UCLA Minicourse — Michael Moortgat

Fragment: hindi.pl
Abstract

This fragment takes its inspiration from Shrvan Vasishth ‘Word order and negation in Hindi. A multimodal categorial grammar account’, Chapter 15 in Proceedings of Formal Grammar 1999, Geert-Jan M. Kruijff & Richard T. Oehrle (editors). The data to be accounted for are

[...] that the Subj(ect) and Obj(ect) can appear freely around the Neg-V-Aux or V-Neg-Aux cluster. By contrast, [...] neither the Subj nor the Obj can appear anywhere within the Neg-V-Aux or V-Neg-Aux cluster, and [...] the Aux cannot intervene between the Neg and V (p 166)

The postulate package presented here is based on the patterns for distribution/promotion that were also used in our analysis of Germanic verbal clusters and Romance clitic attachment.

On careful inspection, you will notice that not all permutations of the Subj/Obj around the verbal cluster are accounted for. Can you structurally characterize the missing cases, and think of a way to cover them? Can you formulate a simpler analysis (smaller number of modes/postulates, simpler types)?

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1. The fragment

1.1. Postulates

\[ \Diamond_1 (A \bullet_1 B) \vdash \Diamond_1 A \bullet_1 B \] \[ P1 \]
\[ \Diamond_1 (A \bullet_1 B) \vdash A \bullet_1 \Diamond_1 B \] \[ P1 \]
\[ \Diamond_1 (B \bullet_1 A) \vdash \Diamond_1 A \bullet_1 B \] \[ P1 \]
\[ \Diamond_1 (B \bullet_1 A) \vdash A \bullet_1 \Diamond_1 B \] \[ P1 \]

\[ \Diamond_1 A \vdash \Diamond_0 A \] \[ P2 \]
\[ \Diamond_0 (B \bullet_0 A) \vdash \Diamond_0 A \bullet_0 \Diamond_0 B \] \[ P3 \]
\[ \Diamond_0 (A \bullet_2 B) \vdash \Diamond_0 A \bullet_2 \Diamond_0 B \] \[ P3 \]
\[ \Diamond_0 (B \bullet_2 A) \vdash \Diamond_0 A \bullet_2 \Diamond_0 B \] \[ P3 \]

\[ B \bullet_0 (\Diamond_0 A \bullet_2 C) \vdash \Diamond_0 A \bullet_2 (B \bullet_0 C) \] \[ P4 \]
\[ B \bullet_1 (\Diamond_0 A \bullet_2 C) \vdash \Diamond_0 A \bullet_2 (B \bullet_1 C) \] \[ P4 \]
\[ B \bullet_1 (\Diamond_0 A \bullet_0 C) \vdash \Diamond_0 A \bullet_0 (B \bullet_1 C) \] \[ P4 \]

\[ (\Diamond_0 A \bullet_2 B) \bullet_1 C \vdash \Diamond_0 A \bullet_2 (B \bullet_1 C) \] \[ P5 \]
\[ (\Diamond_0 A \bullet_0 B) \bullet_1 C \vdash \Diamond_0 A \bullet_0 (B \bullet_1 C) \] \[ P5 \]
Discussion The $P_1$ family localizes the head (verbal cluster) of a phrasal configuration, unbraiding argument permutations around the head.

\[
P_1 \quad \Diamond_1(A \bullet_1 B) \vdash \Diamond_1 A \bullet_1 B | A \bullet_1 \Diamond_1 B | \Diamond_1 B \bullet_1 A | B \bullet_1 \Diamond_1 A
\]

$P_2$ switches control from the phrasal to the verb cluster mode:

\[
P_2 \quad \Diamond_1 A \vdash \Diamond_0 A
\]

The $P_3$ family breaks up the verbal cluster, making sure that AUX (mode $\bullet_0$) is on the right branch, and unbraiding the NEG-v cluster, if necessary. For $i = 0 \lor i = 2$,

\[
P_3 \quad \Diamond_0(B \bullet_i A) \vdash \Diamond_0 A \bullet_i \Diamond_0 B
\]

\[
P_3 \quad \Diamond_0(A \bullet_2 B) \vdash \Diamond_0 A \bullet_2 \Diamond_0 B
\]

The $P_4/P_5$ family promotes NEG/AUX for meaning assembly. In the case of $P_4$ ($j = 0 \land i = 1) \lor (j = 2 \land (i = 0 \lor i = 1))$; in the case of $P_5$, $j = 0 \lor j = 2$.

\[
P_4 \quad B \bullet_i (\Diamond_0 A \bullet_j C) \vdash \Diamond_0 A \bullet_j (B \bullet_i C)
\]

\[
P_5 \quad (\Diamond_0 A \bullet_j B) \bullet_1 C \vdash \Diamond_0 A \bullet_j (B \bullet_1 C)
\]
1.2. Lexicon

Type assignments use three composition modes: $\bullet_1$ (phrasal), $\bullet_0$ (Aux), and $\bullet_2$ (Neg). There is a phrasal control feature $\diamondsuit_1$, and one for the V-Neg-Aux/Neg-Aux-V clusters, $\diamondsuit_0$.

bred : $ob \rightarrow$ bread
khaataa : $\Box_0(vp/1ob) \rightarrow$ eat
nahii : $\Box_0((su\backslash_1s)/2(su\backslash_1s)) \rightarrow \lambda x_0.\lambda y_0.(\text{not} \ (x_0 \ y_0))$
raam : $su \rightarrow$ ram
thaa : $\Box_0((su\backslash_1s)/_0vp) \rightarrow \lambda x_0.\lambda y_0.(\text{past} \ (x_0 \ y_0))$

1.3. Run the examples

1. raam bred nahii khaataa thaa $\vdash \Box_1 s$
2. raam bred khaataa nahii thaa $\vdash \Box_1 s$
3. bred nahii khaataa thaa raam $\vdash \Box_1 s$
4. bred khaataa nahii thaa raam ⊨ □₁s
5. raam nahii khaataa thaa bred ⊨ □₁s
6. bred raam nahii khaataa thaa ⊨ □₁s
7. raam nahii bred khaataa thaa ⊨ □₁s
8. nahii raam bred khaataa thaa ⊨ □₁s
9. raam nahii khaataa bred thaa ⊨ □₁s
10. bred nahii khaataa raam thaa ⊨ □₁s
11. raam khaataa thaa bred nahii ⊨ □₁s
12. raam bred khaataa thaa nahii ⊨ □₁s
13. raam khaataa bred thaa nahii ⊨ □₁s
14. raam bred thaa nahii khaataa ⊨ □₁s
15. raam bred thaa khaataa nahii ⊨ □₁s
2. **Interactive session**

**Test example**

Type in an example:

**Goal formula:**

Use Polish prefix notation for goals. Atomic formulas and modes should be atoms. Use the atom \([\text{nil}]\) if you don’t want a mode index. Input connectives as ♦: dia, □: box, •: p, /: dr, \(\backslash\): dl. Example: \(\square(np_{1}s)\) becomes box \([\text{nil}]\) dl 1 np s.

**Display options**

Structure labels: Yes ✖️ No ✖️ Semantic labels: Yes ✖️ No ✖️

Lexical semantics: Yes ✖️ No ✖️ Unary semantics: Yes ✖️ No ✖️

Submit    Reset