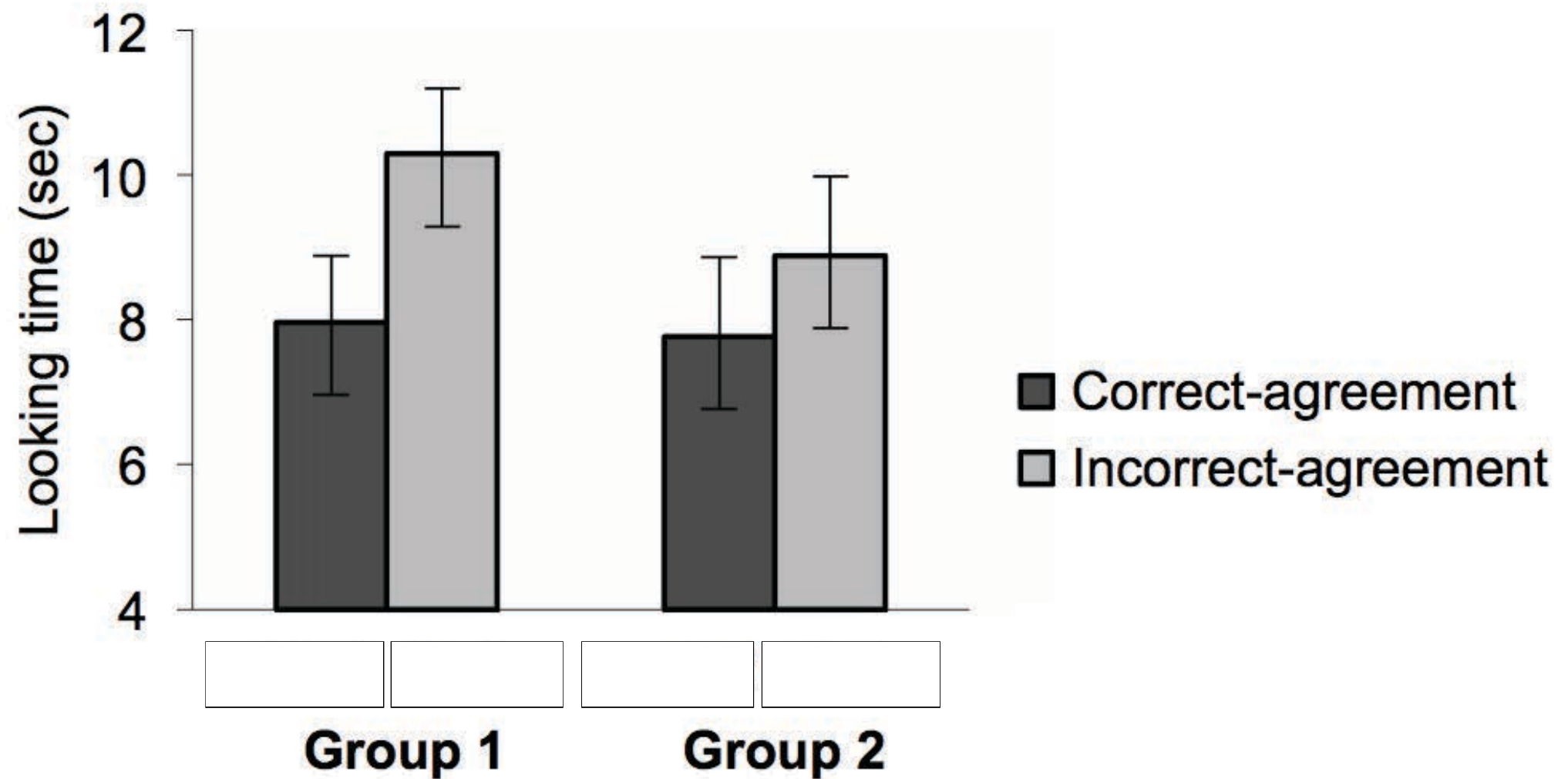
La banane_F et le chapeau_M, ils_{M/Def} VP
the banana and the hat, they VP

- Linear rule based on closeness
 - Discrimination across groups, but not within
- Linear rule based on first NP
 - Discrimination across groups, but not within
- Structure-dependent rule
 - Discrimination within groups
 - Uniform direction of preference based on grammaticality across groups

Results, 30mos



Results, 17mos



Upshot

- Children who are omitting functional elements in their production are nevertheless sensitive to remarkably sophisticated aspects of syntax that these elements partake in.

Still, Eve talk funny

- i. Papa have it (Eve 1;6)
- ii. Marie go. (Sarah 2;3)
- iii. Doggy bite (Adam 2;4)
- iv. Baby doll ride truck (Allison 1;10)
- v. Pig say oink (Claire 2;1)

Next class

- Root Infinitives
- Read: Wexler 2011

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