# Some Thoughts on Feature-Inheritance and Case

Sakumi Inokuma
University of Tokyo

inokumas@L.u-tokyo.ac.jp

## 1.  Introduction

This paper presents some notes on the inheritance-based phase theory and the treatment of abstract Case (Chomsky 2005, 2007; Richards 2007). Although we must admit its existence as a matter of empirical fact, proper treatment of Case has not found a principled explanation in the current minimalist framework. The intuition behind what has been called The Visibility Condition (Chomsky 1986) or (in)activity condition (Chomsky 2000, 2001, 2005) on argument nominals, however, might find an explanation that is derived from design specifications of language faculty given the inheritance-based phase system.

I first point out that Richards's (2007) argument for feature-inheritance system bears yet another consequence on how computation proceeds, without resulting in automatic crash at phase level. In a nutshell, I suggest that the feature-inheritance by nonphase heads from phase heads is not the only logically possible way to avoid automatic crash. Then I draw a preliminary sketch as to how the inheritance-based phase theory interacts with Case theory.

## 2.  Feature-Inheritance

Chomsky (2005) suggests that all syntactic operations are driven solely by phase heads.[1] What this implies is that T is not a phase head, nor a probe. The operations apparently driven by T (e.g., A-movement into SpecT) are in fact triggered by the phase head C, which comes immediately above T. Although Chomsky's argument is based on conceptual consideration of language design, i.e., identification of probes with phase heads C, v*, Richards (2007) provides a stronger argument for feature-inheritance.

Richards's argument goes as follows. Following Chomsky (2000, 2004, 2005), uninterpretable features (uFs) are unvalued in the lexicon, and these features must get valued and deleted in the course of (narrow) syntax, in accordance with Full Interpretation (FI) ; otherwise they cause crash at the interfaces. The crucial assumption here is that computational system cannot distinguish valued uninterpretable features from interpretable features. Hence, valuation and deletion (in the course of Transfer) must happen "simultaneously." We thus obtain (1) as an interface condition.

(1)     *Premise 1:*
        Value and Transfer of uFs must happen together.                    (Richards (2007:566))

Second, again following Chomsky (2000, 2001, 2004), Richards assumes that what is transferred to the interfaces is the complement domain of phase heads: TP for C phase, VP for v* phase. This is natural when we consider that something must remain in the narrow syntax in order to feed further computation, otherwise no structural relations could be defined between different phases.[2]

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[1]  Putting aside External Merge that builds up the structure (Chomsky 2007:17).
[2]  See Fox and Pesetsky (2004) and Fukui and Kasai (2005) for a different conception for a spell-out domain, where the concern is mainly with the phonological interface.

(2)   *Premise 2:*
      The edge and nonedge (complement) of a phase are transferred separately.        (Richards (2007:568))


From these two premises, Richards concludes that feature-inheritance necessarily holds as in (3), since if otherwise, all the derivations would result in automatic crash at phase level.


(3)   *Conclusion:*
      uF must spread from edge to nonedge (i.e., from C to T, v* to V, etc).        (Richards (2007:569))


Richards seems to take the conclusion in (3), which is correctly derived from combination of premises (1) and (2), as the only logical possibility. We have another way to avoid automatic crash while keeping to premises (1) and (2), however.

Recall the logic of Richards's argument. The problem arises when an uF gets valued through probe-goal Agree relation with a phase head $PH_1$ in a phase $P_1$, and yet it remains untransferred in $P_1$ to enter the next phase $P_2$. The higher phase head $PH_2$ can never "know" that the valued F in question is in fact an uninterpretable feature valued in the preceding phase $P_1$, and treats it as an interpretable feature. There is no way to successfully delete this feature, resulting in crash at the semantic (i.e., CI) interface at $P_2$ level. Thus any uninterpretable feature brought in the computational system by phase heads must be inherited by nonphase heads, which are inside the complement (i.e., internal) domain of its phase head.

This line of argumentation does rationalize the validity of feature-inheritance mechanism, but does not necessitate the mechanism. Allowing valuation and transfer of a certain uninterpretable feature to take place in different phases causes crash. Then we can try the opposite strategy of Richards's: just to leave it for the next phase; no inheritance, no valuation. As long as the feature stays in the phase head, there is no problem in transferring its complement domain at the interfaces.

To make the discussion concrete, let us go through all the combinatorial possibilities of two operations: inheritance and valuation. First consider (4a), where no inheritance occurs and the uninterpretable feature is valued "in situ" on the phase head $PH_1$. Since the phase level operation Transfer sends only the complement domain of a phase, the valued uninterpretable feature on $PH_1$ is left untransferred. This feature never has a chance to be deleted within the next phase, since the next phase head has no access to the information that this valued feature is in fact an uninterpretable feature that is valued in the previous phase. Hence the derivation necessarily crashes at this second phase.[3]


(4)   a.   *\* VALUE + TRANSFER:*
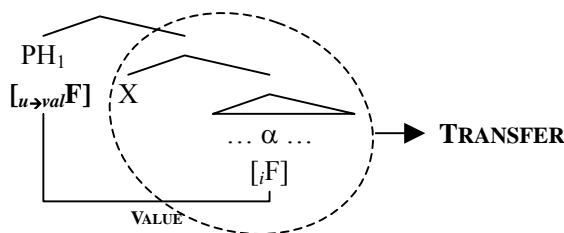



Next case, (4b), is more straightforward. Here we have inheritance and transfer, but not valuation. The uninterpretable feature on $PH_1$ is inherited by X, rendering $PH_1$ "clean." But thus inherited feature is not valued within the domain of $PH_1$ and transferred without being valued. This unvalued feature causes crash at the $P_1$ level.

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[3] I am not sure whether this derivation counts as a "crashing" one or as a converging but semantically abnormal one. Though crash is defined by unvalued features reaching to interfaces, whether valued (hence indistinguishable from interpretable counterparts) features causes "crash" is unclear. In any case, such a derivation causes a problem in interpretation at the interfaces.

(4)     b.   *INHERIT + TRANSFER:
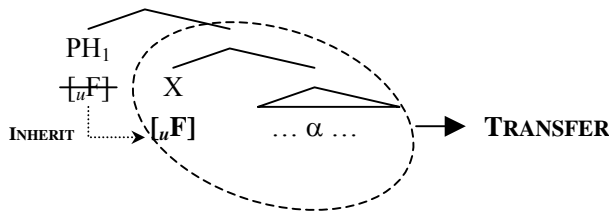


(4c) is the configuration that Richards argues remains as the only possibility. Nonphase head X inherits uninterpretable features on $PH_1$, making $PH_1$ clean. And then this "derived probe" X Agrees and values those features. Transfer applies to the internal domain of $PH_1$, in which uninterpretable features inherited by X are successfully valued and are subject to deletion.

(4)     c.   ✓ INHERIT + VALUE + TRANSFER:
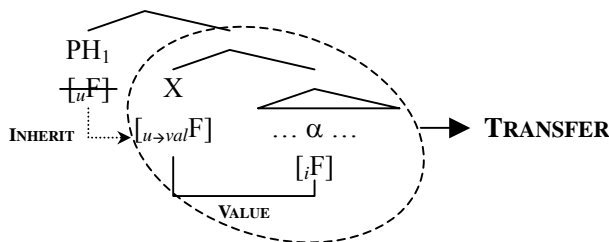


The last case, which I would like to argue is possible under the model developed by Chomsky (2005, 2007) and Richards (2007) is given in (4d). In this structure, nothing other than Transfer happens. $PH_1$ carries uninterpretable feature(s) into the derivation, but neither inheritance nor valuation occurs. Transfer applies as usual, leaving the $PH_1$ (and its uninterpretable features) in narrow syntax. At this level, there is no problem with regard to Full Interpretation at the interfaces and Phase Impenetrability Condition (PIC).[4]

(4)     d.   ✓ TRANSFER ONLY:
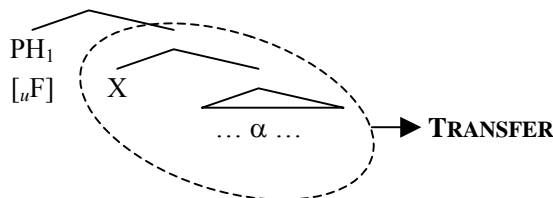


The two premises of Richards (2007) are satisfied "vacuously" in (4d). Since no problem arises in $P_1$ phase in (4d), we must check whether this orphan uF causes automatic crash at the next phase. If it does, (4d) must be excluded on a principled ground; if it does not, we expect some empirical support for this option. Below I speculate that the latter might in fact be the case.

## 3.   Case and Feature-(Non)Inheritance

Suppose that the derivation proceeds to the next phase $P_2$ after finishing (4d), as represented in (5):

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[4] Assuming that other uninterpretable features have been successfully taken care of, which is an independent matter.

(5)

$$PH_2$$
$$[_uF_2]$$ $$Y$$
**INHERIT** $$\dashrightarrow [_uF_2]$$ $$\ldots$$

$$PH_1$$
$$[_uF_1]$$
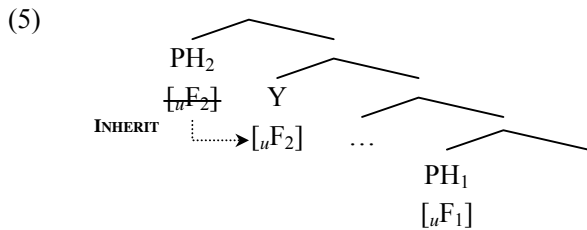
To simplify the discussion, let us suppose the uninterpretable feature on the next phase head $PH_2$ (i.e., $[_uF_2]$) is inherited by the nonphase head Y. $PH_1$, though it still has $[_uF_1]$, can no longer be a probe, since the derivation has already reached to the next phase $P_2$. The situation is one not considered in Chomsky (2005, 2007): a nonphase head carries uF. The only way for this uF to be valued and deleted is to "free ride" on other Agree relations. This reminds us of a classical condition on argument nominals: argument nominals must carry a Case. Conditions traditionally called *The Case Filter* or *The Visibility Condition* are the principal examples:

(6)     Case Filter:[5]
        *NP if NP has phonetic content and has no Case.                    (Chomsky (1981: 49))
(7)     Visibility Condition:
        Argument NPs must be assigned Case in order to be visible for θ-marking.     (Chomsky (1986: 94))

In a more recent term, *The Activity Condition* is supposed to play the same role:

(8)     Activity Condition:
        Goal as well as probe must be active, by virtue of having uninterpretable features, for Agree to apply.
                                                                    (Chomsky (2000: 123; 2001: 6))

While the existence of Case is undeniable, proper treatment of Case, let alone its nature, does not fall into the picture in a straightforward manner. Especially in the probe-goal framework, which depends on valuation by interpretable features, Case feature is idiosyncratic in that it has no interpretable counterpart.[6] The core intuition is that a structural Case does not have any semantic contribution, that is, Case is uninterpretable.

(9)     Case feature is uninterpretable.

Although uninterpretable, Case features cannot be parallel to uninterpretable ϕ-features on phase heads in light of the current phase theory. A Case feature on a nominal head does not probe into its complement domain; if it did, the nominal would get its Case valued by an element in its complement, in a way parallel to ϕ-features on C-T and v*-V.

I suggest that this is where the feature-inheritance system and the treatment of structural Case interact: like ϕ-features on (clausal) phase heads, Case is an uninterpretable feature introduced by (nominal) phase heads (assuming that some nominals constitute phases[7]), but it is not subject to inheritance, unlike uninterpretable ϕ-features:

(10)    Case feature is not inherited.

This seems to make sense in light of external vs. internal distinction in both nominal and clausal syntax. As a

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[5]  See Chomsky and Lasnik (1995: 119) for formulating the visibility condition in terms of (A-)chains.
[6]  But see Pesetsky and Torrego (2004) for reinterpreting (Nominative) Case feature as uninterpretable Tense feature.
[7]  Of course this assumption is too simplistic, ignoring definite/indefinite distinctions. See Hiraiwa (2005), Svenonious (2004) and Chomsky (2007) for the phasal status of DPs.

working hypothesis, let us assume (11):

(11)   Internal/External Syntax of Phases:
    a.   "Internal syntax" employs uninterpretable features inherited by nonphase heads.
    b.   "External syntax" employs uninterpretable features that remain uninherited on (ex-) phase heads.

This hypothesis distinguishes two types of uninterpretable features on phase heads: inherited and uninherited. The former acts as a "downward probe" that searches in the complement domain, as is usually supposed; the latter acts as an "upward probe" that does not function as a "probe" in a usual sense but rather as an "activator" of the phase it heads. The effect is the standard distinction between internal and external syntax of constituents. A tentative speculation is that (11) is the mechanical source of the fundamental clausal-nominal asymmetry: nominals must be embedded in a clause, but not vice versa. However parallel their internal structures are, nominals and clauses must be asymmetric at least in this respect.[8]

    Limiting for now our attention to nominal domain, (11a) will correspond to nominal-internal agreement/concord; (11b) to nominal-external (i.e., clausal) agreement. Concentrating (11b), which is the main concern of the present discussion, recall the structure (5), repeated below as (12):

(12)
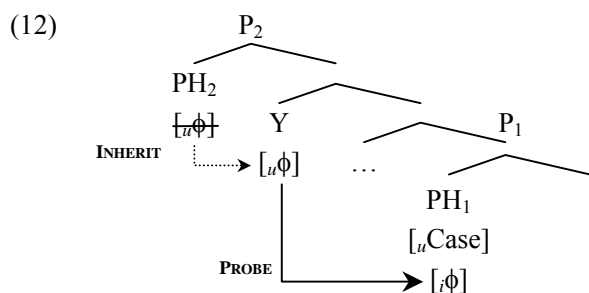


This derives Visibility Condition effect in its essence. Put in the phase system pursued here, we can sharpen the notion as the condition on External Merge (EM) to argument positions:

(13)   A nominal phase can undergo EM to an argument position in clausal phases only if its phase head carries unvalued Case feature.[9]

This condition is similar to Pesetsky and Torrego's (2006) Vehicle Requirement on Merge (VRM), in that (13) requires "probe-goal relation," or the existence of [uF], in performing EM:[10]

(14)   Vehicle Requirement on Merge (VRM):
    If $\alpha$ and $\beta$ merge, some feature F of $\alpha$ must probe F on $\beta$.        (Pesetsky and Torrego (2006:1))

Although the present paper might shed light on the mechanical treatment of structural Case, the primary question is left unanswered: why there is such a thing as Case.

## 4.   Closing Remarks

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[8]   See Abney (1987), Bernstein (2001), Brugé (2002) and Hiraiwa (2005) among others for clausal-nominal parallelisms.
[9]   A similar idea can be found in Alboiu (2007), where Case is taken to be a property of a phase.
[10]   In proposing (14), Pesetsky and Torrego (2006) allow probe-goal Agree relation not to involve feature valuation. Notice that the present approach also necessitates Agree without valuation, since Case feature is presumably valued by Agree with a higher phase head. For more on this point, see Pesetsky and Torrego (2007).

Let us close the discussion with a few consequences and further puzzles. Firstly, since visibility condition must be satisfied in every argument nominals, it does not distinguish definite and indefinite nominals, contrary to Chomsky (2007:25-26). The null hypothesis is uniformity, in which both definite and indefinite nominals are assumed to constitute phases when they function as arguments. This hypothesis is conceptually supported if we assume that uninterpretable features are introduced into derivations solely by phase heads. Argument nominals, whether they are definite or indefinite, require Case. At first sight, though, giving the phasal status to indefinite nominals faces with an empirical problem with regard to famous definite-indefinite asymmetry in extraction.

(15)  a.  Who do you like a picture of ~~who~~?
      b.  *Who do you like the picture of ~~who~~?

The present approach does not predict the contrast between (15a) and (15b). But notice that the definite/indefinite distinction in terms of the phasal status of nominals does not provide an explanation, either. Suppose the definite article *the* in (15b) constitutes a phase. If so, there is no reason for the *wh*-element within the DP to move into SpecD and on to SpecC. One of the characteristic functions of phase heads is to provide an "escape hatch" in successive cyclic movement. Hence an additional stipulation would be needed even if we adopt definite/indefinite distinction.

Yet another puzzle, conspicuously avoided in the above discussion, is the precise geometry of φ-features within nominal phrases. When we talk about the relation between Case and φ-agreement in the clausal domain, we implicitly or explicitly treat argument NPs as atomic elements. The point is clear when we look at the formulation of Case Filter (6) and Visibility Condition (7), where the conditions are stated on phrasal levels, i.e., NP/DPs. Now the question arises: what actually acts as a goal of Agree? The whole nominal phrase must have Case and φ-features. We are assuming that Case is a property of D. Then what about φ-features? The current probe-goal relation is defined on the feature level, so it is not easy to formulate conditions such as Visibility or Activity in any straightforward fashion, given that interpretable φ-features reside on lexical category N.[11] There seem to me to be two possible ways out: (i) to employ a notion like "extended projections" (Grimshaw (1991/2003)) and reformulate the probe-goal relation so that constituents beyond the head level can be captured; or (ii) to articulate the nominal-internal syntax so that the relevant features be successfully "stacked" on a unique head (i.e., $D^0$) by the time that nominal phrase enters into clausal syntax. The choice between the two (or other) requires much further investigation. But the problem is clear: there is a deep theoretical gap between clausal and nominal syntax.

To sum up, this short note is devoted to pointing out fundamental theoretical cracks between nominal and clausal syntax, which seem to remain untouched in the syntactic theory: (i) clausal-nominal asymmetry, based on a primitive observation that nominals must be embedded in clauses but not vice versa; and (ii) a linking problem of clauses and nominals, i.e., proper formulation on conditions on arguments such as Visibility/Activity conditions.

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[11] In fact, the problem is much more serious. Recent studies on nominal syntax suggests convincingly that components of φ-features (person, number and gender) do not form a single head in syntax, but rather are scattered on different heads (See Cinque (1995, 2005), Bernstein (2001) and Watanabe (2006) among many others). See also Chomsky (1995:231) for distinction between intrinsic and optional features.

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