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Item Type	article;article
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Download date	2025-05-19 07:54:11
Link to Item	https://hdl.handle.net/20.500.14394/36932

Control and Extraposition: The Case of Super-Equi

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1. The Problem

This paper investigates the distinction between obligatory control (OC) and non-obligatory control (NOC) as revealed in the Super-Equi construction. This construction, first studied (and named) by Grinder (1970), poses a non-trivial challenge to any syntactic account of control - the challenge of locality. The basic paradigm that Grinder observed is given below:

- (1) a. John said that making a fool of herself in public disturbed Sue.
- b. John said that making a fool of himself in public disturbed Sue.
- c. John said that it disturbed Sue to make a fool of herself in public.
- d. * John said that it disturbed Sue to make a fool of himself in public.

To facilitate discussion, let us refer to cases where the controller occurs in the clause immediately dominating the PRO-containing infinitive/gerund as *local control*, and cases where it does not *long-distance (LD) control*. Let us further refer to the nonfinite clause in (1a,b) as in *intraposition* and in (1c,d) as in *extraposition*, taking these terms as strictly descriptive labels at the moment. Then Grinder's facts amount to the observation that if a local controller is available then it is obligatory in extraposition but optional in intraposition.¹

For nearly 30 years now, this asymmetry has been taken to constitute the fundamental empirical challenge facing any theory of Super-Equi. That is, the challenge was to formalize a locality principle that would be restrictive enough to rule out LD-control in extraposition with a potential local controller (1d) but not too stringent to rule it out in extraposition without a potential local controller or in intraposition (1b).

It turns out that Grinder's paradigm is misleadingly partial; and that once the full paradigm is considered, the line between LD and local control ceases to correspond to the line between intraposition and extraposition. The relevant factor is the semantic class of the predicate governing the infinitive. The following examples present the full paradigm:

¹ Some speakers find (1d) improved if the matrix tense is modal (*would, might*, etc.). Yet for other speakers the example remains bad. I will assume the latter judgment; however, to avoid controversy, I will use only past tense in this kind of examples. In section 5.3 I return to a possible reason for this effect.

- (2) a. Mary knew that it was painful to John [PRO to perjure himself/*herself].
 b. Mary knew that it was harmful to John [PRO to perjure himself/herself].
 c. Mary knew that [PRO to perjure himself/herself] would be painful to John.
 d. Mary knew that [PRO to perjure himself/herself] would be harmful to John.
- (3) a. Mary thought that it pleased John [PRO to speak his/*her mind].
 b. Mary thought that it helped John [PRO to speak his/her mind].
 c. Mary thought that [PRO to speak his/her mind] would please John.
 d. Mary thought that [PRO to speak his/her mind] would help John.

The property that *painful/please* have in common but which *harmful/help* lack is that of being psychological. By that we simply mean that statements like “X is painful to Y” carry certain psychological entailments with respect to the mental state of Y, whereas statements like “X is harmful to Y” carry no such entailments.

Two comments are in order: The (b) cases above trigger a residual garden-path effect, giving rise to some difficulty under the LD-control reading. Crucially, though, speakers easily recover from that garden-path effect, given the appropriate context, whereas LD-control remains fatally bad in the (a) cases. This suggests a real grammatical difference. Secondly, the contrast is obscured (that is, LD-control in the (a) cases improves) if an intonational pause is inserted before the infinitive; this favors a right-dislocation analysis, which is again expected to affect the status of the sentences, given the analysis below.

Bearing these comments in mind, consider the pattern above: As an object of psychological predicates, the EXPERIENCER *John* triggers an intervention effect in the (a) examples above, which involve extraposition. No comparable effect is attested in the (c) examples, which involve intraposition. As an object of non-psychological predicates, the GOAL/PATIENT *John* triggers no intervention effect either in the extraposition cases (b) or the intraposition ones (d). Notice that the pattern is identical for verbs, adjectives and nouns in the position of the predicate, hence the generalization is category-neutral.

Grinder’s intervention effect is therefore restricted to infinitives under psychological predicates. The theoretical problem now is the following: What notion of *control* may yield this pattern? In particular, how does the locality component in this notion interact with the thematic structure of the governing predicate and the position of the infinitival to produce the Super-Equi paradigm? The following section addresses these issues.

2. An Analysis

The analysis I propose incorporates assumptions about Obligatory Control, about extraposition and about the projection of argument structure. Let us start with the first component:

- (4) *Obligatory Control*
 Let X be a predicate and S, a PRO-containing infinitive, an argument of X.
 If S is contained within XP, then the controller of PRO is also an argument of X.

(4) or some other distinction between OC and NOC is necessary in any theory of control. Thus, Bresnan (1982) attributes the distributional distinction between OC-clauses and NOC-clauses to the distinction between open and closed grammatical functions (although the latter is itself stipulated, not derived). Manzini (1983) reduces it to the distinction between governed and ungoverned positions. It is in fact not clear that anything more complicated than the simple co-argumenthood condition in (4) is necessary; at least

with respect to the present discussion, (4) is a sufficiently accurate descriptive generalization.

A point to note is that the locality implied by (4) is an effect of argument structure, not syntactic structure. That this is the right view of OC will be argued in section 4. Notice that (4) makes no claims as to the *particular* choice of controller within the domain of OC; rather, it merely fixes the domain within which such a controller must be found. Under this view, the choice between subject and object control is a semantic/pragmatic one. This approach to OC is in line with Chomsky (1981), Manzini (1983), Koster (1984), Comrie (1984), Farkas (1988), Sag & Pollard (1991) and others, as opposed to the MDP tradition of Rosenbaum (1967), Larson (1991), Hornstein (1997) and Manzini & Roussou (1998). The debate is largely orthogonal to the questions raised by Super-Equi, hence I will not try to resolve it here.

(4) makes immediate predictions as to the classification of three major types of controlled clauses: complement, extraposition and intraposition. An infinitival in a complement position of a predicate X satisfies (4) w.r.t. XP; hence, it must be locally controlled, that is, within the minimal S containing XP (by some other argument of X). By contrast, an infinitival in subject or extraposed position is not contained in the maximal projection of its governing predicate; therefore, it will constitute an instance of NOC, allowing either arbitrary or LD-control. All these predictions are borne out, as will be presently shown.

Next, I assume that extraposition has the following properties:

- (5) *Extraposition*
- a. Motivation: VP-internal clauses must be peripheral at PF.
 - b. Level: Extraposition may apply in the syntax or at PF.

Assumption (5a) corresponds to the crosslinguistic observation that embedded clauses are typically peripheral to the VP and seldom intervene between a predicate and other internal arguments. Where this does not obtain in base-structure (because of thematic mapping), the embedded clause must extrapose. I assume that extraposition in this case is adjunction to VP; some evidence for this assumption is given below.

Notice that given (5a), (5b) is the null hypothesis. That is, if an operation X is driven by a PF-interface condition, then the simplest assumption would be that it can take place at any stage in the derivation prior to that interface. Any other stipulation - e.g., that X can only take place at the phonological component - is a departure from the null hypothesis, analogous to the (incorrect) claim that any operation driven by an interpretive constraint must be covert. The surprising, perhaps controversial consequence of the present proposal, is that a PF-driven operation (extraposition) might have an interpretive effect (licensing LD-control).

Lastly, we mention (fairly standard) assumptions about the projection of argument structure:

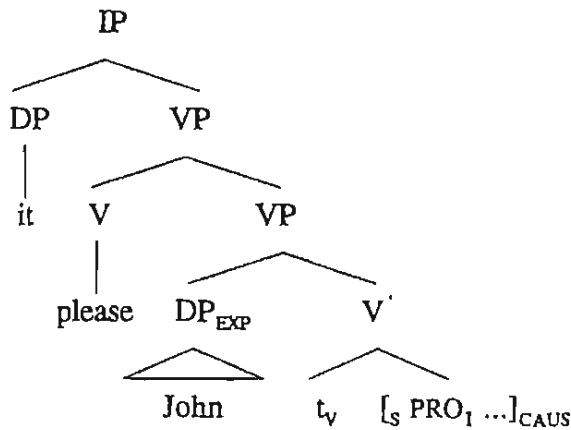
- (6) *Argument Structure*
- a. EXPERIENCER is generated above CAUSER.
 - b. CAUSER is generated above GOAL/PATIENT/THEME.

(6a) has been invoked to explain several unaccusative properties of psych-verbs (Belletti & Rizzi 1988), as well as certain scope reversal properties they display (Pesetsky

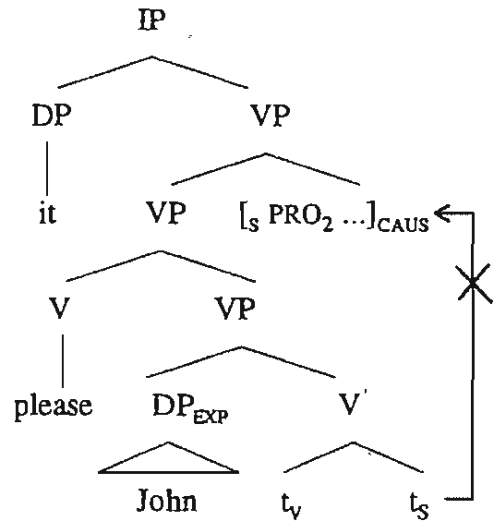
1995, Stroik 1996). (6b) is a standard assumption that needs no further comment. Notice that the two clauses of (6) never apply jointly; no predicate selects EXPERIENCER, CAUSER and GOAL/PATIENT at the same time. In what follows I will assume that thematic specifications such as (6) are neutral with respect to the categorial realization of arguments. In particular, the CAUSER argument may be either DP, IP or CP, all of which are generated in accordance with (6).

Armed with (4)-(6), we obtain the following structures (the index 1 indicates local-control, 2 indicates non-local control):

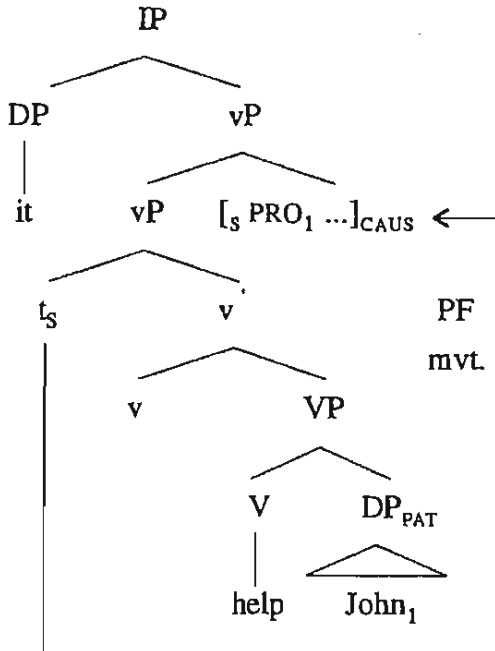
(7) (a) It would please John₁ [_S PRO₁ ...]



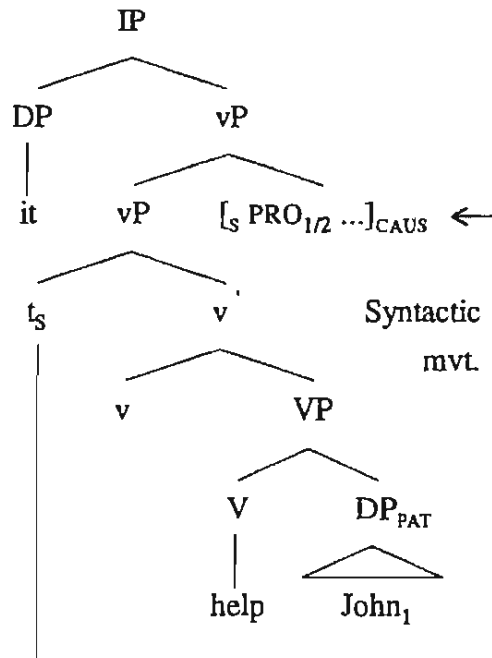
(b) * It would please John₁ [_S PRO₂ ...]



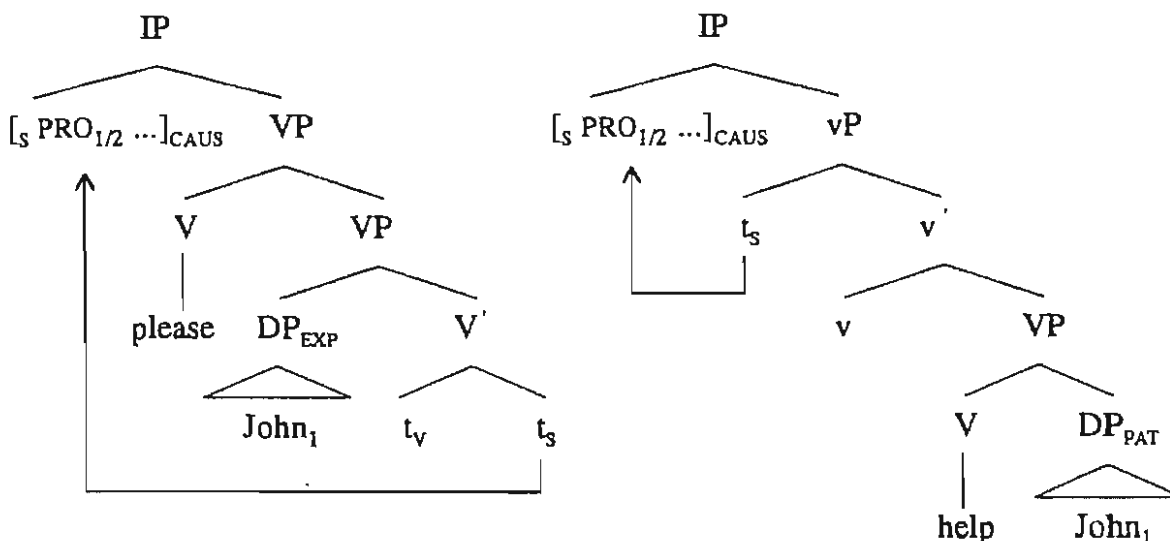
(8) (a) It would help John₁ [_S PRO₁ ...]



(b) It would help John₁ [_S PRO_{1/2} ...]



- (9) (a) [_S PRO_{1/2}] would please John₁ (b) [_S PRO_{1/2}] would help John₁



In (7a) the infinitive S is in-situ, below the direct object (by (6a)). By (4), the direct object is an obligatory controller. S is already VP-peripheral, hence extraposition as in (7b) - whether syntactic or phonological - is unmotivated. The ungrammaticality of (7b), with LD-control, follows from economy considerations. In (8) the infinitive S is generated above the direct object (by (6b)), hence not peripheral to VP. Extraposition is forced, by (5a), either syntactic or phonological, by (5b). If phonological, as in (8a), S is syntactically in-situ, and the direct object is an obligatory controller by (4). If syntactic, as in (8b), the structure fails (4), becoming an instance of NOC; hence the possibility (though not necessity) of LD-control.² In (9), with either predicate, S moves to [Spec,IP] in the syntax (EPP), escaping the domain of OC; we get again the option of LD-control. Notice that intraposition removes the infinitive from the VP, thus removing the motivation for extraposition (which is a VP-internal occurrence of the infinitive). We may assume, then, that (6c) only applies within VP. We thus account for the full Super-Equi paradigm.

3. Configurational Consequences

Striking confirmation for the proposed analysis comes from the interaction of extraction and c-command effects with LD-control. It is a theorem of the set of assumptions in (4)-(6) that whenever the infinitival is (syntactically) in situ, control is local; and whenever control is non-local (arbitrary or long-distance), the infinitival is extraposed to a position adjoined to VP. Assuming that adjuncts are islands to extraction, we expect a correlation between non-local control and failure of extraction.³

The following paradigm confirms our prediction w.r.t. arbitrary control:

- (10) a. It would help Bill₁ [PRO₁ to introduce himself to these professors].
 b. To whom₂ would it help Bill₁ [PRO₁ to introduce himself t₂ ?]

² While OC *forces* a local controller, NOC *allows* an LD-controller; thus, NOC subsumes OC in the range of possible controllers.

³ As infinitives are inherently weak islands, the observed effects are contrastive, not absolute.

- (11) a. It would help Bill₁ [PRO_{ARB} to introduce him₁ to these professors].
 b. * To whom₂ would it help Bill₁ [PRO_{ARB} to introduce him₁ t₂ ?]

The examples in (10) involve local control, those in (11) involve arbitrary control. Notice that the latter is available in principle as the predicate *help* is non-psychological. We observe that extraction is licit from a locally controlled infinitive (10b) but not from an ARB-controlled one (11b); this follows if the former is a complement and the latter is an extraposed adjunct, forming an island for extraction.

The following paradigm demonstrates the same facts with LD-control:

- (12) a. Hillary thinks it damaged Bill₁ [PRO₁ to talk about himself on the Dave Letterman show].
 b. That's the talk show₂ that Hillary thinks it damaged Bill₁ [PRO₁ to talk about himself on t₂].
- (13) a. Hillary₁ thinks it damaged Bill [PRO₁ to talk about herself on the Dave Letterman show].
 b. * That's the talk show₂ that Hillary₁ thinks it damaged Bill [PRO₁ to talk about herself on t₂].

The asymmetry is perhaps sharper in cases where, for pragmatic reasons, no ambiguity is possible, not even one that is resolved later on. Such cases arise when the argument preceding the infinitive is not a potential controller:

- (14) a. It would kill the workers₁ [PRO₁ to build this dam].
 b. What₂ would it kill the workers₁ [PRO₁ to build t₂ ?]
 c. It would kill the forest [PRO_{ARB} to build this dam].
 d. * What₂ would it kill the forest [PRO_{ARB} to build t₂ ?]
- (15) a. It would benefit John₁ [PRO₁ to explain the program to the dean].
 b. Who₂ would it benefit John₁ [PRO₁ to explain the program to t₂ ?]
 c. It would benefit the program₁ [PRO_{ARB} to explain it₁ to the dean].
 d. * Who₂ would it benefit the program₁ [PRO_{ARB} to explain it₁ to t₂ ?]

Adjunct extraction also brings out a clear contrast (in the following examples, matrix readings of the extracted adjunct - if possible at all - should be ignored):

- (16) a. It would be useful to Bill₁ [PRO₁ to talk about himself₁ more modestly].
 b. How₂ would it be useful to Bill₁ [PRO₁ to talk about himself₁ t₂?]
 c. It would be useful to Bill₁ [PRO_{ARB} to talk to him₁ more gently].
 d. * How₂ would it be useful to Bill₁ [PRO_{ARB} to talk to him₁ t₂?]

The extraction data strongly support the structural analysis proposed in section 2. Although string identical, locally and non-locally controlled infinitives occupy different positions in the syntax: The former are VP-internal, the latter are VP-external. This follows from the operation of OC within VP, and the complementary operation of NOC elsewhere. Control, which is sensitive to syntactic configurations, "sees" this contrast; pronunciation, which sees phonological configurations, does not see it, due to PF-extraposition, which neutralizes the contrast at the PF interface.

It is interesting to note that a very similar correlation between control and extraction was noted by Chomsky (1986) in the context of *tough*-constructions. Chomsky points out that sentences like (17a) are ambiguous, depending on whether or not *they* controls PRO

(whether, say, *they* is the organizers or the crowds). The ambiguity, however, is resolved in favor of local control if extraction takes place from the infinitive (17b):

- (17) a. They were too angry [PRO to hold the meeting].
 b. Which meeting were they too angry to hold?
 c. [they were [too angry [_{CP} PRO to hold the meeting]]]
 d. [_{IP} [they were too angry] [_{CP} PRO to hold the meeting]]

Chomsky suggests that the two readings of (17a) correspond to the two different structures (17c,d): Where *they* c-commands PRO it controls it (17c), and when it does not c-command PRO, we get arbitrary control (17d). Crucially, the infinitive in the latter is ungoverned, hence a barrier for extraction; therefore, only (17c) is a possible source for (17b), and we derive the desired correlation. Notice that modulo the notion of government, which is absent from the present proposal, the logic of the argument is the same: A VP-external infinitive is the common source for both arbitrary control and islandhood.⁴

The islandhood effects suggest that a non-locally-controlled infinitive is an adjunct, however they leave open the question of the exact adjunction site. The constraint in (5a) requires adjunction to VP; we now turn to hierarchical evidence to this effect.

Given standard conceptions of English clause structure, NEG c-commands VP-adjuncts but not IP-adjuncts, while direct objects c-command neither. The following pattern of NPI-licensing shows that both a complement infinitive and an extraposed one are within the scope of NEG, but only the former is in the scope of a direct object:

- (18) a. It wouldn't help Bill₁ [PRO₁ to praise himself at all].
 b. It wouldn't help Bill₁ [PRO_{ARB} to praise him₁ at all].
- (19) a. It would be useful to no one₁ [PRO₁ to ever say such things in public].
 b. ?? It would be useful to no one₁ [PRO_{ARB} to ever tell him₁ such things in public].

These contrasts indicate that the extraposed position is in the scope of NEG but not of the direct object (namely, VP). The position of VP-adjunct satisfies both of these conditions. Furthermore, Condition C tests show that a direct object does not c-command an ARB-controlled infinitive (20a)⁵ - however *does* c-command it if extraction took place (20b):

- (20) a. It would help him₁ [PRO_{ARB} to introduce Bill₁ to these professors].
 b. * To whom₂ would it help him₁ [PRO_{ARB} to introduce Bill₁ t₂ ?]

This follows again on the assumption that extraction is only possible from a complement position, placing the infinitive within the c-command domain of the object.

⁴ Another difference is the fact that for Chomsky, c-command determines control, whereas for me, co-argumenthood is the relevant notion. Favoring the latter in *tough*-constructions is the following example:

- i. He₁ thought that they were too angry to hold a meeting with John₁.

Notice that arbitrary control is possible in (i), just as in (17a), although the pronoun *he* c-commands the extraposed position (as the disjoint reference indicates). This follows if the domain of OC is restricted to the minimal argument structure containing the infinitive; beyond that, both LD and arbitrary control are equally available (subject to logophoricity restrictions).

⁵ It is easier to get coreference in (20a) when the pronoun *him* is destressed.

Finally, observe the following Weak Crossover effect:

- (21) a. It would ruin this tune₁ [PRO_{ARB} to play it₁ on a flute].
 b. ?? What tune₁ would it ruin t₁ [PRO_{ARB} to play it₁ on a flute]?
 c. What tune₁ would it ruin t₁ [PRO_{ARB} to play e₁ on a flute]?

Since the matrix object does not c-command the infinitive when arbitrary control obtains, the configuration in (21b) violates Weak Crossover. Predictably, the sentence becomes acceptable if the pronoun is replaced by an empty category, as in (21c); this involves a parasitic gap strategy, which is licensed precisely because the “anti c-command” condition is satisfied.

4. Control by Implicit Arguments

The idea that OC controllers are thematically determined is often recognized, though its full implications are occasionally neglected. Thus, although there is plenty of evidence that implicit arguments may control (see, among others, Kimball 1971, Koster 1984, Epstein 1984, Williams 1985, Roeper 1987), recent accounts assume that OC involves *syntactic* movement to the position of the controller (Hornstein 1997, Manzini & Roussou 1998).

Interesting support to the idea that implicit arguments are visible to OC comes from the interaction of Super-Equi and modal interpretation. It is well known that certain modal predicates are ambiguous between what has been called “epistemic” and “root” modality:

- (22) a. It is possible for John to win the race.
 b. It is possible [for John to win the race].
 c. It is possible [for John] [PRO to win the race].
 d. John might win the race.
 e. John is able to win the race.

The epistemic/root terminology is somewhat misleading, conflating semantic and syntactic properties. Hence I will use the neutral terms monadic vs. dyadic modals. A monadic modal, like *might*, takes a proposition as its sole argument; a dyadic modal, like *is able to*, denotes a relation between an individual and a property. Notice that (22a) has both readings, corresponding to (22d) and (22e). Following common treatments, I assume that the semantic ambiguity reflects a syntactic one: When *John* is parsed as the subject of the infinitive (22b) we get the monadic (semantically epistemic) modal, and when it is parsed as a matrix prepositional object (22c) we get the dyadic (semantically dynamic) modal.

In a Super-Equi context, the infinitive is the sole syntactic argument of the modal - hence, a complement falling under the OC generalization. If the generalization applies to implicit arguments, then apparent LD-control of infinitives under modals must be mediated by an implicit argument; therefore, such modals will only admit the dyadic reading. If, on the other hand, the OC generalization does not apply to implicit arguments, PRO can be directly controlled by a remote antecedent, and these sentences should be interpretively equivalent to sentences with overt pronominal subjects in the infinitive; in particular, they should give rise to epistemic readings as well. The facts confirm the former hypothesis:

- (23) a. Leibniz thinks it is necessary *(for him) to be identical to himself.
 b. Leibniz thinks it is necessary (for him) to be honest with himself.
- (24) a. John admits it is possible *(for him) to have been talking to himself unknowingly.

- b. John admits it is possible (for him) to talk about himself openly.
- (25) a. Mary insists it is impossible *(for her) to resemble anyone but herself.
b. Mary insists it is impossible (for her) to care about anyone but herself.

The infinitives in the (a) cases describe properties that are not amenable to individual control, strongly favoring monadic (epistemic) readings; by contrast, the infinitives in the (b) cases describe controllable properties, which permit dyadic (deontic/dynamic) readings. Crucially, only the latter allow the pronoun to be omitted. Schematically, then, the configuration in (26a), with an implicit θ -role, is grammatical, but the one in (26b) is not:

- (26) a. $DP_i \dots [_{CP} \dots [\text{Pred-}\theta_i [PRO_i \dots \text{to VP}]]]$
b. * $DP_i \dots [_{CP} \dots [\text{Pred} \dots [PRO_i \dots \text{to VP}]]]$

The contrast in (26) follows from the OC generalization (4). The infinitive, being the single internal syntactic argument, is generated as a complement to the modal predicate, hence inside its maximal projection. The OC generalization requires the controller to be a co-argument of the infinitive, which is precisely what the implicit (benefactive) argument is, and the remote DP is not. It therefore follows that in *intraposition*, the epistemic reading will be salvaged, since OC does not apply in this structure so the mediation of an implicit argument is not necessary. This prediction too is borne out:

- (27) a. Leibniz thinks that to be identical to himself is necessary.
b. John admits that to have been talking to himself unknowingly is possible.
c. Mary insists that to resemble anyone but herself is impossible.

We thus see that the facts of modal interpretation in Super-Equi follow automatically from the assumption that implicit arguments are visible to OC.

5. Deriving The OC Generalization

The present analysis heavily relies on a new generalization, given in (4) and repeated below, concerning the nature of obligatory control:

- (28) *Obligatory Control*
Let X be a predicate and S, a PRO-containing infinitive, an argument of X.
If S is contained within XP, then the controller of PRO is also an argument of X.

What (28) amounts to is the claim that an infinitive in-situ must find a co-argumental controller, whereas a displaced infinitive is not similarly restricted. This view of OC is theoretically distinguished from various alternatives in two important senses: First, it is fairly theory-independent, appealing to no problematic notions (open grammatical function, government, etc.); secondly, it identifies argument structure as the level where OC is determined (as opposed to syntactic structure, or grammatical relations). It was argued above that this generalization is not only conceptually simpler but also empirically adequate to handle all the properties of Super-Equi (and, of course, standard complement control). Nonetheless, (28) is merely a generalization, and one wants to know whether it can be derived from deeper principles of the grammar.

The task of this section is to derive the OC generalization in this sense. That is, I will show that (28) can be deduced from the combination of the anaphoric Agr theory of

Borer (1989), an identification condition on referentially dependent elements and bounding constraints; at the core of the explanation lies the necessity of the infinitival Agr to raise in order to be licensed. Furthermore, I will show that the category of NOC corresponds to a remarkable degree to the category of logophors in the sense of Reinhart & Reuland (1993); that is, anaphors that fail to be syntactically licensed. The range of constructions that fall under this account covers most cases of control that are discussed in the literature.⁶

5.1 Anaphoric Agr: Borer (1989)

The basic tenet of Borer (1989) is the idea that control is not a relation between an NP and the null subject of a nonfinite clause, but rather between an NP and the *head* of that clause, namely Infl/Agr. In analogy to the dependent Tense of infinitives, the phi-features of Infl are also dependent on a matrix antecedent, or in Borer's terms - anaphoric. When Agr is anaphoric, it must be identified (bound). The null subject, possessing no inherent phi-features, cannot serve as an antecedent. Agr raises to C, from where it may be bound by a matrix argument in accordance with the standard Condition A of the binding theory. Since the null subject is coindexed with Agr, it indirectly inherits the reference of Agr's antecedent. Thus "control of PRO" reduces to "binding of Agr".

On the empirical side, Borer's theory makes two important predictions not made by theories which assume that PRO is the target of control: i) If an anaphoric Agr can occur in a finite Infl, one expects to find control into finite clauses; ii) If overt pronouns can occur as subjects of infinitives, one expects to find control of overt pronouns. Both cases are crosslinguistically attested (see Borer (1989) for details).

5.2 OC = Anaphoric Agr

In what follows I will adopt the core idea of Borer (1989) - namely, that infinitival Agr is anaphoric. Yet I argue that the effect of OC should not be reduced to Binding Condition A, as in Borer's analysis, but rather to an identification condition on the distribution of referentially "defective" elements.

There are two compelling reasons, in my view, to dissociate OC from Condition A. The first of them is that OC is sensitive to argument structure, not syntactic structure. However, it is well known that Condition A allows the binder and the bindee to belong to different argument structures (as in *John believes himself to be intelligent*). The second reason concerns the visibility of implicit arguments vis-à-vis the two theories. It is an irreducible fact, first discussed by Rizzi (1986), that implicit arguments can control but not bind. This suggests that the underlying mechanisms involved are quite different.

Let us assume that an anaphoric Agr, like all referentially defective elements, must be in a local relation with its antecedent; the latter is now understood to be an argument slot specified for the predicate of which the infinitive is also an argument. As argument slots are not syntactically represented, "locality" here cannot be a relation between two distinct nodes on a syntactic tree. Rather, it must be a relation on a "sub-syntactic" level - the level of the lexical head itself. It follows that for anaphoric Agr to be identified by an argument slot, it must attach to the head of the predicate on which that argument slot is specified.

Put formally, we propose the following principle:

⁶ One construction that I will not discuss is control into gerundive temporal adjuncts. There are complicated factors involved in these constructions, including logophoricity, [+human] restrictions and topic/comment sensitivity; there is also considerable amount of speaker variation concerning the status of various examples (see Williams (1992) and especially Kawasaki (1993) for discussion).

(29) *Syntactic Identification of Anaphoric Agr*

If Agr is anaphoric, then it must be in the following configuration at LF:

$$\begin{array}{ccc}
 (\text{NP}_i) \dots \text{Agr}_i\text{-H(P)} & & [\text{H(P)}=\text{head of predicate P}] \\
 & | & \\
 & \theta_i &
 \end{array}$$

Notice that the presence of an overt controller is optional; strictly speaking, it is not part of the licensing condition itself, a correct result given the possibility of implicit control. (29) is restricted to *syntactic* identification; below I argue (following Reinhart & Reuland (1993)) that, failing syntactic identification, anaphors are interpreted as *logophors*, which are subject to radically different conditions.

Given that Agr is not base-generated in the configuration (29), some syntactic operation must take place to bring it about. So Agr has to raise to the matrix predicate in order to be licensed. Being a feature bundle, syntactically a “sub-head” split off the embedded Infl, it is natural to assume that Agr-raising is a variety of head-movement. (30a,b) illustrate the referential chain for subject and object control, respectively (abstracting away from subsequent movements of V, OBJ and SUB):

- (30) a. [..._{VP} SUB_i [_V Agr_i -V [_{CP} t_{Agr} [_{IP} pro_i [_{I'} Tense-t_{Agr} (to) VP]]]]]]]
 b. [..._{VP} SUB [_{VP} v [_{VP} OBJ_i [_V Agr_i +V [_{CP} t_{Agr} [_{IP} pro_i [_{I'} Tense-t_{Agr} (to) VP]]]]]]]]]

We have now fully derived the OC generalization. The argumenthood requirement follows from (29); and the locality requirement (namely, *co*-argumenthood) follows from the Head Movement Constraint. Agr can only raise as far as the governing predicate, and then must be linked to a thematic slot on that predicate.

Recall that for Borer, Agr-to-C is required to place Agr in the binding domain of a matrix argument. Unlike Borer, I assume that Agr does not stop in C but raises further to the matrix predicate, via successive-cyclic movement. The shift from Agr-to-C to Agr-to-C-to-V proves crucial for the explanation of why certain syntactic environments force OC and others allow NOC. To see this, consider again the consequences of the OC generalization (28); the three major positions an infinitive may occupy fall under the following two statements:

- (31) a. complement infinitive ⇒ OC
 b. subject / adjunct infinitive ⇒ NOC

We have already seen that this partitioning is supported by extraction asymmetries: OC infinitives, as complements, are transparent to movement, whereas NOC infinitives - like subjects and adjuncts in general - are islands. The claim I now make is that the *same* structural distinction is responsible for whether an infinitive displays OC or NOC: It is *because* complements are transparent to movement that Agr can raise out of them and be locally identified by a matrix argument; and it is *because* subjects and adjuncts are islands that Agr fails to raise out of them, resulting in NOC. The latter option, as will be shortly demonstrated, corresponds to logophors - namely, anaphoric elements that are not syntactically licensed. It should be noted that the literature offers numerous diagnostics for the OC/NOC distinction, but very few *explanations* for why certain infinitival positions are subject to OC and others to NOC. The Agr-to-V hypothesis is a genuine explanation in that it reduces the distinction to the well-established CED of Huang (1982).

5.3 NOC = Logophoric Agr

In the reflexivity theory of Reinhart & Reuland (1993), reflexives are distinguished by a certain formal feature, [-R], which reflects their referential dependence. Reflexives that are syntactically licensed (by Condition A) are *anaphors*, and all the rest are *logophors*. The dividing line is purely syntactic: Only reflexives occupying positions that qualify as “syntactic arguments” fall under Condition A. Logophors are licensed by discourse factors such as focus, perspective and center of consciousness or communication. Although these factors are quite diverse, the class itself is well-defined, being the complement to the class of reflexives occupying syntactic argument positions.

Suppose this division applies to all anaphoric elements, in particular, to anaphoric Agr as well. We then expect anaphoric Agr (and derivatively, PRO) to be logophoric precisely in those environments where it is not syntactically licensed - namely, where it cannot raise for whatever reason. These environments should display LD-control, subject to logophoricity constraints. The prediction is strikingly confirmed across a wide array of constructions, to which we now turn.

Consider first the Super-Equi cases analysed in detail above:

- (32) a. Mary₁ thought that it [_{VP} [_{VP} helped John] [_{TP} PRO₁ to speak her mind]].
 b. Mary₁ thought that [_{TP} [PRO₁ to speak her mind] would help John].

Whether in adjunct or in subject position, the infinitive is an island; consequently, Agr is “trapped” in its base position, violating (29), and can only be licensed as a logophor.

That LD-control in Super-Equi has a lot in common with logophoric anaphora is an old insight in generative grammar (Grinder 1970, Kuno 1975, Lebeaux 1985). Kuno observes the following parallels:

- (33) a. John said to Mary that it would be easy to prepare herself for the exam.
 b. John said to Mary that there was a picture of herself with a Mafia figure in the newspaper.
- (34) a. * John said about Mary that it would be easy to prepare herself for the exam.
 b. * John said about Mary that there was a picture of herself with a Mafia figure in the newspaper.

Kuno’s “Direct Discourse” analysis, by which the anaphoric element must refer to a discourse participant, is readily understood as the restriction that logophors refer to the center of consciousness or communication in the discourse.⁷ Under the present proposal, the logophoric nature of picture-anaphora and the parallel nature of displaced infinitives are the very same fact.

Recall that in section 5.2 Agr movement was formalized as head movement. While motivated by the general locality of OC, this locality does not in itself force a head-movement analysis. One may ask whether Agr-raising displays familiar properties of head movement - specifically, whether it is subject to the Head Movement Constraint (HMC). The answer is positive, and the cases in point genuinely reveal how productive the combination of Borer’s and Reinhart & Reuland’s insights is. Our analysis

⁷ According to Sells (1987, p.445), an antecedent for a logophor can be “the source of the report, the person with respect to whose consciousness (or self) the report is made, and the person from whose point of view the report is made”.

straightforwardly derives a well-known property of complement control which is rarely explained (see Bouchard 1984, Hornstein 1997 and Manzini & Roussou 1998 for discussion). This is the fact that arbitrary PRO is impossible if the infinitival is in complement position unless it is interrogative (the property holds quite generally of control verbs that may select an interrogative):

- (35) a. John instructed Mary [_{IP} PRO to prepare herself / *oneself to the exam].
 b. John instructed Mary [_{CP} how PRO to prepare herself / oneself to the exam].

I assume that the embedded interrogative C is a semantically contentful (though phonetically null in English) complementizer. The anaphoric Agr can neither skip this C, due to the HMC, nor pass through it (excorporation being excluded). Thus it cannot enter a local relation with the matrix predicate, and we get the effect of NOC. Notice that a theory in which PRO is the target of control has no obvious way to express the correlation between the content of [Spec,CP] (a *wh*-word) and that of [Spec,IP] (arbitrary PRO). In contrast, a theory in which Infl is the target of control, can naturally capture the dependence between the "accessability" of that head and the presence of a higher head.

If control into interrogative complements is an instance of NOC, we expect it to display logophoricity effects. This is indeed the case:

- (36) a. To John, Mary said [how to make himself popular].
 b. * Of John, Mary said [how to make himself popular].
 c. Of John, Mary said [how he should make himself popular].

Being a participant in the speech act of (36a) but not of (36b), *John* is a logophoric center only in the former, hence the contrast. Notice that the problem is really related to control and not to any selectional factors, as (36c) indicates.

A second case which plausibly falls under the same category of "insulated" nonfinite clauses is gerunds. Several authors have observed that gerundive complements (unlike infinitival ones) display NOC, e.g., allowing arbitrary or split control:⁸

- (37) a. Mary discussed cursing oneself. [Mohanani (1983)]
 b. Mary discussed perjuring themselves with Sandy. [Sag & Pollard (1991)]
 c. The government abolished having to serve in the army. [Kawasaki (1993)]

Gerunds cannot occur as matrix predicates, so it is reasonable to suppose that they are headed by an anaphoric Infl (perhaps an aspectual head). Following Abney (1987), I assume that the aspectual projection of gerunds is embedded in a DP. Thus the D above the

⁸ This statement should be qualified, as gerundive complements to some verbs display OC:

- i. John regrets drinking himself/*oneself into poverty.
 ii. Mary recalled hating herself/*oneself at high school.

Whatever (probably semantic) property distinguishes these cases, the present point is simply that *only* gerunds, but not infinitives, may display NOC in complement position. Notice that examples like (iii) do not undermine this conclusion, for there PRO is locally controlled by an implicit argument (as witnessed by the contrast in (iv)):

- iii. The guide said to take care of oneself in the cave.
 iv. The guide said to Mary to take care of herself / *oneself in the cave.

gerund in (37) functions as the C above the infinitive in (35) - intervening between the anaphoric Agr and the matrix predicate. Local identification is blocked, and we get the effect of NOC. Again, logophoricity is observed with LD-control:

- (38) a. ? Mary knew that Bill would discuss making a fool of herself in public.
 b. * Mary's husband knew that Bill would discuss making a fool of herself in public.

Finally, the HMC provides an answer to a problem raised in footnote (1). It was noted there that for some speakers, Grinder's intervention effect goes away - even with psychological verbs - when the infinitive is embedded under a modal tense. These speakers find (39b) markedly better than (39a):

- (39) a. * John said that it disturbed Sue to make a fool of himself in public.
 b. ? John said that it would disturb Sue to make a fool of himself in public.

The difference does not seem to follow from the CED, as the infinitive in both examples occupies a complement position. However, D. Pesetsky (p.c.) has pointed out to me that (39b) has a conditional semantics, roughly paraphrasable as *John said that it would disturb Sue if he made a fool of himself in public*. Suppose that the speakers who accept LD-control in (39b) actually represent the conditional reading in the syntax. In particular, they project an abstract *if*-morpheme in the complementizer position of the infinitive. That complementizer will then function in the same way that the interrogative one does - blocking Agr-raising from within the infinitive, resulting in NOC. Notice that the semantics of conditionals does not *necessitate* such a tight mapping to syntax, hence we expect to find speakers for whom (39b) is not better than (39a), as seems to be the case.

To sum up, we have seen four types of cases which do not fall under (29), giving rise to NOC (i.e., logophoric control): Extraposition, intraposition, interrogative and gerundive complements. Although syntactically quite different from one another, they all share one property - namely, the infinitival Agr fails to raise to the matrix predicate and so cannot be syntactically identified. This state of affairs mirrors the pattern of nominal anaphora to a remarkable degree, suggesting that the conception of control as a manifestation of anaphoric Agr captures a deep property of anaphora in natural language.

6. Conclusion

In this paper I have argued from hitherto unnoticed asymmetries for a particular view of how control and extraposition interact. Specifically, it was shown that infinitives embedded under psychological predicates require local control, whereas those embedded under non-psychological predicates, or intraposed to a subject position, allow non-local control. The empirical content of the proposal resides in the correlations observed between the possibility of LD-control and the structural position of the infinitive, diagnosed by extraction. From the fact that infinitives in certain contexts behave as though they occupy one position in the syntax but a different one at PF, I concluded that PF-extraposition must be admitted in the grammar, as a way of satisfying the interface condition on the placement of embedded infinitivals.

It was argued that a fairly simple theory of OC - one whose central notion is co-argumenthood of an infinitive in-situ and the controller - can account for all the relevant data. I argued that OC is a manifestation of an identification condition on Anaphoric Agr. The condition requires Agr to attach to a predicate head so that it can be identified by one of its argument slots. To obtain that configuration, Agr must raise to the matrix predicate, an operation that was shown to have properties of head-movement. This view succeeds not

only to derive the OC paradigm but also the various cases formerly classified as NOC; it was shown that all of them are instances of logophoric anaphora, precisely what the analysis predicts. This picture results in a principled division of labor between syntax (which fixes the domain of OC), semantics (which fixes the controller in OC) and pragmatics (which fixes the controller in NOC).

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