CASE CHECKING AND A THEORY OF LF BINDING*

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0. Introduction

Within the extended IP structure hypothesis of Chomsky (1989) and Pollock (1989), functional categories and their projections contribute much to a substantial revision of the principles-and-parameters theory of Chomsky (1981, 1986a, b). In particular, Chomsky (1992) (see also Chomsky 1989 and Chomsky and Lasnik 1991) views AGR (AGRs and AGRo) as a collection of ϕ-features and proposes to implement the relevant feature checking of the subject and the object NPs under agreement via the Spec-Head relation in these AGR projections. Thus the subject moves to Spec (AGRsP) and the object to Spec (AGRoP) at the relevant level(s). In this approach, Case theory can also be reduced to a theory of feature checking (Case checking); in other words, Case is another instance of agreement (the Big Theory).

Consider the following schematic IP structure, where irrelevant projections, including NegP, are omitted:

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Movement of T to AGRs transmits the former’s Case feature [+nom] to the latter, and subsequent movement of the subject NP₁ (which originates within VP; see the discussion below) to Spec (AGRsP) permits the Case checking of NP₁ through the Spec-Head relation via AGRs. An analogous process takes place among AGRo, V and the object NP₂ with respect to the [+acc] Case checking. As Chomsky (1992) argues, whether each movement involved here applies in overt syntax or in covert LF syntax depends on the nature of the relevant feature(s) in each language, thus predicting a wide range of word order variations. At LF, however, [+nom] subjects are in Spec (AGRsP) and [+acc] objects are in Spec (AGRoP) universally because, besides PF, LF is the only interface level where licensing conditions must be satisfied, Case checking being one of them (see Chomsky 1992 for details).

In this paper, I will discuss some important consequences of this Case checking theory for the Binding theory. Specifically, I will show that this new Case theory allows us to account for the phenomenon of backward binding and some other binding properties, typically observed in psych verb constructions, in a more unified manner.
than other analyses proposed so far. To deal with the lack of such binding properties in other environments, however, this approach requires some elaboration of the extended IP structure as in (1). One such proposal—the revised extended IP structure hypothesis—will be advanced.

The theory to be developed here attempts to reduce the binding properties in question to certain LF configurations that crucially differ from the corresponding D- and S-structures, which entails, if correct, that the Binding theory, notably Condition A, can only be satisfied at LF. This in turn provides further support for Chomsky’s (1992) claim that D- / S-structures are no longer necessary as independent levels of representation.1

1. The Problem: Pesetsky’s Generalization

Psych predicates that select Experiencer objects have been known to permit an unusual pattern of backward binding, in which the object can bind an anaphor embedded in the subject. (2a, b) should be contrasted with (3a, b):

(2) a. Stories about each other, please [John and Mary].
    b. Zibuni-no uwasa-ga Taro-o nayamaseta.
       ‘lit. Self’s rumors annoyed Taro.’

(3) a. *Friends of each other hit [John and Mary].
    b. *Zibuni-no hahaoya-ga Taro-o nagutta.
       ‘lit. Self’s mother hit Taro.’

Belletti and Rizzi (1988) have proposed an unaccusative analysis of these psych verbs and argued that Condition A can be satisfied at D-structure, where the surface Theme subject originates in a position lower than the surface Experiencer object, as in (4):

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1 In the following discussion I assume on the part of the reader a certain level of familiarity with Chomsky’s (1981, 1986a, b) framework, which should permit me to use terms like ‘c-command’ and ‘Condition A’ without quoting precise definitions.

2 In (2a) and subsequent examples, the reciprocal each other and its antecedent are coindexed simply for an expository purpose. See Baker, Johnson and Roberts (1989) for arguments that in fact they are not.
In (4), NP₁ undergoes movement to Spec (IP) to get Case, yielding the surface order of (2a) (and (2b), *mutatis mutandis*), but at D-structure NP₂ c-commands NP₁ and hence may bind the anaphor embedded in NP₁. For the analysis to be proposed below, here it is important to note that the same account should also hold at S-structure by adopting Barss's (1986) 'chain-binding' theory. The following rather informal definition will suffice for our purpose (cf. Saito 1989):

\[(5) \ \alpha \text{ chain-binds } \beta \text{ iff } \alpha \text{ and } \beta \text{ are coindexed and } \alpha \text{ c-command a trace of } \gamma \text{, where } \gamma \text{ contains } \beta.\]

Grimshaw (1990), on the other hand, proposes a thematic approach to anaphor binding and attempts to account for such contrasts as in (2) and (3) in terms of the thematic prominence of the arguments involved. In her framework, the antecedent for an anaphor must be thematically most prominent in the thematic domain which contains the anaphor. The contrast in question then follows from the assumption that the Experiencer objects are the most prominent arguments in (2) whereas the Agent subjects are the most prominent in (3), in accordance with the thematic hierarchy she adopts.

We can reject both B&R's analysis and Grimshaw's simply by noting that backward binding is in fact commonly observed in a far wider range of environments than psych predicate constructions. Thus (6a, b) are instances of English analytic and Japanese synthetic causatives, respectively, while (7a, b) exemplify lexical causatives in these languages (see Pesetsky 1992 and Campbell and Martin 1989):
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(6) a. News items about herself make [Mary laugh].
   b. Zibun]-no sippai-ga [Taro-o intais]-aseta.
      'lit. Self's failure made Taro retire.'

(7) a. Those pictures of himself ultimately destroyed Bill.
   b. Zibuni-ga eizu kamo sirei-koto ga Hanako-o utinomesita.
      'lit. That self might have AIDS beat Hanako down.'

Pesetsky (1992: 44) states the generalization to be captured as follows:

(8) A Causer argument of a predicate π may behave as if c-commanded by an argumental DP governed by π.

That is, it is rather the Causer role assumed by the subject, rather than the Experiencer role of the object, that is responsible for the possibility of backward binding of a subject-contained anaphor. Psych verb constructions as in (2) can be viewed as one such case among many others, with the subject associated with the Causer role (as in Baker 1988b; see below) instead of the Theme role (as in B&R and Grimshaw).

The problem is now obvious. The two analyses mentioned above equally fail to explain why (8) holds. Consider syntactic causatives as in (6). The unaccusative hypothesis is irrelevant here: In what theoretically compatible sense can the matrix subject originate in a position lower than the embedded subject, when the former is an argument of the matrix predicate and the latter of the lower one? Thematic prominence will not help, either, because the embedded subject cannot be the most prominent in the matrix clause. Lexical causatives as in (7) pose essentially the same problem, because the Causer subjects here are not derived subjects (unaccusativity is again irrelevant), and are associated with the highest thematic prominence. In short, both approaches are too limited in their coverage.¹

Instead, a proper analysis of cases like (6) and (7) should automatically extend to psych predicates, thus rendering the latter nothing exceptional, to be treated on a par with other causative constructions. In the next section, I will propose to derive the generalization (8) from the conspiracy of the VP-internal subject hypothesis (see also Koopman and Sportiche 1991, among others) and LF object movement to Spec

¹ See Pesetsky (1992), Baker (1988b) and Campbell and Martin (1989) for further problems with B&R's approach.
(AGRoP) for Case checking within the framework of Chomsky (1992) as outlined at the outset. For lack of a better name, I will refer to this object movement at LF as 'LF Object Shift' in the following discussion, thereby suggesting that it is a covert form of a phenomenon known as Object Shift in certain languages (see Johnson 1991 and Wyngaerd 1989).

2. LF Object Shift and Chain-Binding

Given that the subject originates in Spec (VP), the application of LF Object Shift yields a configuration in which the raised object c-commands the original trace of the subject (which has moved to Spec (AGRoP)) from the Spec position of AGRoP, as shown in (9):

\[
\begin{array}{c}
\text{NP}_1 \\
\downarrow \\
\text{AGRs} \\
\uparrow \\
\text{AGRs'} \\
\uparrow \\
\text{AGRsP} \\
\end{array}
\]

One important consequence immediately follows: NP$_2$ can now chain-bind an anaphor contained in NP$_1$, by definition (5). My claim here is that this is exactly what explains backward binding in such examples as (2) and (6)-(7) in the previous section. This amounts to saying, in effect, that backward binding is a fully expected phenomenon which calls for no special treatment under current theory.

Let us assume, for concreteness' sake, that psych verbs like *please, annoy*, etc., as well as other lexical causative verbs like *break, kill*, etc., are derived by a lexical operation that is similar to syntactic causativization. The latter is responsible for Japanese causative complex verbs
of the form 'V-sase,' which include, among others, psych verbs like yorokob-(s)ase 'to please,' nayam-(s)ase 'to annoy,' etc.\(^1\) Thus, (2a) above, for example, has the following derivation, where NP\(_1\) stands for the Causer argument stories about each other and NP\(_2\) the Theme argument John and Mary:

\[
\begin{align*}
&(10) \quad \text{a. } [vP_1 \text{ NP}_1 [v \text{ V}_1 [vP_2 \text{ V}_2 \text{ NP}_2]]] \\
&\quad \text{b. } [vP \text{ NP}_1 [v \text{ V}_2 \text{ V}_1 (=\text{please}) \text{ NP}_3]] \\
&\quad \text{c. } [\text{AGRSP} \text{ NP}_1 [\text{AGRSP} \ldots [vP \text{ t}_1 [v \text{ V} \text{ NP}_2]]]]
\end{align*}
\]

\(^1\) Alternatively, one may be tempted to distinguish between syntactic causatives like yorokoba-se-ru and nayama-se-ru on the one hand and lexical causatives like yorokoba-su and nayama-su on the other, claiming that it is rather the latter that form the psych verb class while the former are instances of 'usual' causative predicates with an Agent subject. Observe the subtle difference in (i):

(1) a. Taro-ga Hanako-o (??wazato) nayamasu (koto). 'The fact that (the fact that) Taro annoys Hanako (intentionally).' \\
b. Taro-ga Hanako-o (wazato) nayamaseru (koto). 'The fact that Taro annoys Hanako (intentionally).'

To my ear, (iia) sounds more natural with the nonvolitional Causer reading of Taro, and therefore does not readily cooccur with volition adverbs like wazato 'intentionally,' while (ib) is more likely to receive the volitional Agent subject reading.

The distinction between lexical and syntactic causatives in Japanese is certainly motivated by the consideration of pairs like mi-\text{to-se} 'to make-see or to show' and mi-\text{sase} 'to make see' or ki-\text{to-se} 'to make-wear' and ki-\text{sase} 'to make wear.' It has been known (Grimshaw 1990, for example) that these two classes of predicates behave differently with respect to the binding of an anaphor by the 'embedded subjects':

(ii) a. Taro-ga [Hanako\(_1\)-ni zibun\(_1\)-me-o ie-o mi]-seta. 'Taro showed Hanako self's house.' \\
b. Taro-ga [Hanako\(_1\)-ni zibun\(_1\)-me-o ie-o mi]-saseta. 'Taro made Hanako see self's house.'

Given the subject-oriented nature of zibun, the fact that in (iib) but not in (iia) Hanako can bind the anaphor indicates that at the relevant level lexical causatives do not have the kind of complement structure which would contain Hanako as an embedded subject.

As it turns out, however, in the case of psych verbs we can detect no such asymmetry, at least as clearly as in (ii):

(iii) Sono nyuuusu-ga Hanako\(_1\)-ni zibun\(_1\)-no seikoo-o yorokobasu/yorokobaseru (koto). 'The fact that (the fact that) the news pleases Hanako at self's success.'

Regardless of the type of the predicate used, Hanako can bind the anaphor in (iii). (For related issues, see Pesetsky's (1992) discussion on what he calls the 'T/SM restriction.') That backward binding is possible in either construction casts further doubt on the relevance of lexical vs. syntactic distinction for the psych vs. non-psych causative verbs:

(iv) Zibun\(_1\)-no seikoo-ga Hanako\(_1\)-o yorokobasu/yorokobaseru (koto). 'The fact that (the fact that) self's success pleases Hanako.'
d. \[[AGRsP NP_1 [AGRs \cdots] [AGRoP NP_2 [AGRo' V-AGRo [VP t_1 [v, t_1, t_2]]]]]]

I will assume that the mapping from (10a) to (10b) takes place in the lexicon, where \( V_2 \) incorporates into \( V_1 \) to form the lexical 'causative' verb *please* (cf. Baker 1988a). (10a) amounts to Hale and Keyser's (1991) 'lexical relational structure (LRS).’ Here \( V_1 \) indicates the abstract causative verb—call it 'CAUSE'—while \( V_2 \) is the abstract verb with the meaning 'to be pleased.' Thus \( V_2 \) as such represents the inchoative event 'John is pleased,' which in turn is the complement of the causative \( V_1 \). With lexical insertion, (10b) comes close to the D-structure representation of (2a), which should replace B&R's (4).

As noted above, here I follow Baker (1988b) and assume that B&R's 'Theme' is in fact the Causer argument (NP_1), while their 'Experiencer' corresponds to the Theme argument (NP_2). (10c) is the S-structure representation derived by, among others, the movement of NP_1 into Spec (AGRs_P), and (10d) is the LF representation derived by LF Object Shift as well as V-to-AGRo raising.

What concerns us here is the fact that in (10d) NP_2 c-commands the trace of NP_1 left in the VP-internal subject position. Backward binding now reduces to a case of the chain-binding effect, on a par with (11), for example:

(11) [Pictures of himself], John likes t_j.

The only difference is that in (2a) the binding relation is established only at the level of LF.

Essentially the same account holds of other cases of backward binding with a Causer subject. Here I show only one more example, leaving further confirmation to the reader:

(12) a. \[[NP_1 Zibun-no sippai]-ga [[NP_2 Taro]-o intais-(s)ase-ta (= (6b))]

b. \[[AGRsP \cdots [VP_1 NP_1 [V, [VP_2 NP_2 intais-(s)ase]]]]

c. \[[AGRsP NP_1 [AGRs \cdots] [AGRoP NP_2 [AGRo' [VP_1 t_1 [V, [VP_2 t_2 t_v] t_sase]] intais-(s)ase-AGRo \cdots]]]

(12b) is the D-structure representation. On the assumption that subjects in Japanese remain within VP until at LF, the S-structure representation differs from (12b) only in the application of V-to-*sase* raising to form the complex causative predicate *intais-(s)ase*. (Recall that we view Japanese psych verbs also as such predicates.) The LF repre-
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sentation (12c) is derived by the movements of NP₁ to Spec (AGRₛP) and of NP₂ to Spec (AGRₒP), as well as of the complex V to AGRₒ. Observe that NP₂ now c-commands t₁.

Let us now turn to a second consequence of the present analysis. It is widely attested that psych verb constructions do not permit a reflexive Theme (=B&R’s ‘Experiencer’) object. Thus we have the following contrast:¹

(13) a. Johni hit himself₁.
   b. Taro₁-ga zibun₁-o nagutta.
      ‘Taro hit himself.’

(14) a. *Johni pleased himself₁.
   b. *Taro₁-ga zibun₁-o yorokobasetā.
      ‘Taro pleased himself.’

Roberts (1991) proposes to derive the ungrammaticality of examples like (14a) from a general chain condition as stated in (15):

(15) The sequence (α₁ . . . αₙ) is a chain only if αᵢ locally binds αᵢ₊₁, i < n.

Roberts builds his analysis on the Belletti-Rizzian D-structure representation for psych verbs, but his proposal is equally valid for the present approach. (14a), for example, is associated with the following LF representation:

(16) [AGRₛP Johnᵢ [AGRₛ Grammar ... [AGRₒP himselfᵢ₊₁ [AGRₒ Grammar [vP tᵢ [v, tᵢ = i]]]]]]

Here with the intervention by himselfᵢ₊₁, (Johnᵢ, tᵢ) cannot form a well-formed chain; in particular, it is not a θ-chain, and the argument John cannot be related to its θ-position, thus yielding a θ-criterion violation.² Consequently, (14a), and (14b) too, can be ruled out on a par with other local binding violations including the following (see Baker, Johnson and Roberts 1989):

¹ Here the subjects in (14a, b) should be carefully limited to the nonvolitional Causer interpretation. The contrast becomes even more striking if we replace yorokobasēru with yorokobasu in (14b):

(1) *Taro₁-ga zibun₁-o yorokobasu (koto).

See the discussion in fn. 1. to p. 155.

² On the other hand, that tᵢ intervenes in the chain (himselfᵢ₊₁, tᵢ₊₁) cannot be responsible for the ungrammaticality of the sentence, for a reason to be clarified below. Cf. fn. 1. to p. 164.
(17) a. *John$_i$ seems to himself$_i$ [$_i$ to be intelligent].
    b. *John$_i$ was killed by himself$_i$.
    (cf. John$_i$ was kill-EN$_i$ t$_i$ (by himself$_i$).)

I have argued in this section that the general possibility of backward binding with Causer subjects is an automatic consequence of LF Object Shift in tandem with the VP-internal subject hypothesis. Thus, backward binding constitutes one successful instance of the interaction of the Binding theory and Chomsky’s (1992) new Case theory, thereby providing evidence for the latter. This analysis also explains why forward binding is prohibited in psych verb constructions, much in the spirits of Roberts (1991). Chomsky (1992) proceeds further and proposes to eliminate both D- and S-structures as grammatical levels of representation. He attempts to endorse this rather radical shift in part by showing that the application of the Binding conditions can be, and in fact must be, limited to the level of LF. It is of great interest here to note that the analysis just outlined argues in favor of this shift, as it provides further cases in which correct generalizations can be captured by applying Condition A not to D- /S-structures (as in B&R’s theory, for example) but rather to LF structures that differ from them in crucial respects.

A serious problem now must be addressed. As seen above, Agent subjects behave in exactly the opposite way to Causer subjects; they prohibit backward binding, while allowing forward binding. These properties are totally unexpected in our analysis so far. Below I will suggest one possible solution of this dilemma, which will lead to an elaborated revision of the extended IP structure hypothesis. Before that, in the next section I will briefly discuss scrambling in Japanese. Scrambling has been known to exhibit certain binding peculiarities, which are in fact shared by the constructions considered here. This in turn suggests that scrambling may be reduced to an overt counterpart of LF Object Shift.

3. Scrambling as Overt Object Shift: Evidence from Binding

The theoretical status of scrambling has received much attention in recent literature (Saito 1989 and Mahajan 1990, among others). In particular, it is observed cross-linguistically that at least some instances of scrambling affect binding possibilities, and therefore must be treated
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as syntactic operations that feed into LF. Consider the following Japanese data:

(18) a. *Taro-ga otagai\textsubscript{1}-no tomodachi-o [Hanako to Yoshiko]\textsubscript{-}ni syoo-kai sita.
   \textquoteleft Taro introduced each other\textquotesingle s friends to Hanako and Yoshiko.'
   b. Taro-ga [Hanako to Yoshiko]\textsubscript{-}ni otagai\textsubscript{1}-no tomodachi-o t\textsubscript{1} syoo-kai sita.
   \textquoteleft Taro introduced to Hanako and Yoshiko each other\textquotesingle s friends.'

The prohibited reciprocal binding in (18a) becomes possible in the scrambled version (18b). Without specifying the landing site for the scrambling in (18b), the binding pattern here can be represented as follows:

\[
\begin{array}{c}
\text{Ok} \\
\text{*}
\end{array}
\]

(19) [H \& Y . . . [ . . . otagai . . . [ . . . H \& Y . . .
scrambling

As should be obvious, what happens here bears a striking resemblance to the pattern of backward binding via LF Object Shift discussed above. In both processes, the binder is raised from a non-c-commanding to a c-commanding position, thereby establishing an otherwise impossible binding relation. This consideration strongly suggests a close connection between these two operations.

There is another binding property shared by scrambling and LF Object Shift. Scrambling has the effect of canceling weak crossover (WCO) effects. Compare the following:\footnote{I have carefully excluded \textit{zibun} from the examples in (20) because of its subject-oriented nature. One SEL reviewer correctly observes that (20c) will be unacceptable if we replace \textit{sono hito} with \textit{zibun}, but this is simply because the antecedent is not a subject—a matter which has no bearing on the present topic.}

(20) a. Daremo\textsubscript{1}-ga [sono hito\textsubscript{1}-no hahaoya]-o aisiteiru.
   \textquoteleft lit. Everyone loves the person\textquotesingle s mother.'
   b. *[Sono hito\textsubscript{1}-no hahaoya]-ga daremo\textsubscript{1}-o aisiteiru.
   \textquoteleft lit. The person\textquotesingle s mother loves everyone.'
   c. Daremo\textsubscript{1}-o [sono hito\textsubscript{1}-no hahaoya]-ga t\textsubscript{1} aisiteiru.
   \textquoteleft lit. Everyone, the person\textquotesingle s mother loves.'
In Japanese, personal pronouns like kare 'he' cannot bear a bound variable reading. Instead, expressions like sono hito 'the person' and soitu 'the guy' assume the role of a bound pronoun, as witness (20a) (cf. Hoji 1991). (20b) then manifests the usual WCO effect, which disappears once the quantificational antecedent is scrambled over its binder, as in (20c).\footnote{Because of the rather dubious status of the Bijection Principle, I tentatively assume that the following condition is what explains the WCO effect:} \footnote{(i) Overt pronominals cannot be locally bound by an operator. See Fujita (1991).}

Quite interestingly, WCO cancellation occurs also in psych verb constructions. Thus, compare (21) with (20b):

\begin{quote}
(21) [Zibun\textsubscript{1}-no / Sono hito\textsubscript{1}-no uwasa]-ga daremo\textsubscript{1}-o nayamaseta.
\quad 'lit. Self's / The person's rumor annoyed everyone.'
\end{quote}

Compare also:

\begin{quote}
(22) a. *His\textsubscript{1} father hit everyone\textsubscript{1}.
b. His\textsubscript{1} photograph pleased everyone\textsubscript{1}.
\end{quote}

Once again, LF Object Shift, which permits the pronominal binding in (21) and (22b), has the same effect as scrambling in that they both move the quantificational antecedent to a position from which proper pronominal binding is possible. WCO cancellation then counts as a third binding property which follows from the analysis proposed here. In fact, it can be observed with Causer subjects in general:

\begin{quote}
(23) Soitu\textsubscript{1}-no sippai-ga daremo\textsubscript{1}-o intaisaseta.
\quad 'lit. The guy's failure made everyone retire.'
\end{quote}

In short, scrambling shares certain binding properties with LF Object Shift because both processes have the same effect of raising an otherwise illicit antecedent to a position from which it can properly bind an anaphor or a pronoun. From this consideration the possibility now follows that some instances of scrambling, notably those which have been known as VP-internal short distance scrambling, are in fact an overt counterpart of LF Object Shift (see Wyngarede 1989).

Gien that LF Object Shift is motivated by the Case theory, it seems natural to ask whether scrambling is not motivated in the same way. If it is, then the optionality of short distance scrambling in a given
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language should mean that the relevant Case checking may apply either before or at LF in that language. We can conjecture that when it does not apply, it is because AGRo does not yet have the relevant feature to be checked—the [+acc] Case feature. It should be recalled that this feature originates in V and is transmitted to AGRo by V-to-AGRo movement. Then the optionality of short distance scrambling will be reduced to that of the syntactic V-to-AGRo movement. Johnson (1991) quotes Icelandic data which show that syntactic Object Shift is possible in this language only when there is concomitant application of V raising. This phenomenon receives a natural interpretation in the present approach, and is evidence for it. Thus short distance scrambling may well be a syntactic operation triggered by a feature checking requirement, on a par with wh-movement and others. Whether all instances of scrambling can be handled in the same manner remains unclear, however.

4. On the Existence of AGRoP-External Subjects: The Revised Extended IP Structure Hypothesis

In the foregoing discussion I have argued that the possibility of backward binding with Causer subjects, together with certain other binding properties, follows from the conspiracy of LF Object Shift and the VP-internal subject hypothesis within the framework of Chomsky (1992). These properties have long been treated as exceptional peculiarities of psych verbs. A radical change of view is mandatory now, however, and what calls for an explanation is rather the fact that other subjects, most notably Agent and Experiencer subjects, do not manifest these binding properties:

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1 It is a widely accepted view (Chomsky 1986b) that wh-movement is triggered by the requirement of [+wh] feature agreement between C and its specifier. The optional application of syntactic wh-movement, as in French, has been accounted for by allowing the agreement requirement to be satisfied either at S-structure or at LF. An alternative view which seems more appropriate in the current context is as follows: When wh-movement does not apply overtly, it is because at S-structure there is simply no feature to be checked under agreement via that movement. In general terms, movement need not, and must not, apply unless necessary, along the economy of derivation guideline of Chomsky (1989). Accordingly, C is always [−wh] when syntactic wh-movement does not take place. If the sentence contains a wh-in-situ to be raised at LF, then its LF movement into Spec (CP) turns the [−wh] C into [+wh] only at this level, perhaps due to a mechanism like Rizzi's (1991) 'dynamic agreement.'
(24)= (3)
   a. *Friends of each other, hit [John and Mary].
   b. *Zibun₁-no hahaya-ga Taro₁-o nagutta.
(25) a. *Children of each other, fear these mothers.
     (cf. Children of each other, please these mothers, where children =
      Causer)
   b. *Zibun₁-no hahayaya-ga Taro₁-o aisiteiru.
      'lit. Self's mother loves Taro.'

According to the proposed analysis, backward binding holds because the object c-commands the VP-internal subject position at LF. A natural approach to the 'exceptional' status of Agent and Experiencer subjects as in (24)–(25) will then be to assume that these subjects originate in a VP-external position—more precisely, in a position higher than Spec (AGRoP)—so that the raised object will not c-command the subject trace at LF.

Let us consider Experiencer subjects first. Diesing (1992), in her analysis of Individual-level predicates (ILPs) and Stage-level predicates (SLPs), proposes to account for the obligatory generic reading of bare plural subjects of ILPs on the basis of the assumption that these subjects are base-generated in Spec (IP)—or in an AGRoP-external position, for our purpose. Without entering into the details of Diesing's theory, here it is important to note that Experiencer-subject psych verbs are ILPs while Causer-subject (=traditional Experiencer-object) psych verbs are SLPs, as argued by Diesing (see also Endo and Zushi 1993). Given this, the subjects in (25a, b) will be projected in a position outside VP. This position, however, cannot be Spec (IP) as in Diesing's analysis for an obvious reason. Instead, I will assume that there is a higher abstract verb which selects AGRoP as its complement and assigns to its subject whatever θ-role will be appropriate in Diesing's theory.¹ ² Assume furthermore, again following Diesing, that ILPs have a PRO subject in the VP-internal subject position.

¹ Diesing suggests a θ-role which roughly means 'has the property x,' where x corresponds to the lower predicate. If our characterization of Agent as volitional Causer is correct (see below), this θ-role must also be the source of such volitionality.
² As an alternative to a higher abstract V, one could assume that subjects of ILPs are base-generated in the Specifier of some functional head higher than AGRoP, T(ns) for example. It would be interesting in this connection to note that the generic reading of bare plural subjects of ILPs is in part dependent on the [+present] Tense feature.
These considerations lead us to the postulation of a more elaborate IP structure than the Chomsky-Pollockian model introduced at the outset—call this the revised extended IP structure hypothesis:

(26)

\[
\begin{align*}
&\text{AGRsP} \\
&\quad \text{NP}_1 \quad \text{AGRs'} \\
&\quad \quad \text{AGRs} \quad \text{TP} \\
&\quad \quad \quad T' \\
&\quad \quad \quad T \\
&\quad \quad \quad \quad \text{VP1} \\
&\quad \quad \quad \quad t_1 \quad V' \\
&\quad \quad \quad \quad \quad V_1 \\
&\quad \quad \quad \quad \quad \text{AGRoP} \\
&\quad \quad \quad \quad \quad \quad \text{NP}_2 \quad \text{AGRo'} \\
&\quad \quad \quad \quad \quad \quad \quad \text{AGRo} \quad \text{VP2} \\
&\quad \quad \quad \quad \quad \quad \quad PRO_1 \quad V' \\
&\quad \quad \quad \quad \quad \quad \quad \quad V_2 \\
&\quad \quad \quad \quad \quad \quad \quad \quad \quad t_2
\end{align*}
\]

(25a), for example, now has the Experiencer subject *children of each other* as NP₁, and the Theme object *these mothers* as NP₂, in the structure of (26). Here the actual verb *fear* can be seen as the amalgamation of the two abstract verbs V₁ and V₂, though it would not be easy to understand to which part of the entire meaning of the verb V₁ and V₂ each contribute.

What is crucial with (26) in explaining the impossibility of backward binding in (25a) is, of course, that the VP-internal subject position is now occupied by PRO₁ controlled by NP₁ instead of the trace of NP₁ itself. NP₂ c-commands this PRO at LF, but certainly cannot chain-bind the anaphor inside NP₁. The same account holds of the Japanese example (25b), and readily extends to such cases as in (24), where the Agent subjects have no Causer counterpart. The possibility of for-
ward binding and the presence of WCO effects in these constructions can also be accounted for:

(27) a. John\textsubscript{i} hit himself\textsubscript{i}. \((=13a))\)
    b. John\textsubscript{i} fears himself\textsubscript{i}.

(28) a. *His\textsubscript{i} father hit everyone\textsubscript{i}. \((=22a))\)
    b. *His\textsubscript{i} father fears everyone\textsubscript{i}.

In the case of (27), the anaphor \textit{himself\textsubscript{i}} \((=\text{NP}\textsubscript{2} in (26))\) does not intervene in the subject chain \((John\textsubscript{i} \ldots t\textsubscript{i}) \((=\text{NP}\textsubscript{1} \ldots t\textsubscript{i})\) in (26)), hence no violation of the \(\theta\)-criterion in the manner mentioned above.\(^1\) As for (28), the pronoun is embedded in \text{NP}\textsubscript{1} in (26) and therefore is not in a position to be properly bound by the quantificational antecedent even after the latter has moved to \text{Spec}\ (\text{AGR}\text{OP}) at LF.

Consider then (29), in which the same subject can be interpreted either as the volitional Agent or as the nonvolitional Causer:\(^2\)

    ‘Students (intentionally) annoy Prof. Yamada.’
    b. [Zibuni-no gakusei]-ga (*wazato) Yamada-sensei,i-o nayamasete iru.
    ‘lit. Self’s students (*intentionally) annoy Prof. Yamada.’

The fact that a subject in a single sentence is sometimes ambiguous between the two readings (as in (29a)), and that backward binding is possible with the Causer reading but not with the Agent reading (as shown by the ungrammaticality induced by the volition adverb \textit{wazato} in (29b)), suggests that the subject can be projected either at Spec (VP\textsubscript{2}), as the Causer, or at Spec (VP\textsubscript{1}), as the Agent, in the structure (26). In particular, the Agent subject cannot be linked to a trace in Spec (VP\textsubscript{2}); otherwise backward binding would be incorrectly permitted and, furthermore, the resulting chain would obviously violate the \(\theta\)-criterion because it would contain two \(\theta\)-positions. The null hypothesis here will be that those Agent subjects which do have Causer

\(^1\) Notice also that PRO will intervene in the object chain in (27a, b). Given the full grammaticality of these examples, this intervention should not yield any \(\theta\)-criterion violation on the part of the object chain.

\(^2\) The two distinct readings of (29a, b), with the resulting (im)possibility of backward binding, seem obvious to me but not to others including a SEL reviewer. Presumably this is because of the general tendency for a human subject to appear with Agentivity.
counterparts also control a PRO subject in Spec (VP2). The corresponding Causer subject reading will then be represented by a structure which lacks the higher verb, \( V_1 \) in (26), and its projections, much in the same manner as the original extended IP structure.¹

Our analysis requires, in effect, that in (26) \( V_2 \) \( \theta \)-marks its Spec as Causer, while \( V_1 \) (or the \( V_1-V_2 \) amalgamation) \( \theta \)-marks Spec (VP1) as Agent, which can now be equated with volitional 'Causer.' Let us call \( V_1 \) MAKE, as opposed to \( V_2=\text{CAUSE} \), for ease of reference. A fully projected VP for causative constructions will now be as in (30):

\[
(30) \quad \begin{array}{c}
\text{VP1} \\
\text{Agent} \\
\text{MAKE} \\
\text{AGRoP} \\
\text{Spec} \\
\text{AGRo'} \\
\text{AGRo} \\
\text{VP2} \\
\text{Causer} \\
\text{CAUSE} \\
\text{Spec} \\
\text{V'} \\
\text{V3} \\
\text{NP}_3
\end{array}
\]

In languages with syntactic synthetic causatives, MAKE and CAUSE can each be realized by overt causative morphemes (like \(-sae\) in Japanese). \( V_3 \) is the inchoative base verb, which may or may not undergo incorporation into CAUSE or into MAKE, whether lexically or syntactically, thereby yielding a wide variety of causative constructions across languages.

The structure (30) makes a very strong claim about the correspondence between argument structure and base syntactic structure. Not

¹ For Diesing’s theory, this will mean that predicates with Causer subjects are all SLPs. The correctness of this rather strong prediction remains yet to be seen.
only does it require (like Baker's (1988a) Uniformity of Theta Assignment Hypothesis: UTAH) that, in accordance with a possible thematic hierarchy, Agent be projected in a position higher than Theme, etc., it also specifies distinct positions for the projection of these arguments. In particular, Agent and Causer have to appear in different positions, though they are equally 'external' arguments in some relevant sense. What will emerge from such an analysis is a somewhat strong version of UTAH—call it 'S(strong)-UTAH.' (Dis)confirmation of S-UTAH requires wide-ranging considerations which far surpass the coverage of this paper, but, for our present purpose, it suffices to note that S-UTAH correctly predicts that Agent subjects do not permit backward binding and other binding properties in question.1

Above we have noted that Spec (VP1) and Spec (VP2) cannot both be occupied by a single Agent argument at the same time. This complementarity is somewhat reminiscent of Baker's (1988b) analysis of psych verbs. Baker discusses the apparent loss of the 'Object of Emotion (OE)' argument in (31b), which does appear in its Experiencer-subject counterpart (31a):

\[(31)\]
\[a. \text{John fears death.} \\
\[b. \text{Ghosts frighten John (*at death).}\]

In Baker's terms, John in both sentences is the Theme, death the OE, and ghosts in (31b) is the Cause. To account for the obligatory absence of the OE argument in (31b), Baker assumes that in the lexical conceptual representation of frighten the OE argument is identified with the Cause argument, which means that either of them, but not both, can be projected into D-structure:

\[(32)\]  Frighten: \(\text{CAUSE} \left(\lambda x, \text{GO}_{\text{phobic}}(y) \rightarrow \text{TO}(\text{FEAR-OF}(x))\right)\)  

(Baker 1988b)

---

1 A SEL reviewer very rightly questions the theoretical status of UTAH in Chomsky's (1992) framework, which attempts to eliminate the Projection Principle as well as D-/S-structures. My tentative claim is that something like (S-) UTAH still exists at LF, which is now the only level of representation where the \(\theta\)-criterion holds. Not only is this a logical possibility, but it turns out to be a natural assumption once we choose the MAKE-CAUSE amalgamation rather than MAKE alone as the actual \(\theta\)-marker for the Agent in (30). Note that in English V-raising in general, and therefore the amalgamation in question, does not take place until at LF.
Thus *ghosts* in (31b) is in fact ambiguous between the OE and the Cause readings.¹

In a parallel fashion, we may represent the lexical conceptual structure (LCS) of *please*, for example, roughly as in (33):

(33) Please: \( \text{MAKE}(x, \text{CAUSE}(x, \text{GO}_{\text{psych}}(y, \text{TO}(\text{PLEASURE})))) \)

As before, backward binding is possible only when the Causer argument is chosen over Agent for projection. If something like (33) is indeed the LCS of *please*, then the corresponding LRS will not differ from (30), except for the absence of AGRo projections. This will mean that what syntax does for the derivation of (30) is in fact not the introduction of AGRo and MAKE projections above VP2 but only the insertion of AGRo projections inside VP1. In other words, we can still maintain the probably desirable assumption that lexical categories are all present in lexical syntax, prior to overt syntax, while

1 Accordingly, in Baker's analysis backward binding is possible only when the subject is projected as the OE argument, in which case the surface form is derived in the Belletti-Rizzian manner.
limiting the insertion of functional categories to the latter component.

The derivation of Japanese synthetic causatives like (29a, b) above, involving *nayamase*, is now straightforward; it can include either of the following two substructures:

On one hand, -*sase* in (34a) corresponds to MAKE in (30) and its subject NP₁ is assigned the Agent role. On the other, -*sase* in (34b) corresponds to CAUSE in (30), NP₂ being the Causer argument. In both structures, NP₃ indicates the Theme argument. The complex verb *nayamase* is uniformly the output of the V movement as indicated, the sole difference being in the target position. Only in (34b), i.e., only when the subject is the Causer, is backward binding possible after LF Object Shift has raised NP₃ to Spec (AGRoP) via Spec (VP₃), permitting it to c-command the trace of NP₂. In this way, we can correctly distinguish between the two readings of (29a, b) and predict the resulting (im)possibility of backward binding.

I have argued throughout this section that the presence vs. absence of the binding properties under consideration reduces to the question of whether the subject involved is projected below or above AGRoP, so that the position will be or will not be c-commanded by the object at LF from the Spec (AGRoP) position. In particular, Pesetsky’s generalization (8) follows from the VP₂-internal position of Causer subjects in the structure (30). This analysis would remain only descriptive if we could not know in any principled manner which subjects are projected where. Diesing’s theory of ILPs and SLPs provides a clue to a solution. Thus we can assume that Experiencer subjects are subjects of ILPs and therefore are projected AGRoP-externally, in Spec (VP₁) in our terms, hence no backward binding, etc. In accordance with this line of approach, I have proposed the revised extended IP structure hypothesis as shown in (26) and (30) by incorporating into the extended IP structure Diesing’s proposal for two distinct thematic subject positions.

5. Concluding Remarks

To sum up, the mechanism of LF Object Shift, triggered by the new Case theory, has the effect of yielding a structure in which the object c-commands the VP-internal subject position. Accordingly, the phenomenon of backward binding observed in constructions with Causer subjects, together with some other binding properties, now
follows as an automatic consequence. The absence of these phenomena in other constructions is then attributed to an AGRoP-external position of the subjects involved.

Many problems are left open, but of great theoretical importance here is that in this analysis the required structural relation between the binder and the bindee is established only at the level of LF; neither D- nor S-structure configuration is sufficient (or necessary, for that matter) to account for these binding phenomena. This clearly indicates that the Binding theory, here Condition A in particular, must crucially apply at the level of LF but need not refer to D- or S-structure. This conclusion offers further support for Chomsky's (1992) proposal to eliminate D- / S-structures as independent levels of representation from the theory of grammar.

References


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