Morphological agreement in Minimalist Grammars

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Overview

- Agreement: morphological manifestation of dependencies between words

  He walks.

  There seems to have arrived a man.

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- Minimalist Grammars (MGs, Stabler 1997): formalization of Chomsky's Minimalist Program
- **Goal**: extend MGs with morphological features and operations on them

Overview

Agreement in Minimalist Syntax (Adger 2010)

- Syntax is driven by **feature checking/valuation**
- **Merge and Move**:
  - operate on categorial features (`T`, `V`, `D`, `N`...)
  - build new structure
- **Agree**:
  - targets morphosyntactic features (`num`, `per`, `case`...)
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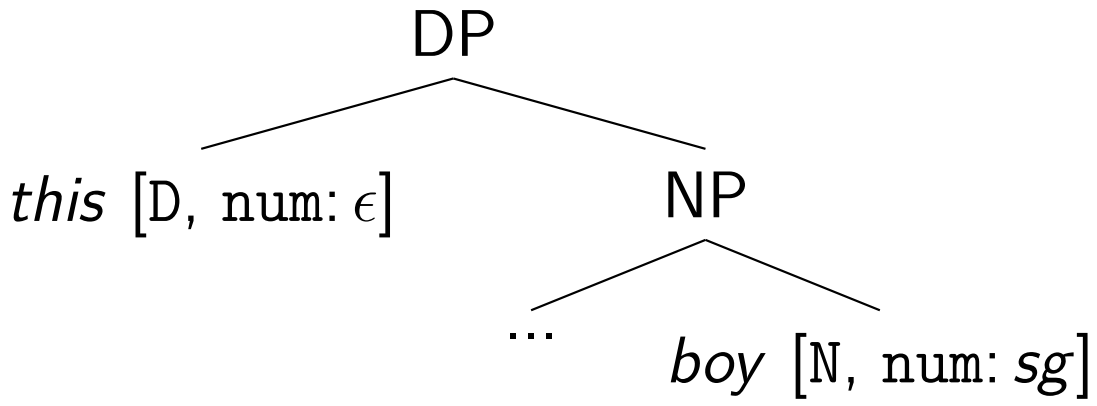

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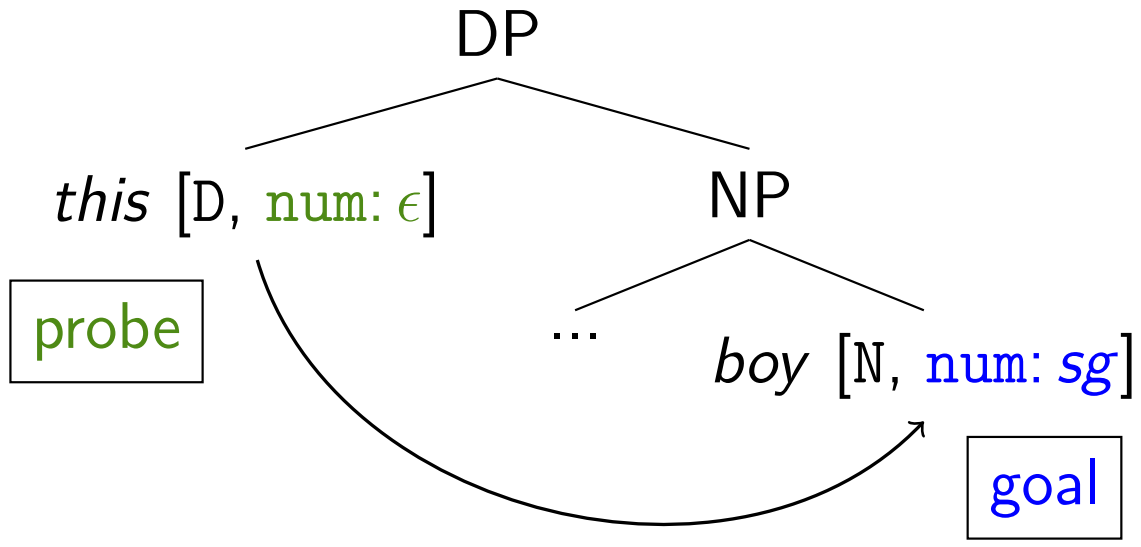

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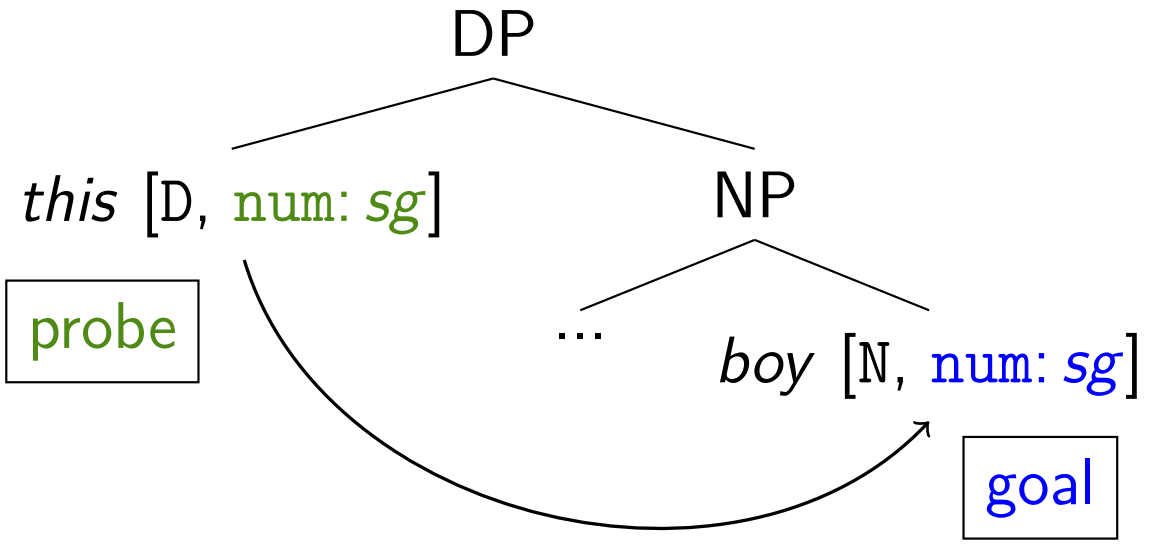

Minimalist Grammars (Stabler 1997)

- A set of **syntactic features**:

$$
\begin{aligned}
Syn = {} & base && \text{(categories)} \\
& \cup \{\texttt{=f} \mid \texttt{f} \in base\} && \text{(selectors)} \\
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- Two structure-building operations: ***merge*** and ***move***

Minimalist Grammars

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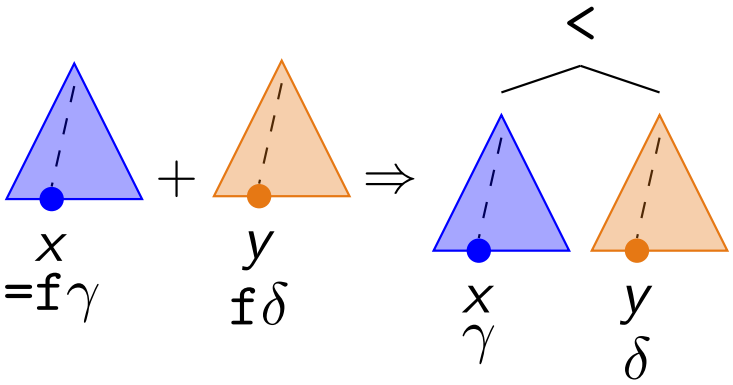

Minimalist Grammars

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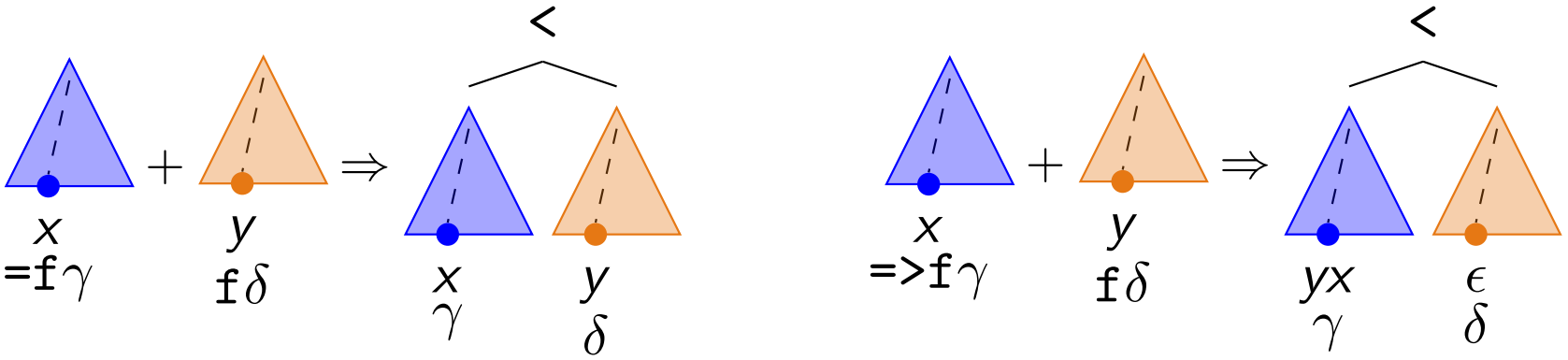

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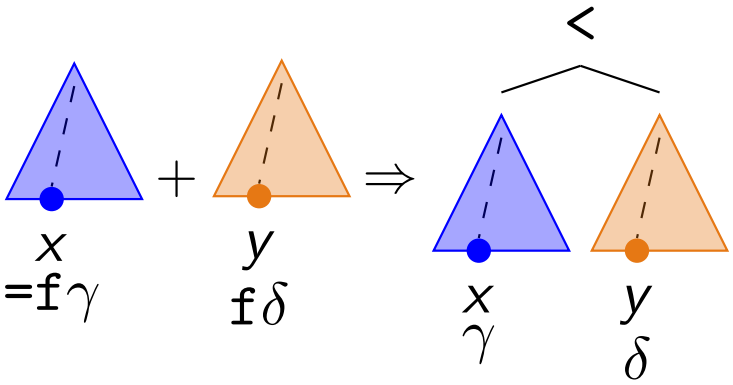

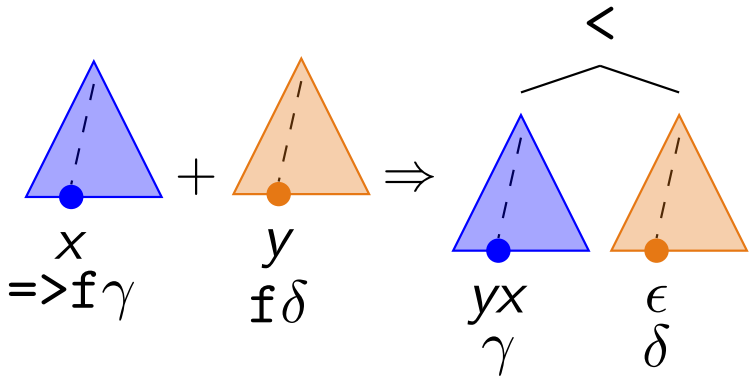

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Minimalist Grammars

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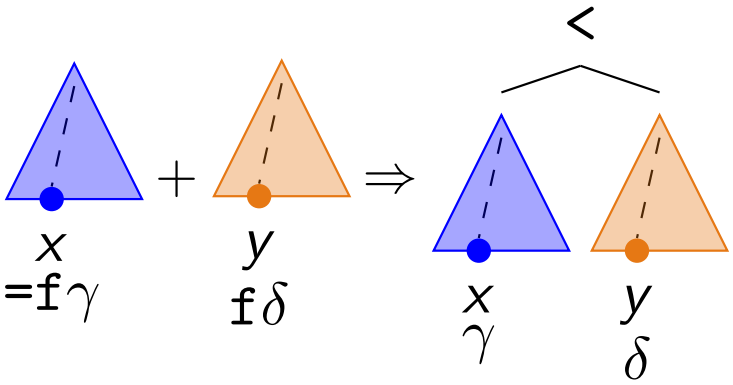

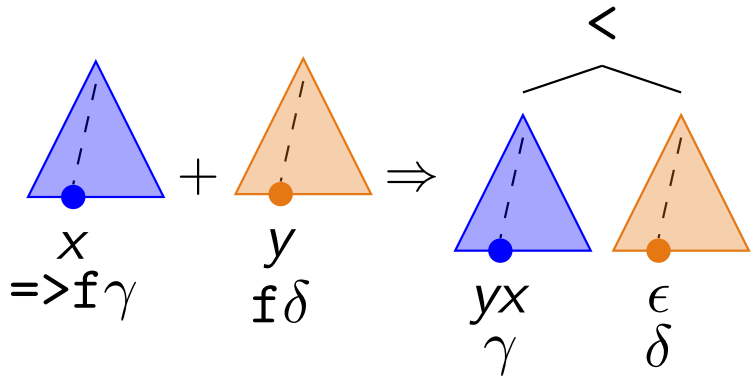

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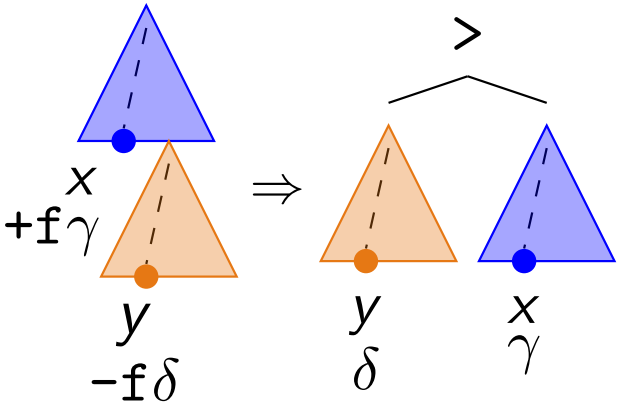

Minimalist Grammars

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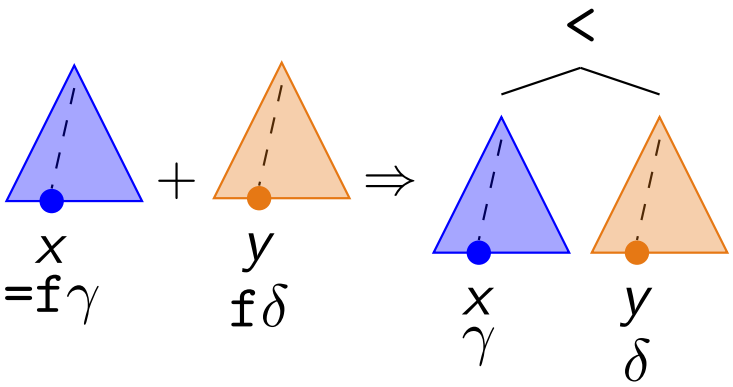

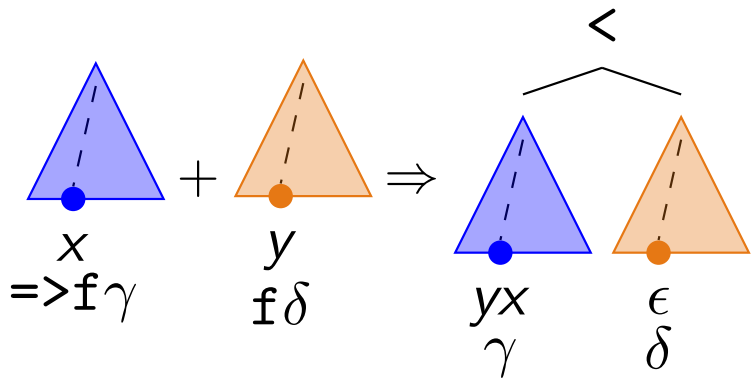

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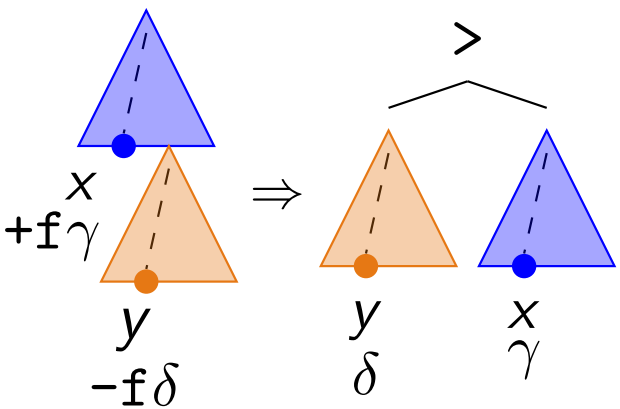
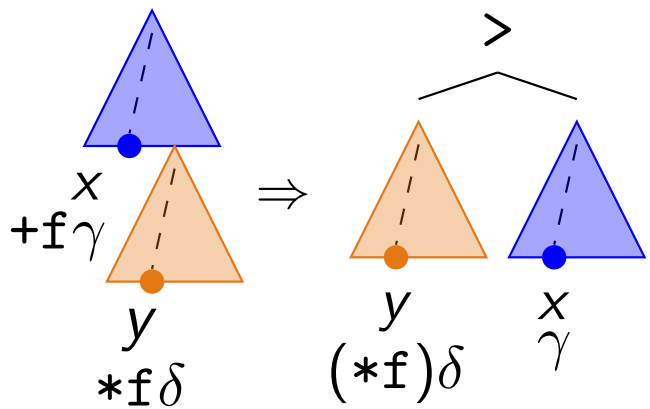




Minimalist Grammars

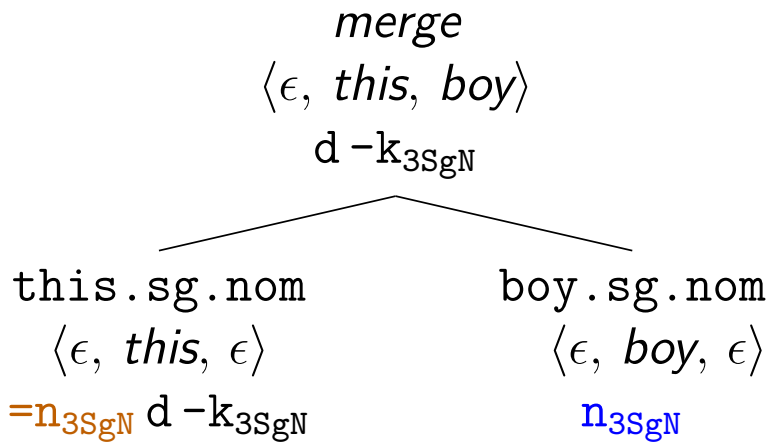
- Chain notation (Stabler 2001):

$$\underbrace{\langle \texttt{Spec},\ \texttt{Head},\ \texttt{Comp}\rangle\ :\ \texttt{Features}}_{\text{Initial chain}},\ \underbrace{\texttt{Mover}_1,\ \texttt{Mover}_2,\ \ldots}_{\text{Non-initial chains}}$$

- Example grammar:

$$\begin{aligned}
\texttt{this.sg.nom} &:= \langle \epsilon,\ \textit{this},\ \epsilon\rangle\ ::\ \texttt{=n}_{\texttt{3SgN}}\ \texttt{d}\ \texttt{-k}_{\texttt{3SgN}}\\
\texttt{boy.sg.nom} &:= \langle \epsilon,\ \textit{boy},\ \epsilon\rangle\ ::\ \texttt{n}_{\texttt{3SgN}}\\
\texttt{walk} &:= \langle \epsilon,\ \textit{walk},\ \epsilon\rangle\ ::\ \texttt{=d v}\\
\texttt{prs.3sg} &:= \langle \epsilon,\ \textit{-s},\ \epsilon\rangle\ ::\ \texttt{=>v +k}_{\texttt{3SgN}}\ \texttt{t}
\end{aligned}$$

Example derivation



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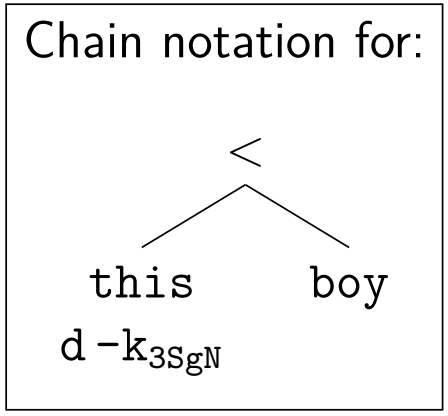

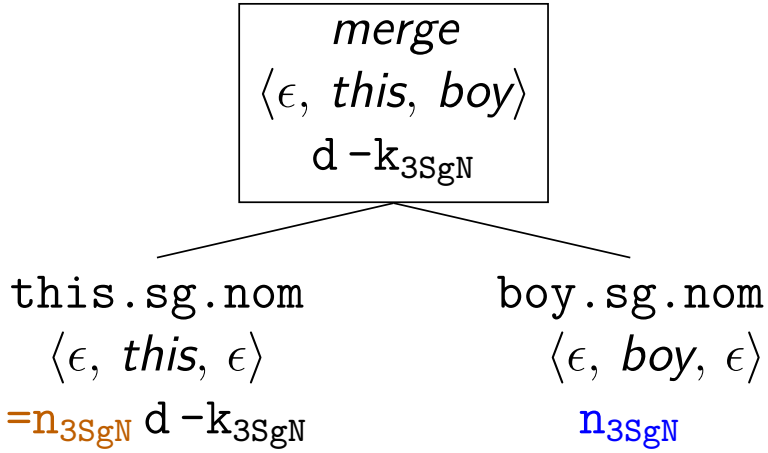

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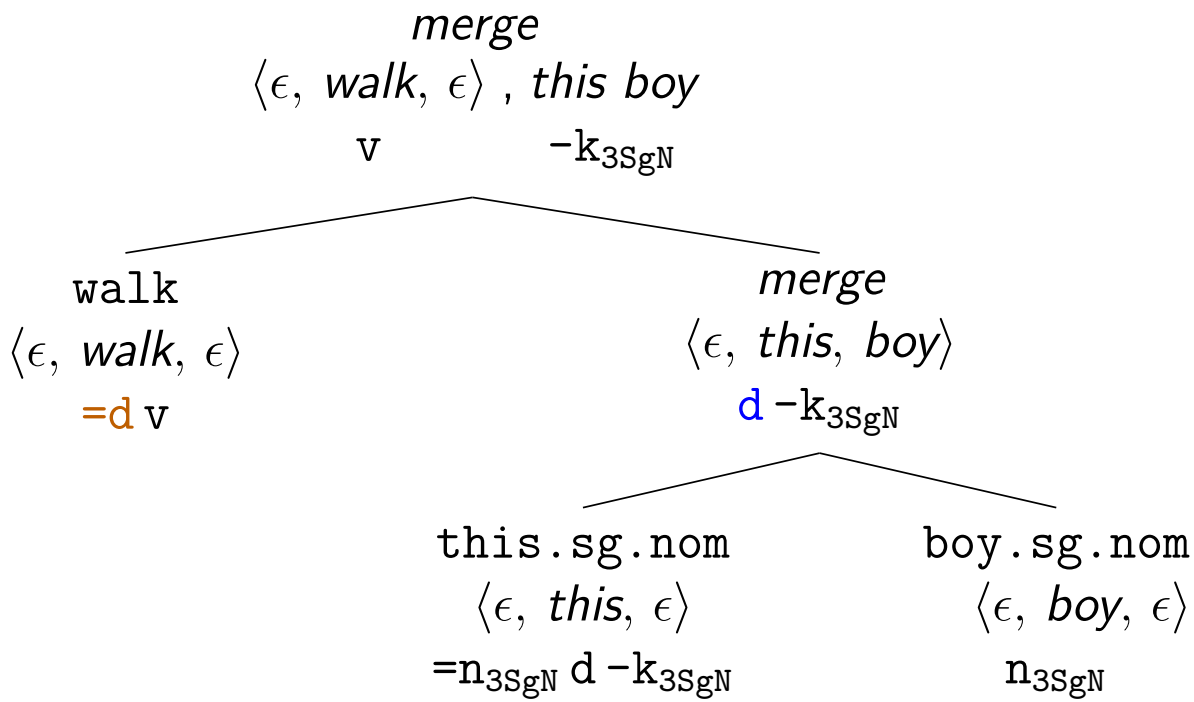

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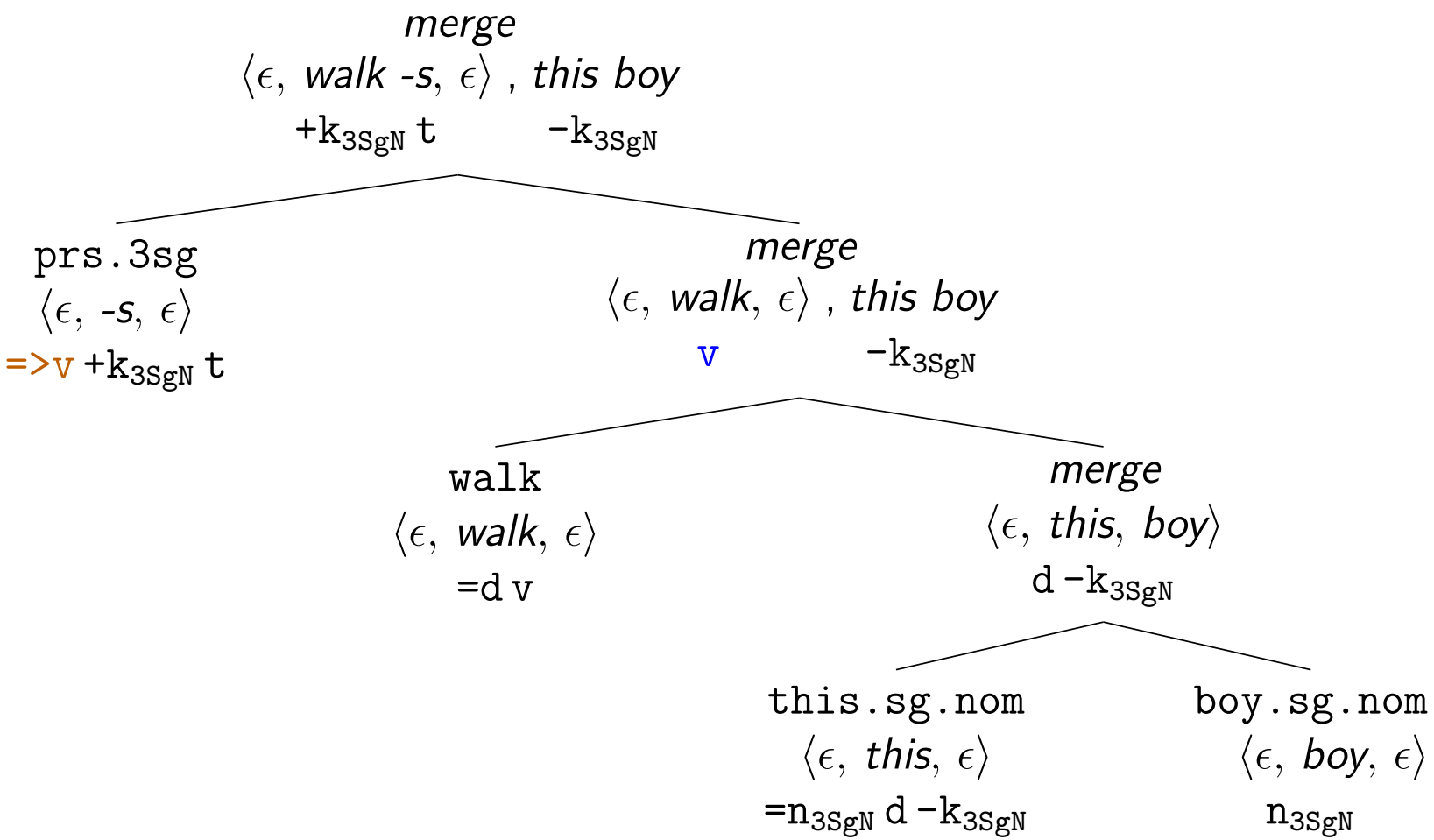

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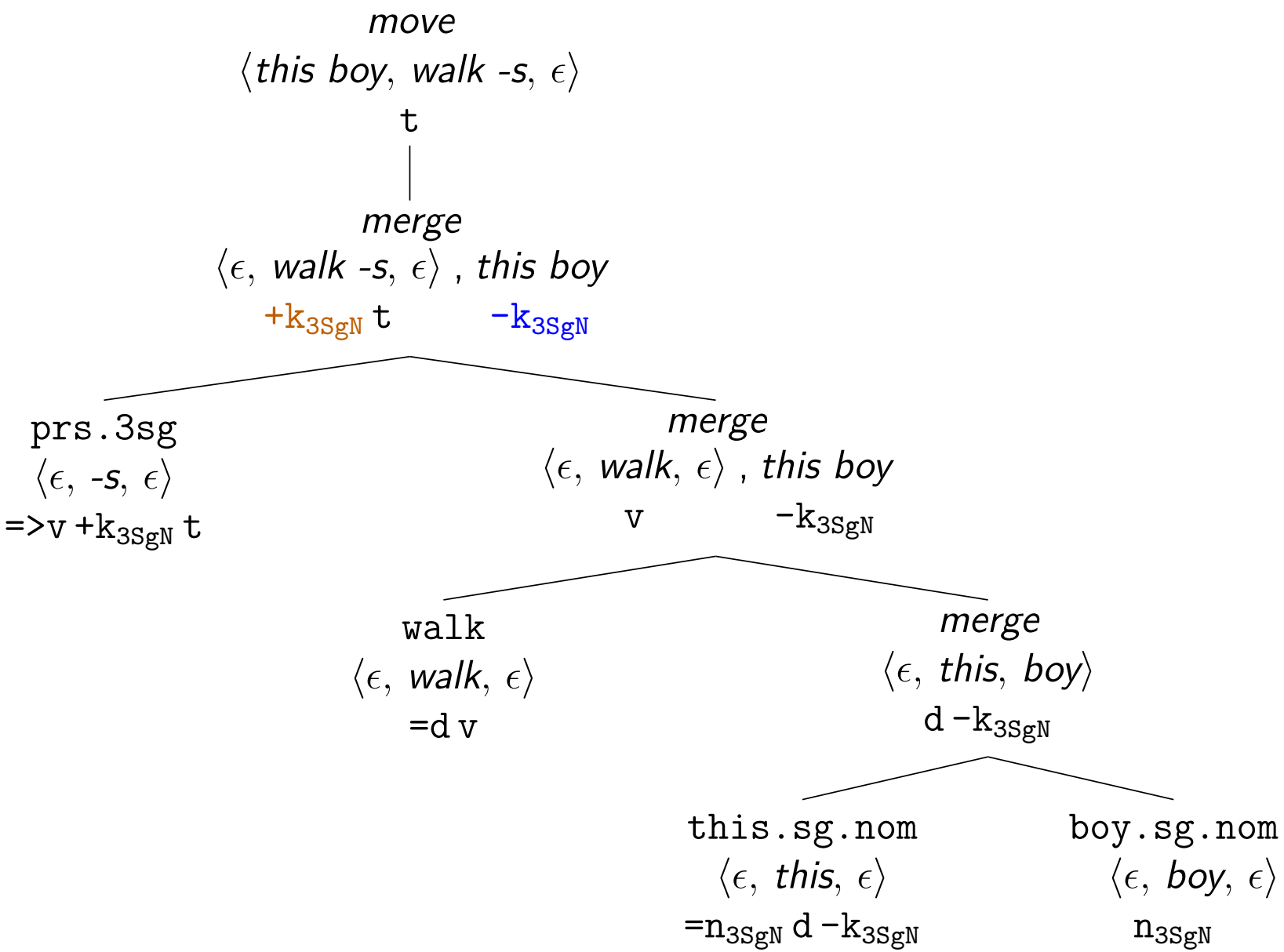

Overview

Bundles and channels

$$\texttt{boy.sg.nom} \;:=\; \left\langle \epsilon,\ \textit{boy},\ \epsilon \right\rangle \;::\; \texttt{n}_{\texttt{3SgN}}$$

Bundles and channels

- Lexical items carry morphological **feature bundles**

$$\texttt{boy.sg} \;:=\; \left\langle \epsilon,\; \begin{bmatrix} \text{BOY} \\ \texttt{num}{:}\textit{sg} \\ \texttt{per}{:}\textit{3} \\ \texttt{case}{:}\epsilon \end{bmatrix},\; \epsilon \right\rangle \;::\; \texttt{n}_{\texttt{3SgN}}$$

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- Heads exchange information across *merge* and *move* dependencies (Kobele 2012)

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Bundles and channels

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- Heads exchange information across *merge* and *move* dependencies (Kobele 2012)
- Syntactic features annotated with **channels**
  - receiving channel: does it accept values from whatever checks it?
  - emitting channel: what values does it pass to whatever checks it?

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- Closest goal (Chomsky 2000)
  - overwriting values
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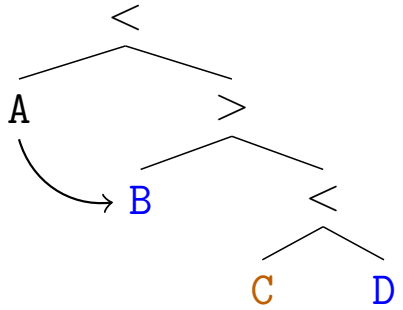

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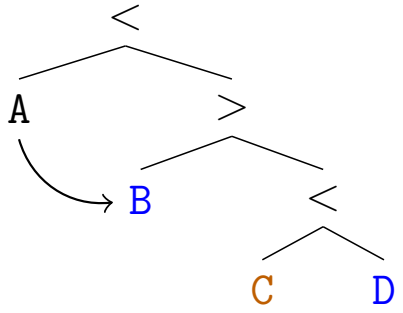

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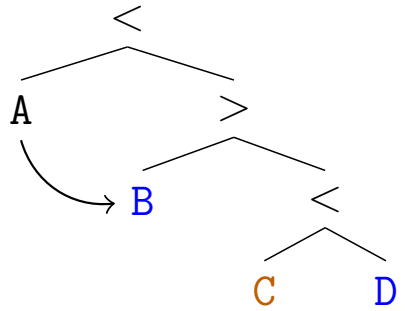

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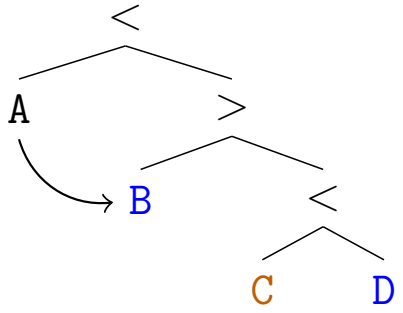

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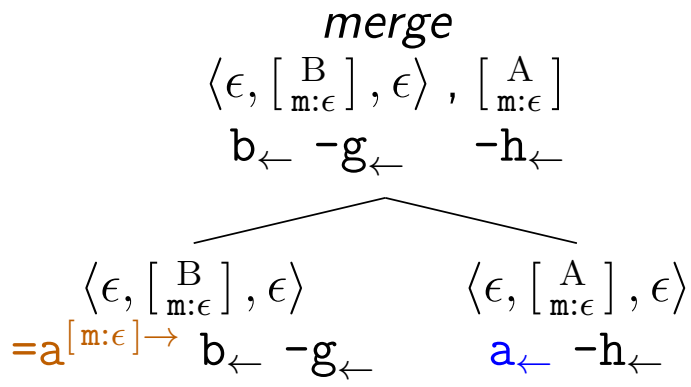
- Long-distance agreement as a series of local exchanges
- Is this enough?

Long-distance agreement



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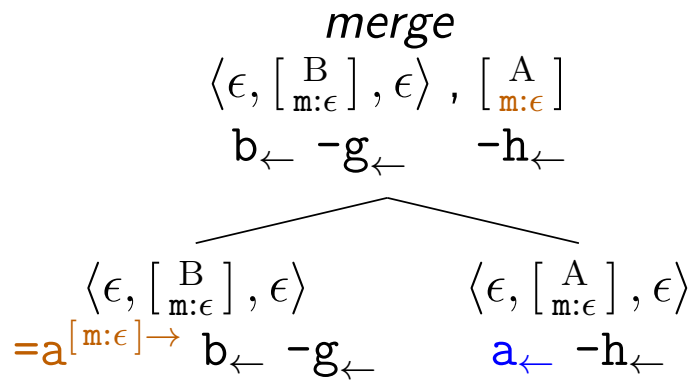

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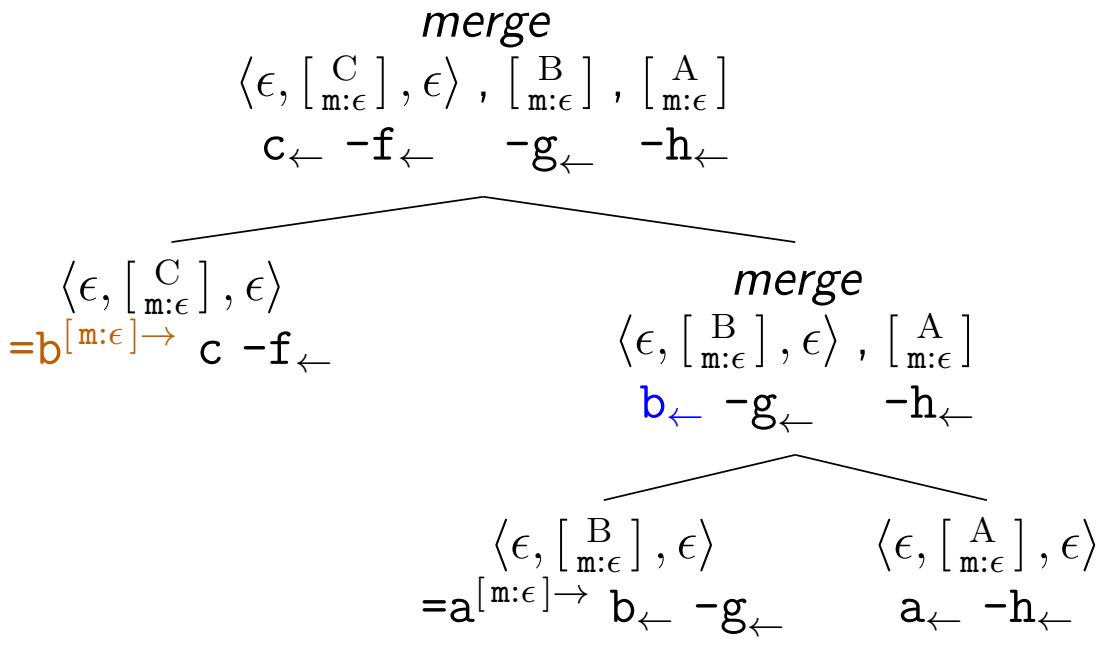

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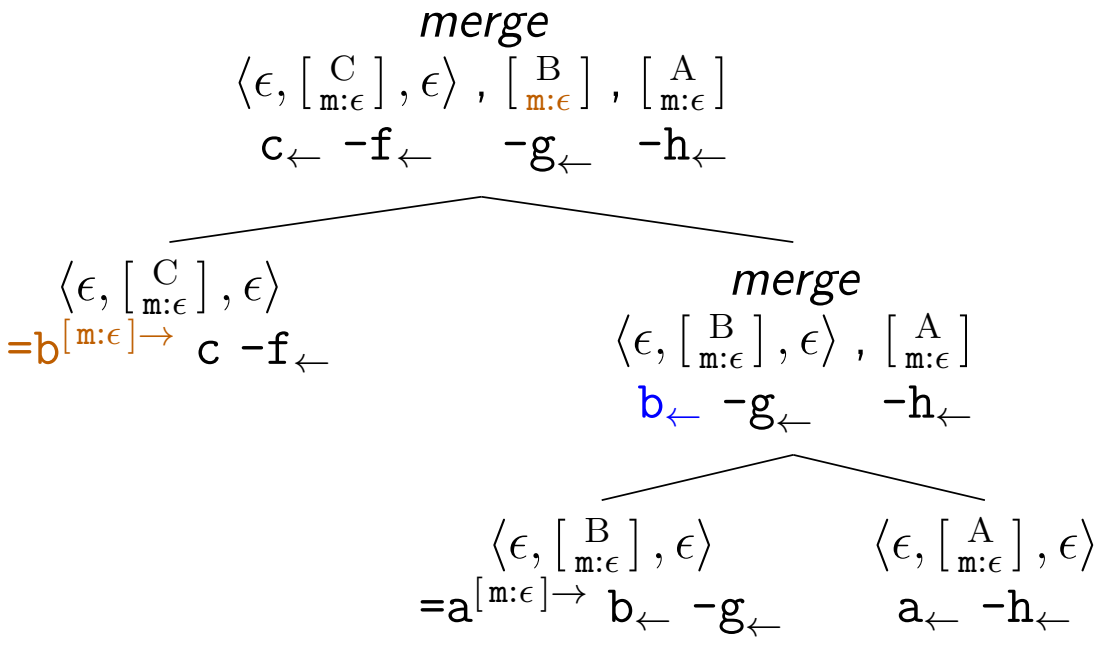

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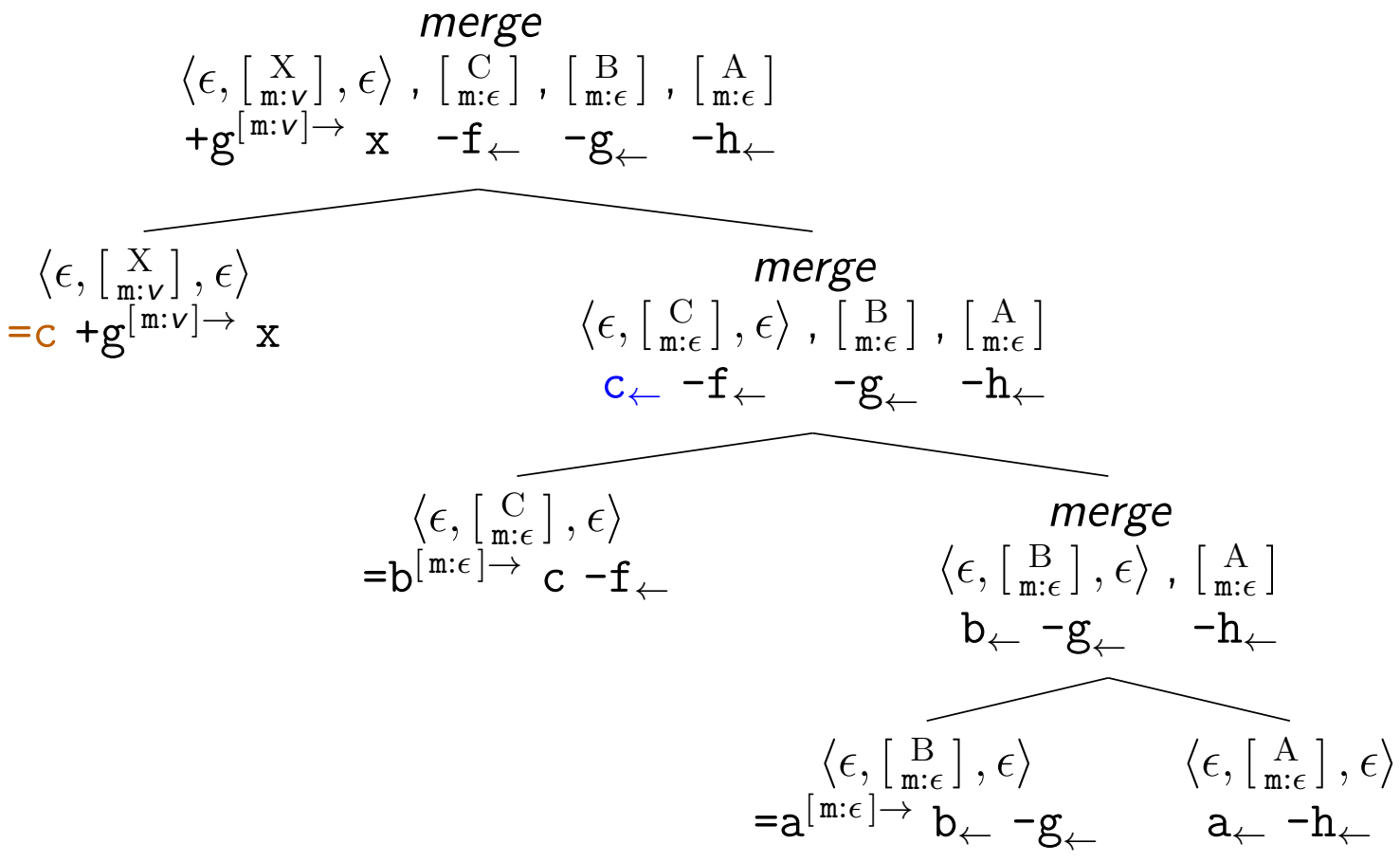

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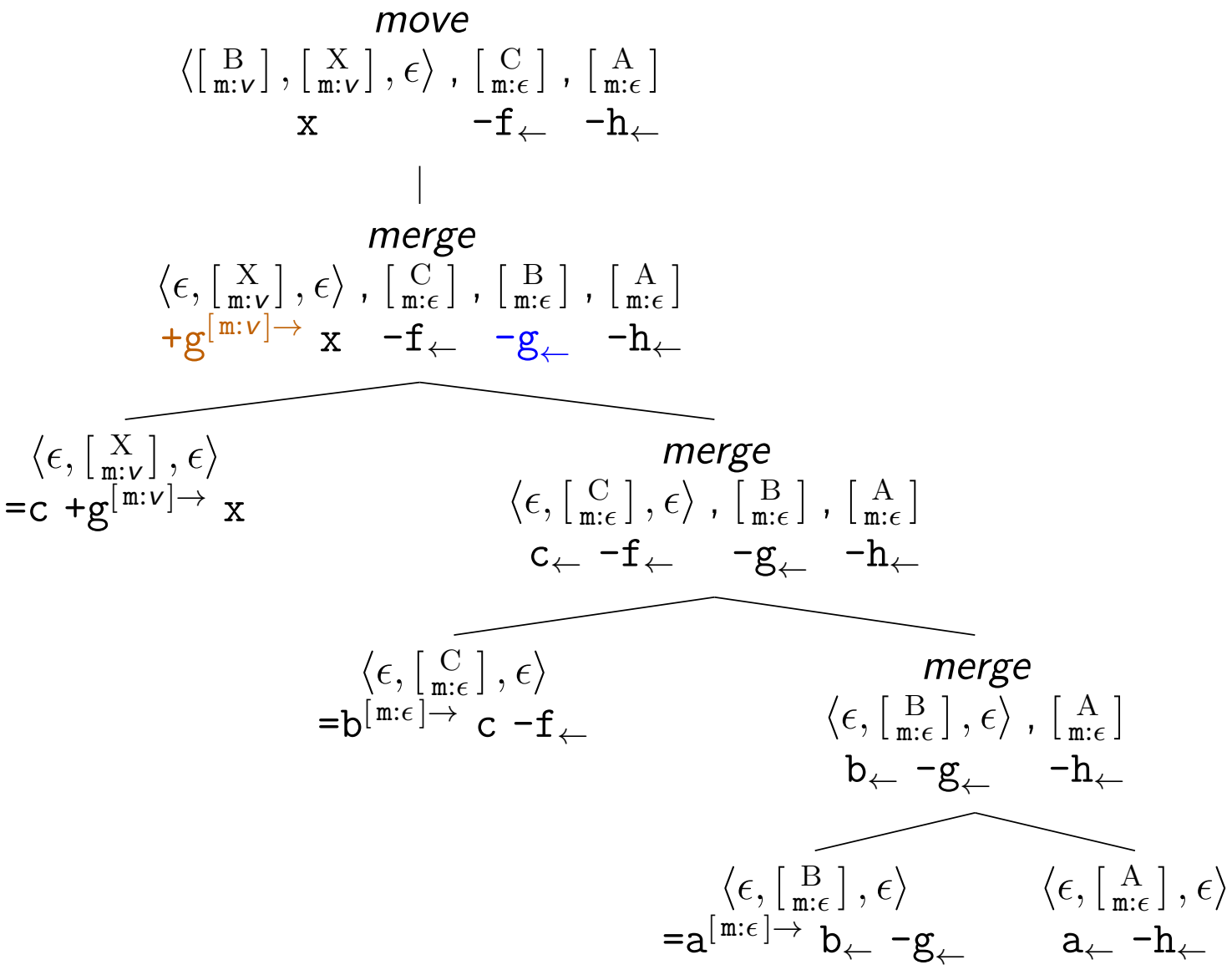

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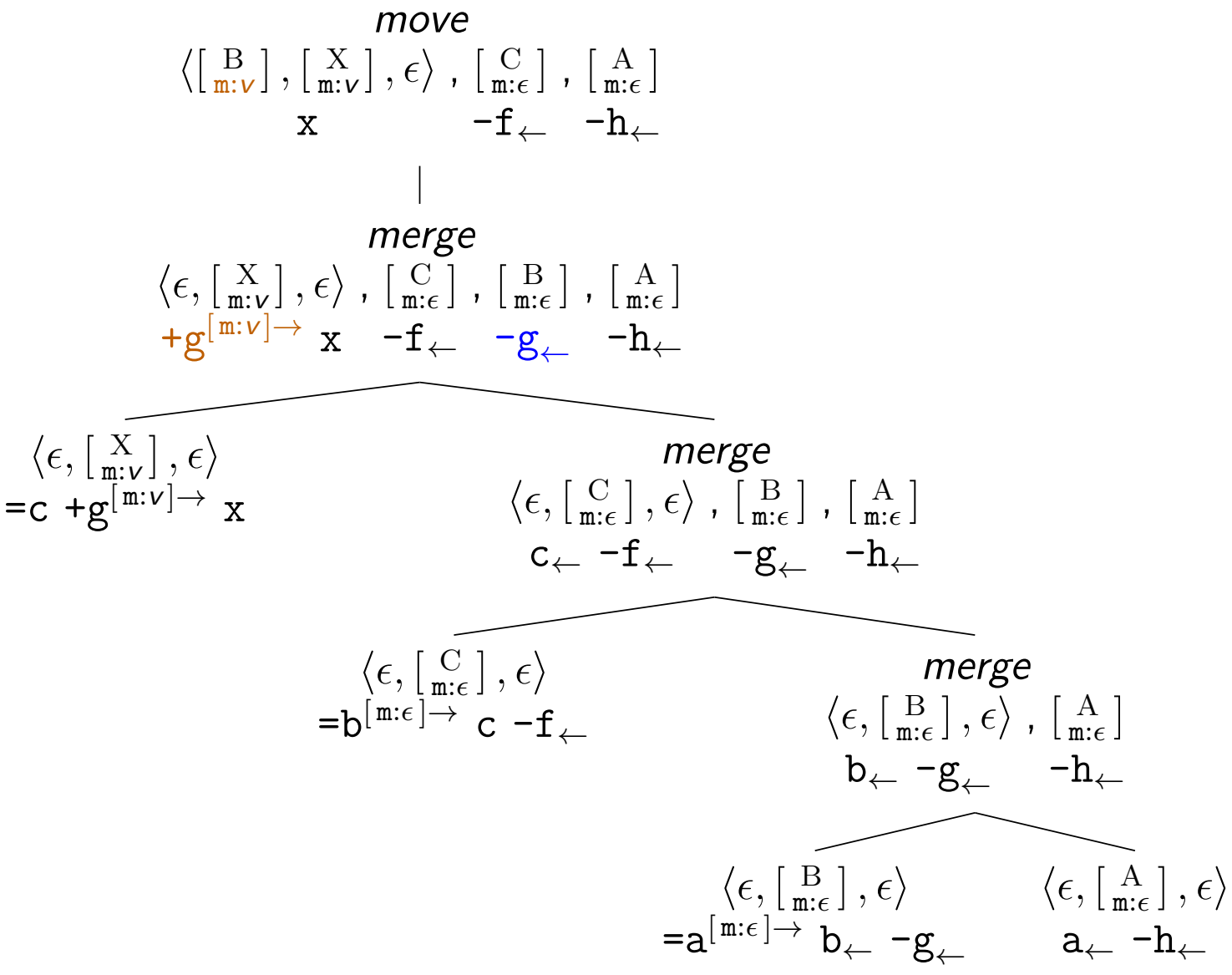

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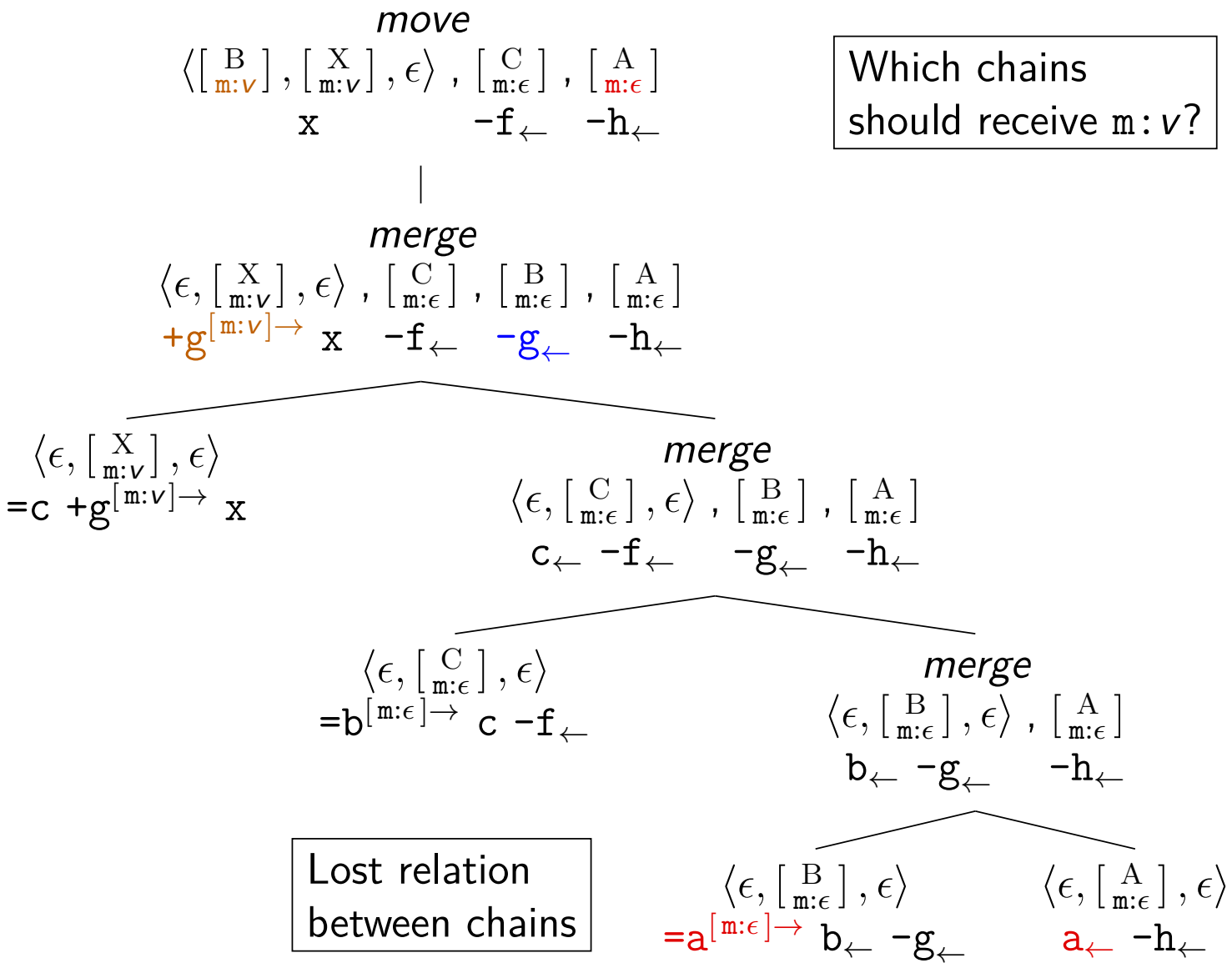

Additional bookkeeping

- Long-distance agreement as an unbroken sequence of local exchanges of values
- Where does this sequence end?
  - **feature rewritability**: the highest chain that can update the feature's value
- What path does it take?
  - **chain lineages**: hierarchical relations between chains

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$$\underset{+g^{[\mathrm{m}:v/\mathtt{off}]\rightarrow}}{\left\langle \epsilon, \begin{bmatrix} \mathrm{X} \\ \mathrm{m}:v/\mathtt{off} \end{bmatrix}, \epsilon \right\rangle} \quad , \quad \underset{-f_{\leftarrow}}{\begin{bmatrix} \mathrm{C} \\ \mathrm{m}:\epsilon/\mathtt{f} \end{bmatrix}} \quad , \quad \underset{-g_{\leftarrow}}{\begin{bmatrix} \mathrm{B} \\ \mathrm{m}:\epsilon/\mathtt{f} \end{bmatrix}} \quad , \quad \underset{-h_{\leftarrow}}{\begin{bmatrix} \mathrm{A} \\ \mathrm{m}:\epsilon/\mathtt{f} \end{bmatrix}}$$

$$\mathtt{x}\ (\mathtt{off}) \qquad (\mathtt{f}\ \mathtt{off}) \qquad (\mathtt{f}\ \mathtt{g}\ \mathtt{off}) \qquad (\mathtt{f}\ \mathtt{g}\ \mathtt{h}\ \mathtt{off})$$

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non-rewritable

rewritable by: f or lower chains

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$$+\text{g}^{[\text{m}:v/\texttt{off}]\rightarrow}\ \texttt{x}\ (\texttt{off}) \quad -\text{f}_{\leftarrow}\ (\texttt{f}\ \texttt{off}) \quad -\text{g}_{\leftarrow}\ (\texttt{f}\ \texttt{g}\ \texttt{off}) \quad -\text{h}_{\leftarrow}\ (\texttt{f}\ \texttt{g}\ \texttt{h}\ \texttt{off})$$

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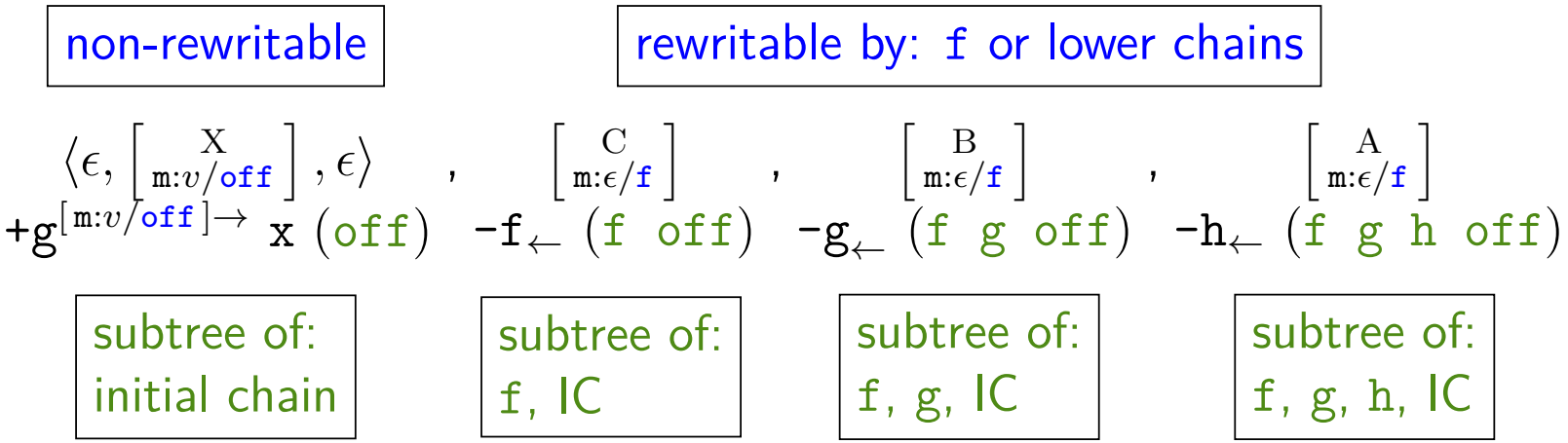


Example grammar revisited

$$\texttt{this} \quad := \left\langle \epsilon,\ \begin{bmatrix} \textsc{this} \\ \texttt{num:}\epsilon\texttt{/on} \\ \texttt{per:}\epsilon\texttt{/on} \\ \texttt{case:}\epsilon\texttt{/on} \end{bmatrix},\ \epsilon \right\rangle \ ::\ \texttt{=n}^{[\texttt{case:}\epsilon\texttt{/on}]\rightarrow}_{\leftarrow}\ \texttt{d -k}^{\begin{bmatrix}\texttt{num:}\epsilon\texttt{/on}\\ \texttt{per:}\epsilon\texttt{/on}\end{bmatrix}\rightarrow}_{\leftarrow}\ (\texttt{off})$$

$$\texttt{boy.sg} \quad := \left\langle \epsilon,\ \begin{bmatrix} \textsc{boy} \\ \texttt{num:}\textit{sg}\texttt{/off} \\ \texttt{per:}\textit{3}\texttt{/off} \\ \texttt{case:}\epsilon\texttt{/on} \end{bmatrix},\ \epsilon \right\rangle \ ::\ \texttt{n}^{\begin{bmatrix}\texttt{num:}\textit{sg}\texttt{/off}\\ \texttt{per:}\textit{3}\texttt{/off}\end{bmatrix}\rightarrow}_{\leftarrow}\ (\texttt{off})$$

$$\texttt{walk} \quad := \left\langle \epsilon,\ \left[\ \textsc{walk}\ \right],\ \epsilon \right\rangle \ ::\ \texttt{=d v}\ (\texttt{off})$$

$$\texttt{prs} \quad := \left\langle \epsilon,\ \begin{bmatrix} \textsc{prs} \\ \texttt{num:}\epsilon\texttt{/on} \\ \texttt{per:}\epsilon\texttt{/on} \end{bmatrix},\ \epsilon \right\rangle \ ::\ \texttt{=v +k}^{[\texttt{case:}\textit{nom}\texttt{/off}]\rightarrow}_{\leftarrow}\ \texttt{t}\ (\texttt{off})$$

Example grammar revisited

$$\texttt{this} := \left\langle \epsilon, \begin{bmatrix} \text{THIS} \\ \texttt{num:}\epsilon\texttt{/on} \\ \texttt{per:}\epsilon\texttt{/on} \\ \texttt{case:}\epsilon\texttt{/on} \end{bmatrix}, \epsilon \right\rangle :: \texttt{=n}^{[\texttt{case:}\epsilon\texttt{/on}]\rightarrow}_{\leftarrow}\ \texttt{d -k}^{\begin{bmatrix}\texttt{num:}\epsilon\texttt{/on}\\ \texttt{per:}\epsilon\texttt{/on}\end{bmatrix}\rightarrow}_{\leftarrow}\ (\texttt{off})$$

$$\texttt{boy.sg} := \left\langle \epsilon, \begin{bmatrix} \text{BOY} \\ \texttt{num:}\mathit{sg}\texttt{/off} \\ \texttt{per:}\mathit{3}\texttt{/off} \\ \texttt{case:}\epsilon\texttt{/on} \end{bmatrix}, \epsilon \right\rangle :: \texttt{n}^{\begin{bmatrix}\texttt{num:}\mathit{sg}\texttt{/off}\\ \texttt{per:}\mathit{3}\texttt{/off}\end{bmatrix}\rightarrow}_{\leftarrow}\ (\texttt{off})$$

$$\texttt{walk} := \left\langle \epsilon, \begin{bmatrix} \text{WALK} \end{bmatrix}, \epsilon \right\rangle :: \texttt{=d v}\ (\texttt{off})$$

$$\texttt{prs} := \left\langle \epsilon, \begin{bmatrix} \text{PRS} \\ \texttt{num:}\epsilon\texttt{/on} \\ \texttt{per:}\epsilon\texttt{/on} \end{bmatrix}, \epsilon \right\rangle :: \texttt{=v +k}^{[\texttt{case:}\mathit{nom}\texttt{/off}]\rightarrow}_{\leftarrow}\ \texttt{t}\ (\texttt{off})$$

Example grammar revisited

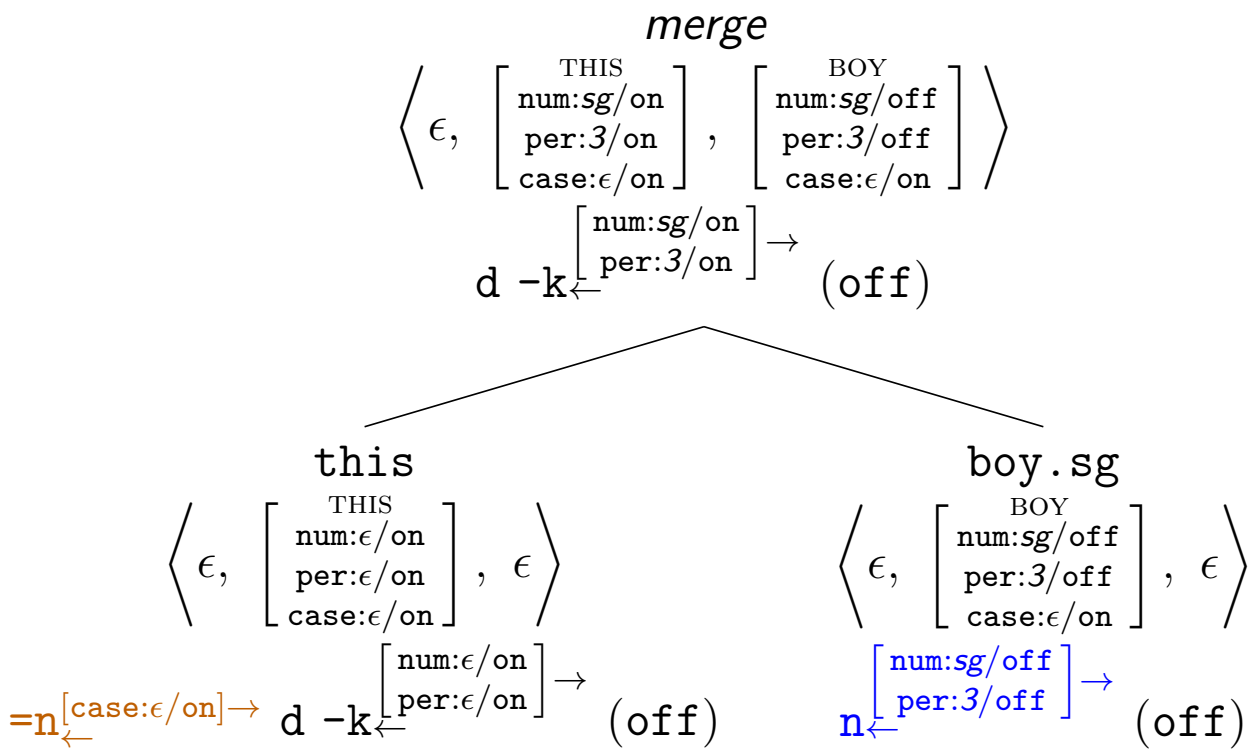
$$\texttt{this} := \left\langle \epsilon, \begin{bmatrix} \text{THIS} \\ \texttt{num:}\epsilon\texttt{/on} \\ \texttt{per:}\epsilon\texttt{/on} \\ \texttt{case:}\epsilon\texttt{/on} \end{bmatrix}, \epsilon \right\rangle :: \texttt{=n}\overset{[\texttt{case:}\epsilon\texttt{/on}]\rightarrow}{\leftarrow}\ \texttt{d -k}\overset{\begin{bmatrix}\texttt{num:}\epsilon\texttt{/on}\\ \texttt{per:}\epsilon\texttt{/on}\end{bmatrix}\rightarrow}{\leftarrow}\ (\texttt{off})$$

$$\texttt{boy.sg} := \left\langle \epsilon, \begin{bmatrix} \text{BOY} \\ \texttt{num:}\textit{sg}\texttt{/off} \\ \texttt{per:}\textit{3}\texttt{/off} \\ \texttt{case:}\epsilon\texttt{/on} \end{bmatrix}, \epsilon \right\rangle :: \texttt{n}\overset{\begin{bmatrix}\texttt{num:}\textit{sg}\texttt{/off}\\ \texttt{per:}\textit{3}\texttt{/off}\end{bmatrix}\rightarrow}{\leftarrow}\ (\texttt{off})$$

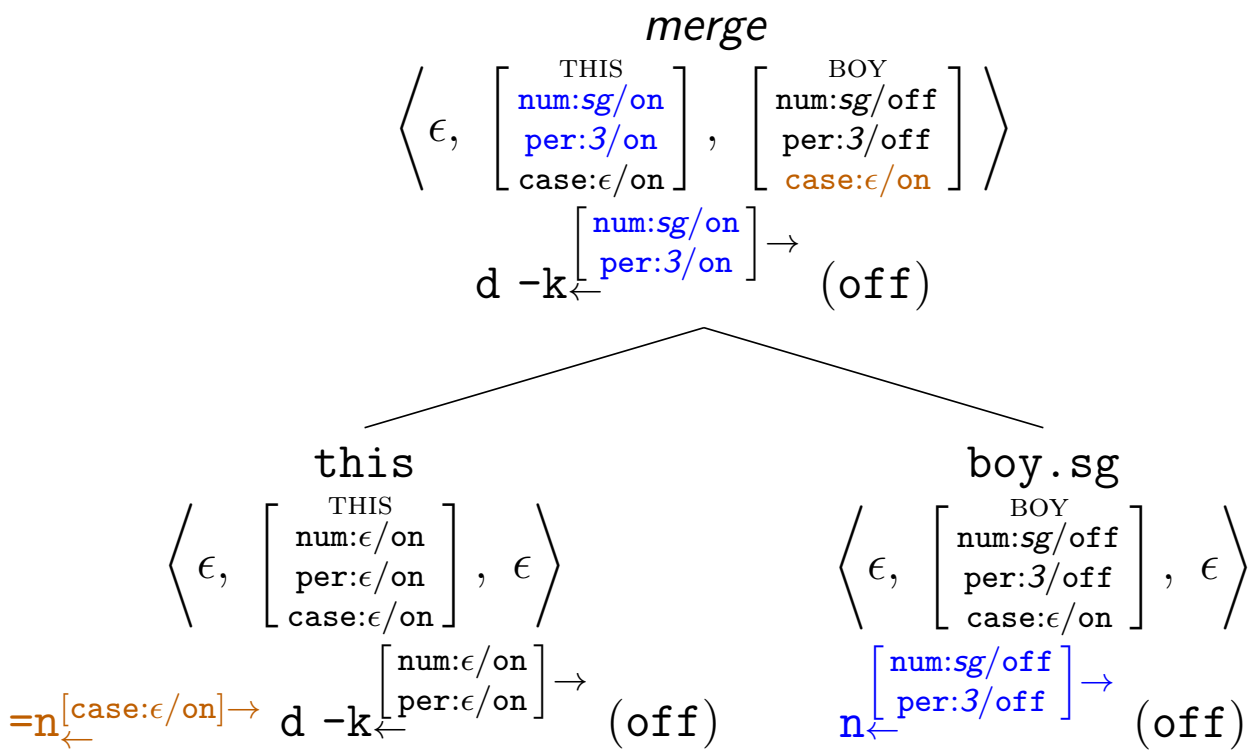
$$\texttt{walk} := \left\langle \epsilon, \begin{bmatrix} \text{WALK} \end{bmatrix}, \epsilon \right\rangle :: \texttt{=d v}\ (\texttt{off})$$

$$\texttt{prs} := \left\langle \epsilon, \begin{bmatrix} \text{PRS} \\ \texttt{num:}\epsilon\texttt{/on} \\ \texttt{per:}\epsilon\texttt{/on} \end{bmatrix}, \epsilon \right\rangle :: \texttt{=v +k}\overset{[\texttt{case:}\textit{nom}\texttt{/off}]\rightarrow}{\leftarrow}\ \texttt{t}\ (\texttt{off})$$

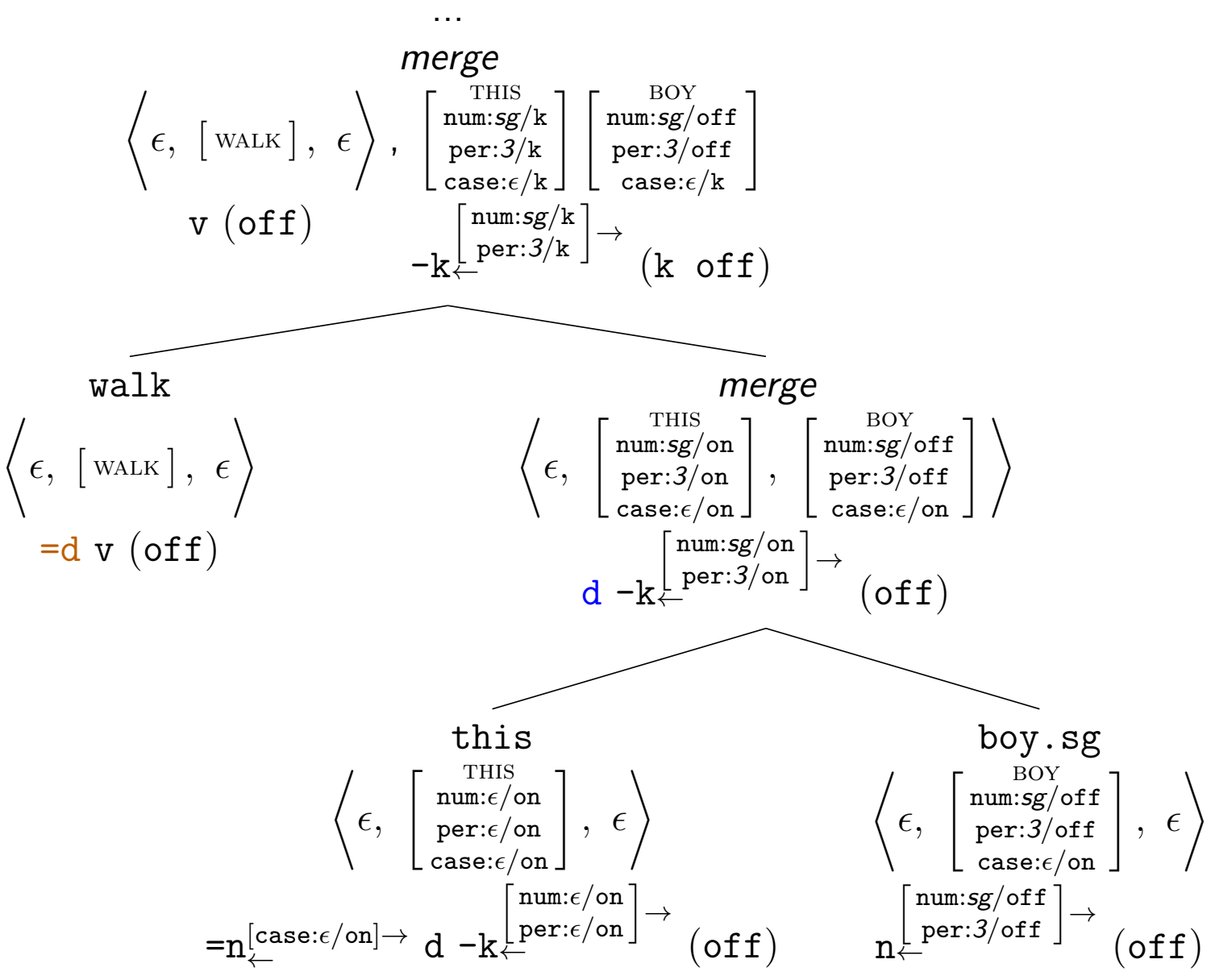
Example derivation



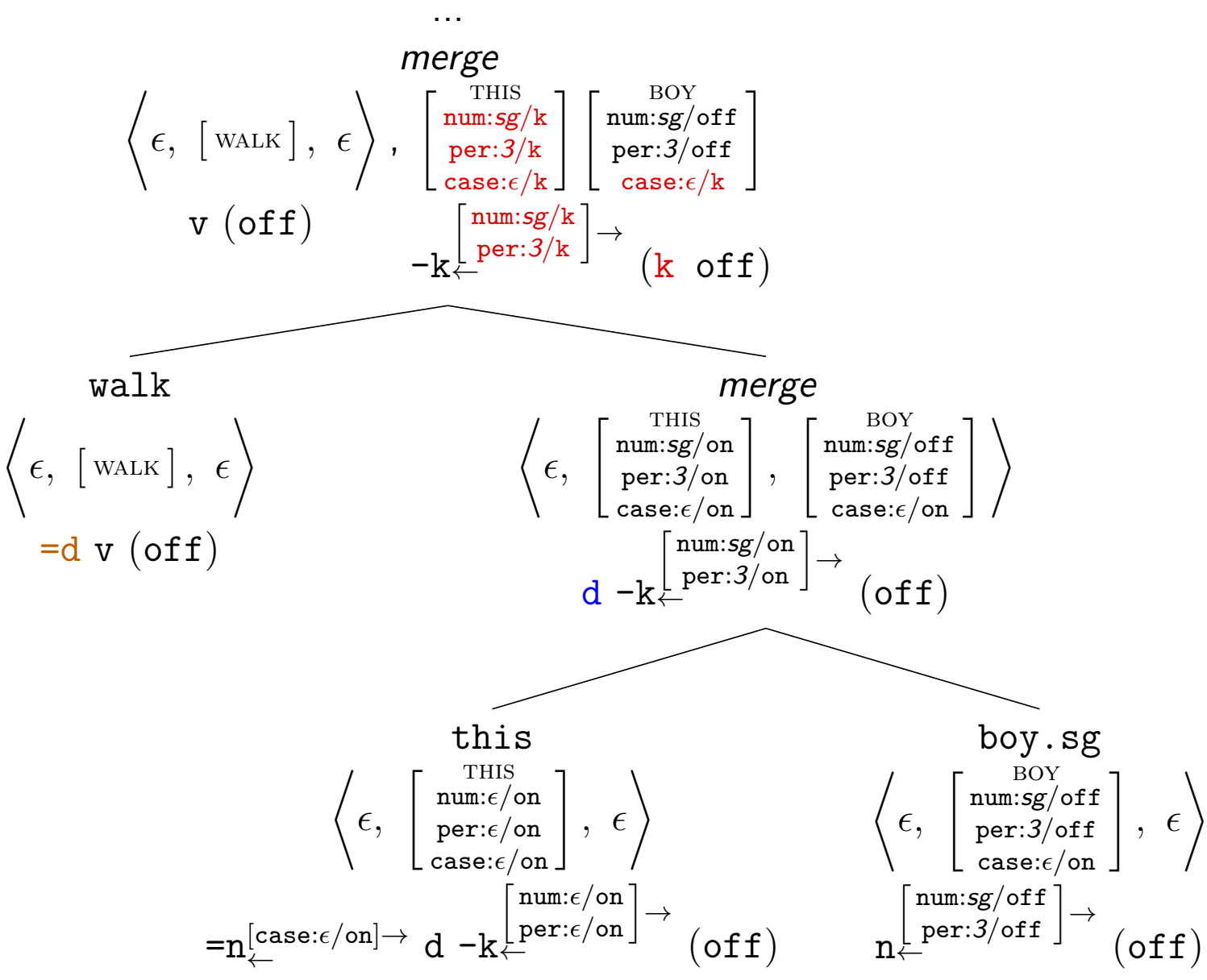
Example derivation



Example derivation



Example derivation



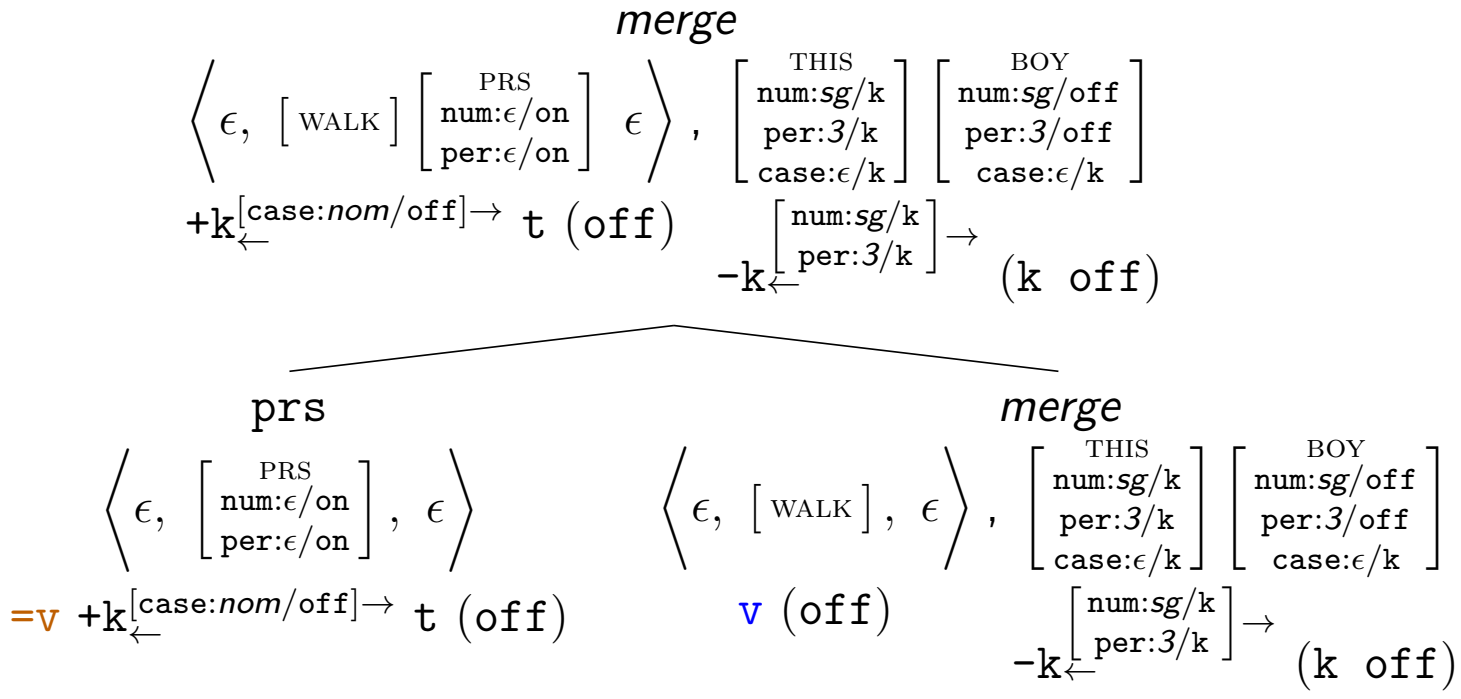
Example derivation

$$\left\langle \epsilon,\ \left[\ \textsc{walk}\ \right],\ \epsilon \right\rangle,\ \begin{bmatrix}\textsc{this}\\ \texttt{num:}\mathit{sg}\texttt{/k}\\ \texttt{per:}\mathit{3}\texttt{/k}\\ \texttt{case:}\epsilon\texttt{/k}\end{bmatrix}\begin{bmatrix}\textsc{boy}\\ \texttt{num:}\mathit{sg}\texttt{/off}\\ \texttt{per:}\mathit{3}\texttt{/off}\\ \texttt{case:}\epsilon\texttt{/k}\end{bmatrix}$$

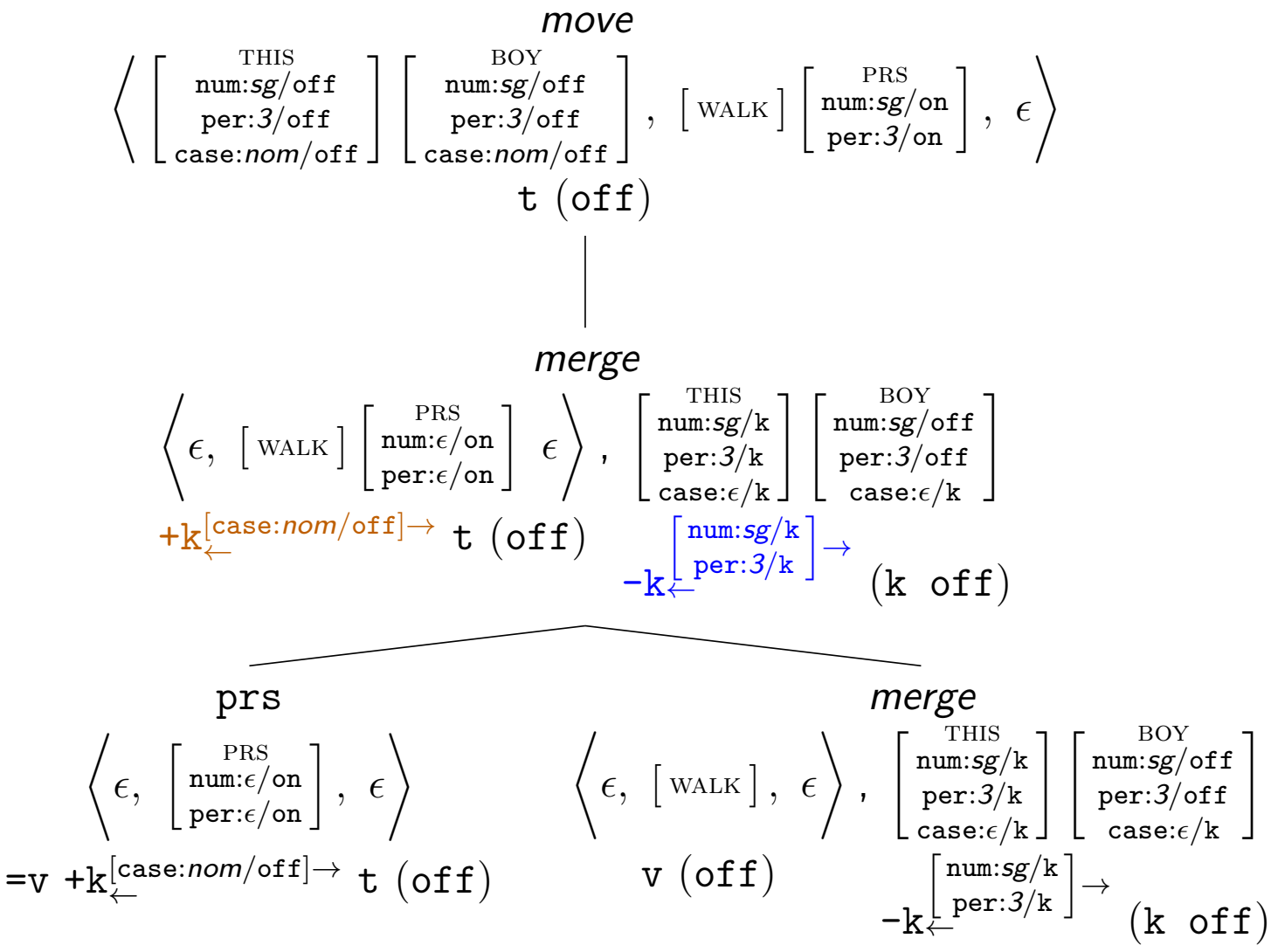
merge

$$\texttt{v}\ (\texttt{off}) \qquad \texttt{-k}\overleftarrow{\begin{bmatrix}\texttt{num:}\mathit{sg}\texttt{/k}\\ \texttt{per:}\mathit{3}\texttt{/k}\end{bmatrix}}\rightarrow\ (\texttt{k off})$$

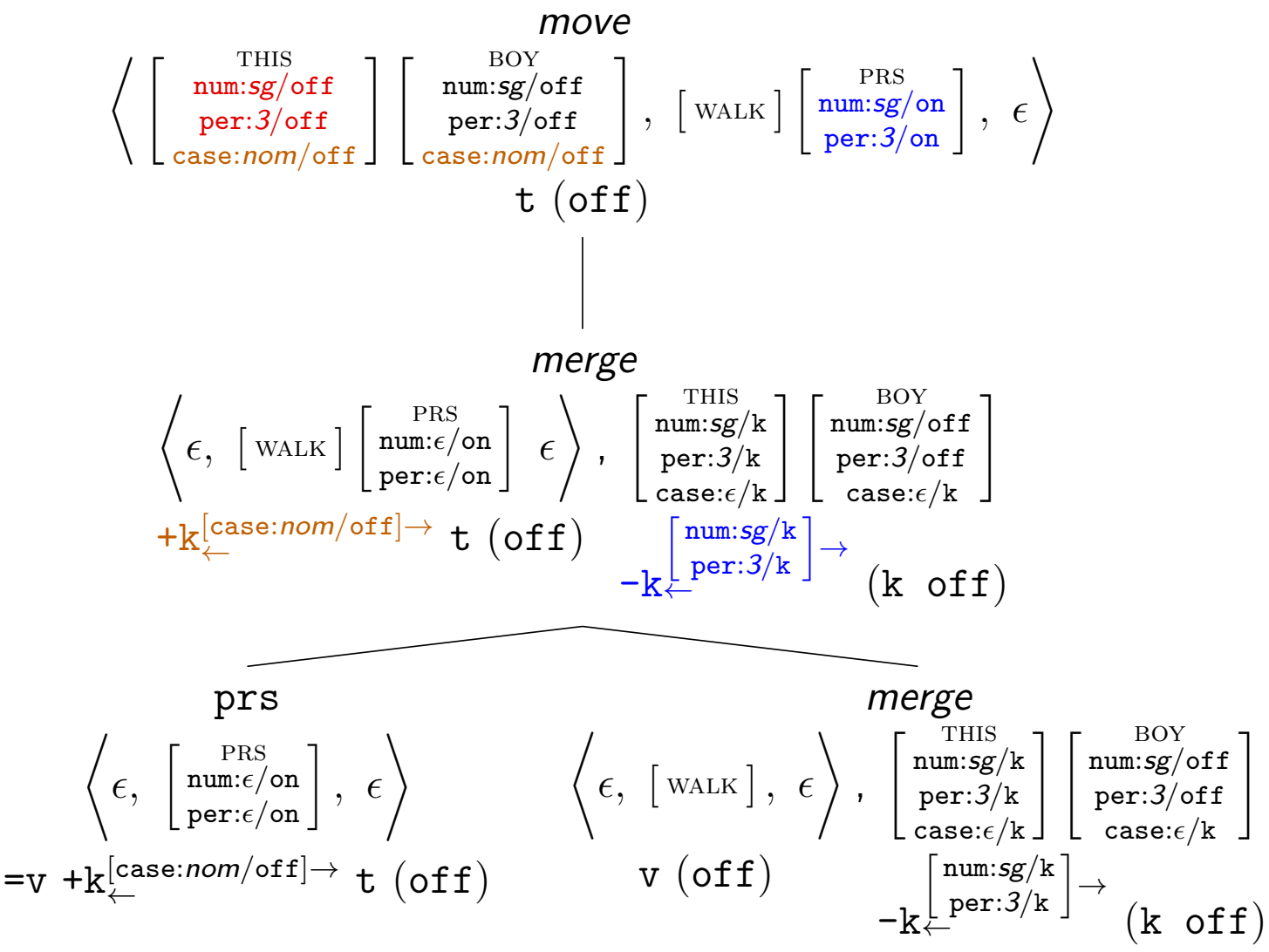
Example derivation



Example derivation



Example derivation



Overview

Icelandic verb agreement

- Optional number agreement with the nominative DP:

Það finnst **mörgum stúdentum** tölvurnar ljótar.
EXPL find.SG many students.DAT computers.DEF.NOM ugly.NOM

Það finnast **mörgum stúdentum** tölvurnar ljótar.
EXPL find.PL many students.DAT computers.DEF.NOM ugly.NOM
'Many students find the computers ugly.'

- Some dative experiencers disrupt agreement:

Það finnst **fáum börnum** tölvurnar ljótar.
EXPL find.SG few children.DAT computers.DEF.NOM ugly.NOM

*Það finnast **fáum börnum** tölvurnar ljótar.
EXPL find.PL few children.DAT computers.DEF.NOM ugly.NOM
'Few children find the computers ugly.'

Analysis (Kučerová 2016)

- Agreement with the nominative if the dative DP undergoes *Object Shift*:

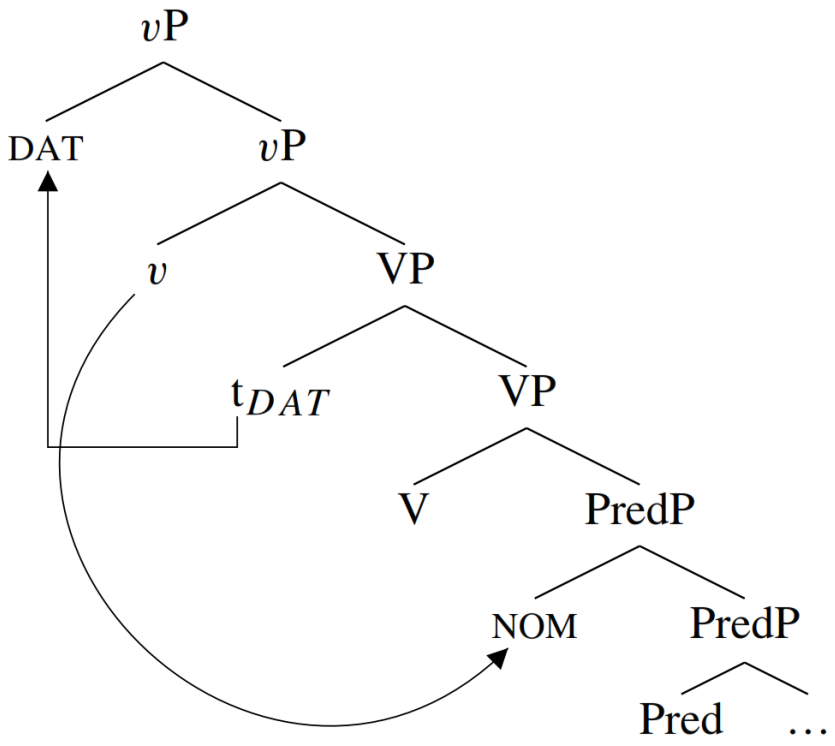
Það ??finnst **mörgum köttum fljótt** mýsnar góðar.
EXPL find.SG many cats.DEF.DAT quickly mice.DEF.NOM tasty
Það finnast **mörgum köttum fljótt** mýsnar góðar.
EXPL find.PL many cats.DEF.DAT quickly mice.DEF.NOM tasty
'Many cats quickly find the mice tasty.'

- Default agreement otherwise:

Það finnst **fljótt mörgum köttum** mýsnar góðar.
EXPL find.SG quickly many cats.DEF.DAT mice.DEF.NOM tasty
Það ??finnast **fljótt mörgum köttum** mýsnar góðar.
EXPL find.PL quickly many cats.DEF.DAT mice.DEF.NOM tasty
'Many cats quickly find the mice tasty.'

Analysis (Kučerová 2016)

- **Shiftable** vs. **non-shiftable** DPs
- Shifted datives do not block v from probing the nominative
- Non-shiftable datives always block agreement



(Kučerová 2016:55)

Grammar fragment

$$\texttt{many}\sim \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{many}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \; \texttt{*k}^{[\texttt{num:}\mathit{sg}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{few}\sim \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{few}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \; \texttt{-k}^{[\texttt{num:}\mathit{sg}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{find} \quad :: \left\langle \epsilon, \left[\textsc{find} \right], \epsilon \right\rangle \quad :: \quad \texttt{=sc}_{\leftarrow} \; \texttt{=d} \; \texttt{V}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{comp}\sim \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{comp}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{sc}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{AgrO} \quad :: \left\langle \epsilon, \left[\textsc{AgrO} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>V}_{\leftarrow} \; \texttt{+k}_{\leftarrow} \; \texttt{agrO}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{v} \quad :: \left\langle \epsilon, \left[\textsc{v} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{v}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{v}_{\texttt{shift}} \quad :: \left\langle \epsilon, \left[\textsc{v}_{\textsc{shift}} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{+k} \; \texttt{v}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{T} \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{T} \\ \texttt{num:}\epsilon/\texttt{on} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>v}_{\leftarrow} \; \texttt{t} \qquad (\texttt{off})$$

Grammar fragment

$$\texttt{many}\sim \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \text{MANY}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \; *\texttt{k}^{[\texttt{num:}\mathit{sg}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{few}\sim \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \text{FEW}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \; -\texttt{k}^{[\texttt{num:}\mathit{sg}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{find} \quad :: \left\langle \epsilon, \left[\text{FIND} \right], \epsilon \right\rangle \quad :: \quad \texttt{=sc}_{\leftarrow} \; \texttt{=d} \; \texttt{V}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{comp}\sim \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \text{COMP}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{sc}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{AgrO} \quad :: \left\langle \epsilon, \left[\text{AgrO} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>V}_{\leftarrow} \; \texttt{+k}_{\leftarrow} \; \texttt{agrO}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{v} \quad :: \left\langle \epsilon, \left[\text{v} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{v}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{v}_{\texttt{shift}} \quad :: \left\langle \epsilon, \left[\text{v}_{\text{SHIFT}} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{+k} \; \texttt{v}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{T} \quad :: \left\langle \epsilon, \left[\begin{smallmatrix} \text{T} \\ \texttt{num:}\epsilon/\texttt{on} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>v}_{\leftarrow} \; \texttt{t} \qquad (\texttt{off})$$

Grammar fragment

$$\texttt{many}\sim \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \text{MANY}\sim \\ \texttt{num:}\mathit{pl}\texttt{/off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}\texttt{/off}]\rightarrow} \; \texttt{*k}^{[\texttt{num:}\mathit{sg}\texttt{/off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{few}\sim \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \text{FEW}\sim \\ \texttt{num:}\mathit{pl}\texttt{/off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}\texttt{/off}]\rightarrow} \; \texttt{-k}^{[\texttt{num:}\mathit{sg}\texttt{/off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{find} \quad :: \quad \left\langle \epsilon, \left[\text{FIND} \right], \epsilon \right\rangle \quad :: \quad \texttt{=sc}_{\leftarrow} \; \texttt{=d V}^{[\texttt{num:}\epsilon\texttt{/on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{comp}\sim \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \text{COMP}\sim \\ \texttt{num:}\mathit{pl}\texttt{/off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{sc}^{[\texttt{num:}\mathit{pl}\texttt{/off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{AgrO} \quad :: \quad \left\langle \epsilon, \left[\text{AgrO} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>V}_{\leftarrow} \; \texttt{+k}_{\leftarrow} \; \texttt{agrO}^{[\texttt{num:}\epsilon\texttt{/on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{v} \quad :: \quad \left\langle \epsilon, \left[\text{v} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{v}^{[\texttt{num:}\epsilon\texttt{/on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{v}_{\texttt{shift}} \quad :: \quad \left\langle \epsilon, \left[\text{v}_{\text{SHIFT}} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{+k v}^{[\texttt{num:}\epsilon\texttt{/on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{T} \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \text{T} \\ \texttt{num:}\epsilon\texttt{/on} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>v}_{\leftarrow} \; \texttt{t} \qquad (\texttt{off})$$

Grammar fragment

$$\texttt{many}\sim \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{many}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \; \texttt{*k}^{[\texttt{num:}\mathit{sg}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{few}\sim \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{few}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{d}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \; \texttt{-k}^{[\texttt{num:}\mathit{sg}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{find} \quad :: \quad \left\langle \epsilon, \left[\textsc{find} \right], \epsilon \right\rangle \quad :: \quad \texttt{=sc}_{\leftarrow} \; \texttt{=d} \; \texttt{V}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{comp}\sim \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{comp}\sim \\ \texttt{num:}\mathit{pl}/\texttt{off} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{sc}^{[\texttt{num:}\mathit{pl}/\texttt{off}]\rightarrow} \qquad (\texttt{off})$$

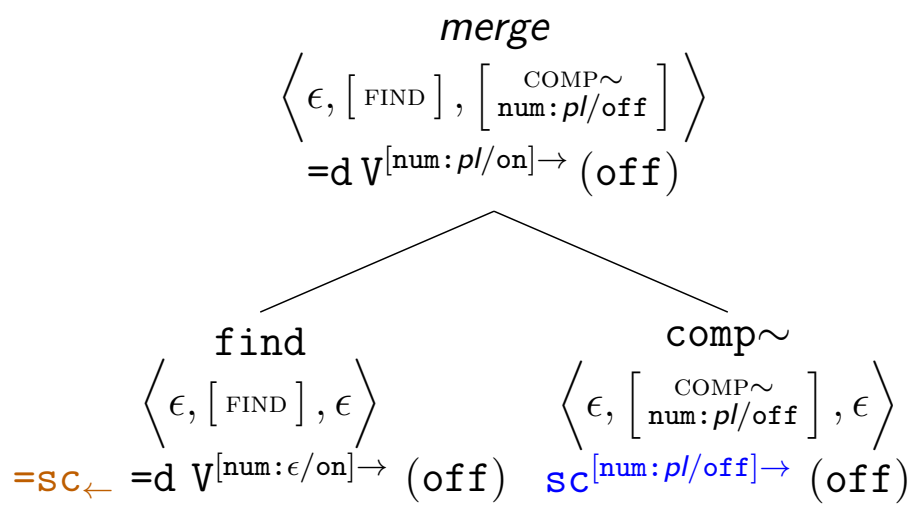
$$\texttt{AgrO} \quad :: \quad \left\langle \epsilon, \left[\textsc{AgrO} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>V}_{\leftarrow} \; \texttt{+k}_{\leftarrow} \; \texttt{agrO}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{v} \quad :: \quad \left\langle \epsilon, \left[\textsc{v} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{v}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

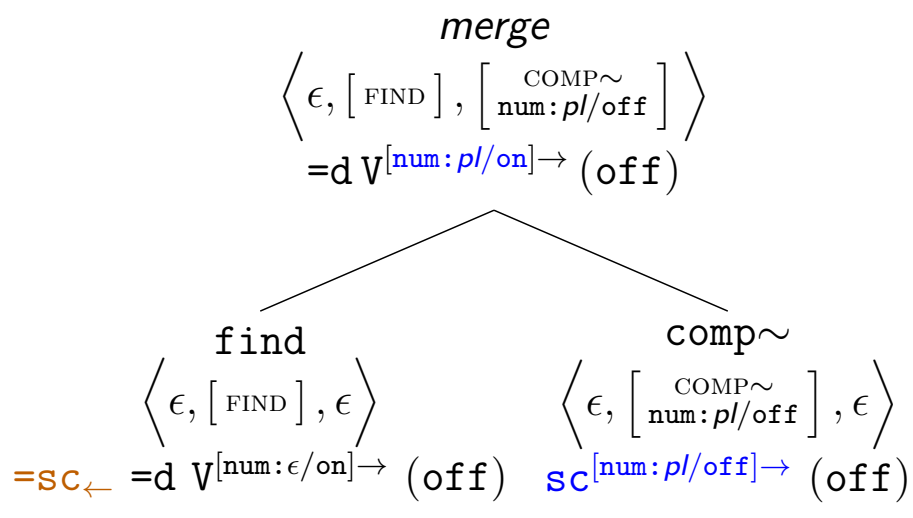
$$\texttt{v}_{\texttt{shift}} \quad :: \quad \left\langle \epsilon, \left[\textsc{v}_{\textsc{shift}} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>agrO}_{\leftarrow} \; \texttt{+k} \; \texttt{v}^{[\texttt{num:}\epsilon/\texttt{on}]\rightarrow} \qquad (\texttt{off})$$

$$\texttt{T} \quad :: \quad \left\langle \epsilon, \left[\begin{smallmatrix} \textsc{T} \\ \texttt{num:}\epsilon/\texttt{on} \end{smallmatrix} \right], \epsilon \right\rangle \quad :: \quad \texttt{=>v}_{\leftarrow} \; \texttt{t} \qquad (\texttt{off})$$

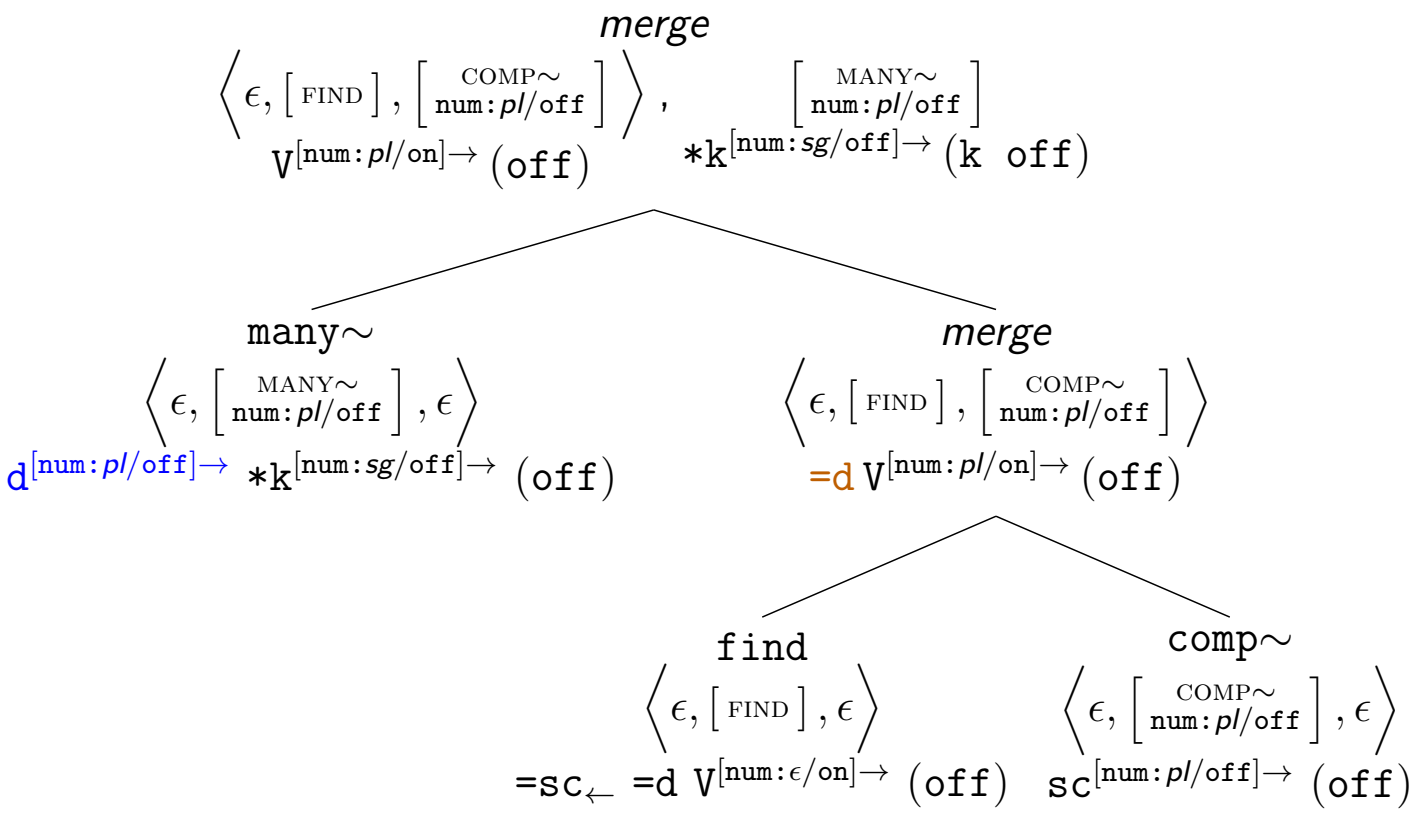
Example derivation



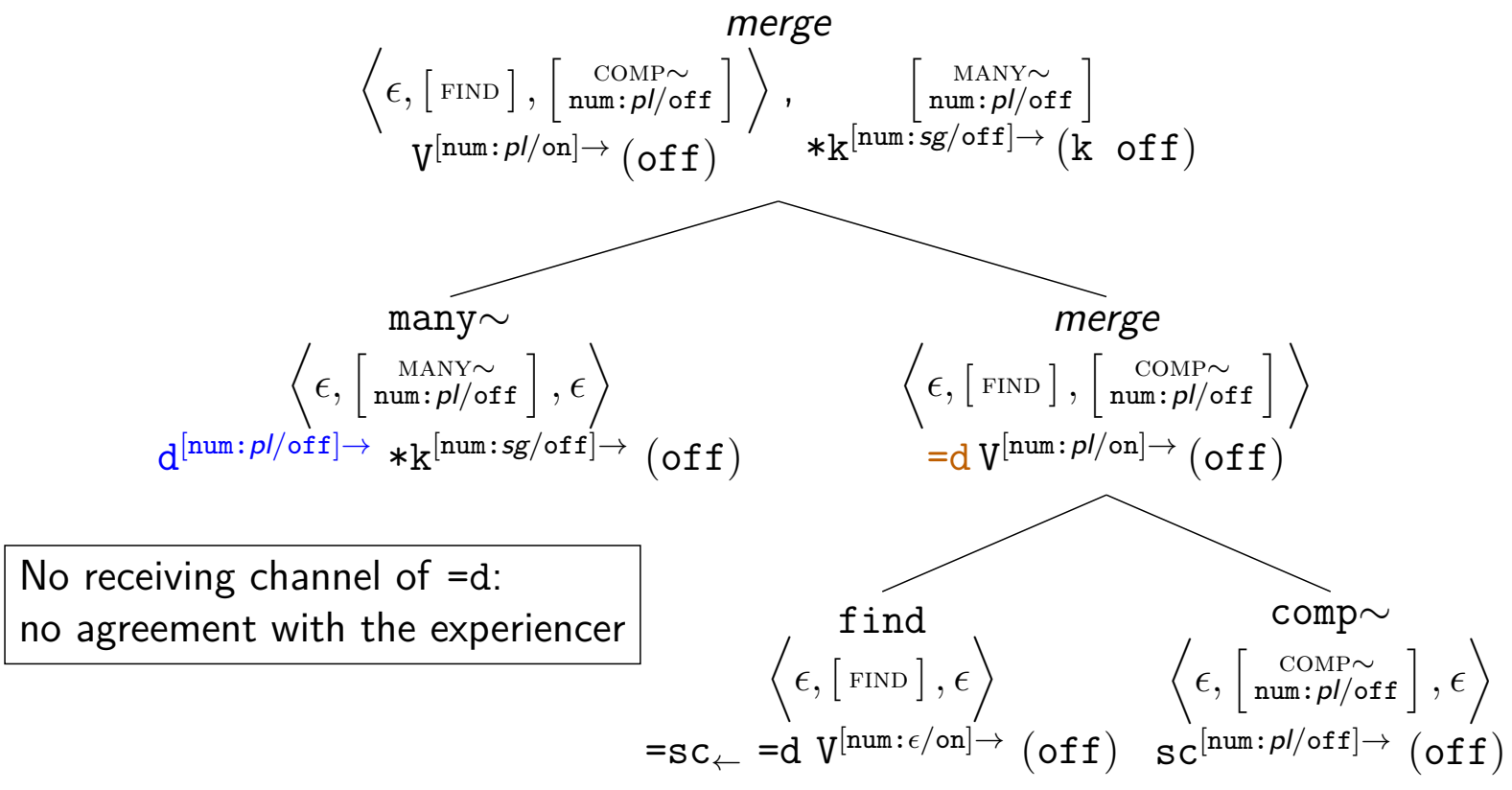
Example derivation



Example derivation

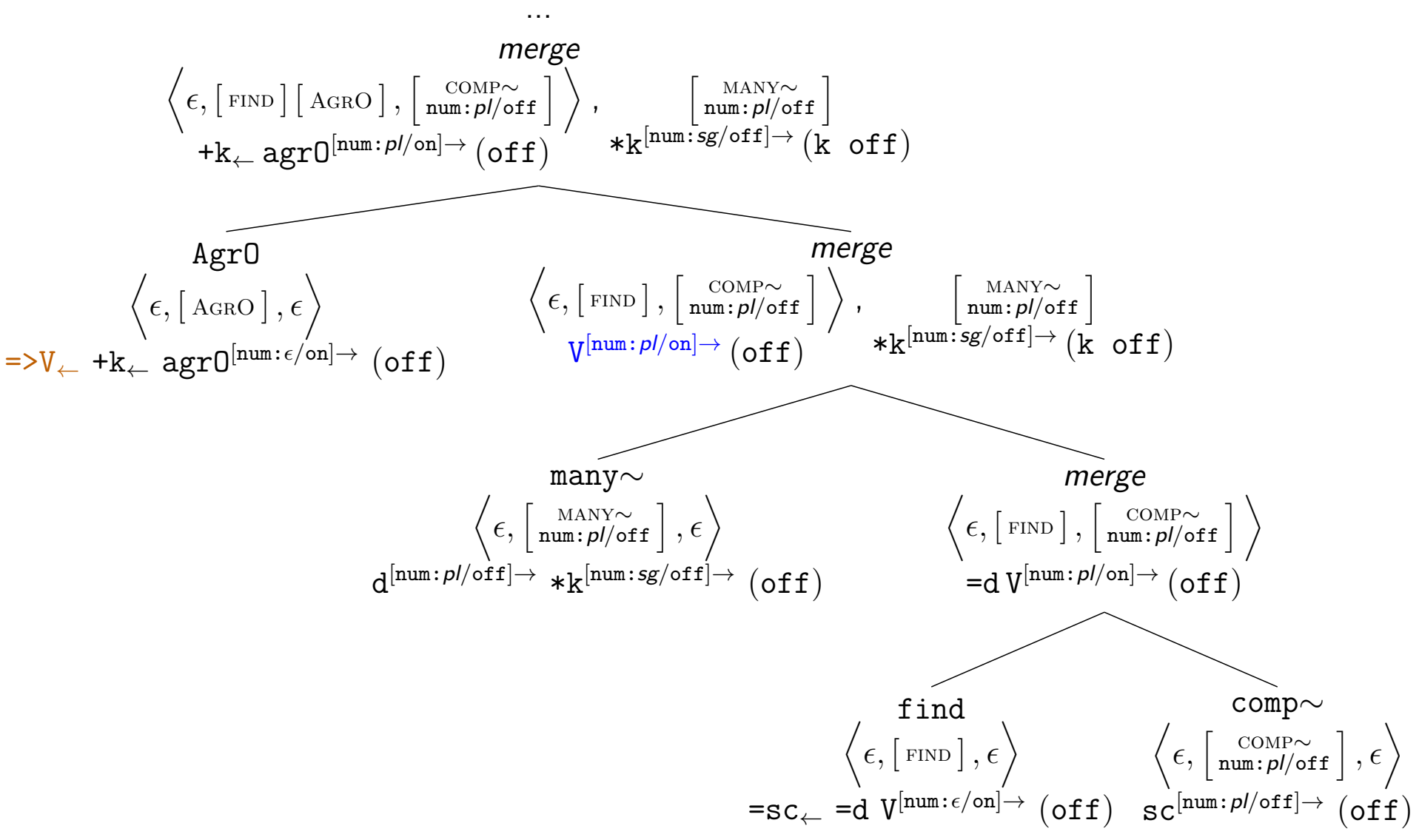


Example derivation

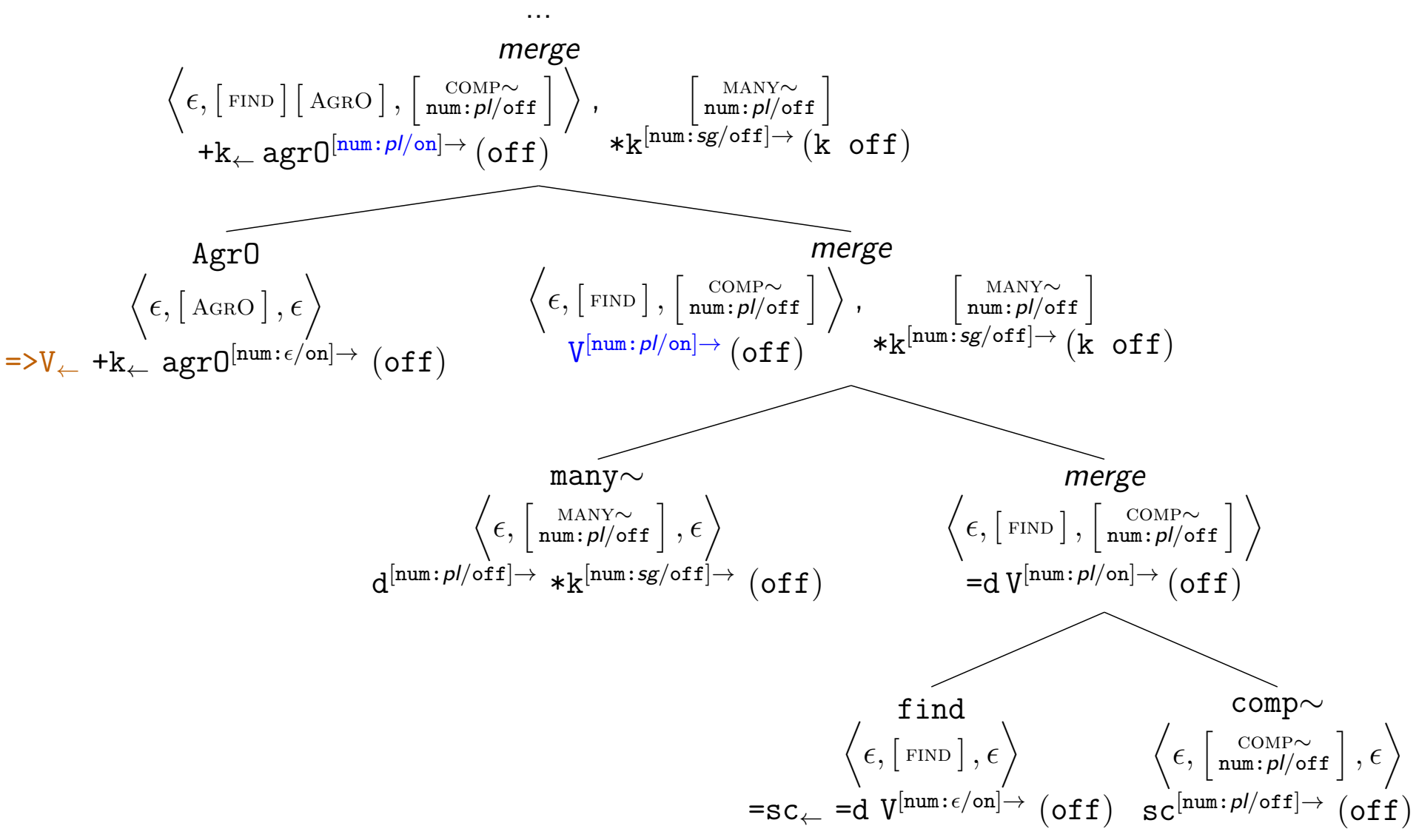


No receiving channel of =d:
no agreement with the experiencer

Example derivation



Example derivation



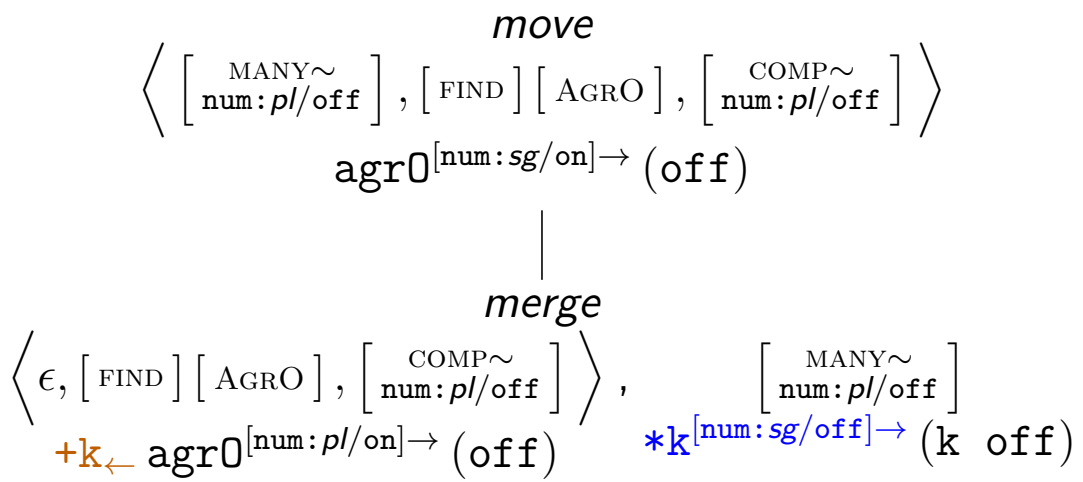
Default agreement: shiftable and non-shiftable DPs

$$\left\langle \epsilon, \left[\ \textsc{find}\ \right]\left[\ \textsc{AgrO}\ \right], \left[\begin{smallmatrix}\textsc{comp}\sim\\ \texttt{num}:\textit{pl}/\texttt{off}\end{smallmatrix}\right] \right\rangle, \left[\begin{smallmatrix}\textsc{many}\sim\\ \texttt{num}:\textit{pl}/\texttt{off}\end{smallmatrix}\right]$$

$$\texttt{+k}_{\leftarrow}\ \texttt{agr0}^{[\texttt{num}:\textit{pl}/\texttt{on}]\rightarrow}\ (\texttt{off}) \qquad \texttt{*k}^{[\texttt{num}:\textit{sg}/\texttt{off}]\rightarrow}\ (\texttt{k}\ \ \texttt{off})$$

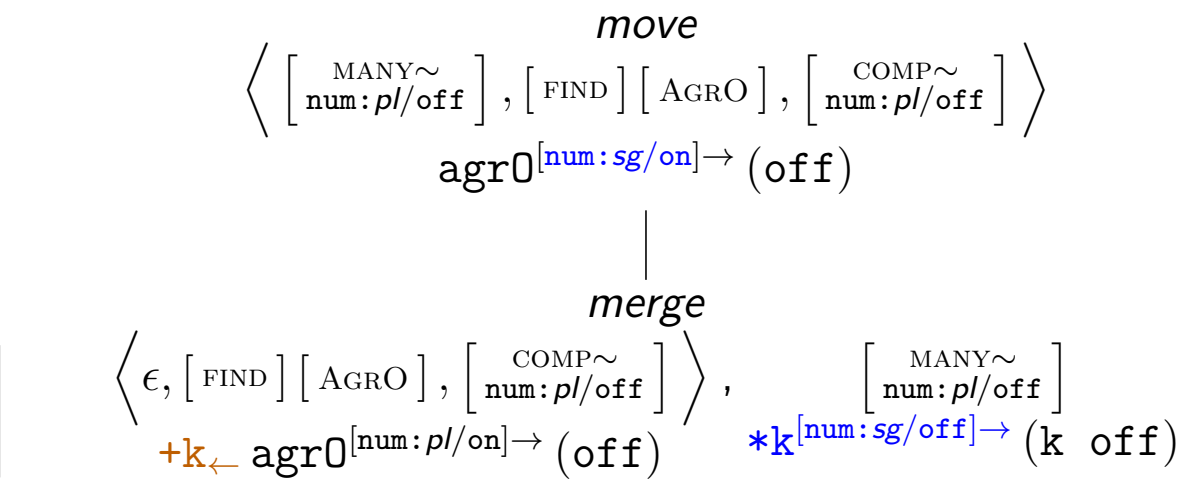
merge

Default agreement: shiftable and non-shiftable DPs

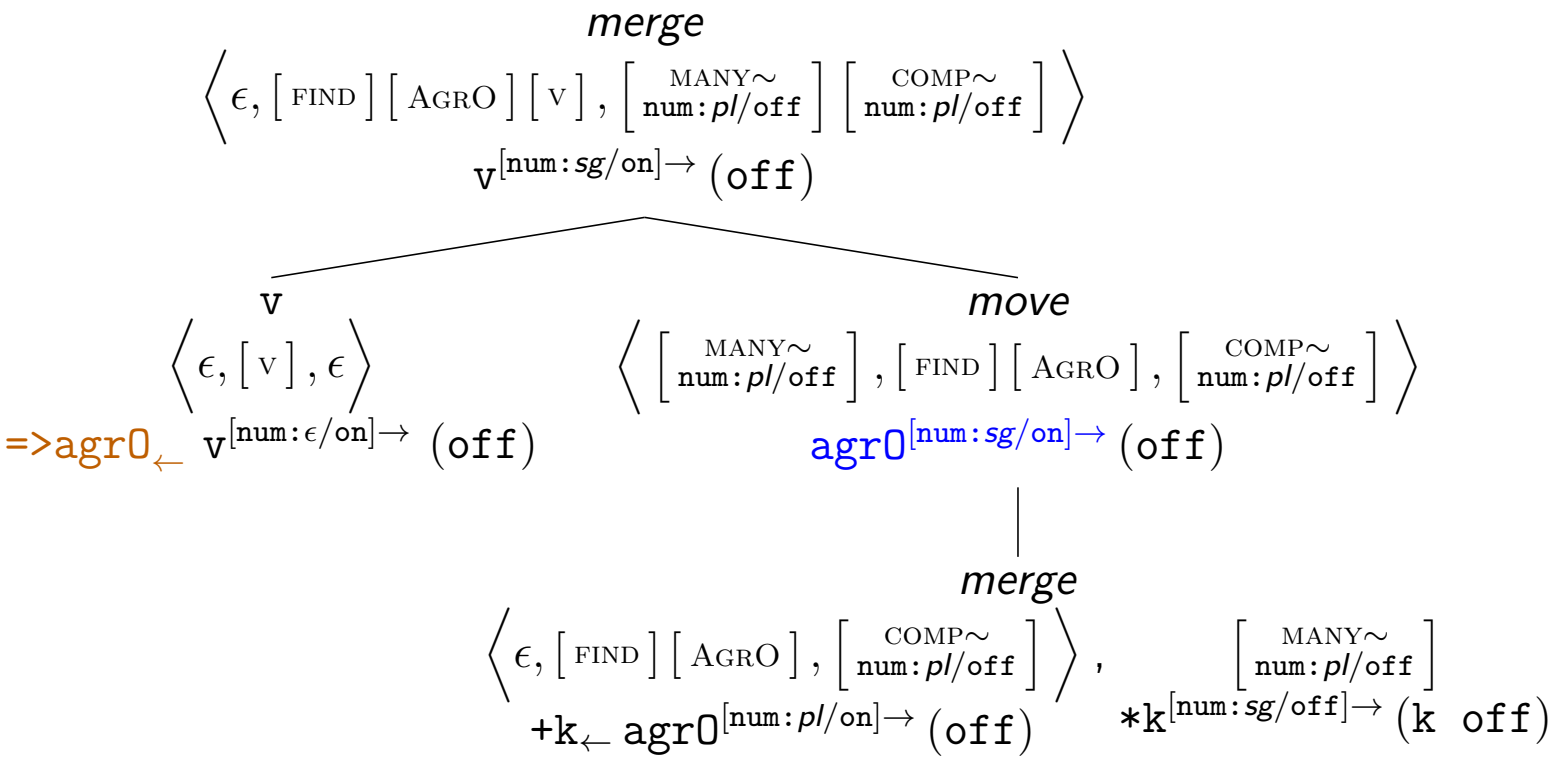


Default agreement: shiftable and non-shiftable DPs

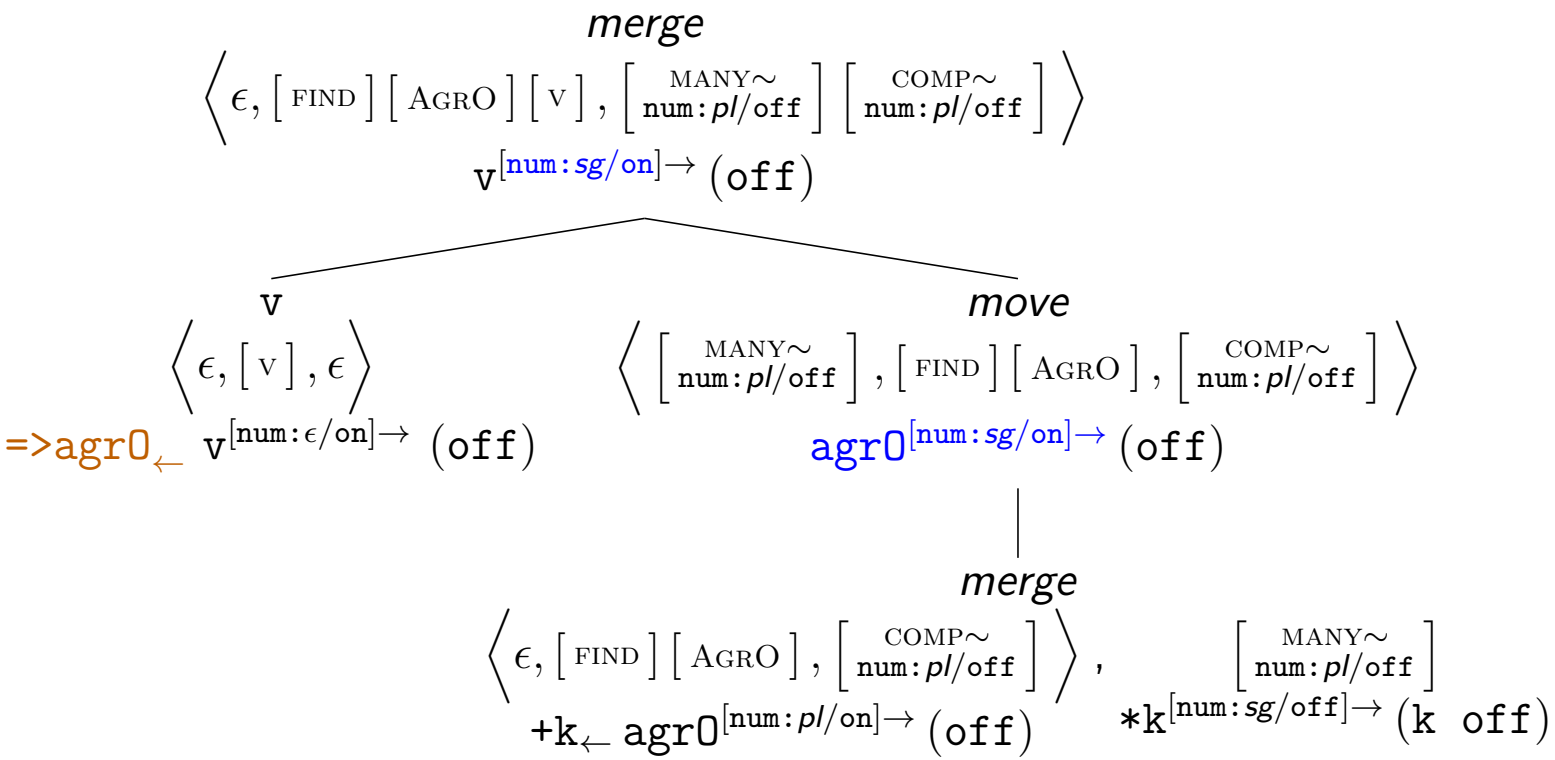
Last channel wins: agreement via *move*



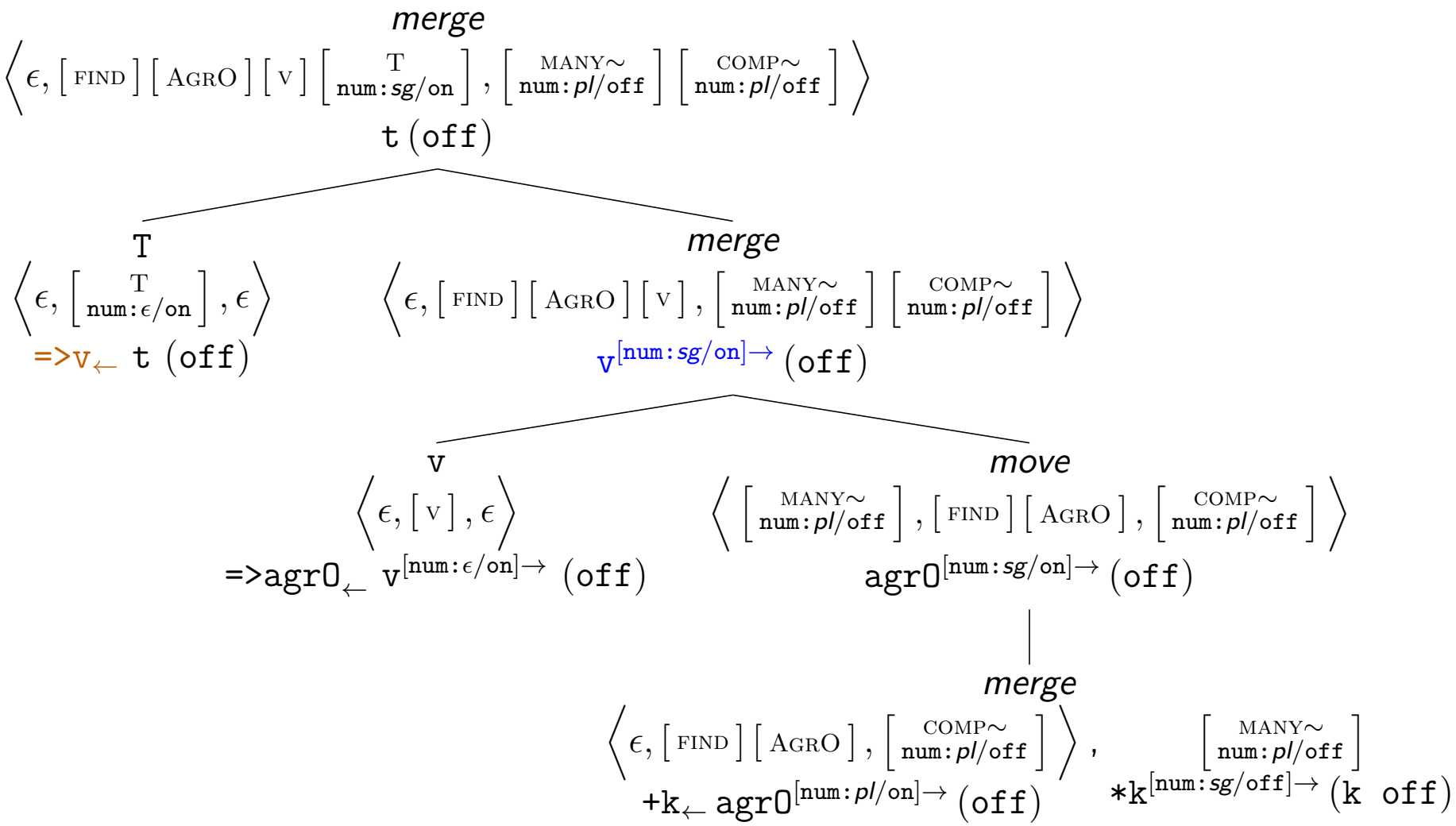
Default agreement: shiftable and non-shiftable DPs



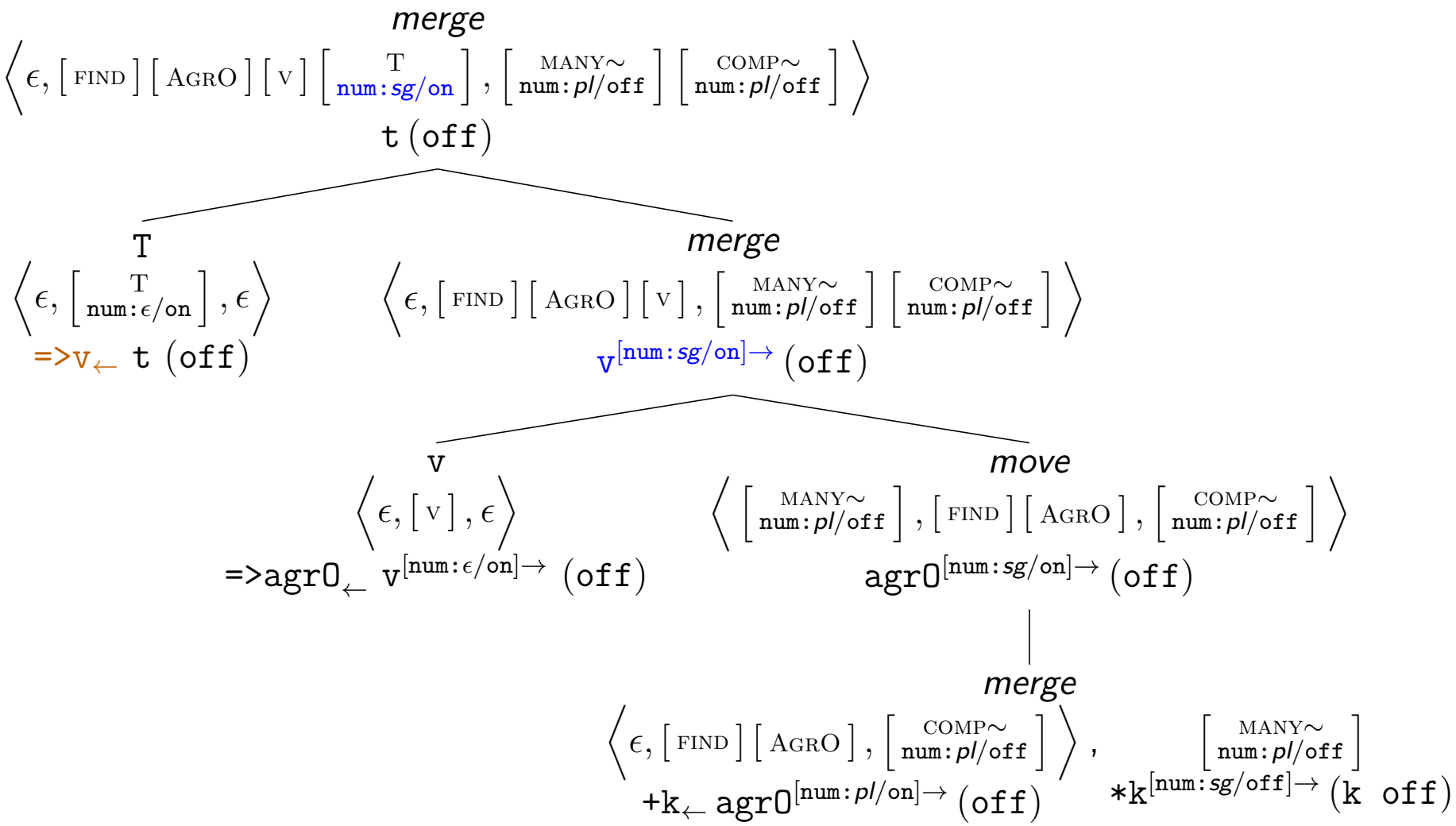
Default agreement: shiftable and non-shiftable DPs



Default agreement: shiftable and non-shiftable DPs



Default agreement: shiftable and non-shiftable DPs



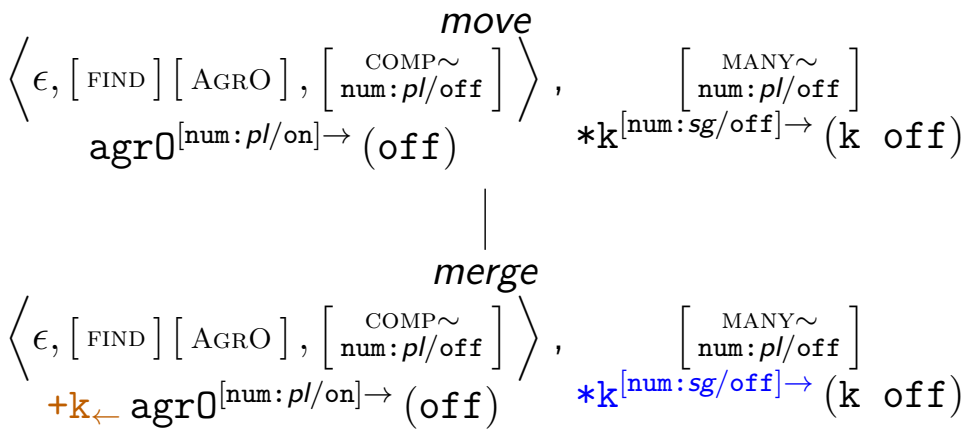
Normal agreement: shiftable DPs only

$$\left\langle \epsilon, \left[\ \textsc{find}\ \right]\left[\ \textsc{AgrO}\ \right], \left[\begin{smallmatrix}\textsc{comp}\sim\\ \texttt{num}:\textit{pl}/\texttt{off}\end{smallmatrix}\right] \right\rangle, \quad \left[\begin{smallmatrix}\textsc{many}\sim\\ \texttt{num}:\textit{pl}/\texttt{off}\end{smallmatrix}\right]$$

merge

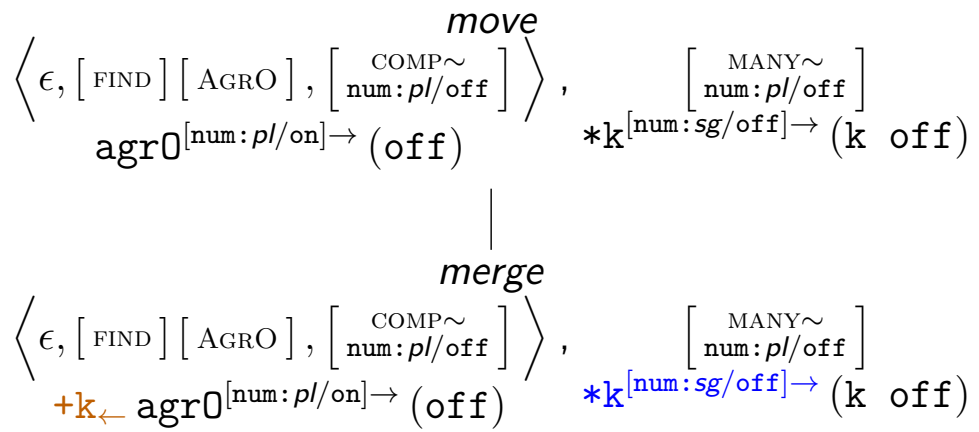
$$\texttt{+k}_{\leftarrow}\ \texttt{agr0}^{[\texttt{num}:\textit{pl}/\texttt{on}]\rightarrow}\ (\texttt{off}) \qquad \texttt{*k}^{[\texttt{num}:\textit{sg}/\texttt{off}]\rightarrow}\ (\texttt{k off})$$

Normal agreement: shiftable DPs only

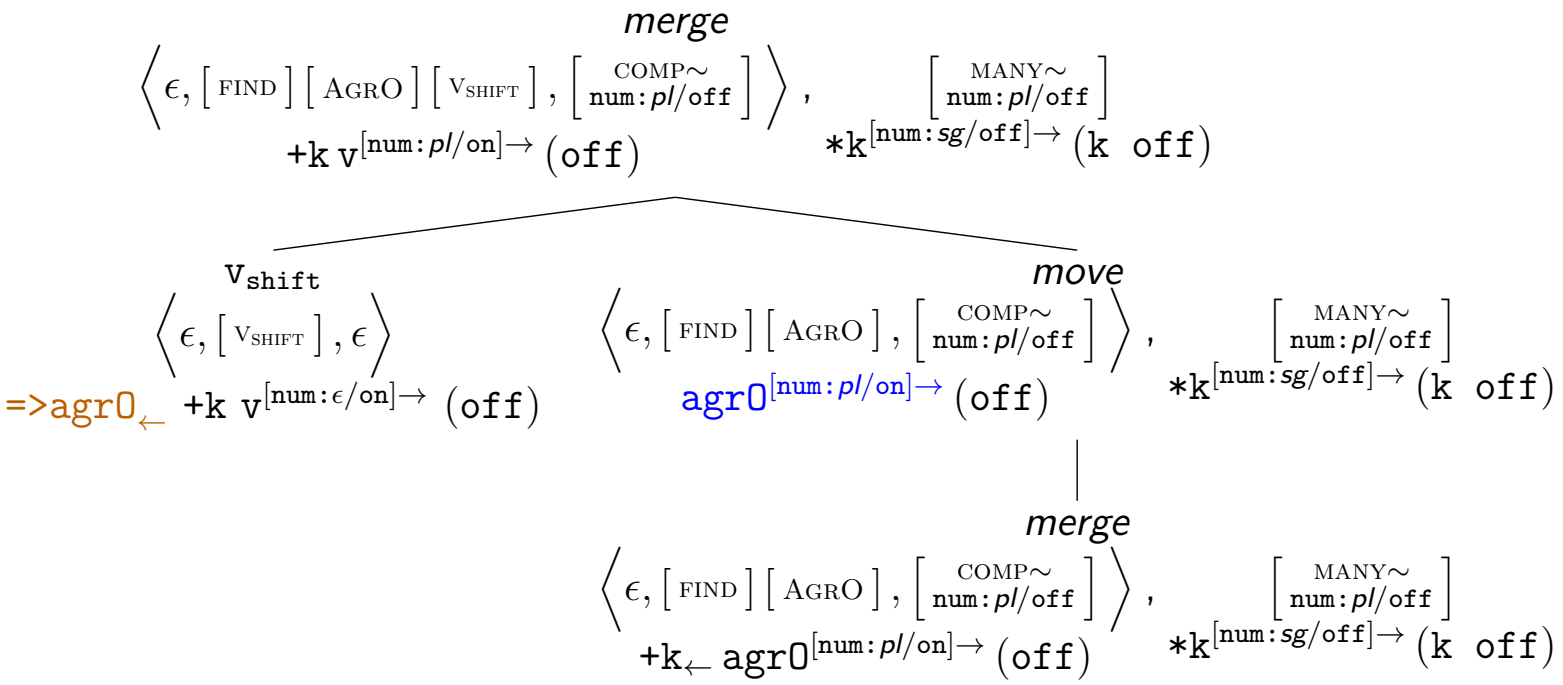


Normal agreement: shiftable DPs only

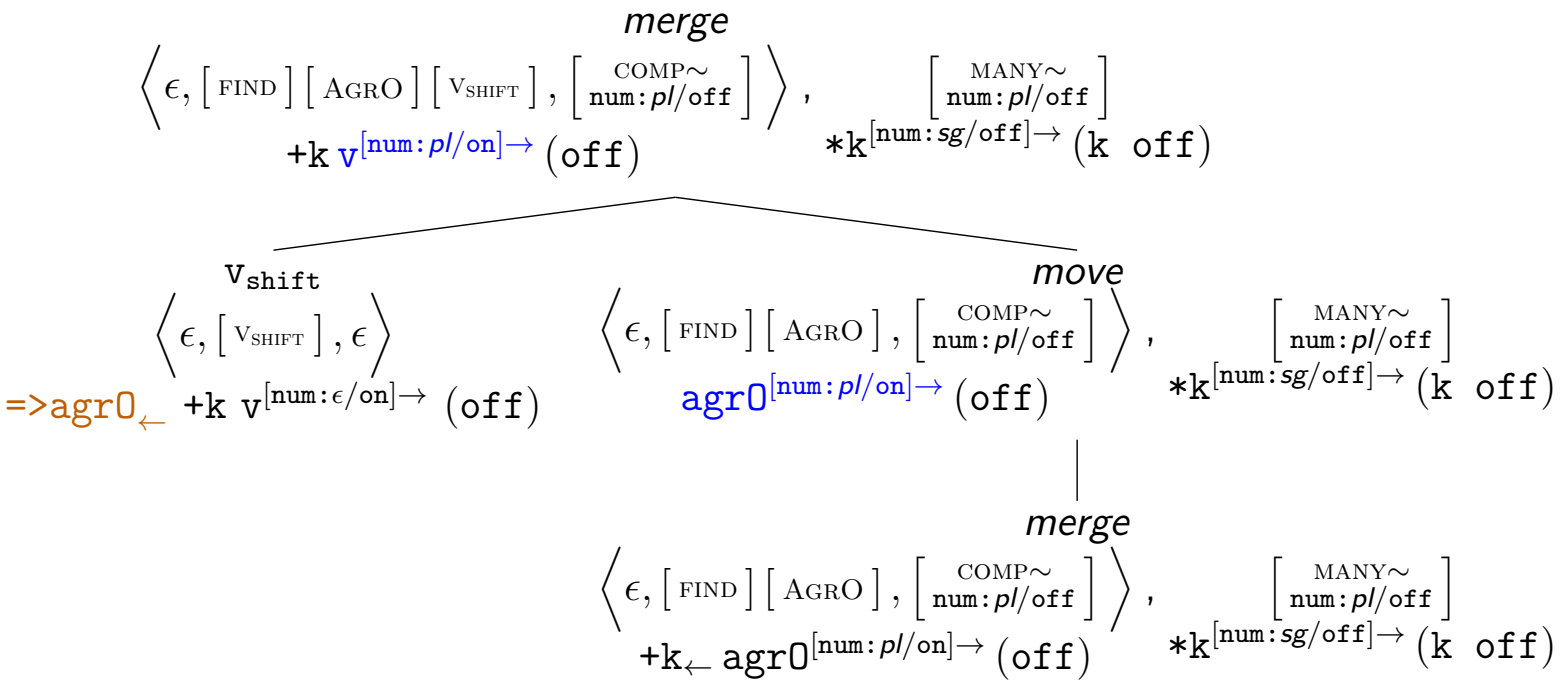
Intermediate position: no agreement



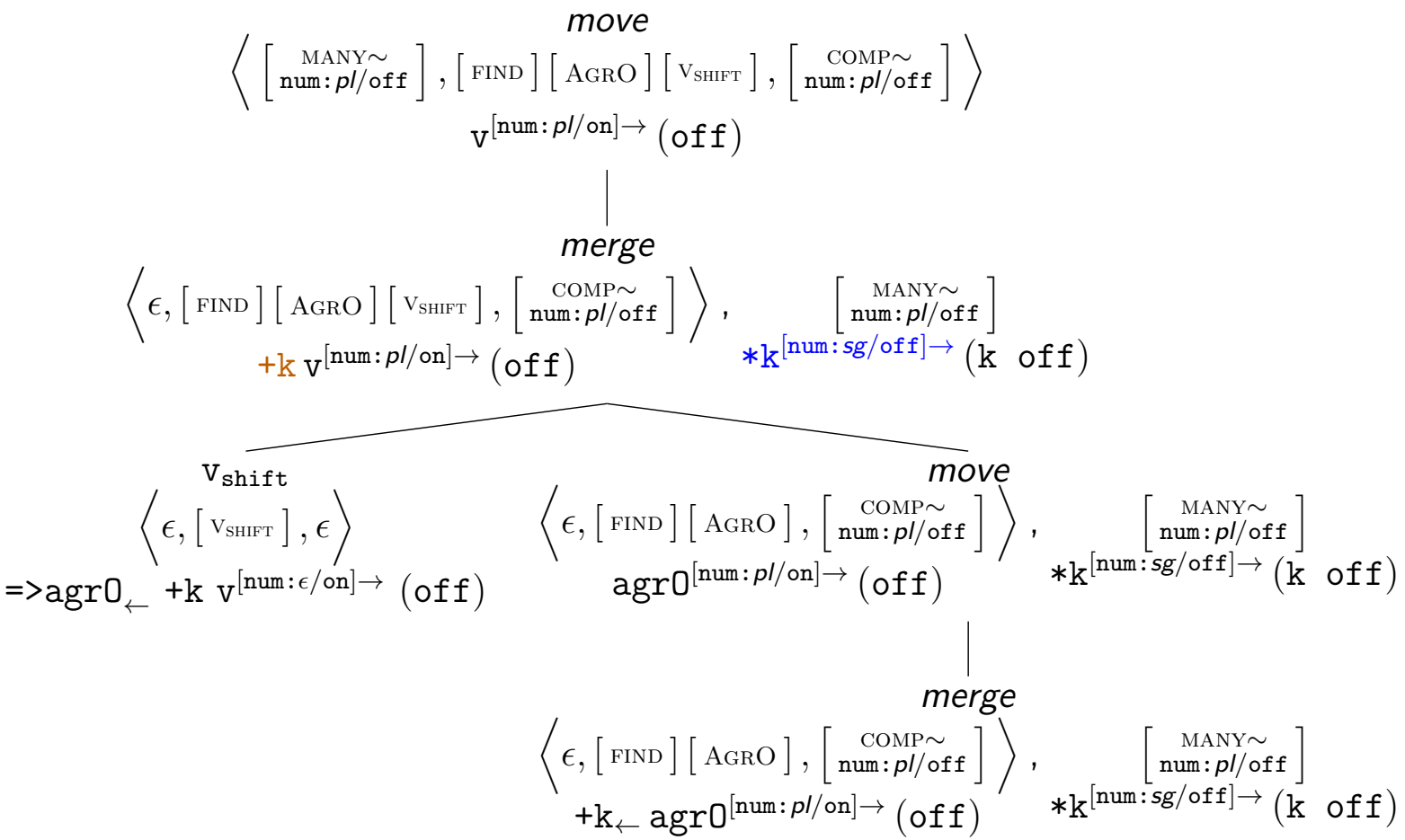
Normal agreement: shiftable DPs only



Normal agreement: shiftable DPs only

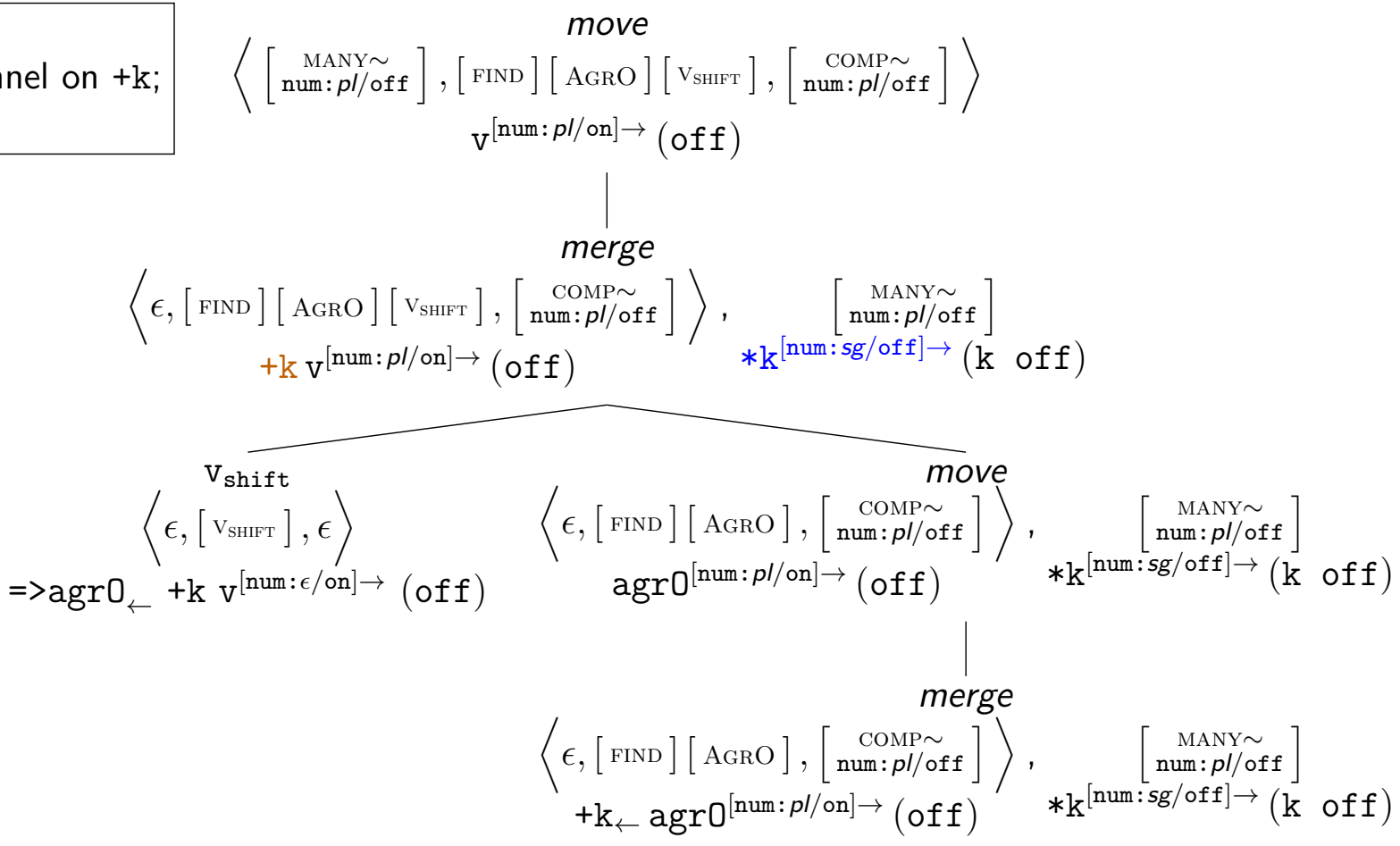


Normal agreement: shiftable DPs only

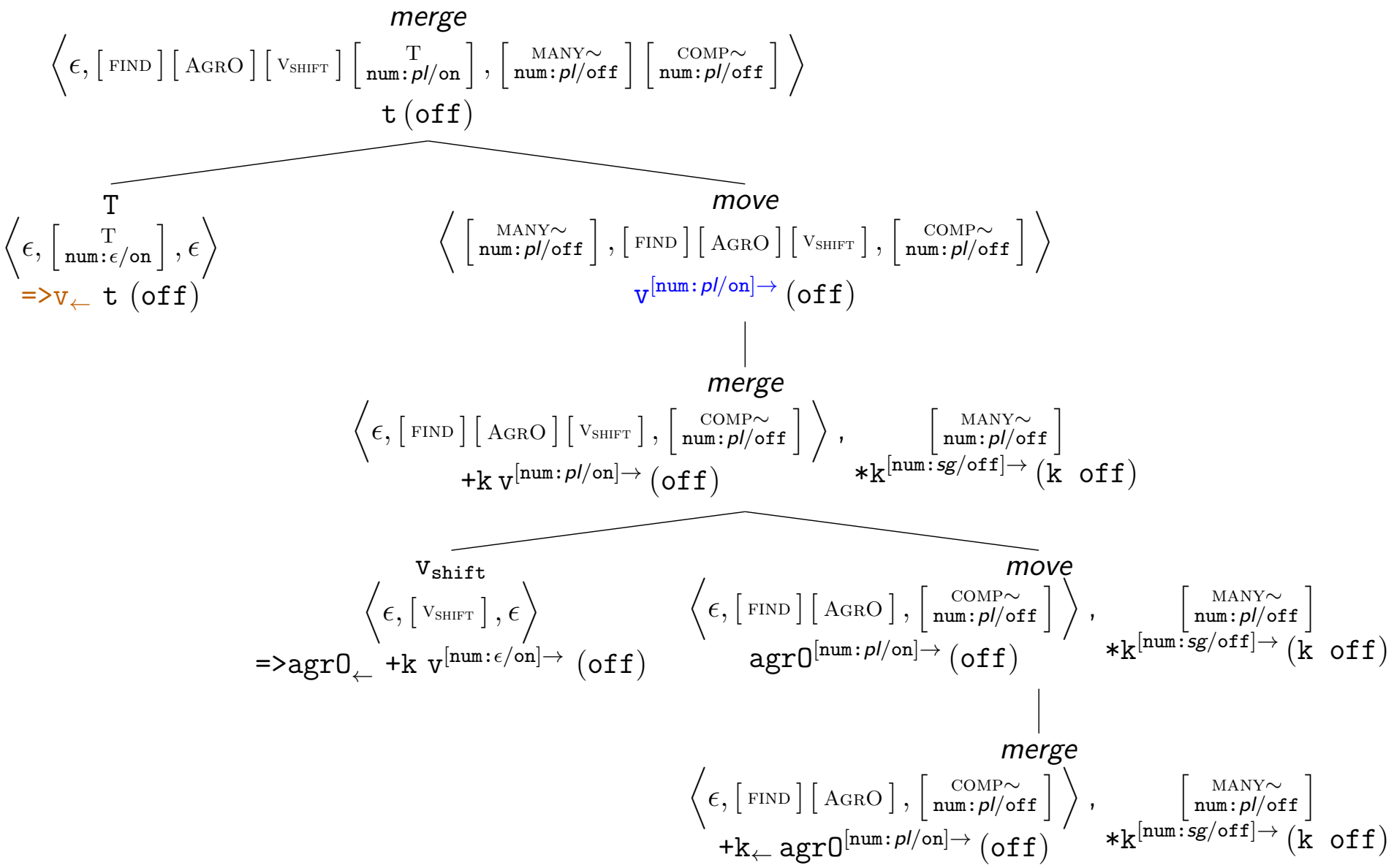


Normal agreement: shiftable DPs only

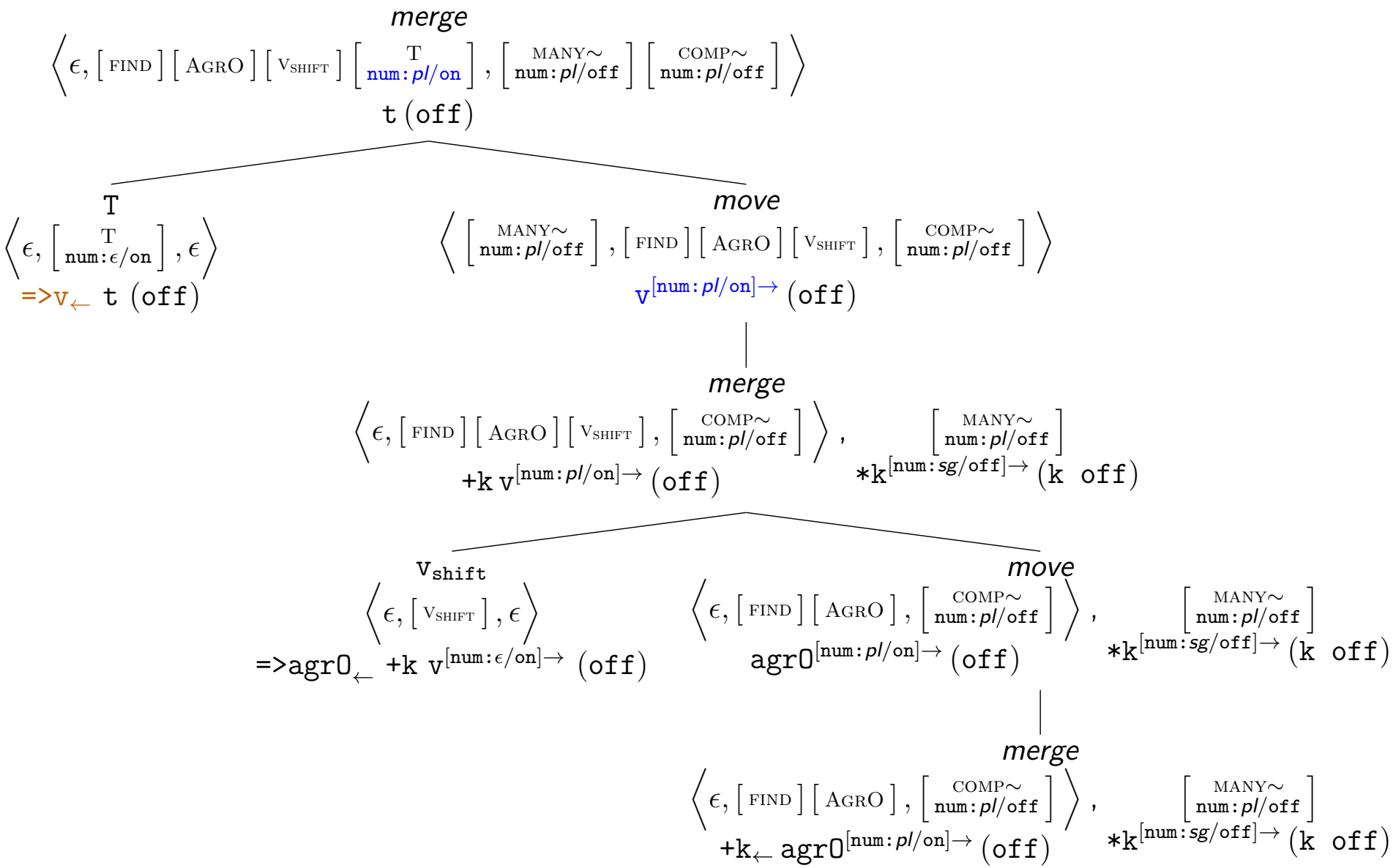
Object Shift:
no receiving channel on +k;
no agreement



Normal agreement: shiftable DPs only



Normal agreement: shiftable DPs only



Overview

Discusssion

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  - Modified MG formalism operating over bundles of morphological features
  - Proof of concept: a straightforwardly expressed analysis of Icelandic dative intervention

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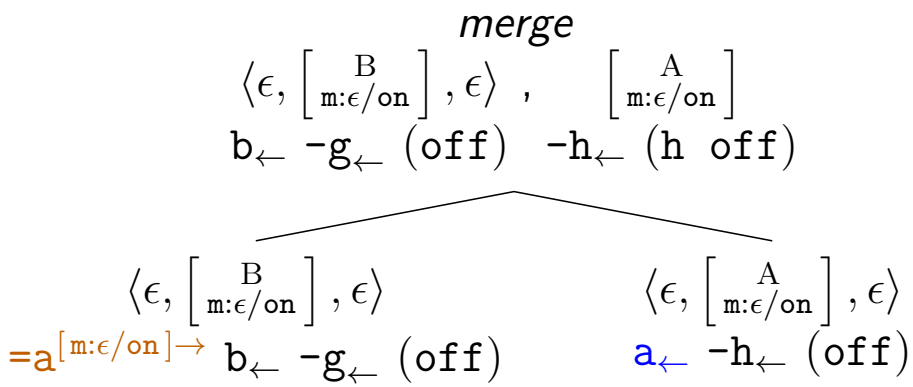
    Ermolaeva & Edmiston 2017: Distributed Morphology over sequences of feature structures

Thank you for your attention!

Appendix: long-distance agreement



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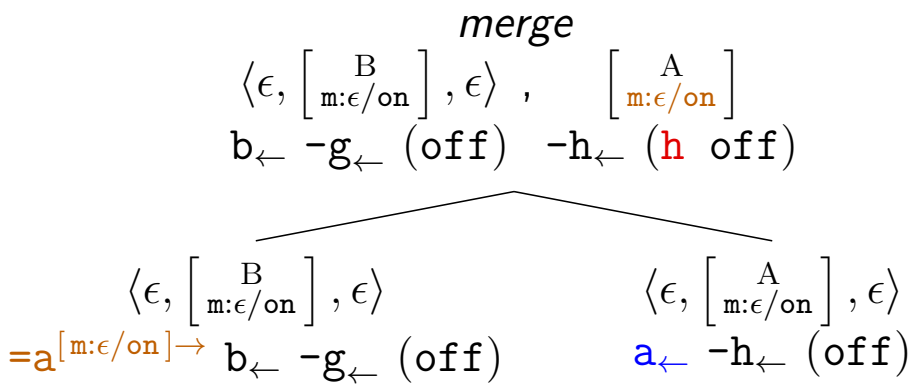

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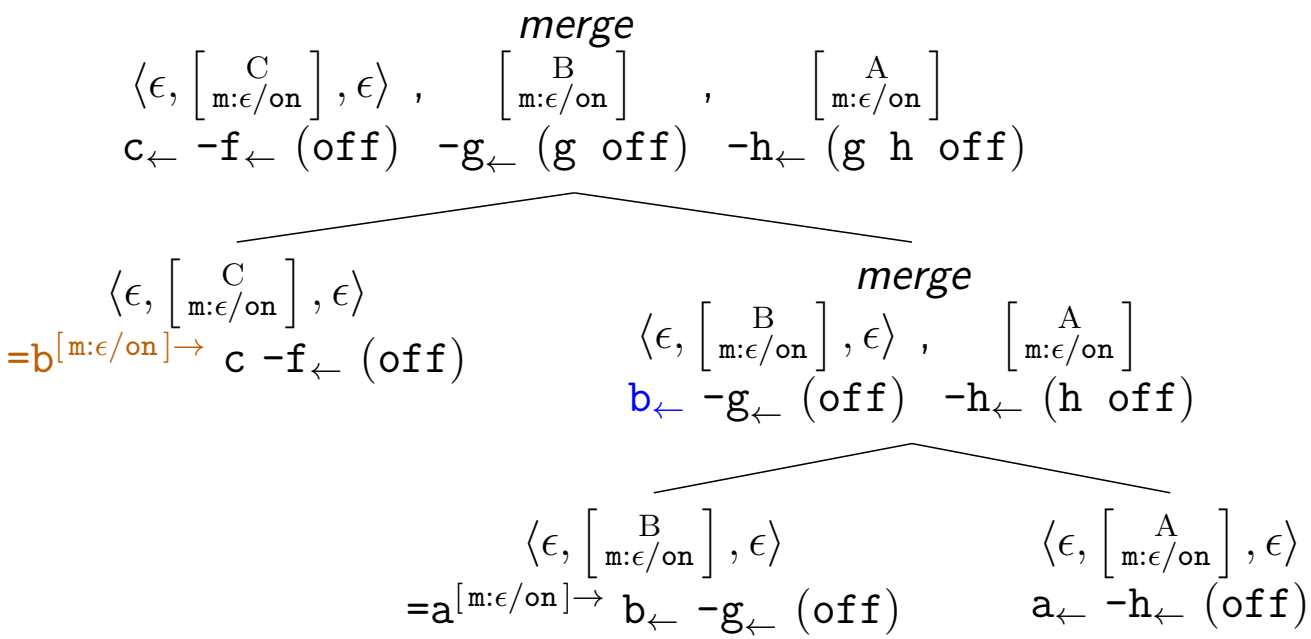

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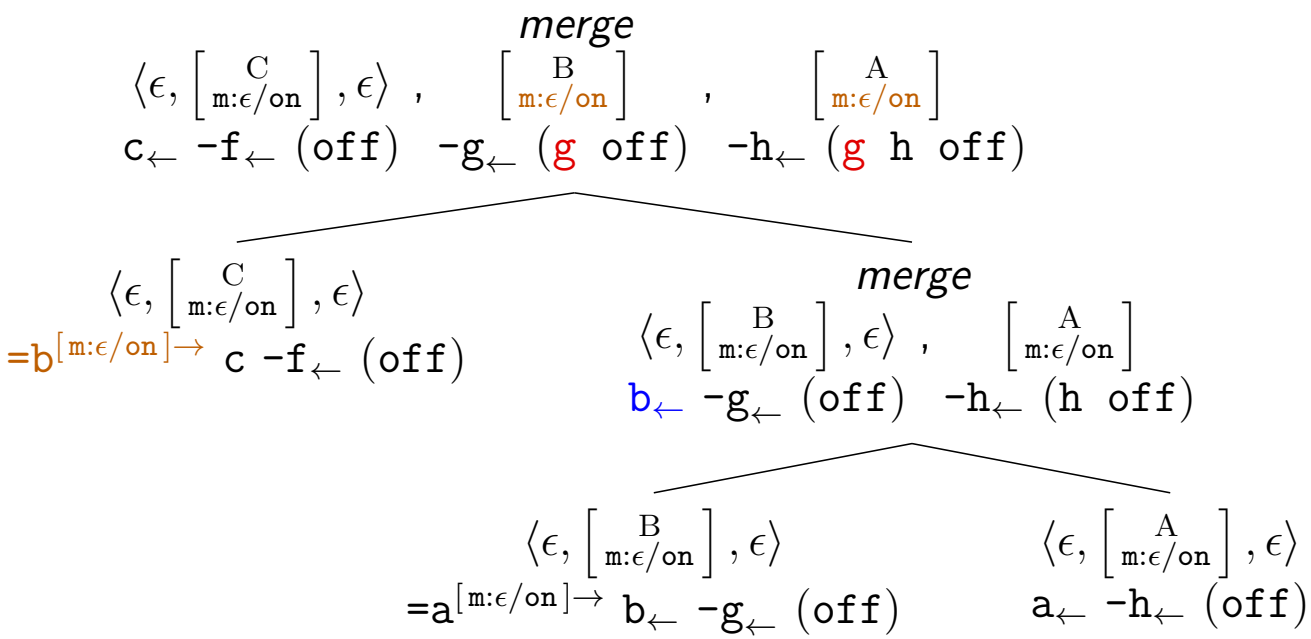

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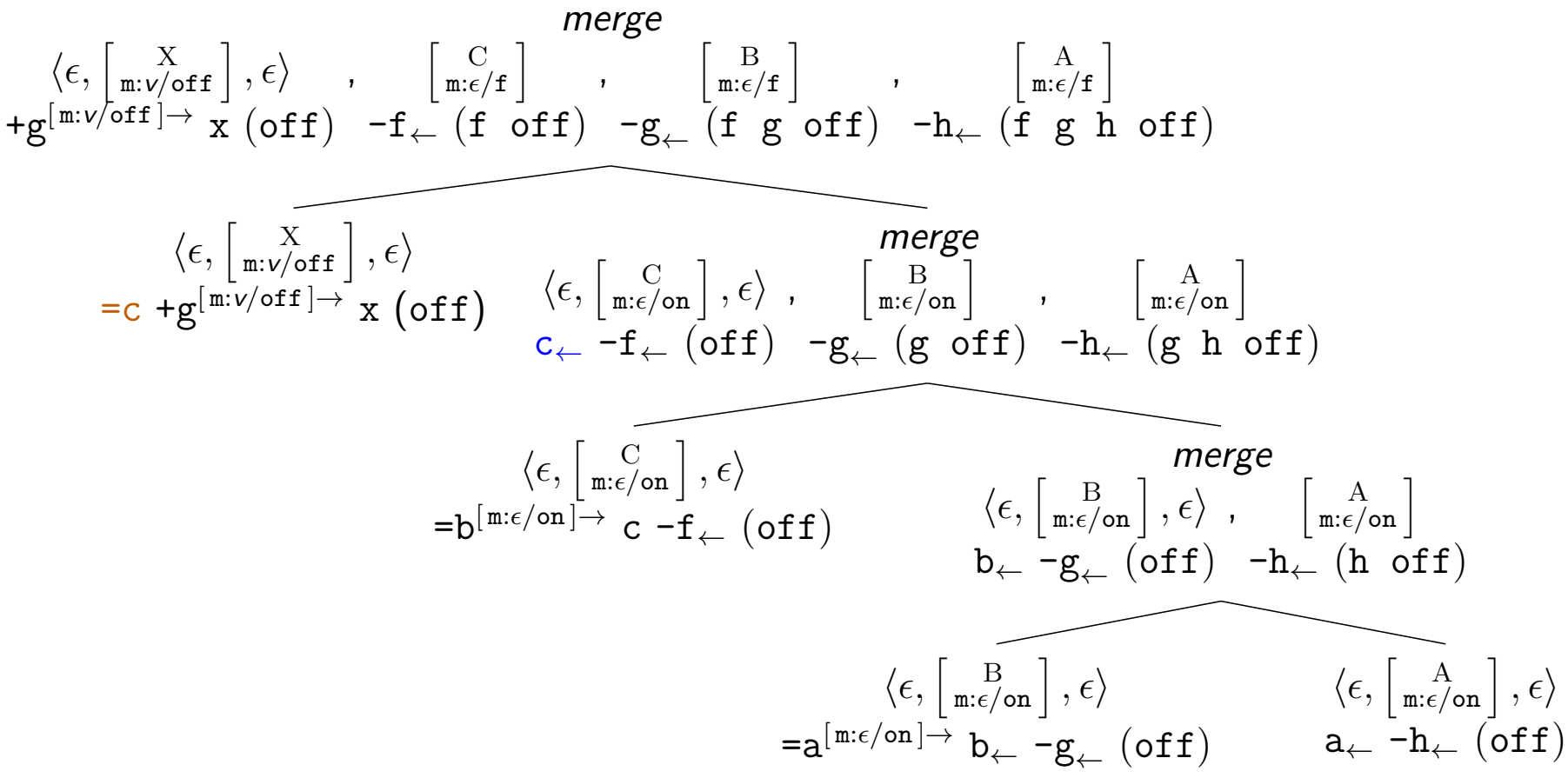

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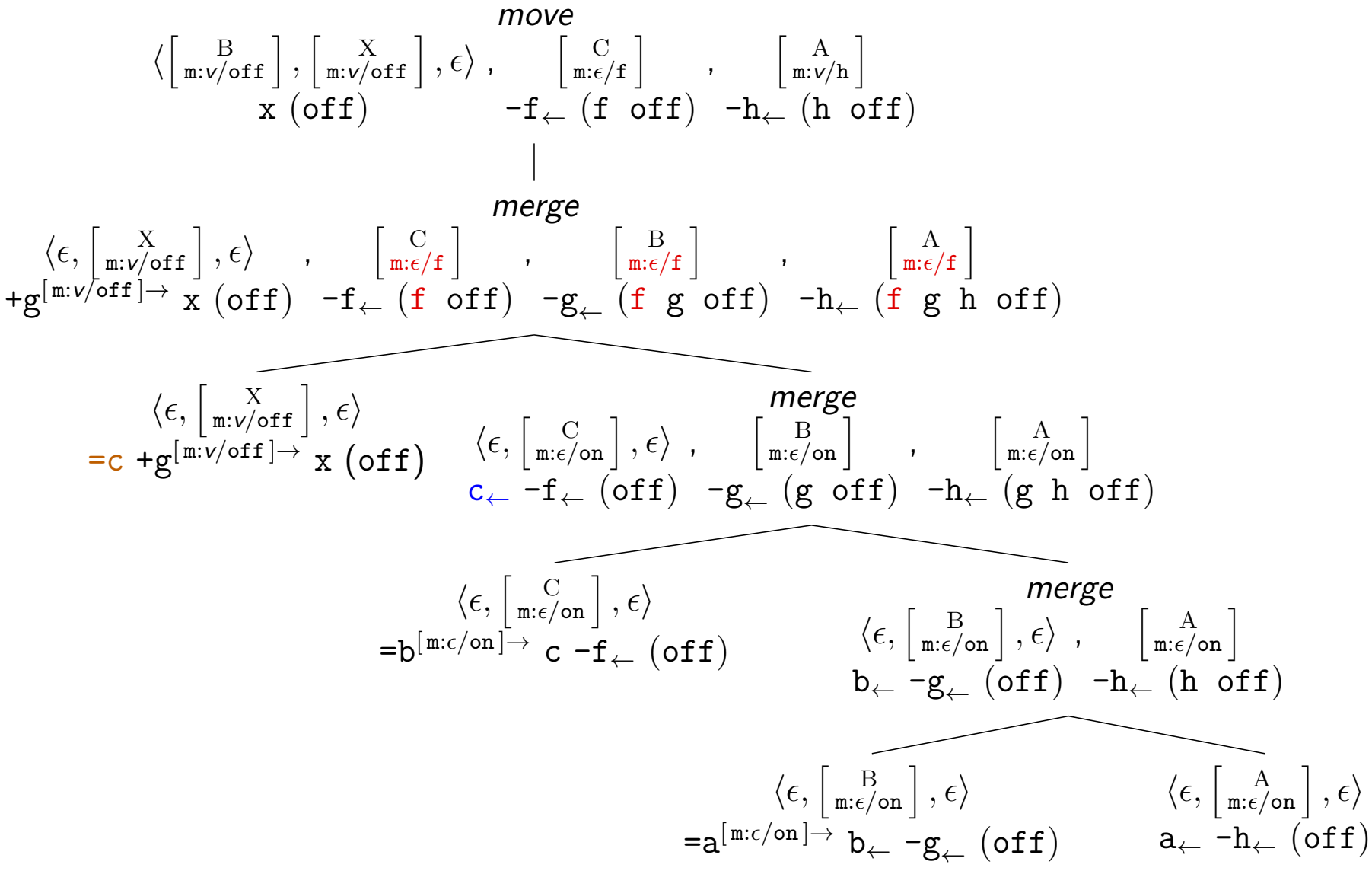

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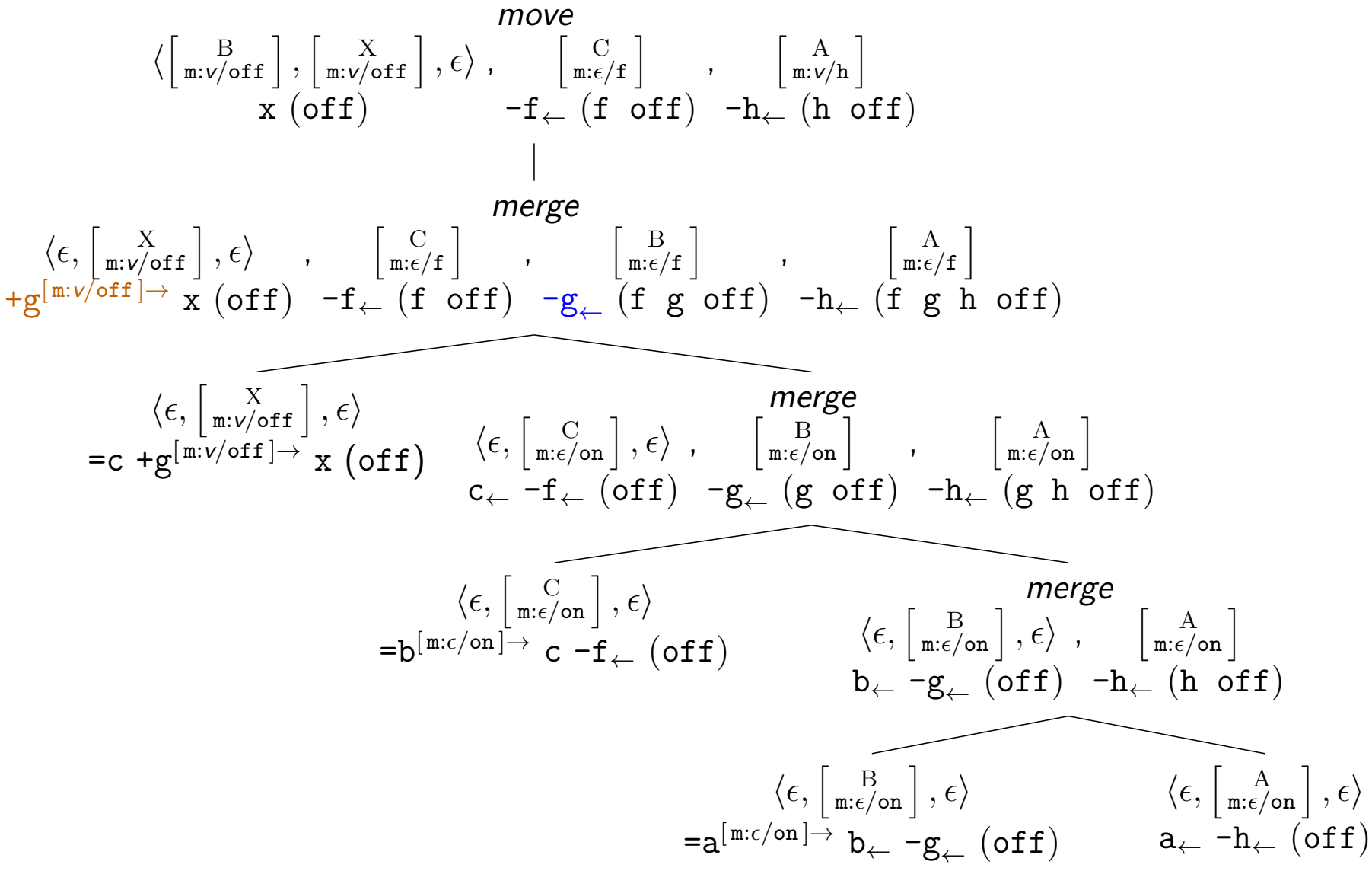

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