Agree, Internal Merge and Feature Percolation

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This paper presents a new view on the implementations of Agree and Internal Merge (IM).

Agree: First, we argue that Agree applies when a lexical item (LI) with an uninterpretable feature (uF) establishes a sister relation with an LI carrying an interpretable feature (iF) to be introduced at a later stage of the derivation. To implement this idea, the computational system needs to keep track of the presence of a uF, and this is done by adapting the feature-based labeling algorithm of Chomsky (2012). This labeling algorithm inspects the feature content of the immediate constituents of a root node and allows features to be part of a label so that the presence of a uF will percolate up the structure until its interpretable counterpart is introduced. This is illustrated in (1)-(3). Suppose that ZP with a uF is merged with Y and Y projects YP, then the uF becomes part of the label of YP, as in (1). Now suppose that X with an iF is merged with $\mathrm{YP}_{[\mathrm{uF}]}$, as in (2), where $\mathrm{X}_{[\mathrm{iF}]}$ and $\mathrm{YP}_{[\mathrm{uF}]}$ are in a sister relation, then Agree applies and marks every occurrence of uF all the way down to $\mathrm{ZP}_{[\mathrm{uF}]}$ for deletion, as in (3). An obvious advantage of this approach is that we can reduce "Agree at a distance" to the sister relation, the simplest structural relation. Another advantage is that we can identify, without stipulation, what features are involved in the Agree relation. All we need to do is to identify a matching feature between the LIs that Agree. This is straightforward because the interpretable feature by definition receives an interpretation at the C-I interface, so that we can identify a feature that matches it as an uninterpretable counterpart of that feature.

Empirical support for the present proposal comes from the indeterminate system and the nominative Case licensing in Japanese. As is well known, wh-phrases in Japanese need to be "licensed" by an element at a distance. Wh-questions and negative concord are good cases in point, as shown in (4) and (5). To treat these instances, we propose that the wh-phrase in (4) bears an uninterpretable Q-feature [uQ] and the one in (5) an uninterpretable Neg-feature [uNeg], and that these features percolate up the structure via labeling until hitting upon their licensers, the question particle in (4) and the sentential negation in (5). The structures in which Agree applies are shown in (6) and (7), linear order and irrelevant details ignored. Note that the postulation of [uQ] and [uNeg] on the wh-phrases follows from the feature content of their licensers. Take the [uQ] for example. The wh-phrase in (4) requires a question particle, which has an independent function as a polarity question marker. This means that it bears an interpretable Q-feature. Therefore, it is natural to regard the Q-feature as a matching feature between the wh-phrase and the question particle and posit a [uQ] on the former. Postulation of any other feature is a stipulation.

Turning now to nominative Case licensing, let us consider what is a matching feature. As is widely held, we assume that nominative Case assignment is a reflection of communication between Tns and DP. However, in view of the considerations above, it is wrong to postulate an uninterpretable Case feature on DP because there is no such thing as an "interpretable Case feature" on Tns. It is also wrong to posit φ-features as matching features because the proposed Agree system requires φ-features on DP to be uninterpretable and ones on Tns to be interpretable, contrary to the standard view. It also runs counter to Fukui (1986) and Kuroda's (1988) hypothesis that Tns/INFL in Japanese is inactive, lacking in agreeing φ-features. So it seems that we have come to a dead end. But there is a way out. Notice that Tns receives a temporal interpretation, which means that it bears an interpretable T feature. Thus, T is a good candidate for a matching feature between Tns and DP. In relation to this, Pesetsky and Torrego (2001) have made an intriguing proposal that nominative Case on DP is an uninterpretable T feature. Adopting this proposal, we can schematize the process of nominative Case licensing, as in (8), where the [uT] of the DP percolates to *v*P and then $v\mathrm{P}_{[\mathrm{uT}]}$ Agrees with $\mathrm{Tns}_{[\mathrm{iT}]}$ in a sister relation, resulting in marking [uT] for deletion. A consequence of this analysis is that it provides a basis to explain why subextraction from subject is possible in Japanese, as argued in Stepanov 2007, where the key factor is that subjects remain in situ.

Another consequences of the present proposal is that we can unify the licensing mechanism of indeterminates with that of nominative Case under the name of Agree. Thus, it is straightforward to extend the analysis of multiple wh-questions (9) and multiple negative concord structures (10) to that of multiple nominative constructions (11), or vice versa. What needs to be clarified is how the labeling algorism treats multiple instances of uninterpretable features. We propose that multiple instances of the same kind of uninterpretable features are distinguished from each other by an index and that feature percolation forms the conjunction of distinct features. For illustration, the relevant structure of (9) is shown in (12). The point is that the [uQ2] of *who* percolates to $v\mathrm{P}_{[\mathrm{uQ1}]}$, resulting in $v\mathrm{P}_{[\mathrm{uQ1}]+[\mathrm{uQ2}]}$, which further percolates to TP.

<u>Internal Merge</u>: We propose that IM applies as soon as an uninterpretable feature enters into the derivation by External Merge. Under this proposal, IM can also be regarded as an operation driven by the need to establish a sister relation between matching features. Suppose that Y with a uF is merged with ZP, which contains XP with an interpretable counterpart feature, as shown in (13). Then, $Y_{[uF]}$ projects $YP_{[uF]}$, as in (14). At this point, the root node is marked by an uninterpretable feature, which triggers the computational system to probe for a matching goal. In the present case, it is $XP_{[iF]}$. In order to establish an Agree relation between $YP_{[uF]}$ and $XP_{[iF]}$, the two has to be in a sister relation. Thus, $XP_{[iF]}$ is merged with $YP_{[uF]}$, becoming a Spec-YP in the traditional sense, as sketched in (15), and then uF is marked for deletion, as shown in (16). For a concrete example, one could imagine a case of IM of DP to TP driven by the uninterpretable φ-features of T(P). Note that in this case, in addition to φ-features, T-feature is also involved. The derivation proceeds as follows. First, before Tns is merged, uT of DP percolates to *v*P, as in (17). Second, Tns is merged, as in (18), which bears [uφ] and [iT]. Third, since Tns and *v*P are in a sister relation, Agree applies, resulting in marking [uT] for deletion, as in (19). Forth, $Tns_{[u\varphi][iT]}$ projects TP, as in (20). Fifth, now that the root node is marked by [uφ], the computational system starts to probe for a matching goal, which is $DP_{[i\varphi][\cancel{uT}]}$. Thus, the DP undergoes IM to "Spec-TP", as shown in (21). Finally, since the DP and the TP are in a sister relation, the [uφ] of the latter is marked for deletion, as illustrated in (22). A benefit of this proposal is that the EPP feature can be eliminated. The proposed analysis can be carried over to successive-cyclic DP raising in infinitives and wh-movement as well.

<u>Quantifier Scope</u>: Finally, we will demonstrate that the proposed analysis can extend to quantifier scope. We assume that quantificational DPs bear a Quantificational feature [Quant] (Chomsky 1995) and that this feature is uninterpretable on DPs just like T-feature is uninterpretable on DPs a la Pesetsky and Torrego (2001). The idea is that a feature is uninterpretable when it occurs in a position where it does not receive an interpretation. For T-feature, it is uninterpretable on DPs but interpretable on Tns. Likewise, [Quant] is uninterpretable on DPs, but interpretable in a scope-taking position, *v*P or TP. Thus, [uQuant] of DP does not induce Agree or IM, but it percolates up to a scope-taking position and turns into [iQuant], as shown in (23). Two advantages obtain from this proposal: we can (i) eliminate Quantifier Raising and (ii) give a principled account for weak crossover (WCO) in light of Lasnik's (1996) claim that feature movement does not change binding relations. That is, the WCO effect in (24) can be unified with the failure of reciprocal binding in (25). In both cases, the [Quant] of the binder may percolate up to TP, but it does not affect binding relations.

Examples

(1) $[_{YP[uF]}\ Y\ ZP_{[uF]}]$ (2) $[X_{[iF]}\ [_{YP[uF]}\ Y\ ZP_{[uF]}]]$ (3) $[X_{[iF]}\ [_{YP[\cancel{uF}]}\ Y\ ZP_{[\cancel{uF}]}]]$

(4) Taro-wa **nani-o** tabe-ta-**no**
Taro-Top what-Acc eat-Past-Q
"What did Taro eat?"

(5) Taro-wa **nani-mo** tabe-**nak**-atta
Taro-Top what-MO eat-Neg-Past
"Taro did not eat anything."

(6) $[\mathbf{C}_{[iQ]}\ [_{TP[uQ]}\ T\ [_{vP[uQ]}\ v\ [_{VP[uQ]}\ \mathbf{what}_{[uQ]}]]]]$ (7) $[\mathbf{Neg}_{[iNeg]}\ [_{vP[uNeg]}\ v\ [_{VP[uNeg]}\ V\ \mathbf{what}_{[uNeg]}]]]$

(8) $[Tns_{[iT]}\ [_{vP[uT]}\ DP_{[uT]}\ [_{v'}\ v\ [_{VP} \ldots]]]] \rightarrow [Tns_{[iT]}\ [_{vP[\cancel{uT}]}\ DP_{[\cancel{uT}]}\ [_{v'}\ v\ [_{VP} \ldots]]]]$

(9) **Dare**-ga **nani-o** tabe-ta-no
Who-Nom what-Acc eat-Past-Q
"Who ate what?"

(10) **Dare**-mo **nani-mo** tabe-**nak**-atta
who-MO what-MO eat-Neg-Past
"Nobody ate anything."

(11) Taro-ga imoto-ga kasikoi
Taro-Nom sister-Nom intelligent
"Taro's sister is intelligent."

(12) $[\mathbf{C}_{[iQ]}\ [_{TP[uQ1]+[uQ2]}\ Tns\ [_{vP[uQ1]+[uQ2]}\ v\ \mathbf{who}_{[uQ2]}\ [_{VP[uQ1]}\ V\ \mathbf{what}_{[uQ1]}]]]]$

(13) $[Y_{[uF]}\ [_{ZP} \ldots XP_{[iF]} \ldots]]$ (14) $[_{YP[uF]}\ Y_{[uF]}\ [_{ZP} \ldots XP_{[iF]} \ldots]]$

(15) $[XP_{[iF]}\ [_{YP[uF]}\ Y_{[uF]}\ [_{ZP} \ldots XP_{[iF]} \ldots]]]$ (16) $[XP_{[iF]}\ [_{YP[\cancel{uF}]}\ Y_{[\cancel{uF}]}\ [_{ZP} \ldots XP_{[iF]} \ldots]]]$

(17) $[_{vP[uT]}\ DP_{[i\varphi][uT]} \ldots]]$ (18) $[Tns_{[u\varphi][iT]}\ [_{vP[uT]}\ DP_{[i\varphi][uT]} \ldots]]$

(19) $[Tns_{[u\varphi][iT]}\ [_{vP[\cancel{uT}]}\ DP_{[i\varphi][\cancel{uT}]} \ldots]]$ (20) $[_{TP[u\varphi][iT]}\ Tns_{[u\varphi][iT]}\ [_{vP[\cancel{uT}]}\ DP_{[i\varphi][\cancel{uT}]} \ldots]]$

(21) $[DP_{[i\varphi][\cancel{uT}]}\ [_{TP[u\varphi][iT]}\ Tns_{[u\varphi][iT]}\ [_{vP[\cancel{uT}]}\ DP_{[i\varphi][\cancel{uT}]} \ldots]]]$

(22) $[DP_{[i\varphi][\cancel{uT}]}\ [_{TP[\cancel{u\varphi}][iT]}\ Tns_{[\cancel{u\varphi}][iT]}\ [_{vP[\cancel{uT}]}\ DP_{[i\varphi][\cancel{uT}]} \ldots]]]$

(23) $[_{TP} \ldots DP_{[uQuant]} \ldots] \rightarrow [_{TP[iQuant]} \ldots DP_{[uQuant]} \ldots]$

(24) *His_1 mother loves every son_1.

(25) *There seem to each $other_1$ to have been some $linguists_1$ given good job offers.