Raising to Object under Multiple Spheres Hypothesis*

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Im, Chegyong. 2006. Raising to Object under Multiple Spheres Hypothesis. *The Linguistic Association of Korea Journal, 14*(1), 273-293. The primary purpose of this paper is to provide an alternative analysis of RTO constructions based on the assumptions of Multiple Spheres Hypothesis. Adopting the CP analysis of the lower clause suggested in Bruening (2000, 2001) and Hiraiwa (2005), we argue that the so-called raised argument occupies SpecvP of matrix sentence by the rule PLACE. We also argue that if the argument discharges its [Top] feature and stays at lower SpecCp position, (i) it gets its pronominal form by the rule DRESS before PF interface in languages like English, (ii) it is normally deleted at PF in languages like Korean and Japanese. Otherwise it should find some other place, e.g., SpecvP of matrix sentence by the rule PLACE, the process of which has been traditionally called RTO.

Key Words: Raising-To-Object, Multiple Spheres Hypothesis, Exceptional Case Marking, Minimalist Program

1. Introduction

Some languages including Korean and Japanese allow raising to object (henceforth, RTO) across a finite/tensed CP boundary (see Bruening 2001a, 200b, Hiraiwa 2005 among others) in contrast with English (Rosenbaum 1967, Postal 1974). This type of languages often

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allow a null pronoun, and hence raise a non-trivial question as to whether the RTO is "raising", "control", "Agree"/ECM or something else. Phase Impenetrability Condition (PIC, Chomsky 2001) suggested in the Minimalist Program solves some part of the problems, but still others remain. This paper attempts to provide an alternative analysis of RTO constructions based on the assumptions of Multiple Spheres Hypothesis (henceforth, MSH) suggested in Im (2003, 2004a, b, c, 2005a, b). Chapter 2 contains the survey of the researches on ECM/RTO constructions of English, Japanese and Korean. In chapter 3, an alternative analysis of these constructions are suggested with the brief sketch of MSH. Chapter 4 concludes the paper.

2. Previous Analyses

2.1. RTO/ECM in English

According to Davies and Dubinsky (2004), the evolution of syntactic approaches to RTO/ECM structures, began with Rosenbaum (1967), Chomsky (1977), and Postal (1974): the relation of the sentences in (1) and (2) has been critical because the syntactic differences between RTO construction in (1) and control structure in (2) provided important bases for the development of conventional generative grammar[1].

(1) Barnett believed the doctor to have examined Tilman.
(2) Barnett persuaded the doctor to examine Tilman.

GB theory (Chomsky 1981) does away with the Tensed-S Condition as a separate principle, incorporating its effects within a set of articulated grammatical modules and the new principles operating within them:

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1) The two structures show syntactic asymmetries in passive complement clauses, assignment of thematic roles, selectional restrictions, pleonastic subject constructions, and idiomatic expressions.

(3a) Jack believed (that) himself was immortal
(3b) Jack believed himself to be immortal

Case Filter applied for ECM shows that *to* cannot assign Case, the matrix verb *believe* assigns Accusative to *himself*. When we apply Principle A of the Binding, (3a) is out but (3b) is good. Following Theta Theory, movement is blocked in (3b) because of Theta Uniformity[2].

Theoretical innovations of the mid- and late-1980s (Sportiche 1988, Larson 1988) made it possible to reassess the ECM analysis, and the proposals in Pollock (1989) led to a reconsideration of the ECM approach to RTO clauses in favor of a neo-Raising movement analysis. Pollock (1989) argues that Infl (projecting IP) should be divided into separate categories for tense (T, projecting TP) and agreement (Agr, projecting AgrP) and early Minimalist Program analyses (Chomsky 1989) adopted an AgrO functional category, analogous to AgrS, for the accusative Case checking. If we follow this account, both the verb and its object would move, at least at LF, into a functional projection outside of VP, as in (4).

(4) [AgrOP OBJECT1 VERB2 ... [VP ... t2 t1 ...]]

The ECM analysis of RTO constructions is no longer possible under this account since there is no functional position between the matrix verb and infinitival subject wherein Case might be checked: ECM subjects cannot occupy the AgrO position where ordinary direct objects are supposed to be.

Lasnik and Saito (1991) suggested Raising analysis using quantifier scope differences illustrated in (5).

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2) Chomsky (1986: 194): If α is an inherent Case-marker, then α Case-marks NP iff it θ-marks the chain headed by NP.

(5) a. The FBI proved that few students were spies
b. The FBI proved few students to be spies
(6) a. There are few students such that the FBI proved them to be spies (wide scope)
b. The FBI proved that there were few students who were spies (narrow scope)

(5a) is ambiguous: it can be interpreted in either ways given in (6), in which (6a) asserts the existence of students and (6b) does not. On the other hand, (5b) has the sole interpretation of (6a) where *few students* has the wide scope interpretation.

They introduce new data to confirm RTO analysis: antecedent-anaphor relation between *defendants* and *each other* in (7).

(7) ?The DA accused the defendants$_i$ during each other's$_i$ trials
[L & S 1991: 26]

If we don't assume AgrO category, the direct object *defendants* cannot bind *each other* since the verb complement position does not c-command into the adverbial PP headed by *during,* But if we assume AgrO, the problem is solved as in (8).

(8) [AgrOP [the defendants$_i$]1 [accused2 [VP [VP t2 t1] during each other's$_i$ trials]]]]

From its position in SpecAgrO, *the defendants* c-commands and binds the anaphor *each other* satisfying the Condition A.

Lasnik & Saito (1991), showing that the embedded subjects of tensed complement clauses contrast markedly with the embedded subjects of tensed complement clauses, argue that the embedded subjects of RTO constructions exhibit the same behavior in this regard. Consider the contrast between (9a) and (9b) here below.

(9) a. ?The DA proved [the defendants to be guilty] during each other's trials
b. ?*The DA proved [that the defendants were guilty] during each other's trials

Example (9a) is parallel to (7), strongly suggesting that the infinitival subject moves into the matrix AgrOP for accusative Case checking, so coming into a position from which it can bind the reciprocal *each other* in the adverbial PP. But if we assume that English finite verbs remain in VP until LF, the infinitival subject of an RTO construction would raise overtly to a functional projection. Then we would have the following word order of RTO construction as in (10).

(10) *Joan him believes to be intelligent

So along with the theoretical assumptions of the time, the movement of the infinitival subject must be covert as suggested in Lasnik & Saito (1991).

2.2. Bruening (2000, 2001) and Hiraiwa (2001)

Since the beginning of the generative transformational grammar in 1960s, many approaches employed for the English RTO/ECM structures have been adopted by the researchers who tried to analyse the RTO/ECM structures in Korean and Japanese (among others, see Kuno 1976, Kuroda 1978, Hoji 1991, Hiraiwa 2000, Tanaka 2001, for Japanese, Yoon 1989, Hong 1990, Lee 1991, Schütze 2001, for Korean). They agree that RTO is optional in Korean and Japanese. The subject of the complement clause can be marked with accusative Case, appropriate to a matrix direct object, or with nominative Case, appropriate to the surface subject of the embedded clause.

(11) a. John un Mary ka/lul papo la ko sayngkakhayssta
TOP NOM/ACC fool is COMP thought

'J thought M was a fool' or 'J thought M to a fool'

b. Yamada wa Tanaka ga/o baka da to omotteita
TOP NOM/ACC fool is COMP thought
'Y thought T was a fool' or 'Y thought T to a fool'

Korean and Japanese RTO (combined with the fact that "Raising" is optional) was highly problematic for a GB/P&P-type ECM approach to the construction. On the one hand, the RTO account has the problems of how to account for A-movement across a CP boundary, and how to avoid double Case marking of the raised NP. On the other hand, the ECM approach has the problem of the inverse issue of managing Case assignment across a CP boundary, as well as explaining the substantial evidence that the accusative nominal can indeed be outside the embedded clause[3].

Bruening (2001a, b) tries to solve the problem of optionality by employing multiple derivations[4]. His account of RTO constructions involves two distinct structures, shown here in (12). The derivation schematized in (12a) can be characterized as movement to Comp (SpecCP), and the one schematized in (12b) involves movement from Comp.

(12) a. Movement to Comp
[... V (NP) [CP NP_i [... t_i ...]]]
b. Movement from Comp
[... V (NP) NP_i [CP t_i [... pro_i ...]]]

For Japanese cases in which the accusative nominal appears to have remained in the embedded clause, Bruening proposes the "neo-ECM"

3) In addition to these problems, Kim & Kim (2002) show many instances of asymmetries found in Korean ECM constructions such as (in)transitivity of the predicates, asymmetry of generic/existential (or specificity) interpretation of the arguments, asymmetry of individual/stage level predicates. Part of these aymmetries are resolved in our model suggested in Chpt. 3.

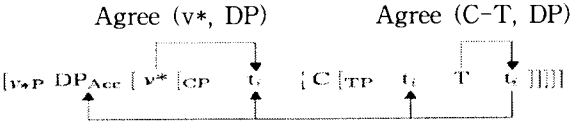
4) While Passamaquoddy data is his major concern, Bruening argues that his claims can account for the data in many languages, including Japanese.

analysis of (12a), in which the nominal moves from its initial IP/TP internal position into SpecCP. To account for those instances in which the accusative nominal shows signs of being outside of the embedded clause, Bruening assumes a "neo-RTO" structure like that given in (12b). There, the accusative nominal is base-generated in SpecCP, binds a null pro in IP/TP, and moves into the matrix clause.

Note that Bruening resorts to the discourse properties to answer the fundamental question: why the accusative nominal is base-generated in SpecCP? He argues that Japanese has a topic/focus construction, in which a topic or focus is base-generated at the edge of a clause. A topic/focus phrase, occurring at the left-edge of the lower clause, can Agree with the higher verb and receive Case from it[5].

If we adopt PIC[6] of MP for his proposal, we expect an ECMed element in RTO to be first dislocated to the edge of the embedded CP clause, at which position it Agrees with v*, deriving the Tensed-S Condition effects. The derivation of RTO in Korean/Japanese consists of the following three operations:

(13)



Successive Cyclic Raising

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5) Topic/Focus is simply a base-generated. as in (ia). Such a topic/.focus can be marked with accusative case in raising to object as in (ib).

(i) a. Tokyo-wa sumi-nikui.
Tokyo-Top live-hard
'Tokyo is hard to live in'

b. John-wa Tokyo-o sumi-nikui-to omotta
J-Top Tokyo-Acc live-hard-Comp thought
'John thoght that Tokyo is hard to live in' (Bruening 2001a: 35)

We will return to this argument of Bruening's to support our proposal in Chpt 3.

6) Phase Impenetrability Condition (Chomsky 2001)

In phase α with head H, the domain of H is not accessible to operations outside α, only H and its edge are accessible to such operations.

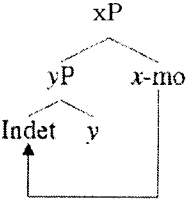
Hiraiwa (2005), observing the split quantification phenomena as in (14), pursues a hypothesis for Indeterminate-Agreement: the indeterminate must be in the c-command domain of the Q-particle -mo (henceforth cd (Q)) as in (15).

(14) a. Taro-wa [DP dare-no hon]-mo yoma-nakat-ta
Taro-Top Indet-Gen book-Q read-Neg-Pst
'Taro didn't read anyone's book'

b. Taro-wa [V*P dare-ni sono-ronbun-wo yom-ase]-mo
Taro-Top Indet-Dat the-paper-Acc read-Caus-Q
si-nakat-ta
do-Neg-Pst
'Taro didn't allow anyone to read the paper'

c. Taro-wa [CP dare-ga kai-ta ronbun]-mo yoma-nakat-ta
Taro-Top Indet-Nom write-Pst paper-Q read-Neg-pst
Taro didn't read any paper that anyone wrote'

(15)



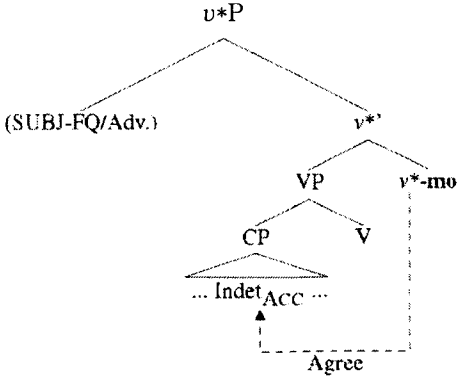
Hiraiwa (2005) argues that Indeterminate-Agreement is licit with RTO. In (16), the embedded subject is marked Accusative just as in ECM constructions in English. This construction has been considered to be a case of RTO/ECM in Japanese (Kuno 1976).

(16) Japanese:
Taro-wa dare(-no-koto)-wo baka da to-mo omowa-nakat-ta.
Taro-Top Indet(-Gen-thing)-Acc stupid Cpl C-Q think-Neg-Pst
'Taro didn't consider anyone to be stupid.'

Case is "assigned" in-situ from v* via Agree and hence the

indeterminate remains in-situ throughout the derivation.

(17) Case Assignment via Agree



Based on the facts in (16) and (17), along with his generalization (15), Hiraiwa demonstrates that (i) syntactic raising into the matrix clause in RTO in Japanese is only optional and an ECMed DP can remain downstairs, and (ii) Case is assigned without displacement (i.e. via Agree rather than Spec-Head Agreement).

The "Multiple" Case-marking is crucially made possible by dislocation of the DP to the edge of the phase to escape valuation/inactivation. Thus under his theory, the availability of RTO across a finite CP is predicted to be contingent on the availability of the "dislocation" operation to the edge. The morphological reflex of double Case-marking is suppressed in Japanese.

However, under his theory of Indeterminate-Agreement, it remains to be explained why there is such an asymmetry in (18).

(18) Taroo-wa [nani-? **ga/-OK wo** uta- e-mo] si-na-i.
Taro-Top Indet-Nom/ - Acc sing-can-Q do-Neg-Prs
'Taro cannot sing anything.'

This asymmetry can be expected under the phase theory developed in

Chomsky (1998, 1999, 2001). If the PIC of the theory is right, the only way for a goal element in the lower phase to be accessible to a higher probe is for the former to be moved to the edge of the lower phase.

The phase theory demands that the ECMed indeterminate subject be dislocated to the edge of CP, but how could it license Indeterminate-Agreement with the Q-particle attached to C? Hiraiwa adopts Left Periphery of CP (Rizzi 1997) to solve the paradox. He proposes that Q-particle -mo attaches to C3, while the ECMed subject DP undergoes movement to the edge of C2P. We will adopt this idea in our model suggested in Chpt. 3.

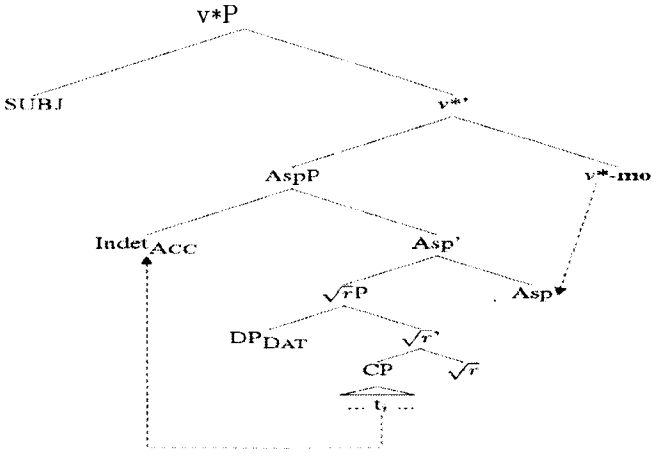
Hiraiwa also shows that there is a case of the raised subject landing at a lower position. In (19a), the raised subject precedes the matrix dative argument. Significantly, in this case, Indeterminate-Agreement becomes licit as shown in (19b).

(19) a. Taro-wa boku-no-koto-wo$_i$ Hanako-ni t_i baka da to ii-mo
Taro-Top I-Gen-thing-Acc Hanako-Dat stupid Cpl C say-Q
si-nakat-ta.
do-Neg-Pst
'Taro didn't even tell Hanako that I was stupid.'

b. Taro-wa dare-no-koto-wo$_i$ Hanako- ni t_i baka da to
Taro-Top Indet-Gen-thing-Acc Hanako-Dat stupid Cpl C
ii-mo si-nakat-ta.
say-Q do-Neg-Pst
'Taro didn't tell Hanako that anyone was stupid.'

This suggests that the landing site of the raised subject in RTO is actually lower than the edge of v*P. The most natural possibility is that raising targets the edge of AspP.

(20) Raising-to-Object



Hiraiwa concludes that the optionality of raising reduces to two derivations: one with C+T and the other C-T. He argues that raising out of the finite CP clause does not give rise to Case problems because of the asymmetry of tense feature distribution between these two types of C. When C3 comes with [+T], the C2 -T probe is capable of assigning nominative Case in its domain and hence no ECM/RTO takes place. If, on the other hand, C3 comes with [-T], the C2 -T system is unable to value uCase of a goal in its domain. Hence, the goal DP is dislocated to the edge of C2P and Agrees with the higher v-Asp probe.

The final problem Hiraiwa addresses is: how a higher probe can Agree with and assign a Case value to an element at the edge of C2P, crossing the C3P. If C3 is a strong phase head, this should be impossible. He suggests that the distinction between strong and weak phase heads may be related to the presence/absence of Tense on C3 . If it comes with Tense, it becomes a strong phase head, while if Tense is missing, it becomes a weak phase head. Another issue is why there are languages that do not allow raising out of CP clauses (e.g. English). He suggests that the difference may reduce to the availability of scrambling. In scrambling languages like Japanese and Cuzco Quechua, C can have EPP. This results in dislocation to the edge, which is saved

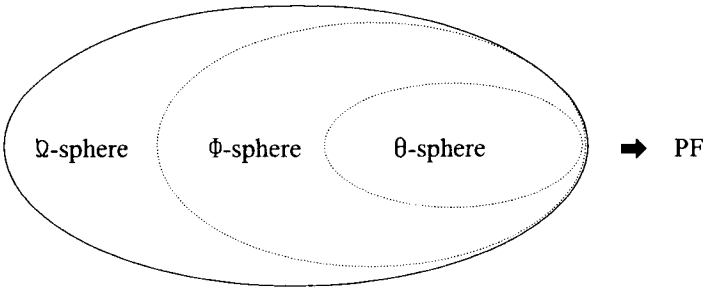
from the PIC. In the next chapter, we will address some of the problems Hiraiwa posited.

3. MSH for RTO

3.1. Assumptions

The most fundamental hypothesis MSH (Multiple Sphere Hypothesis) assumes is that the process of derivation is not cyclic, but simultaneous. L contains operations that determine the phonological value as well as the semantic value of each SO by absorbing the features from the lexicon which exist in three spheres: θ-sphere, Φ-sphere and Ω-sphere[7].

(21)



As proposed in Im (2003, 2004a, 2004b, 2004c, 2005a, 2005b), when syntactic objects α and β come into numeration by Merge, they assume inherent discourse features (of information like specificity, topic, focus . . .) as well as inherent syntactic features (Φ-features, for instance). The parametric variation of word order among languages is determined by the features in each sphere (θ-sphere, Φ-sphere, and Ω-sphere). θ

7) We adapt some of the ideas from Platzack (2000). He claims that the systems of thought access multiple interface levels such as Thematic Form, Grammatical Form, and Discourse Form and information exchanged at these levels pertains to the information assembled at the V-domain, the I-domain and C-domain, respectively. We borrowed the Greek terms from Grohmann (2001).

-sphere is where SOs merge by the interaction of θ-roles, selectional restrictions and subcategorizations. In Φ-sphere, the selected SOs check their agreement features (Agree in MP), establishing their relation to each other, but no structural Case because we don't assume any constructional structure (e.g., binary branching or X-bar) but the relation among SOs (e.g, subject, object, predicate of, etc.)[8]. Finally, in Ω-sphere, the SOs discharge their discourse features (of information such as specificity, topic, focus, etc.). As is well-known, Merge is a set operation that imposes no intrinsic ordering among its members (Yang 1999, Chomsky 2001). In order for a Merger set to be linearized into strings of words at PF, it should discharge all the features in three spheres.

(22) PLACE
Place SO when all the features are discharged

Contra Chomsky (1993, 1995, 1999) and many others, we don't assume one-fell swoop of lexical selection. Rather, we suggest "lexical selection all the time". So the operation would be 24hr-outlet operation whenever necessary. At the beginning of Numeration, the root (or bare) SOs with its inherent phonological, syntactic, as well as semantic features are merged with each other (cf. Marantz 1997). Simultaneously, the order of the elements is decided by PLACE (22). Then, the set of SOs with its full features full morphological form escapes the spheres into sensorimotor system. In the process of this Spell-Out, each SO assumes its morphological forms as well as its phonological forms to satisfy PF convergence. This process of morphological forming is called

8) As an anonymous reviewer points out, we need a further explanation for this claim. We argue that Case is redundant if we assume the rule (22) since the linearization by the features in the three spheres is sufficient to decide the word order among SOs. We also claim that the morphological agreement attributes of Case theory can be absorbed in the relationship among the arguments as suggested in Relational Grammar. Thus the remnants of morphological case (e.g., pronominals in English) are typological variants among languages which can be explained by the rule (23).

Dress.

(23) DRESS
Get SO dressed with morphemes whenever the features are discharged

3.2. Implications of MSH for RTO

Now we'll show how the assumptions of MSH work for RTO constructions. Let's consider an RTO sentence with an anaphor in matrix clause first.

(24) Jack believed himself to be immortal

We believe that in θ-sphere, SOs come into numeration in two small sets in a larger set {{S1{Jack1i, believe}, {S2{Jack2i, be, immortal}}} with their θ-roles discharged. In Φ-sphere, they check their Φ-features each other (morphological agreement, if any, or Agree for Case etc., in MP framework). When these SOs, still with no order among themselves, come into Ω-sphere where the two sets merge[9], they discharge their D-features such as [Top], [Foc], [Specificity], etc..

Now our concern is how *Jack2* becomes an anaphor, occupying SpecvP of matrix sentence. We argue that if *Jack2* discharges its [Top] feature and stays at lower SpecCp position, (i) it should be pronominalized by the rule (23) and pronounced thus at PF in languages like English, (ii) it should be deleted at PF in languages like Korean and Japanese or (iii) it should find some other place, e.g., SpecvP of matrix sentence via RTO in many languages. Since raised *Jack2* is identical to *Jack1*, it is phonologically manifested as the anaphor *himself* by the rule (23) in English.

The examples such as (5) and (6) in L & S (1991) can be reanalyzed in our framework.

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9) See Im 2004 b, for more discussion of Propositional Merge

(25=5) a. The FBI proved that few students were spies
b. The FBI proved few students to be spies
(26=6) a. There are few students such that the FBI proved them to be spies (wide scope)
b. The FBI proved that there were few students who were spies (narrow scope)

(25a) can have either of the interpretations given in (26), in which (26a) asserts the existence of students and (26b) does not. In (25b), on the other hand, *few students* can only have the wide scope interpretation given in (26a)

Under MSH, we assume that *few students* in (25b) occupies the position (e.g., SpecCP in accordance with Rizzi 1997, Hiraiwa 2005) when the SO discharges its D-feature, [Top], in Ω-sphere. Since the feature [Top] presumes the semantic meaning of existence, (25b) is interpreted as (26a), with the wide scope interpretation.

Bruening (2001a, b)'s stipulatory structure in (27=12) can be explained under MSH.

(27=12) a. Movement to Comp
[... V (NP) [CP NPi [... ti ...]]]
b. Movement from Comp
[... V (NP) NPi [CP ti [... proi ...]]]

Under the assumptions of MSH, NP is merged in VP (no word order between the SOs) in θ-sphere, discharges Φ-features (Agree in MP terms) in Φ-sphere, occupies SpecCp position in Ω-sphere with its [Foc] feature by the Rule (22)[10] as in (28=16).

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10) As an anonymous reviewer points out, the same operation can take place with feature [Top] as in the following example.

(i) A: Ne-un **Mary** ka ttokttokhata ko sayngkakha-ni?
you-TOP NOM bright COMP think
'Do you think that Mary is bright?'
B: Ani, (na-nun) (Mary ka) papo la ko sayngkakhay
No, (I-TOP) NOM fool is COMP think

(28=16) Taro-wa dare (-no-koto)-wo baka da to-mo
Taro-Top Indet (-Gen-thing)-Acc stupid Cpl C-Q
omowa-nakat-ta.
think-Neg-Pst
'Taro didn't consider anyone to be stupid.'

We also argue that "raised" *Mary* in (29=11a) occupies the position with its [Top] feature by the rule (22).

(29=11a) John i/nun **Mary** lul papo la ko sayngkakhayssta
NOM/TOP ACC fool is COMP thought

Now, we have to answer the question: what make the Case alternation in (29=11a) possible? We claim that the choice between *-ka* and *-lul* is not optional, that is, RTO is not an optional operation but an compulsory operation PLACE (22) due to the D-features of SO. If the NP has D-feature [Foc], it occupies the lower SpecCP marked with *-ka* at morpho-phonemic interface by the rule (23). If the NP has D-feature [Top], it can also occupy SpecCP position, but it is normally deleted at PF. If the NP has D-feature [Top] but is reintroduced ("Resumptive Topic [RTop]" in Dik (1989)), it occupies SpecvP of the matrix sentence marked with *-lul* by the rule (23). In this way, our explanation for the *-ka/-lul* alternation differs from any previous analysis.

Another problem we have to solve is the optionality of ECM/RTO described as the following (Hiraiwa 2005: 119):

> When C3 comes with [+T], the C2 -T probe is capable of assigning nominative Case in its domain and hence no ECM/RTO takes place. If, on the other hand, C3 comes with [-T], the C2 -T system is unable

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'No, I think she is a fool.'

We claim that in (iB), Mary is the old information occupying SpecCP by the rule (22), which is normally deleted at PF. We also claim that if one of them is not deleted at PF, it assumes new force of information such as contrastive focus.

to value uCase of a goal in its domain. Hence, the goal DP is dislocated to the edge of C2P and Agrees with the higher υ-Asp probe.

As we assume no optionality of an operation, the alternation of C+/-T should be accounted for in a different way. Under MSH, In Φ-sphere, the selected SOs check their agreement features (Agree in MP), establishing their relation to each other. We also assume that when C3 comes with [+T], feature checking (Agree) is complete in Φ-sphere and Ω-sphere. The rule (22) applies to the SOs and the NP occupies the lower SpecCP position. But when C3 comes with [-T], feature checking (Agree) is incomplete, then, i) the NP gets deleted at PF ((iB) in fn. (10)) or ii) it should find some other place to discharge its D-feature [(R)Top] in higher vP as in (28=16).

Our assumptions can also serve as an answer for Hiraiwa's final problem. His question was how a higher probe can Agree with and assign a Case value to an element at the edge of C2P, crossing the C3P. As we don't assume any cyclic derivation, there is no operation like probe which crosses CP

4. Concluding Remarks

As discussed, not only some syntactic behaviors caused by RTO can be explained under the assumptions of MSH, but also some problems of RTO in the framework of P & P and MP can be circumvented (not solved) under the assumptions of MSH. One of the important consequences of our conclusion is that the parametric behavior of RTO between scrambling-type languages and non-scrambling-type languages can be explained under the Rule (22) assuming D-features in Ω-sphere. Another importance advantage our model enjoys is that so-called case alternation of *-ka/-lul* or *-ga/-o* can be explained by the rule (23).

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