

Structural constraints in elliptic constructions

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Abstract

This manuscript argues for a novel approach to the resolution of certain elliptical constructions which takes as its starting point the abstract morphological constraints the head licensing the ellipsis site has to satisfy. Several phenomena - for instance the relative acceptability of verbal ellipsis with nominal antecedents, voice alternations under ellipsis, differential island repairing properties of sluicing and complementary distribution between sluicing and local binding of pronouns - are given a narrowly syntactic account and are shown to follow from standard minimalist assumptions and interfaces effects.

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1 Theoretical set-up

1.1 Distinguishable nodes in binary structures

When coupled with the late insertion hypothesis of lexical items of Distributed Morphology (see for instance [Halle and Marantz, 1993, Section 2.2]), the general minimalist framework of [Chomsky, 1995] implies the existence of an early stage of

syntactic computation, henceforth referred to as narrow syntax, creating and manipulating binary arborescent structures built by the recursive merging of syntactic items. It is commonly believed that at a fine level of representation, the structure of these syntactic items is extremely coarse: maybe nothing more than a single bi-valued feature of a very restricted type, φ -features and focus features for instance, and that the usual objects considered at higher level of representations (\mathbf{N} , \mathbf{D} , \mathbf{V} , \mathbf{v} , \mathbf{T} , $\mathbf{C}...$) are bundle of such atomic elements. If these assumptions are correct, something I henceforth assume without further discussion, the information narrow syntax has access to is radically impoverished.

Despite this dearth of information, the structures narrow syntax produces are required to be legible by the logical and phonological interfaces and thus have to satisfy stringent conditions at the point of transfer. To name a few, the transferred object must admit a linear total ordering by asymmetric c-command to be pronounced (the Linear Correspondence Axiom of [Kayne, 1994]), undistinguishable bundle of features have to occupy structurally distinct nodes for lexical insertion (at least) to be non-ambiguous and bound variables have to respect the Θ -grid of the semantic elements involved. Abstracting from all further formal properties, the second condition alone is already quite stringent: the proportion of random binary trees satisfying it quickly goes to zero and asymptotically only about 49% of the leaves of a large random binary tree occupy an unambiguous position in terms of graph-theoretic structure.¹

In a strictly minimalist style of inquiry, the only further operation available to narrow syntax to produce legible structures is the operation Agree, that is to say the co-valuation of formal features (typically coupled with chain reduction, hence movement, to keep the record of the operation beyond narrow syntax). We formalize this epistemological requirement (which amounts to nothing more than caution towards further stipulations) in the following statement.

- (1) The information available to a head x at the point of transfer is its Agree configuration, that is to say the identification of the set of Agree relations x entered in within the set of all possible such relations.

Note that (1) states that no information exists beyond Agree relations but crucially *allows* the comparison between the actual relations and the total possible relations. Hence, the absence of an Agree relation between x and a head y in its complement is part of the Agree configuration. In view of the mathematical result mentioned above, it could be surmised that in a typical narrow syntactic structure suitable for the interfaces, about half of the elements merged at the point of transfer were merged to help distinguish nodes in their complements. This observation seems to conform roughly to the empirical distribution of lexical and functional heads and is compatible with theoretical formalizations argued for on completely different grounds, such as that of [Den Dikken, 2006] (see especially section 2.5 thereof, in which heads are strictly separated in the two disjoint categories of lexical heads - without specifiers and which assign Θ -roles to their complements - and of functional heads - with specifiers and which mediate predication relations).

1.2 Copying of the Agree configuration

The starting point of my analysis is that this suggests the existence of interaction mechanisms between functional heads allowing the record of Agree on one functional head to be accessible to functional heads higher in the structure and ultimately to the functional head triggering transfer, the phase head of [Chomsky, 2001], [Chomsky, 2008]. From a strictly logical point of view, it could be that any such interaction mechanism is trivial or equivalently that the locus of Agree operations is identified with the set of phase heads, but there are good empirical reasons to believe that this is not so.

Indeed, compare

- (2) Naïm talked about Yanis.

¹See the appendix for a short derivation of this claim.

(3) *Naïm talked Yanis.

and

(4) Who did Naïm talk about?

Despite the fact that two identical bundle of features (the external and internal arguments) are first merged below the first phase head, (2) is well-formed, indicating that the \mathbf{v} -head in *talk* unambiguously distinguishes one from the other. The fact that (3) is out implies that the \mathbf{P} -head in *about* had to enter in some form of formal relation with its complement for this to be possible. As argued extensively in [Abels, 2003], this formal relation is not the fact that \mathbf{P} triggered the spelling-out of its complement. To recall one argument, if \mathbf{P} had triggered the spelling-out of its complement, that *wh*-movement could strand the preposition in (4) would be very puzzling. Nevertheless, the impossibility of the co-referential reading

(5) Naïm_{*i*} talked about him_{**i*}.

implies in the formalism of [Reuland, 2011] that the formal features of *him* have moved at least to \mathbf{v} (in fact to \mathbf{T} , but this plays no role in our argument) and so that the head \mathbf{v} has had access to the Agree relation \mathbf{P} entered in. Putting all this together, we are led to conclude that a) \mathbf{P} entered in an Agree relation with its complement and that b) the head \mathbf{v} had access to the output of Agree relation between \mathbf{P} and its complement at the point of transfer.

Because structures have to be legible at the point of transfer, it is natural to assume that copies of the full Agree configurations are available at least as high as the phase head. For reasons of parsimony and simplicity of computation, I furthermore assume that they are not available further and that the only record accessible higher in the structure is the record kept by the phase head that its complement has been spelled-out. This leads to a more precise version of (1), henceforth referred to as the *Agree configuration record operation*.

(6) The input available to a phase head at the point of transfer is the Agree configuration of its complement, that is to say the identification of the Agree relations between heads in its complements in the total possible space of such relations. A phase head keeps the record of having spelled-out its complement. Functional heads may access the Agree configurations of functional heads in their complements (subject to standard locality conditions).

It follows from these assumptions that a narrow syntactic structure is suitable for the interface only if it satisfies the *Distinct structural position condition* below.

(7) The complement of a phase head x has to be uniquely identified by the Agree configuration of x .

1.3 Structural Case

The *Distinct structural position condition* (7) seems to have two undesirable properties. First, it imposes an apparently heretofore unnoticed requirement on syntactic structures. Second, it seems to be impossible to check empirically, as Agree relations and especially their absence are rarely directly observable. The main theoretical assumption of this manuscript is the following.

(8) The property for a binary structure to be uniquely identified by its Agree configuration, so to satisfy the *Distinct structural position condition*, is equivalent to structural Case assignment.

This hypothesis aims at capturing the essence of structural Case in the original sense of Vegnaud’s 1977 letter (reprinted in [Vergnaud, 2008]): a *structural* condition for the licensing of syntactic items. However, it is distinct in a crucial respect from the formalization of structural Case assignment as the valuation of an unvalued Case feature on DP as reflex of co-valuation of uninterpretable φ -features on the Case assigning head (\mathbf{T} or \mathbf{v}): condition (7) is strictly weaker as it allows for the possibility of a syntactic item to be distinguished by *not* entering in an Agree

relation, whereas equating structural Case assignment with Agree would seem to preclude this possibility. Again, this seems a desirable choice for empirical reasons: many polysynthetic languages tolerate perfectly well the movement of a locative expression to the canonical pre-verbal subject position with φ -agreement and this movement triggers verbal agreement (see for instance [Baker and Collins, 2006] for Kinande). In these constructions, the grammatical subject DP has not entered in an Agree relation with **T** and yet seems to have received structural Case (interestingly, and in perfect agreement with the *Distinct structural position condition*, when this construction is applied to a transitive verb, an extra agreeing head usually appears in between the post-verbal subject and the direct object).

1.4 Syntactic ellipsis resolution

1.4.1 The fundamental hypothesis

If hypothesis (8) is correct, the *Distinct structural position condition* is therefore not a novel contribution but simply an abstract formalization of a fundamental idea of standard minimalism.

But what then, of the idea that functional heads have access to the Agree configuration of heads in their complements? Is the *Agree configuration record operation* a novel addition to the repertoire of syntactic operations? The belief inspiring this manuscript is that this is not so. In fact, an independent empirical motivation for the introduction of (one avatar of) this mechanism is well-known and has been the object of intense scrutiny: the syntactic operation allowing for the syntactic interpretation of (some) elliptical constructions. This is expressed in the following principle.

- (9) The syntactic structure of the elliptical site is given by the copying of the Agree configurations of the heads in the antecedent site starting with the antecedent core head, which is selected through a focus probe/goal relation, and proceeding recursively.

Note already that the very existence of elliptical constructions seemingly violate fundamental minimalist assumptions. Indeed, according to the core tenets of minimalist syntax, narrow syntactic objects may be merged with uninterpretable features as long as such features are eliminated, or valued, at the point of transfer to LF. However, basic elliptical construction such as (10) below appear to be exempt from this condition: the selection property of the auxiliary *did* or the licensing requirements on the *wh*-element are at first glance not satisfied.

- (10) (a) I knew him, or I thought I did.
 (b) (French) Quelqu'un a terminé le gâteau. Ah oui, qui ?

Building on the fact that ellipsis *does* exist, apparently cross-linguistically, principle (9) is then simply the statement that the very same structural constraint at play in the Spell-Out of any narrow syntactic object - the *Distinct structural position condition* (7) - and the very same fundamental operation narrow syntax uses to sieve objects amenable to transfer from illicit ones - the *Agree configuration record operation* (6) - account for the structure and properties of ellipsis sites.

1.4.2 Post-auxiliary ellipsis and sluicing

Of course, only elliptical constructions which are syntactically, rather than pragmatically, controlled (those called *surface anaphora* in [Hankammer and Sag, 1976]) can possibly conform to hypothesis (9). In the remainder of this manuscript, I consider the case of English (and briefly Maliseet) post-auxiliary ellipsis (henceforth PAE) and elliptical interrogative constructions called sluicing in [Ross, 1969].

Sluicing Sluicing is the cross-linguistically extremely commonly attested elliptical interrogative construction exemplified by (11) below.

- (11) Someone came. Guess who?

See [Chung et al., 1995], [Ginzburg and Sag, 2000], [Merchant, 2001], [Chung, 2006], [Merchant and Simpson, 2012], [Chung, 2013] and references therein (among many others) for further discussions.

The following definition recalls the fundamental licensing properties of sluiced constructions.

Definition 1.1. *The head licensing the ellipsis site in a sluiced construction is a wh-element and the core antecedent is an underspecified element entering in an agreeing focus probe/goal relation with the C-head of the antecedent clause (subject to standard relativized minimality) sharing a non-distinct Agree configuration with the licensing head.*

As is well-known, implicit arguments and adjuncts are licit underspecified core antecedent, as in (12) below for instance, which is an example of what has been called *spouting* after [Chung et al., 1995].

(12) She’s been reading but I don’t what.

English PAE English PAE exhibits significant variation in its licensing condition. The following proposition is tentative.

Definition 1.2. *The head licensing the ellipsis site in a PAE is a verbal auxiliary (including to). An expected antecedent is a structural Case assigning head v-head if the licensing head is an auxiliary verb distinct from be and a structural Case assigning be if the licensing head is be. A licit antecedent is any kind of expected antecedent. The core antecedent is the structurally closest expected antecedent whose modality or subject is in contrastive focus with the licensing head if there is one and the structurally closest licit antecedent whose polarity is in contrastive focus with the licensing head if there is none.*

1.4.3 General predictions and the limits of the *deletion under identity* account

Before exploring the fine empirical consequences of the articulation of definitions 1.1 and 1.2 with the condition (7) and hypothesis (9), I record two immediate general predictions.

- (13) The Agree configuration of the ellipsis site is constrained by the Agree configuration of the head licensing the ellipsis and the Agree configuration of the antecedent site.
- (14) Syntactic ellipsis resolution is sensitive to structural Case assignment. In particular, ellipsis should be impossible when no structural Case assignment matches the required structural Case assignment of the ellipsis site.

Within a minimalist framework, the simplest account narrow syntactic account of the resolution of ellipses in terms of independently generally required operations is probably the *deletion under identity* theory of ellipsis: the hypothesis that the ellipsis site is an unpronounced copy of the parallel syntactic object in the antecedent site. In the remainder of this subsection, I recall what I take to be the strongest arguments against a literal interpretation of this position, that is to say the statement that the syntactic object assumed to represent the ellipsis site is a copy of a full antecedent sub-tree.

- (15) Ellipsis tolerates morphological and syntactic mismatch, sometimes of quite extreme nature (voice alternations, morphological alternations, verbal ellipses with non-verbal antecedent, interrogative elliptical constructions with implicit antecedents. . .).
- (16) The spelling-out of the putative tree representing the ellipsis site may violate usual syntactic constraints (syntactic islands, binding condition C. . .).
- (17) The putative tree representing the ellipsis site may violate hierarchical constraints to which pronounced sub-trees are subject.

Here follows explicit examples of some of these objections with the consequences one should draw under a strict interpretation of the copy theory of ellipsis.

- (18) “You’re meeting Hermione Granger? Today?”
 “Yeah. Well, she asked me to, so I thought I would.”²

If the first ellipsis site were to host an identical copy of the syntactic content of the putative antecedent site, then spelling it out should yield

- (19) *Well, she_i asked me to meeting Hermione Granger_i.

which is doubly faulty because of the aspectual mismatch and because of the local binding of the referential expression *Hermione Granger* by the pronoun *she*. Moreover, the impossibility of

- (20) *“You will meet Hermione Granger? Today?” “Yeah. I thought I would be.”

and more generally the necessity of a progressive aspect antecedent if a PAE purports to elide a progressive indicate that the sub-tree representing the ellipsis site is rooted above the head encoding voice in English. The normal syntactic ordering of verbal aspects in English as in

- (21) [T]hat poor fellow [· · ·] is being carried down to the bottom of the sea.³

suggests that the head encoding progressive aspect is higher than the head encoding voice. Putting this together yields that the sub-tree of the ellipsis site contains the head encoding voice and is a copy of an antecedent tree. Hence, voice alternations in PAE should be impossible, contrary to facts.

- (22) The system can be used by anyone who wants to.⁴

As discussed in subsection 2.4 below, these problems are solved if it is assumed that it is the Agree configuration rather than the full sub-tree which is copied.

2 Empirical consequences

2.1 Copying of Agree configurations: the standard case

Under hypothesis (9), the syntactic resolution of

- (23) [T]he bookbinder’s Quarto volume in its dimensioned form does not preserve the shape of the Folio volume, but the Octavo volume does.⁵

or

- (24) Structural Case will play a role in this manuscript. Guess which?

then proceeds as follows. For (23), the licensing head *does* locates the **v**-head *preserve* whose modality is in contrastive polarity focus. This **v**-head has assigned structural Case to *the shape of the Folio volume* and so the syntactic structures of the ellipsis site contains these elements, providing the syntax and semantics of the ellipsis. For (24), the licensing head is the D-linked *wh*-word *which* which locates the indefinite DP *a role* as antecedent. This DP has been assigned structural Case by the **v**-head *play*. In turn, the **v**-head *play* has selected the locative *in this manuscript* so bears a copy of its Agree configuration and has been selected by the **T**-head *will*, which has assigned structural Case to the DP *structural Case*. Notice that the recursive copying of Agree configurations is not (necessarily) fully ordered: once it reaches the head **v**, it accesses configurations higher up (the head **T**) and lower down (the locative) in the structure. This property plays a crucial role in subsection 2.5 below.

²From chapter XXV of *Harry Potter and the Order of the Phoenix* by JK.Rowling.

³From chapter XLV of *Moby-Dick*

⁴From [Merchant, 2013].

⁵From chapter XXXII of *Moby-Dick* by H.Melville.

2.2 Copying of Agree configurations: relation with structural Case

In this subsection, fine empirical consequences of (6) in the formulation (8) are derived.

2.2.1 Connectivity

It is a common observation that the *wh*-element licensing a sluiced construction has to bear the same case marking as if it had been base-generated in the antecedent site, and indeed this has been considered a strong argument in favor of the existence of syntactic material in the ellipsis site.

Within the formalism of this manuscript, this has to be true almost by definition: if the structural Case assignment properties of the licensing head match no antecedent object, the very first step of (9) (or more specifically of definition (1.1)) fails. It also follows directly from (9) that no resolution is possible if the structural Case assignment properties of the licensing head do not allow the unambiguous location of the core antecedent head, that is to say if there are more than one possible antecedent head exhibiting the same structural Case assignment properties. This explains the contrast between the radical unacceptability of

- (25) (French) **Quelqu'un décrit quelqu'un, mais je ne sais pas qui qui.*
Someone describes someone but I not know who who.

in languages like French (or English), despite the transparent semantic interpretation, with poor case morphology and the perfect acceptability of all logically possible alternatives in for instance Bengali.

- (26) (a) (Bengali) *Keu karoke bornona korche, kintu ke ami jani na.*
Someone-NOM someone-ACC description doing, but who-NOM I know not.
Someone is describing someone, but I don't know who [is doing the describing].
(b) (Bengali) *Keu karoke bornona korche, kintu kake ami jani na.*
Someone-NOM someone-ACC description doing, but who-ACC I know not.
Someone is describing someone, but I don't know who [is being described].
(c) (Bengali) *Keu karoke bornona korche, kintu ke kake ami jani na.*
Someone-NOM someone-ACC description doing, but who-NOM who-ACC I know not.
Someone is describing someone, but I don't know who [is describing] who(m).

Japanese provides natural empirical testes, as it allows many seemingly close pairs which differ in grammaticality.⁶

- (27) (a) (Japanese) *Sensei-o hihanshita gakusei-ga koko-ni oozei iru kedo dare-ga dare-o oboeteinai.*
Teacher-ACC criticized student-NOM here-P crowd is but who-NOM who-ACC remember not.
Many students here criticized many teachers but I don't remember who [criticized] who.
(b) (Japanese) **Sensei-ga suki-na gakusei-ga koko-ni oozei iru kedo dare-ga dare-ga suki-ka oboeteinai.*
Teacher-NOM liked student-NOM here-P crowd is but who-NOM who-NOM remember not.
(Intended) Many students here like many teacher but I don't remember who who.

⁶The examples (27) are from [Richards, 2010].

- (c) (Japanese) *Sensei no koto-ga suki-na gakusei-ga koko-ni oozei iru kedo dono gakusei-ga dono sensei no koto-ga ka oboeteinai.
 Teacher of side-NOM liked student-NOM here-P crowd is but which student-NOM which teacher of side-NOM remember not.
 (Intended) There are here many students who show appreciation towards their teachers but I don't remember which towards which.

In (27a), but crucially neither in (27b) nor in (27c) even though the latter is actually semantically non ambiguous, the two *wh*-words *dare* are differentially marked by Case so correspond unambiguously to antecedent heads. Interestingly, my informant (Y.Kito-Neubronner) spontaneously offered

- (28) Sensei-ga suki-na gakusei-ga koko-ni oozei iru kedo dare-ga dare-o suki-ka oboeteinai.
 Teacher-NOM liked student-NOM here-P crowd is but who-NOM who-ACC remember not.
 Many students here like many teacher but I don't remember who whom.

as a technically ungrammatical (the object of *suki* has to bear the nominative case-marking particle *ga*, not the accusative case-marking particle *o*) but marginally acceptable (and with attested close counterparts) spoken alternative to (27b), indicating that native speakers apparently could tolerate incorrect case assignment if this allows for meaning recovery.

2.2.2 Binding

As mentioned in subsection 1.2 above, the copying mechanism involved in (6) is assumed to be the same as the mechanism involved in chain formation in [Reuland, 2011]. This entails that sluiced construction should be in complementary distribution with reflexives. This empirical prediction, which seems to have been heretofore unnoticed, is borne out.

- (29) (a) Alan Greenspan_{*i*} often speaks about him_{**i*} in a flattering way.
 (b) He often speaks about someone but I don't know who.
 (30) (a) (French) Alain Delon_{*i*} parle souvent de lui_{*i*} de manière flatteuse.
 Alain Delon speaks often of him of manner flattering.
 Alain Delon often speaks about himself in a flattering way.
 (b) (French) Il parle souvent de quelqu'un mais je ne sais pas *(de) qui.⁷
 He speaks often about someone but I know not *(of) who.

In the formalism of [Reuland, 2011], the licit co-indexation in (30a) implies that no copying of the Agree configuration of the **P**-head *de* is available to the **v**-head, in agreement with the hypothesis that Agree configurations are copied to the phase head but no further and with the proposal of [Abels, 2003] that **P** is a phase in French. Hence, the bare *qui* in (30b) bears no structural Case assignment properties compatible with an antecedent and cannot license a sluiced construction. Exactly the converse holds for (29a) and (29b).

Moreover, and more strikingly, the licit co-indexation in

- (31) (Frisian) Willem_{*i*} wasket him_{*i*}.
 Willem washes him.
 Willem washes himself.

implies the unacceptability of the Frisian equivalent to

- (32) Willem washed someone but I don't know who.

This prediction seems to be borne out, as sluicing constructions in Frisian are actually analogous to cleft constructions (see [van Craenenbroeck, 2004]); therefore, firstly, lacking accusative Case and, secondly, requiring the extra demonstrative *dat* (the second property following from the first one within our framework if recoverability is to be maintained).

⁷The grammatical judgment reported here is that of written French.

2.2.3 Ellipsis in Maliseet

Maliseet is an endangered dialect of the Algonquian language⁸ which allows post-auxiliary ellipsis. However, transitive verbs in Maliseet assign structural Case to inanimate direct object but oblique case to animate object, as can be seen from the appearance of the particle *-l* and the suffix *-ol* glossed as OBV below (and taking into account the fact that dolls are classified as animate).

- (33) (a) (Maliseet) Skinuhsis ' - kisi- sunhom-on ponapsq.
 Boy 3 PERF paint TI INAN rock.
 The boy painted a rock.
- (b) (Maliseet) Skinuhsis ' - kisi- sunh -a -l amsqocephkan -ol.
 Boy 3 PERF paint TA DIR OBV doll OBV.
 The boy painted a doll.

In agreement with (8), Maliseet seems to allow ellipsis of a transitive clause when the object of the transitive verb is classified as inanimate, as in (34) below

- (34) (Maliseet) Skinuhsis ' - kisi- sunhom-on ponapsq; nil-ote -na n-kis -ehtu-n.
 The boy painted a rock, and I did too.

but not when the object is classified as animate, as in (35) below.

- (35) (Maliseet) *Skinuhsis ' - kisi- sunh -a -l amsqocephkan -ol; nil-ote -na n- kis- ehl -a.
 The boy painted a doll, and I did too.

The formalism of this manuscript would further predict that sluicing constructions should be sensitive to the animacy class of the direct object, namely that sluicing of an inanimate object should be unrestricted whereas sluicing of an animate object should be impossible or involve explicitly oblique case. I don't know if this prediction is borne out.

2.3 Intervention effects in antecedent location

Definitions 1.1 and 1.2 both state that the location of the core antecedent is achieved by a focus probe/goal relation. This implies that it should be sensitive to focus intervention (relativized with respect to the nature of the antecedent). This prediction is borne out.

In (36) below, a negative operator is seen to prevent sluicing, in agreement with the remark in [Beck, 2006] that negative quantifiers trigger the strongest intervention effects.

- (36) *It's not the case that Yanis didn't meet with a friend, but I still wonder who.⁹

There are empirical reasons to believe appositive constructions involve an Agree relation between the appositive clause and **C**, and thus that appositive clauses are marked with a focus feature probed by **C**. For instance, appositive constructions trigger intervention effects for *wh*-questions *in situ*.

- (37) (Japanese) *Henna tomodachi_i ga iru Ayumi ha nani o katta_i ka shiranai.
 Strange friend-NOM is Ayumi-TOP what-ACC bought Q not know.
 (Intended) Ayumi, who has strange friends_i, doesn't know what they_i bought.

Moreover, appositive constructions in Old Japanese are overtly marked with a focus particle which triggers a special form of agreement of the main verb.

- (38) (Old Japanese) Ikito shi ikeru mono, izure ka uta-o yomazarikeru.¹⁰
 All living thing, which FOC poem-ACC compose-FOC/AGR.
 Every living creature sings.

⁸all Maliseet examples and explanations are from [Richards, 2008].

⁹Example from [AnderBois, 2011, Example (2)].

¹⁰Example and explanation from [Miyagawa, 2009, Section 5.3].

This focus feature on appositive clauses is thus predicted to trigger an intervention effect. In particular, indefinites in appositive clauses as in (39) are predicted not to be licit antecedent for sluicing. This is borne out.

(39) *Joe, who once killed a man in cold blood, doesn't even remember who.

Conversely, a structural Case assigning verbal head with no focus feature on its modality is not a core antecedent in the sense of definition 1.2. Indeed an unmarked reading of (40a) below selects *knew* and not *thought* as antecedent. By contrast, when the focus feature probing the antecedent probes for a subject bearing contrastive focus, as in (40b) below, and so when the recursive copying of Agree configuration starts with the record of **T** assigning structural Case to this focused subject, it is indeed the head assigning structural Case which is understood as verbal antecedent.

- (40) (a) He no doubt thought he knew a good deal about the true religion, but he actually didn't [*think he knew a good deal/know a good deal...].¹¹
 (b) He no doubt thought he knew a good deal about the true religion, but I didn't [think I knew.../*know...].

2.4 Morphological mismatch

2.4.1 Voice alternations

It follows directly from the structural Case assignment mismatch and hypotheses (8) and (9) that voice alternations like

- (41) (a) *He was killed, but I don't know who.
 (b) *Someone killed him, but I don't know by who.

are prohibited in sluiced constructions: no underspecified head in the antecedent clause has an Agree configuration non-distinct from that of the licensing *wh*-element. This is the case cross-linguistically.¹²

English PAE is much more subtle. First note that in the derivation of an inchoative clause, the inchoative verb is never in the position to assign structural Case to the grammatical subject. Hence (8) and (9) exclude the possibility of an inchoative/transitive alternation. This prediction seems to be borne out.

- (42) *This can freeze. Please do.

However, active/passive and passive/active alternations like

- (43) (a) We also use the xpdf package in our examples, so you may want to install that now if it isn't already.¹³
 (b) This problem obviously had never been solved properly before and yet somehow we did.¹⁴

are well-known to be attested (see [Merchant, 2013] and references therein for numerous additional examples). In agreement with definition 1.2, the lack of an expected antecedent is alleviated by the salient polar contrast allowing for the location of a licit antecedent (this expresses the findings of [Kertz, 2008] that voice alternations require aux-focus, in the terminology of [Miller, 2011]). For the active/passive alternation, nothing more need be said, as the recursive process (9) stops with the location of the core antecedent.

¹¹Examples adapted from Chapter XVII of *Moby-Dick* by H.Melville.

¹²Apparently attested example in English as

(42) I think he was killed by someone, but I don't know who or why.

from *Mother Jones* December 1976 *The Professor Who Went Out In The Cold* should of course be considered as non-alternations with the stranding of *by*, the crucial empirical fact being the explicit *by*-phrase in the antecedent clause.

¹³Example from [Merchant, 2013, Example (1j)] where it is credited to J.McCloskey.

¹⁴Adapted from [Merchant, 2013, Example (2e)].

Passive/active alternations are much more problematic, as the direct object of the active ellipsis site needs to be licensed, something which seems to require that the \mathbf{v} -head of a passive construction assigns accusative structural Case to the object before it moves to subject position and receives nominative structural Case (and accusative structural Case is then superseded, making passive constructions instances of case-stacking constructions, in the sense of [Richards, 2012]). This has been independently argued for several times in the literature, for instance by J-Y.Pollock for low subject in French as in

- (44) (a) (French) [Il] est dit beaucoup de bonnes choses sur moi et sur ma chère fille mariée.¹⁵
 It is said many good things about me and about my dear daughter married.
 Many good things are said about me and about my dear married daughter.
- (b) (French) [Il] est venu un homme dans la chambre de ma soeur.¹⁶
 It is come a man in the room of my sister.
 A man entered my sister's room.

and generally in [Marantz, 2000]. It seems to be confirmed in Japanese adversive passives, as in (45) below, in which subjects may surface with accusative case.

- (45) (Japanese) Hanako-ga doroboo-ni kuruma-o torareta.
 Hanako-NOM thief-BY car-ACC steal-PASS-PAST.
 The car was stolen by the thief from Hanako.

Under the assumption that \mathbf{v} indeed assigns structural Case to the grammatical subject in the course of the derivation, passive/active alternations fit hypothesis (9).

2.4.2 Non-verbal antecedent

The grammatical judgments of this subsection are delicate and not universal, so that the presence of a star should be interpreted as a sharp decline in acceptability with respect to the closest parallel sentence. PAE with non-verbal antecedents as in

- (46) (a) Seeing Alcor with the naked eye in urban area is very hard but Aiden did.¹⁷
- (b) Visiting my brother was part of our plan but in the end we didn't.
- (c) Controlling yourself under situation of stress is hard even if you have been trained to.
- (d) Him denying the facts surprised me, but he did, so we'll have to present material evidence.
- (e) The Boston Zoo cheetah's survival is unclear, but even if it does, it won't be as magnificent as it once was.¹⁸
- (f) Annie is a great laugher, and when she does, it's infectious.¹⁹
- (g) Blucher's timely arrival is held to have been the crucial factor in Napoléon's defeat by many of his admirers. In fact, probably not much much would have changed if he hadn't.

have been thought problematic for syntactic accounts of PAE. The crucial fact to notice within the formalism of this manuscript is that in all the examples above, either the non-verbal head still retains the faculty to license a DP, so can be safely assumed to contain structural Case assigning \mathbf{v} -head (this is the case for (46a), (46b), (46c) and (46d)), or the recursive construction of the syntactic material in the ellipsis site stops with the location of the core antecedent (this is the case for (46e), (46f) and (46g)). Consequently, I predict that for these constructions to be

¹⁵From *Le pot d'or* by E.T.A Hoffmann in the translation of Émile de la Bédollière.

¹⁶From *Le malade imaginaire* by Molière, Act II scene 8

¹⁷Adapted from [Arregui et al., 2006, Example (9)].

¹⁸Adapted from [Miller and Pullum, 2012, Example (8)]

¹⁹Adapted from *You'll never eat lunch in this town again* as quoted in [Hardt, 1993, Example (111)].

judged acceptable, it is sufficient that the core antecedent be located. In agreement with this prediction, suppressing the structural Case assigning head triggers a sharp decline in acceptability, as evidenced by the comparison between the sentences in (46) and the sentences in (47) which have a virtually identical putative semantical content.

- (47) (a) *Seeings of Alcor in urban area are very rare but Aiden did.
 (b) *The visit of my brother was part of our plan but in the end we didn't.
 (c) *Self-control under situation of stress is hard even if you have been trained to.
 (d) *His denying of the facts surprised me, but he did, so we'll have to present material evidence.

Note also that, in agreement with (8), acceptability is sensitive to different structural Case assignment properties even when the morphology is superficially identical.

- (48) (a) Loathing yourself won't do you any good, so don't.
 (b) *Self-loathing won't do you any good, so don't.
 (c) Obama probably didn't expect Romney's campaign self-annihilating over his remarks at a fund-raiser dinner, but he must have been very happy when it did.

The nouns *self-annihilating* and *self-loathing* both exist, and the former is the apparent antecedent of the PAE in (48c), but the intransitive verb *self-annihilate* exists whereas the intransitive verb *self-loathe* does not, explaining the contrast between (48b) and (48c).

2.4.3 Aspectual mismatch

According to (9), the syntactical properties of the ellipsis site are the properties encoded in the licensing head and those obtained by the recursive copying of Agree relations in the antecedent site. This predicts that aspectual features in the ellipsis site may appear only if they are encoded in the antecedent site or if they are encoded in an Agree relation probed by the licensing head; the latter possibility implying that they are uninterpretable (for only an interpretable feature can surface on the licensing head).

Among such uninterpretable features which may be licensed by the ellipsis licensing head are verbal inflection pieces (agreeing with interpretable φ -features on the head), negative polarity items (agreeing with interpretable negation operators on the head), *-en* (as can be seen from its lack of semantic content and the fact that it is not repeated in fronted predicates constructions; see [Collins, 2005, Statements (24) and (25)] and [Rouveret, 2012, Section 5.4] for further discussions), or finiteness on **T** (agreeing with an interpretable finiteness feature on **C**). These features are thus predicted to be able to appear in the ellipsis site even if they absent in the antecedent site.

Conversely, excluded interpretable features include the interpretable features on **T**, such as modality or *-ing* (bearing an interpretable progressive feature). If hypothesis 9 is correct, there is thus an asymmetry between the ellipsis site, as an interpretable feature can of course be deleted, but can never appear. Note also that according to hypothesis (9), interpretable feature absent from the antecedent site cannot appear in the ellipsis site not so much because it impossible to delete them (this would be the usual deletion under identity formalization of ellipsis) - indeed, no deletion takes place according to the proposal of this manuscript - but rather because interpretable features cannot enter in agreeing relation with the licensing head.

There is broad empirical support for the predictions above: acceptable aspectual mismatches below precisely follow the theoretical outline above.

- (49) (a) Cécile likes cheese but I don't.
 (b) Marion didn't bring any toy but Mathilde did.

- (c) Yanis will leave. Naïm has, already.
- (50) (a) “I swear, the things she says, she’s going to drive me crazy.” “Maybe she has already.”²⁰
 (b) “I swear, the things she says, she’s driving me crazy.” “Maybe she has already.”
 (c) **“I swear, the things she says, she’s driven me crazy.” “Maybe she is right now.”*
- (51) (a) “You’re meeting Hermione Granger? Today?”
 “Yeah. Well, she asked me to, so I thought I would.”
 (b) **“You will meet Hermione Granger? Today?” “Yeah. I thought I would be.”*
- (52) (a) Decorating for the holidays is easy if you know how.
 (b) I remember meeting him, but I don’t remember when.
 (c) **Having to compromise is inevitable, but they have no idea who.*
 (d) **The message said to show up in the square at midnight, but it didn’t say who.*

2.5 Island repair

Island repair has been considered a challenging phenomenon for syntactic accounts of ellipsis. The main facts are as follows. Sluicing can repair islands for *wh*-movement whereas PAE, though obviously sensitive to them, cannot. See [Chung et al., 1995] and [Merchant, 2001] for extensive discussions.²¹

- (53) (a) **They want to hire someone who speaks a Balkan language but I don’t know which Balkan language they want to hire someone who speaks.*
 (b) *They want to hire someone who speaks a Balkan language but I don’t know which.*
 (c) *They want to hire someone who speaks a Balkan language but I don’t know which Ben does [speak/*want to hire someone who speaks].*

This phenomenon is arguably especially puzzling if the licensing head of a sluiced construction is assumed to have been base-generated in a normal full fledged interrogative structure from which it has escaped by normal *wh*-movement (but how?) before deletion of the structure, as is believed in the *deletion under identity* account of ellipsis.

The mystery is deepened when it is noted that Japanese sluicing does not repair some island violations that are repaired under English sluicing.

- (54) (a) I heard that Hanako met a person who gave Taroo something, but I don’t know what.
 (b) (Japanese) **Hanako-ga Taroo-ni nanika-o ageta hito-ni atta sooda ga, watashi-wa nani ka shiranai.*
 Hanako-NOM Taroo-DAT something-ACC gave person-DAT met is said but, I-TOP what Q know.not.
 (Intended) I heard that Hanako met a person who gave Taroo something, but I don’t know what.

I claim that these facts all follow from (8) and (9), once it is remembered that the recursive copying of Agree configuration is subject to locality conditions but not ordered. I take the fact that a single general principle can explain with no extra stipulation the three asymmetries a) normal construction compared to sluiced constructions (as in (53a) compared with (53b)) b) English sluicing compared to English PAE (as in (53b) compared with (53c)) and c) English sluicing compared to Japanese sluicing (as in (54a) compared with (54b)) as a strong empirical point in favor of (9) as an account of the syntactic construction of the ellipsis site.

²⁰From *You’ve been warned* by J.Patterson and H.Roughan.

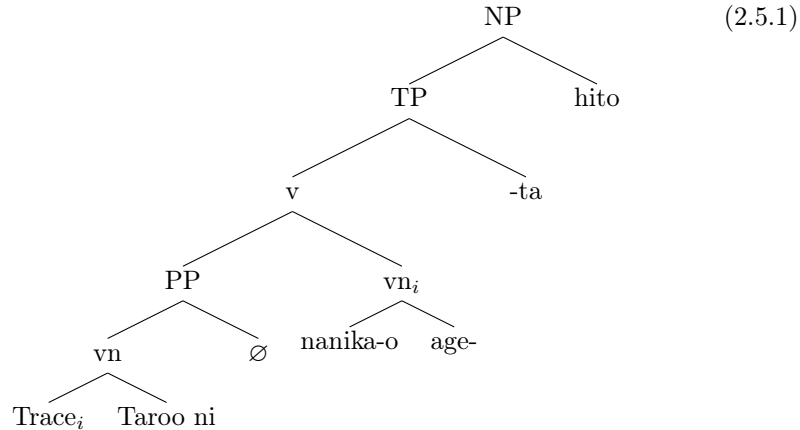
²¹All examples in this subsection are from J.Merchant.

Let us examine first the resolution of (53b). The licensing head *which* finds the indefinite DP *a Balkan language* as core antecedent. Henceforth, the recursive copying of Agree configuration proceeds from the bottom up and all relations involved are local relations of structural Case assignment or selection: *a Balkan language* is licensed by *speak* which is licensed by *-s* which selects the indefinite *someone*. However, the putative resolution of (53c) yielding the island-repairing interpretation would start with the core antecedent *want* and would proceed by selection and structural Case assignment relations down to the indefinite *a Balkan language*, which is not in a local position to license the *wh*-word *which* for exactly the same reason as in (53a). Of course, this derivation having crashed, the alternative selection of the core antecedent *speak* proceeds with no difficulty.

But why then isn't the island repaired in (54b)? The resolution should proceed from the core antecedent *nanika-o*, which has been assigned structural Case assignment by *age-* which has been selected by the **T**-head *-ta*. The difference between English and Japanese is that there are good independent reasons to believe that there is no local relation between this **T**-head and the DP *hito* parallel to the one between *someone* and *speaks* in (53b), and hence that the copying of the Agree configuration fails at this point. On the empirical side, notice that the reflexive anaphor *zibun* cannot be bound by an antecedent in a noun complement phrase. As seen in subsection 2.2.2, this indicates that the formal features of *zibun* do not move as high as the DP.

- (55) (Japanese) *Tatsuki_i-ga totta zibun_i no shashin.²²
 Tatsuki-NOM take-PAST himself-GEN picture.
 (Intended) The picture of himself that Tatsuki took.

General theoretical considerations explain why this might be so. Japanese lacks a functional head **D**. According to the derivation of a Japanese noun complement phrase given in [Fukui and Takano, 2000], the N node *hito* consequently immediately dominates (and thus does not c-command) the TP as in the structure below shows.



Hence, *hito* does not c-command *-ta*. In contrast with the case of its English counterpart (54a) then, the **T**-head *-ta* is not licensed by *hito* in (54b). This is enough to prevent the proper construction of the ellipsis site and consequently to prevent the sluiced construction.

3 Conclusion

Principle (9) accounts in a narrow syntactical way for several apparently unrelated empirical properties of elliptical constructions, including some - such as the complementary distribution of local binding of pronouns and sluicing, the differential acceptability of non-verbal antecedents in VP ellipsis or differential island effects between English, English sluicing and Japanese sluicing - that have been deemed

²²Example adapted from [Hoji, 1985].

mysterious both for semantic accounts of ellipsis and for the *deletion under identity* account of ellipsis. There are thus strong empirical reasons to believe that functional heads can keep the record of the recursive Agree relations they enter into. Parsimony and issues of learnability suggests that this record-keeping operation, the *Agree configuration record operation*, is a fundamental one in narrow syntax, rather than a specialized one exclusive to elliptical constructions. Both theoretical arguments and empirical observations, such as connectivity properties, verbal ellipsis with non-verbal antecedents and voice alternations suggest that the *Agree configuration record operation* is identified with structural Case assignment.

Appendix

A leaf of binary tree is a degree 1 vertex. A leaf x of a tree T is said to be structurally distinguished if any graph automorphism of T fixes x . Let $d(n, k)$ be the number of binary trees with n leaves and k distinguished leaves. Let $D_n(t)$ be the polynomial

$$D_n(t) = \sum_{k=0}^n d(n, k)t^k.$$

Because it is the single vertex of degree 2 (or zero), the root is fixed by any graph automorphism. Hence, it fixes or interchanges the two sub-trees T_1 and T_2 below the root. Because a leaf in a binary tree is structurally distinguished only if it is already structurally distinguished in the binary sub-tree T_i to which it belongs and if and only if this binary tree is furthermore not isomorphic to T_{3-i} , the polynomials $D_n(t)$ satisfy the recursive relation

$$D_n(t) = \begin{cases} 1 & \text{if } n = 1. \\ D_n(t) = \sum_{k=1}^{n-1} D_k(t)D_{n-k}(t) - (D_{n/2}(t) - D_{n/2}(t^2)) & \text{if } n > 1 \text{ is even.} \\ D_n(t) = \sum_{k=1}^{n-1} D_k(t)D_{n-k}(t) & \text{else.} \end{cases} \quad (3.0.1)$$

Let

$$F(x, t) = \sum_{n=1}^{\infty} D_n(t)x^n \in \mathbb{Z}[[x, t]]$$

be the usual generating function of the $D_n(t)$ and let

$$C(x) = \sum_{n=0}^{\infty} \frac{1}{n+1} \binom{2n}{n} x^{n+1} = \frac{1 - \sqrt{1-4x}}{2}$$

be the generating function whose coefficient x^n counts the number of binary trees with n leaves. Then $C(x) = F(x, 1)$ and the average number of distinguished leaves among binary trees with n leaves is the coefficient of x^n in

$$G(x) = \frac{dF}{dt}(x, 1)$$

divided by the coefficient of x^n in

$$x \frac{dC}{dx}(x) = \frac{x}{\sqrt{1-4x}}.$$

The recursion relation (3.0.1) implies that

$$F(x, t) = tx + F(x, t)^2 + F(x^2, 1) - F(x^2, t^2)$$

and thus that

$$\frac{dF}{dt}(x, 1) = x + 2\frac{dF}{dt}(x, 1)F(x, 1) - 2\frac{dF}{dt}(x^2, 1)$$

and so finally that

$$G(x) = x + 2G(x)C(x) - 2G(x^2) = \frac{x}{\sqrt{1-4x}} - \frac{2G(x^2)}{\sqrt{1-4x}}.$$

Replacing $G(x^2)$ by its expression and iterating gives the close form

$$G(x) = \frac{1}{\sqrt{1-4x}} \left(x + \sum_{n=1}^{\infty} (-1)^n \frac{(2n)x^{2n}}{\prod_{i=1}^n \sqrt{1-4x^{2^i}}} \right).$$

The ratio r we look for is the ratio of the limits as x goes to $1/4$ of $G(x)$ and $x \frac{dC}{dx}$. Because $x \frac{dC}{dx}$ is equivalent to

$$\frac{1}{4\sqrt{1-4x}}$$

as $x \rightarrow 1/4$, the ratio r is 4 times the limit as x goes to $1/4$ of

$$x + \sum_{n=1}^{\infty} (-1)^n \frac{(2n)x^{2n}}{\prod_{i=1}^n \sqrt{1-4x^{2^i}}}.$$

Call α the value of the converging sum

$$\frac{1}{4} + \sum_{n=1}^{\infty} (-1)^n \frac{(2n)(\frac{1}{4})^{2n}}{\prod_{i=1}^n \sqrt{1-4(\frac{1}{4})^{2^i}}}.$$

We conclude that the average number of structurally distinguished leaves in a large random binary tree is 4α . As $\alpha \simeq 0,1238$, on average 49,5% of the leaves of a large random binary tree are structurally distinguished.

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