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### *1. The problem*

The following task appears to be so simple: take a verb expressing a two-place relation, and use it to represent a reflexive instantiation of this relation, or - more down-to earth in the words of Jespersen (1933) - let its subject and object be identical. As will be immediately obvious to a speaker of English or Dutch, one has to do something special. Having to do something special is a requirement we see in the vast majority of the languages of the world. What we see cross-linguistically varies from appending a form like *self* or one of its cognates to a pronominal form, using a body-part noun, a special verb form, an affix, a clitic, etc. Of course, we can take this just for granted as an arbitrary fact: "language users just happen to do the things they do". But science starts where we start asking why-questions. One would like to understand why so many languages do something special when expressing reflexive relations, what happens in languages that don't seem to do anything special, and why what languages do can prima facie be so diverse, although the notion of a reflexive predicate appears to be so simple. In a nutshell, what does this tell us about the human language system?<sup>2</sup>

In the next section I will sketch a number of results from the past few decades that should be taken into account when answering such a question. Sections 3-7 outline in more detail the essential background against which the results of the current binding research are to be interpreted. Section 8 presents a detailed account of why languages do something special when expressing reflexivity relations. Section 9 provides a summary.

### *2 Towards a comprehensive theory of binding*

Much of current research in binding is based on the canonical binding theory (henceforth CBT) outlined in Chomsky (1981). This theory is based on a dichotomy between anaphors and pronominals. Anaphors are referentially defective elements that must depend on a linguistically expressed antecedent for

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<sup>1</sup> This contribution grew from my attempts to write an intro to the present issue. Much of the text reflects an endeavor to make the theoretical issues underlying this work as accessible as possible. The part reflecting that endeavor may still serve as a background for the present issue. However, it ended up doing quite a bit more than an intro should do, such as the discussion of alternative approaches through the text. Entirely new is section 8, which for the first time presents an explicit derivation of the need for reflexivity to be licensed, addressing questions that have been raised since I came up with the idea. Hence

<sup>2</sup> Martin Everaert drew my attention to a quote from Martin Joos that is too telling not to include: "Children want explanations, and there is a child in each of us; descriptivism makes a virtue out of not pampering that child." (Joos, 1957:96). Indeed, it is the wonder of the child in us that makes us into scientist (and artists I should add), and that is responsible for any progress in understanding.

their interpretation. They cannot be used deictically. In plain language, it is not felicitous to utter them accompanied by a pointing gesture. Pronominals are not referentially defective, and may but need not depend on an antecedent. Both pronominals and anaphors are subject to *locality conditions*. Anaphors must have an antecedent that is sufficiently close, as expressed by Condition A; the antecedent of a pronominal must be sufficiently far away, as expressed by Condition B, as in (1):

- (1) a. Condition A  
An anaphor is bound in its Governing Category  
b. Condition B  
A pronominal is free (=not bound) in its Governing Category

Informally, the Governing Category of an element is the domain of its nearest subject. In the CBT binding is defined as in (2).

- (2) a binds b iff i. a and b are coindexed; ii. a c-commands b.

Indices are syntactic annotations indicating an interpretive dependency. C-command is informally defined as in (3):

- (3) a c-commands b iff a is the sister of a constituent c containing b

Over the last few years we have seen that in this form these conditions face significant empirical and theoretical problems. For instance, Condition A and B together entail that anaphors and pronominals are always in complementary distribution, which has been found not to be the case. As is well known, in many languages (including most Germanic and Romance languages) 1<sup>st</sup> and 2<sup>nd</sup> person pronouns can be locally bound. A few languages, varying from Frisian (Everaert 1986; Reuland and Reinhart 1995) and Old English (for instance Van Gelderen 2000) to Khanty (Nikolaeva 1995, 1999; Volkova 2014; Volkova and Reuland 2014) and Zhuang (Schadler 2014; this volume) even allow local binding of 3<sup>rd</sup> person pronominals. Furthermore, many languages have expressions that are in some sense in between anaphors and pronominals, such as *long-distance anaphors*, elements that must be bound and cannot be used deictically, hence qualify as anaphors, but yet allow an antecedent far beyond the domain defined in (1) (see the various contributions in Koster and Reuland 1991, and Cole, Hermon and Huang 2000). In fact, some languages allow such an element without a linguistic antecedent whatsoever, such as Icelandic *sig* in its *logophoric* use (see, for instance Thráinsson 1991). Quite strikingly, even English allows an unbound, logophoric use of *himself* (Pollard and Sag 1992, Reinhart and Reuland 1993), illustrated in (4), see Reuland (2011a) for more discussion.

- (4) John<sub>i</sub> was going to get even with Mary. That picture of himself<sub>i</sub> in the paper would really annoy her, as would the other stunts he had planned.

Clearly it is a challenging enterprise to develop a theory that is able to capture and explain facts of the type I touched on in this overview. Some of these and

other challenging cases will be discussed in more detail below and in the individual contributions to this issue.

Although the CBT provides a surprisingly good approximation of certain sub-patterns that can be identified, little is served by attempts to 'resurrect' it, since subsequent developments have shown that its basic conception is beyond repair. In this respect it is comparable to Newtonian physics. What is needed is a fundamental reassessment of its foundations. As is often the case the roots of such a reassessment can already be found in the past.

### 2.1 *Binding and coreference*

First of all, it was already noted decades ago that the conception of binding in (2) is over-simplified. It is an important insight of Heim (1982) and Reinhart (1983) that *binding* must be distinguished from *coreference* or *covaluation* ('having the same value'), see also Evans (1980), and Partee (1978). This in turn bears on the status of indices. A paradigm illustrating this runs as follows:

- (5) a. The soldier<sub>i</sub> has a gun. Will he<sub>i</sub> shoot?
- b. No soldier<sub>i</sub> has a gun. \*Will he<sub>i</sub> shoot?
- (6) a. No soldier<sub>i</sub> who has a gun thinks he<sub>i</sub> will shoot.
- b. \*The girl who discovered every soldier<sub>i</sub> thought he<sub>i</sub> would shoot.
- c. The girl who discovered the soldier<sub>i</sub> thought he<sub>i</sub> would shoot.

(5a) illustrates the fact that two referential expressions may happen to pick out the same individual from the discourse as a referent. However, in (5b) *no soldier* does not denote an individual in the discourse. Hence *he* cannot pick that individual as a referent. Consequently, the mini-discourse in (5b) is ill-formed. However, as (6a) shows, there is nothing intrinsically problematic with *no soldier* as an antecedent of *he*. It can serve as an antecedent of *he* if it c-commands *he*. That is, when it can **bind** *he*, in accordance with (1)-(3). This indicates that there is a fundamental distinction between two different types of anaphoric dependencies: **binding** and **co-reference**. The difference is also illustrated in (6b) and (6c). *Every soldier* is embedded in a constituent modifying *the girl*. Therefore, it does not c-command *he*, hence cannot bind it. Since it doesn't denote a (singular) individual, it cannot be coreferential with *he* either, and the sentence is ill-formed with this indexation. In (6c) we have instead the referential expression *the soldier*. Coreference is possible although there is no c-command and the sentence is well-formed under this indexation. One of the complications with the notion of an index in the CBT is that being coindexed entails having the same value, but the converse doesn't hold. It is possible for two expressions to bear different indices, but yet denote the same individual (as in the old chestnut *The morning star is the evening star* which would be a tautology if *the morning star* and *the evening star* were to bear to same index). On the basis of these and related facts Reinhart concluded that indices are only semantically interpreted in a syntactic binding configuration.

### 2.2 *Types of Anaphors*

From the late seventies on, it started to be recognized that subtypes of anaphors had to be distinguished (for instance, Faltz 1977, Pica 1985, 1987, Everaert

1986, Hellan 1988). Pica noted that complex (phrasal) anaphors required a local antecedent, whereas simplex anaphors could allow long-distance antecedents, arguing for a modular approach to binding. Everaert (1986) brought an important new element in the discussion with his observation that like it had been found for Old English also Frisian – as a living language - allows locally bound pronominals. Not all verbs allow a locally bound pronominal object, though. A comparison of Dutch and Frisian reveals that the conditions on binding do not constitute a unitary phenomenon. This is illustrated in (7) and (8). Dutch has two anaphor types, simplex anaphors (SE-anaphors, *zich*), and complex anaphors (SELF-anaphors, *zichzelf*) The element *zich* is not fully specified for phi-features; it is specified for person, but not for number and gender. The choice of *zich* versus *zichzelf* depends on the type of predicate: agent-theme verbs generally allow *zich* (as in 7a) other verbs such as subject experiencer verbs as in (7b) require *zichzelf*. ECM subjects can be *zich*. (as in 7c), but 3rd person pronominals can never be locally bound (see 7a-c).<sup>3</sup>

- (7) Dutch
- |    |   |                 |
|----|---|-----------------|
| a. | <i>Jack waste zich/*hem</i>                   | SE-anaphor      |
|    | Jack washed                                   |                 |
| b. | <i>Jack bewonderde zich*(zelf)/*hem(zelf)</i> | complex anaphor |
|    | Jack admired himself                          |                 |
| c. | <i>Jack voelde [zich/*hem wegglijden]</i>     | SE-anaphor      |
|    | Jack felt [SE slip away]                      |                 |

Comparing this pattern to Frisian we see that the effect of the predicate is constant. What changes is that Frisian allows a 3<sup>rd</sup> person pronominal just where Dutch allows the dedicated SE-anaphor *zich*.

- (8) Frisian
- |    |                                      |                                  |
|----|--------------------------------------|----------------------------------|
| a. | <i>Jack waske him</i>                | pronominal instead of SE-anaphor |
|    | Jack washed                          |                                  |
| b. | <i>Jack bewûndere him*(sels)</i>     | complex anaphor                  |
|    | Jack admired himself                 |                                  |
| c. | <i>Jack fielde [him fuortgleden]</i> | pronominal instead of SE-anaphor |
|    | Jack felt [SE slip away]             |                                  |

These paradigms show that a distinction must be made between: i. properties of predicates and their effects, and ii. properties of ‘pronouns’ and their effects.

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<sup>3</sup> Reinhart and Reuland (1993) assume that *zich* is restricted to a rather limited class of agent-theme verbs, that can be *lexically reflexive*, and that at least contains the *grooming verbs*. Reinhart and Sioni (2005) further elaborate this notion of lexical reflexivization - see section 5.1.2 for details - and argue that - being lexical - this rule is expected to show idiosyncratic restrictions. In an extensive overview, Lemmen (2005) shows that, at least in Dutch, agent-theme verbs as a rule allow *zich*, and suggests an independent explanation for those that don't (see also Reuland 2011a). It would be important to conduct such studies for other languages; however, I am not aware of such studies as yet.

Furthermore, the fact that Frisian has pronominals where Dutch has *zich* has been shown to follow from an independent difference in the case system found by J. Hoekstra (1994) (see Reuland and Reinhart 1995, and Reuland 2011a for details).<sup>4</sup> Like Dutch, also the Scandinavian languages show a contrast between SE-anaphors (Norwegian, *seg*, Icelandic *sig*, etc.) versus SELF-anaphors (Norwegian *seg selv*, Icelandic *sjálfan sig*, etc.), showing a similar interaction with properties of predicates.

In subsequent discussions this contrast plays a considerable role, which will be addressed in due course.

### 2.3 Indices and locality

Reinhart's result already undercut the status of indices (see Reuland 2011b for a recent overview of the problems). Subsequently, setting the foundations of minimalism, Chomsky (1995) concludes that indices are not possible morpho-syntactic objects, and therefore they violate the 'inclusiveness condition, which limits syntactic computations to morpho-syntactic objects' in the numeration. Hence co-indexing is not available as a means to encode dependencies. This, by itself necessitates a reassessment of the binding theory, since even the definition of binding in Chomsky (1981) is no longer applicable.

Even if binding is essentially a semantic notion, at least certain aspects of binding must be syntactically represented in order to account for a variety of phenomena, among which locality and crosslinguistic variation (see Reuland 1995, 1996, 2001 for initial discussion). One of the major theoretical questions that come up is why there are locality conditions on binding, or even why certain expressions have to be bound at all. One of the challenges this gives rise to is how to represent binding dependencies in the grammar without recourse to indices.

Proposals for how to deal with this challenge are presented in Reuland (1995, 2001), Hornstein (2000), Boeckx, Hornstein and Nunes (2007), Safir (2004), Hicks (2009), Reuland (2011a), and Rooryck and Vanden Wyngaerd (2011). In order to be viable, solutions should be sufficiently general, and rigorous in avoiding inclusiveness violations. One of the problems in evaluating these proposals is that they don't cover the same ground.

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<sup>4</sup> Very briefly, Frisian has a split in the pronominal paradigm that is visible in 3<sup>rd</sup> person plural *se* versus *har(ren)* and 3<sup>rd</sup> person feminine singular *se* versus *har*. The *se*-form is limited to subject and object positions. It cannot be used in oblique positions, for instance, as a 'free dative', as in *De kjittten steane har/\*se yn'e tún* 'The weeds stand her in the garden'. This form cannot be locally bound either. So we have *Klaske<sub>i</sub> waske har<sub>i</sub>* 'Klaske washed her', but not *\*Klaske<sub>i</sub> waske se<sub>i</sub>*. The claim is that these facts are related. Thus, the fact that *har* can be locally bound is taken to follow from the fact that it can be licensed obliquely, and the fact that *se* cannot be locally bound from the fact that it cannot be licensed obliquely. In 3<sup>rd</sup> person singular masculine the two paradigms just lack a formal distinction. See Reuland and Reinhart (1995), and Reuland (2011a) for a comprehensive overview of the facts and a full discussion.

Reuland (2001) bases his proposal on the idea that feature checking is the mechanism to encode a syntactic dependency that is interpreted as binding of SE-anaphors. Elaborating an idea in Reinhart and Reuland (1991) he argues that binding of SELF-anaphors is encoded by SELF covertly moving onto the verb.

Hornstein (2000), Boeckx, Hornstein and Nunes (2007) also pursue the idea that binding is syntactically encoded by movement, be it with a different implementation. Essentially, *John* in *John washed himself* has moved from the object to the subject position, and *him* spells out a copy of *John*. *Self* is an element facilitating the movement. As such the idea of using movement as encoding binding dependencies is in the right direction, since movement is an independent syntactic operation. Their analysis has nothing to say, however, about the logophoric use of *himself* illustrated in (4). Moreover, the authors do not deal with simplex anaphors (Dutch *zich*, Norwegian *seg*, Icelandic *sig*, etc.) in either their local or their long-distance use, and it is unclear how their analysis could be extended to cover them. The same holds true of the specific requirement on the representation of reflexivity in general, and the cross-linguistic variation in the way it is morpho-syntactically expressed.

To the contrary, Safir (2004) covers a much wider range of facts, and pays explicit attention to long-distance anaphora and the logophoric use of *himself*. However his analysis is based on the notion of a dependency as a primitive, hence goes less far in complying with inclusiveness, and is not quite commensurable with the other approaches (see Reuland 2009 for discussion). Moreover his analysis does not extend to reflexivity in general and its cross-linguistic expression.

Hicks (2009) proposes an analysis based on Agree. Just like Move, this is a primitive operation in the minimalist conception of grammar. Although his analysis covers quite a bit of ground, it is based on a notion *var* 'variable', which serves as the basis for encoding the anaphoric dependency, but appears to lack independent motivation. It is unclear how this type of analysis can be extended to cover the issues in the expression of reflexivity outlined above.

Rooryck and Vanden Wyngaerd (2011) focus on local binding in Germanic. They pursue an interesting Agree-based approach. However, in their explanation of the prohibition of local binding of pronouns, they have to distinguish between the original feature set of pronominal elements and the features contributed by Agree. This is implemented by a specific \*-annotation of feature values resulting from Agree. However, such an annotation violates inclusiveness. Moreover their proposal does not carry over to non-local binding of SE-anaphors (which they acknowledge), nor does it cover issues in the expression of reflexivity in general.

Since Chomsky (2001) introduced the notion of a phase as the key to our understanding of locality a variety of proposals have been presented exploiting this notion for an understanding of locality on binding, for example Lee-Schoenfeld (2008), Quicoli (2008), Despić (2015), Charnavel and Sportiche (2016). Phases are local domains. In Chomsky's original conception, they are CP and vP (or v\*P; Chomsky 2001:12). These constitute the two specific points at

which the syntactic derivation is handed over to the realization and the interpretation systems. Essentially, they are the two maximal projections that are propositional. The basis of phase theory is the *Phase impenetrability condition* (PIC): *The domain of H (of a phase head) is not accessible to operations at ZP; only H and its edge are accessible to such operations.* The effect of the PIC is that only the head (H) and the edge (e.g., XP) of a lower phase (HP) are accessible to movement/interpretive operations taking place at the level of a higher phase (ZP). Although the basic intuition is clear, there is considerable discussion about the details of phase theory. For instance whether or not all maximal projections are phases, instead of only CP and vP, or whether or not handover to PF proceeds in terms of exactly the same projections as handover to the interpretative system.

In so far as binding dependencies are encoded by core syntactic operations such as Internal Merge (=Move) and Agree, it should be uncontroversial that these operations are subject to some version of the PIC as it can be eventually empirically established. Yet, one important question is to what extent an independently motivated definition of phase-hood and or the relevant set of operations can be given.

Consider, for instance, the well-known contrast between wh-movement and pronominal binding. Wh-movement is subject to a phase-based locality condition blocking wh-movement out of adjuncts as in *\*Who did Bill leave Mary [after spotting-]*. However, nothing blocks binding into adjuncts as in *Every suitor<sub>i</sub> left Mary [after her father threatened him<sub>i</sub>]*. Semantically the *after*-phrase is an open expression in both cases. However, locality only applies in the movement case. This shows that the notion of propositionality should be used with some care, and that it certainly cannot be maintained that PIC restricts all interpretive operations. The question is then, which operations it blocks, and which ones it doesn't. Parsimony would lead us to expect that PIC applies to just those operations encoding a binding dependency that are strictly syntactic, and reducible to Merge and/or Agree. From this perspective, proposals that just restate binding conditions in terms of phases without an analysis of the syntactic mechanisms involved in the representation of binding dependencies that would motivate a role of phases fall short in explanatory potential.<sup>5</sup>

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<sup>5</sup> In some cases the nature of the mechanism that has to be involved can be reconstructed relatively straightforwardly. Despić (2015), for instance, develops a very insightful phase based analysis of cross-linguistic variation in the distribution of dedicated anaphoric possessives. His analysis is quite easily compatible with an implementation in terms of a basic syntactic operation such as Agree.

Charnavel & Sportiche (2016) propose that, generally, the locality requirement expressed by Condition A of the canonical binding theory can be reduced to Phase Theory. To this end they present the following reformulation of condition A:

- (i) Condition A: an anaphor must be bound within the spellout domain containing it.

They leave open the type of operations involved in binding. However, in their case it is rather unclear which mechanisms could be involved given their further assumptions. But in the absence of a definition of the syntactic mechanisms

This leads to the proposal in Reuland (2011a). Starting point is the idea that the full range of the patterns observed should be derivable from general principles of syntactic computation, in tandem with the morphosyntactic feature composition of the anaphoric elements involved. This should equally apply to local binding - and its conditions - and non-local binding, and to the variation in the expression of reflexivity and the structural conditions on the logophoric interpretation of anaphors. In this proposal, binding of SE-anaphors is syntactically encoded by Agree (rather than feature checking as in Reuland 2001) and binding of SELF-anaphors involves interpreting SELF as an operator on the verb (in languages like English implemented by covert movement, but in others by basic semantic composition procedures).

The leading idea is that in the face of diversity a modular perspective on binding is called for, including a principled distinction between the reflexivization of predicates and the factors entering into the binding of SE-anaphors and pronominals. It will be summarized in some detail later. But first I will discuss two challenges to extant approaches. One is an issue in English SELF-anaphors, the other an issue in non-local binding of SE-anaphors in Germanic.

## 2.4 Two challenges

### 2.4.1 SELF-anaphors

The CBT assumed that the English anaphor *himself* is just one single element that as a whole qualifies as an anaphor. Although already challenged by Helke (1973), and later by Jayaseelan (1997), this assumption still underlies a considerable body of current work in binding theory, notably Safir (2004), Hicks (2009), Rooryck and VandenWyngaard (2011), and also Charnavel and Sportiche (2016), though not, for instance Boeckx, Hornstein and Nunes (2007). To account for the logophoric use of *himself*, which we saw exemplified in (4), it is then assumed that English also has another, homonymous, expression, *him* + intensifier. It is the latter that gives rise to the logophoric interpretation in this view. Consider, for instance, the well-known contrast in (9) discussed in Reinhart and Reuland (1993):

- (9) a. \*Max<sub>i</sub> boasted [that the queen invited himself<sub>i</sub> for a drink]  
 b. Max<sub>i</sub> boasted [that the queen invited [Lucie and himself<sub>i</sub>] for a drink]

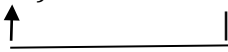
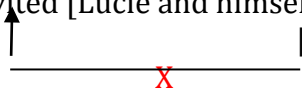
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involved, (i) remains a stipulation. No motivation is given why, for instance, anaphor binding would be sensitive to spellout domains, and binding of pronouns would not be, and it is not easy to see how such motivation could be provided. Furthermore, as stated, their condition A is incompatible with the existence of non-local binding as it is available for simplex anaphors in Scandinavian, and it is unclear how their approach could be extended to cover these.



In (9a) *Max* is outside the binding domain of *himself*, hence the sentence is ill-formed. But somehow, *Max* must be inside the binding domain of *himself* in (9b). Under the homonymity approach, this is accounted for by positing that what we see in (9b) is in fact *him* + intensifier. For the binding conditions this is just a pronoun, hence they are satisfied. The puzzle, not addressed in such work, is why (9a) is not ruled in. Under the homonymity approach condition A violations should in fact never show up.

Reinhart and Reuland (1991) and Reuland (2011a), by contrast, argue that the components of *himself* are syntactically analyzable into *him* and *self*, where *self* is a reflexivizing element operating on the predicate by covert movement. If so, the difference follows from general conditions on movement, as illustrated in (10).

- (10) a. \*Max boasted that the queen (self)-invited himself for a drink  

- b. Max boasted that the queen invited [Lucie and himself] for a drink  


Where possible - for reasons of economy- *self* covertly moves onto the verb, and reflexivizes the latter, leading to a clash in (10a), due to the gender incompatibility between the verb's arguments. In (10b) SELF-movement is prohibited by a syntactic constraint (here the coordinate structure constraint). Hence, *himself* is in what Pollard and Sag (1992) called an *exempt position* -that is, a position in which the local binding requirement is obviated. Since SELF cannot move onto the verb, the latter is not reflexivized, and *himself* can be valued by a suitable more distant antecedent (see Reuland and Winter 2009 for a unified semantics for both uses of *himself*). When not used as a reflexivizer *self* like its cognate in for instance Dutch, conveys a discourse perspective akin to logophoricity.

Note that any version of the homonymity approach will have to stipulate a distributional difference between *himself* and *him* +intensifier that recapitulates the conditions on exemption, and is therefore undesirable.<sup>6</sup>

<sup>6</sup> Charnavel and Sportiche (2016) take issue with the exemption approach and argue that in fact only a minor adjustment to condition A of the CBT is needed. Namely, they argue that anaphors obey condition A under the proviso that the antecedent is inanimate, and that inanimate antecedents are much better probes into the nature of binding than animate/human antecedents. They use this as an argument that reference to reflexivity of predicates is not needed. What they don't take into consideration is the fact that inanimate antecedents will never meet the discourse conditions that exempt anaphors have to meet, hence the fact that they have to be local - and are ill-formed if there is no suitable local antecedent - is a straightforward result of the reflexivity approach. How to state that anaphors obey condition A only in the case of inanimate antecedents without look-ahead remains unclear in Charnavel and Sportiche's approach. Moreover they don't discuss the further evidence in Reinhart and Reuland

Pursuing the distribution of *himself* from another angle, in developing alternative approaches it is always important to take into account not only the bigger picture, but also smaller details. For instance, a particular challenge to approaches that fail to take into account the role of predicates is formed by contrasts as those in (11) and (12), from Reinhart and Reuland (1993), see also Reuland (2011a: ch 3, 106). In this approach a reflexive predicate must be licensed, including reflexive predicates in the entailments of a sentence (see section 5 for discussion of the notion of licensing). Hence, a coordinate NP with a “locally” bound pronominal is predicted to be acceptable as an ECM subject in English, but not as a matrix argument in a control structure (since the latter, but not the former entails a reflexive instantiation. This is illustrated in (11). As we see, in (11a) a reflexive *convince* relation is entailed, as represented in (11b); (11c), however, does not entail a reflexive *expect* relation, as we see in (11d).

- (11) a. In the end John<sub>1</sub> convinced [Mary and him<sub>1</sub>\*(self)] [<sub>TP</sub> PRO to leave the country]  
 b. → ... John ( $\lambda x$  (x convinced Mary, TP)) & John ( $\lambda x$  (x convinced x, TP))  
 c. In the end John<sub>1</sub> expected [[Mary and him<sub>1</sub>(self)] to leave the country]  
 d. → ... John ( $\lambda x$  (x expected [<sub>TP</sub> Mary VP])) & John ( $\lambda x$  (x expected [<sub>TP</sub> x VP]))

Similarly, if *we* is interpreted distributively, then in (12a) a reflexive instantiation of a predicate is entailed ( $\lambda x$  (*x allows x (x runs for the job)*)) applying to *me*), which is ruled out, as unlicensed (and, note that, in English at least, no licensing mechanism is available to rescue this interpretation, since *myself* instead of *me* would enforce syntactic reflexivity, which is ill-formed due to the fact that at this level the arguments are distinct).

- (12) a. \*/?We allow me [PRO to run for this job]  
 b. We expect [me to run for this job]

By contrast, in (12b) the entailed expression does not contain a reflexive predicate ( $\lambda x$  (*x expects (x run for the job)*)) applying to *me*). Hence (12b) is allowed.<sup>7</sup> Such facts are impossible to capture in any theory that does not allow the notion of co-argumenthood to play a role, in addition to dependencies in a

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(1993) showing the crucial role of properties of predicates (see Reuland 2011a: ch 3, for a summary).

<sup>7</sup> Alexis Dimitriadis (personal communication), wonders why in the singular of (12b) “I expect myself to run for this job”, *myself* is required rather than *me*. As argued in Reuland (2011a), this is due to the particular structure of ECM constructions in English, which involves raising of the subject into the matrix domain (see Runner 2005) and, hence, requires the target position to be distinguishable from the source position. Such a structure is absent in free datives such as *I bought me a book*; hence a simple pronoun is possible there.

larger domain, such as the domain in which A-chains can be formed.

#### 2.4.2 *Absence of complementarity*

Right from the early stages of binding theory the idea of complementarity between anaphors and pronominals played a significant role. What was thought to be attractive is that if one can state a principle accounting for the distribution of one, by complementarity the distribution of the other follows. This was the more attractive if complementarity could be understood as following from economy.

For instance, Reuland (2001) derives the complementarity between pronominals and SE-anaphors from an economy principle. Roughly, the idea is that it is more economical to use a SE-anaphor than a pronominal. Hence, where other principles leave the choice open, economy prefers a SE-anaphor. In Boeckx, Hornstein and Nunes (2007) economy plays a similar role.

Economy is also a hallmark of Safir (2004). Safir proposes a scale of relative degree of dependency for morphological forms and a form to interpretation principle (FTIP), which “determines whether or not a dependent interpretation is supported by a given form in syntactic context” (p. 102). It is based on the generalization in (13):

- (13) Generalization: Between any two anaphors, the more referentially specified one is more dependent, whereas among non-anaphors, the more referentially specified one is less dependent. (p. 86) which for Germanic yields the following scale:  
SIG-SELF >> pronoun-SELF >> SIG >> pronoun >> r-expression

Simplified, the form to interpretation principle (FTIP) reads as in (14):

- (14) FTIP (simplified): If X c-commands position Y, and z is the lexical form or string that fills Y, and it is not the most dependent form available in Y, then Y cannot be interpreted as identity dependent on X.

While Safir’s approach fares well for languages with several dependent forms in complementary distribution, it predicts that complementarity should always obtain. This is contrary to fact, as will be discussed shortly.

Rooryck and Vanden Wyngaerd (2011) in a proposal to account for the local binding of 1st and 2nd person pronouns in Germanic and Romance, and 3rd person pronouns in Frisian, make use of an APBE principle:

- (15) Absence of Principle B effects (APBE)  
Pronouns behave like anaphors when a dedicated class of reflexive pronouns is lacking. (p. 19).

Proposals that stipulate complementarity as a leading principle face two problems. The first one is a theoretical problem: it requires a comparison between different derivations. That is whether or not a derivation with a

pronoun is licit, depends on whether an alternative derivation with an anaphor is licit. This is an extremely powerful mechanism, and should be avoided in an optimal theory. The second one is an empirical problem. Complementarity as a general principle simply doesn't hold. Or to put it differently, it is violated so often, that is it extremely dubious that it can be preserved at a reasonable cost. As was already observed in Chomsky (1981), complementarity breaks down in certain English PPs, such as *John put the book behind him(self)*. It is systematically violated in all exemption environments in English (of course, unless one analyzes such occurrences of *himself* differently). However, I see no escape in the cases of non-locally bound SE-anaphors in Dutch and Scandinavian. In these sentences one systematically sees both the pronominal and the SE-anaphor as an option, as in (16) (see already Everaert 1986 for discussion).

- (16) a. *Jon bad oss forsøke å få deg til å snakke pent om seg/ham*  
 Jon asked us (to) try to get you to talk nicely about SE/him  
 (Hellan 1988)
- b. *Alice hoorde [mij tegen zich/haar argumenteren]*  
 Alice heard me against SE/her argue

An appeal to the fact that there is a meaning contrast (*de se* versus *de re*) does not help resolving this, since in the case of local binding the existence of such a contrast does not license a pronominal. In fact we find many more cases where more than one reflexive strategy is available, that might be potential competitors, but where both can be used (staying close at home, in Dutch, verbs like *verdedigen* 'defend' easily allow either *zich* or *zichzelf*, but farther away in Bahasa Indonesia many verbs allow both *dirinya* and *dirinya sendiri* (Kartono 2013, Schadler 2014), Russian verbs may allow either the affix *sja* or the full reflexive *seb'a*, and non-local binding in Russian shows a similar pattern as Scandinavian or Dutch, though with a great deal of inter-speaker variation in the details).

Consequently, complementarity cannot be the basis of an explanatory binding theory. I come back to this issue in section 4, where I will summarize how apparent complementarity effects can be derived without recourse to a transderivational comparison.

All this being said, let's now go back to the simple task we started out with: Explaining why so many languages do special things when representing a simple reflexive predicate.

### 3. Representing Reflexivity

For a starter, let me note that, in line with the terminology in Chomsky (1981), I mostly avoided using the term 'reflexive' so far. Although there is a substantial body of literature in which the term 'reflexive' is used as a virtual synonym of the term 'anaphor'<sup>8</sup>, there is a good reason not to follow this practice, since it is

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<sup>8</sup> In fact in a Google search (22-1-'15) the term 'reflexive pronoun' showed up more often than the term 'anaphor'; even the term 'long-distance reflexive' occurred more often than the term 'long-distance anaphor'.

misleading in the context of a discussion of reflexivity proper. Rather, I will limit the use of the term 'reflexive' to those anaphors that are involved in the expression of reflexivity.

The basic notion of reflexivity I will be using is the following: *A predicate is reflexive iff one semantic argument bears two of the predicate's semantic roles.*<sup>9</sup> In its transitive use a verb like *defend* assigns an agent role to its subject *Jack* and a patient role to its object *Jill*, as in *Jack defends Jill*. In its reflexive use – *Jack defended himself* – both roles end up on the same argument, here *Jack* (with some proviso). Compare this to the predicate *wash*, and take it again in its transitive use – *Jack washed Jill*. For this predicate we have two options for a reflexive use, namely *Jack washed himself*, and *Jack washed*. In both cases one participant plays two roles, the washer and the washee.

This excludes any configuration from qualifying as reflexive where what is semantically the same argument is assigned roles from two different predicates. Consider, for instance *Pasha ljubit svoju koshku* 'Pasha loves his cat'. There is a dependency between *Pasha* and *svoju* (a dedicated possessive anaphor), and traditionally expressions such as *svoj* are indeed called possessive reflexives. However, obviously, the sentence does not denote a reflexive loving-relation, and no reflexive predicate is formed.<sup>10</sup>

Note, that there are many languages that require dedicated reflexives for locally bound objects, but allow simple pronominals as possessors (as in English). Consequently, the operations involved must differ.

One general way of bringing about that two semantic roles of a predicate end up on the same semantic argument is by identifying two co-argument expressions each bearing a semantic role. One strategy to achieve this, and in fact the only strategy usually discussed, is binding. Given the necessity to reassess the notion of binding Reinhart (2006) proposes the following *definition*, explaining the 'linguistic' notion of *A-binding* in terms of the logical notion of *binding* that is independently needed:

- (17) *A-binding* (Reinhart 2006)
- a.  $\alpha$  *A-binds*  $\beta$ , iff  $\alpha$  is the sister of a  $\lambda$ -predicate whose operator binds  $\beta$ .

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<sup>9</sup> Formally, there is a distinction between a predicative head in the lexicon, and its use with arguments in a sentence. This distinction is reflected in the definition of a predicate in Reinhart and Reuland (1993): A [...] predicate formed of (a head) *P*, is *P* and all its arguments [...]. Where no misunderstanding arises we will simply use the term *predicate P* both for the head *P* and for the *predicate formed of the head P*.

<sup>10</sup> Note that the definition of reflexivity used here covers both the cases where reflexivization is reflected in the form of the nominal argument (*himself*, etc.) and the cases where it is reflected in the form of the verb (by an affix such as Russian *sja*, or a medio-passive verb form as in Modern Greek *πλένομαι* 'I wash myself' ('nominal' versus 'verbal' reflexivization)).

- b.  $\alpha (\lambda x (P (x \dots x)))$

So, in (17b),  $\alpha$  A-binds  $x$ ; binding in the concrete example of (18a) is represented as in (18b), and the long-distance binding in (19a) as in (19b):

- (18) a. Pasha ljubit svoju koshku 'Pasha loves his cat'  
 b. Pasha ( $\lambda x$  ( loves (x [x's cat])))
- (19) a. Julia nadeetsja chto John ljubit ee 'Julia hopes that John loves her'  
 b. Julia ( $\lambda x$  (x hopes [that John loves x]))

The idea is that anaphors such as *svoj* or pronominals such as *ee* or *her* are translated as variables in logical syntax. The subject (*Pasha* or *Julia*) undergoes quantifier raising. It leaves a trace, which is translated as a variable. This one is in turn identified with the variable translating the anaphor/pronoun. This process makes binding in the sense of (17a) possible (see, Heim and Kratzer (1998), or Buring (2005) for formal details). Note, that binding dependencies may differ in their syntactic status. The bound interpretation of *ee* in (19a) is possible, but not necessary, since *ee* may also refer to an individual in discourse. Thus, this dependency is not syntactically encoded, but only represented at the level of logical form (logical syntax in the sense of Reinhart 2006). In cases of anaphor binding, however, binding is enforced, and represented syntactically in section 4 we will see precisely how).

This leads us to the main puzzle that has to be resolved. Given the procedures discussed, the most straightforward representation of a reflexive predicate is as in (20), where both the subject argument and the object argument are bound by the same  $\lambda$ -operator.

- (20) DP ( $\lambda x (V x x)$ )

Since pronominals can be translated as variables, one would expect that a common source of (20) would be (21a), instantiated by sentences as in (21b), etc., where the DP binds the pronominal, indicated by italics:

- (21) a. *DP* Verb *Pronominal*  
 b. \**Cindy* defended *her*  
 c. \**Pasha* nenavidel *ego*  
 Pasha hated him  
 d. \**Martin* kende *hem*  
 Martin knew him

But this expectation is not borne out. In most languages studied so far – and, as it turned out, in all languages that have been studied in sufficient depth - the configuration of a subject a verb and a simple pronominal object does not by itself give rise to a reflexive interpretation. Some factor must prevent 'brute force reflexivization' (BFR). In general, the result where a subject binds an object is ill-formed, unless something special happens to license this binding. Note, that we cannot appeal to condition B of the CBT, since it is this condition that must be

reassessed, and eventually derived. In order to sort out the various factors that may be involved we have to be a bit more precise about the way in which binding is syntactically encoded.

#### 4 Encoding binding in syntax

In this section we will review the binding of SE-anaphors. Section 5 (specifically section 5.2.3) will address binding of SELF-anaphors and their kin. SE-anaphors are essentially pronominals with a deficient specification for  $\varphi$ -features. *Zich* (and its Scandinavian counterparts *seg*, and *sig*) are all specified for 3<sup>rd</sup> person, but have unvalued number and gender features.<sup>11</sup> Given our discussion so far, we have to show how the dependency between a SE-anaphor and its antecedent is encoded, and answer the question of why a 3<sup>rd</sup> person pronoun instead of *zich* is ruled out in Dutch, but not in Frisian.<sup>12</sup>

The idea in Reuland (2005), and elaborated in Reuland (2011a: Ch 5) is that binding of SE-anaphors is encoded by *feature chains* formed by the Agree operation (but see already Everaert 1986 for a proposal to represent binding by syntactic chains). The starting point is that syntax proper has precisely one way of representing identity, namely by the *y is a copy of x*-relation. This is the relation that underlies movement as in *The men were admired (~~the men~~)*; this relation also underlies Agree, which copies feature values: Agree copies features from a source and uses these to fill/overwrite features in the matrix of a (partially) empty target. This is technically implemented in Pesetsky and Torrego's (P&T, 2007) theory of feature chains. Agree results in literal identification of features (in P&T's terms, turning 'occurrences' into 'instances').<sup>13</sup>

For sake of concreteness, consider the structure in (22), where EA stands for the external argument/subject.

(22) [Tns [EA [v\* [ V [SE ....]]]]]

The process of chain formation is set in motion by the structural Case feature, since structural Case is an independent syntactic 'trigger' in this environment. The chain is formed by check/agree via a series of probe-goal relations, essentially based on structural Case being analyzed as uninterpretable Tense. Thus, the  $\varphi$ -feature dependency gets a free rider on the Case dependency. The

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<sup>11</sup> It is crucial to distinguish between 'having a feature that is unvalued' and various forms of syncretism. See Reuland (2011a: 137-138) for detailed discussion.

<sup>12</sup> There is a further question: Why does *zich* have to have a linguistically expressed antecedent? Departing from Reuland (2001, 2011a), an option to be discussed in section 8 is that, being pure variables, elements such as *zich* cannot discharge a theta-role unless they are bound.

<sup>13</sup> The notion of identity at stake is illustrated by difference between *The men were admired (~~the men~~)*, and *The men admired the men*, where the two occurrences of *the men* are easily interpreted as referring to different groups of men in the latter case, but not in the former.

dependencies are summarized in (23), with the subject EA providing the required valued and interpretable instance of [ $\varphi$ ] (where *u* stands for unvalued and *val* for valued) (see Reuland 2011a for more detail):

(23) [Tns<sub>u $\varphi$</sub>  [SE<sub>u $\varphi$</sub>  [EA<sub>val $\varphi$</sub>  [V\*<sub>u $\varphi$</sub>  [ V (SE<sub>u $\varphi$</sub> ).... ]]]]]]

In P&T's approach the exchange of values in the formation of a feature chain unifies the features it contains. By valuation, feature values are copied/overwritten, hence all the tokens of  $\varphi$  in (23) share instances of one feature. Just as with copies in dislocation structures, copying/overwriting of feature values encodes identity. Therefore, we have a syntactic representation of the binding relation.

The fact that this is allowed with SE-anaphors and not with pronominals is captured by a general *condition on chain formation*. Overwriting features amounts to deleting the features that are overwritten. Overwriting is subject to a general *principle of recoverability of deletions* (PRD, Chomsky 1995). Informally, an occurrence of a feature cannot be overwritten by another occurrence of that feature unless this doesn't limit interpretive options. A SE-anaphor and its antecedent only share interpretive constants (category, person). But the pronominal *he* in let's say *Mark hoped he would win* may be interpreted as Mark, but also as someone else. This entails that *Mark* and *he* cannot become members of the same syntactic chain (although they can become co-valued by an interpretive process). Consequently, with SE in the position of (23) true identity of feature bundles can be effected; with a 3<sup>rd</sup> person pronominal in the position of SE in (23) no chain can be formed.

This analysis explains the contrast between 3<sup>rd</sup> person pronominals and 1<sup>st</sup> and 2<sup>nd</sup> person pronouns. As I brought up earlier, many languages allow local binding of 1<sup>st</sup> and 2<sup>nd</sup> person pronouns. In their case chain formation is not blocked by the PRD, since their interpretation is constant (modulo proxies) within one reportive context (see Reuland 2001, 2011a for discussion).<sup>14</sup>

This reasoning leaves open, so far, why this option cannot be bypassed, by having the pronominal bound in logical form. That is, why don't we have (24b) alongside (24a), with *hem* semantically bound by *Jack*, as in the intended interpretation (25) (with binding indicated by italics)?

- (24) a. *Jack* voelde [*zich* wegglijden]  
       Jack felt [SE slip away]  
       b. \**Jack* voelde [*hem* wegglijden]  
       Jack felt [him slip away]

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<sup>14</sup> That is, different occurrences of a 1st person pronoun in one reportive context will always have the same value, namely the author. Of course, this is modulo Jim McCawley's famous sentence "I dreamt that I was Brigitte Bardot and that I kissed me". But here two contexts are intertwined, the dream context and utterance context, so the condition referred is nevertheless met. (Moreover, no chain formation is involved anyway).



As we saw above, this is the type of question that is often answered in terms of competition, with a transderivational comparison. Here we will see how such a transderivational comparison can be avoided. As noted, the envisaged interpretation is (25):

(25) Jack ( $\lambda x. (x \text{ felt } [x \text{ slip away}])$ )

Deriving this representation from (24b) by encoding the dependency in the syntax is blocked as a violation of the PRD. PRD is a fundamental principle of grammar. Any 'attempt' to violate it – i.e. creating a configuration that would lead to its violation – entails that the derivation is cancelled (Chomsky 1995). If a derivation is cancelled all other options to continue this derivation are blocked. More specifically, the possibility to bypass the prohibition of chain formation by semantic binding is blocked: 'Rejection is final' (Reuland 2011a). Note, that we don't have to compare the *zich*- and the *hem*-options, invoking global economy. The *hem*-option is just blocked in its own right.

This brings us back to the Dutch-Frisian contrast. As noted earlier, J. Hoekstra (1994) found an independent difference in their case systems. As indicated in fn. 2, Frisian has a split in the pronominal paradigm that is visible in 3<sup>rd</sup> person plural *se* versus *har(ren)* and 3<sup>rd</sup> person feminine singular *se* versus *har*. *Se* is just a pronominal form (not to be confused with a SE-anaphor), alternating with *har(ren)*. But it is limited to structural Case positions. So, speaking about a woman, or a bunch of people one can say *Ik haw se sjoen* 'I have seen her/them', or *ik haw har(ren) sjoen* (id.). It cannot be used in oblique positions (see fn. 2). The form *har(ren)* can occur in all the oblique positions where *se* cannot. So, *har(ren)* is licensed by non-structural Case. But, since it also occurs in direct object positions, one must conclude that Frisian – unlike Dutch- allows licensing of object pronominals with non-structural Case. This is directly relevant for their visibility for chain formation. In P&T's system structural cases represent interpretable Tense, as we saw, that is, they are *T-related*. Non-structural Case is not T-related in this sense. Consider, then, the structure in (26):

(26) *Klaske* *fielde* [*har*/\**se* *fuortglied*en]  
Klaske felt [her slip away]

Under the option where *har* in (26) doesn't have structural case – is not T-related - it is not visible as a goal for probing. Hence, a chain is not attempted and PRD does not come into play. Consequently, the derivation is not cancelled. Therefore, semantic binding of *har* by *Klaske* is not blocked (see Reuland 2011a for extensive discussion).<sup>15</sup> In its *se*-form the pronominal does have T-related

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<sup>15</sup> Note that Van Gelderen (2000) shows that Old English, another language with locally bound pronominals, lacked structural accusative Case. The analysis of Frisian given here has been criticized by Rooryck and Vanden Wyngaerd (2011). However, this criticism ignores the difference between features being unvalued and the effects of syncretism (discussed in Reuland 2011a: Ch. 5), hence misses the point.

Case. Hence it is visible as a goal for probing just like pronominals in Dutch. Consequently PRD comes into play, the derivation is cancelled, and semantic binding is blocked. Thus, the fact that the *se*-form cannot be locally bound, whereas the *har*-form can, immediately follows from an independent difference in Case, in tandem with general properties of the syntactic and semantic systems (a comparable role of Case one also finds in certain German dialects, see Reuland and Reinhart 1995 for references and discussion).

Note, that binding by chains and its restrictions is just a by-product of general principles of grammar, and language specific morpho-syntactic properties. This is illustrative of what we may expect cross-linguistically: Minor differences in morpho-syntax, may have striking effects at the macro-level.

It is easily seen that understanding these differences between pronominals, SE-anaphors and SELF-anaphors in the manner sketched presupposes a connection between their morpho-syntactic make-up and their role in the mapping from form to interpretation. This connection is expressed in what Reuland (2011a) refers to as the Feature Determinacy Thesis (FDT):

*Feature determinacy thesis*

Syntactic binding of pronominal elements (including anaphors) in a particular environment is determined by their morphosyntactic features and the way these enter into the syntactic operations available in that environment.

The FDT assumes that the principles mapping syntactic forms onto morphology allow a degree of *transparency* that is sufficient for the realized form to provide a window on properties of the interpretation process. Although a sufficient amount of transparency is crucial for linguistics as an empirical science, the status of this transparency is currently under debate (e.g. Drummond et al. (2011: 399). In my view abandoning transparency has unacceptable consequences for the field of linguistics as a whole. though. I will come back to this issue in section 7.

*5 Approaching reflexivity*

Applying the result of the previous section to the cases in (21), we can see that their ill-formedness immediately follows. Thus, part of the answer to the question of why *brute force reflexivization* is excluded comes from the conditions on chain formation. However, this cannot be all. As the paradigms in (7) and (8) illustrated, what Dutch and Frisian share is that reflexive subject experiencer predicates require a complex reflexive. In this they are not alone. We see this in other languages as diverse as Russian (Slavic), Khanty (Finno-Ugric), and Sakha (Turkic).<sup>16</sup> Other languages require a complex reflexive across the board, or have a verbal strategy alongside a nominal strategy (see, for instance, Lust et al. 2000, for an overview of reflexivity markings in a range of languages spoken in India,

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<sup>16</sup> A notable exception are languages with reflexive clitics (Romance, West and South Slavic). For reasons of space, I refer to Marelj and Reuland (2016) for an explanation.

and Schadler 2014 for discussion of a yet different range of languages varying from Niger-Congo to Tai Kadai, and Malayo-Polynesian. Also the patterns in (11) and (12) indicated that a prohibition of *Brute Force Reflexivization* even holds at the level of entailments. The question, then, is why BFR is prohibited also where chain formation plays no role.

There is extensive discussion in the literature of what makes reflexive predicates special. The general line of these analyses is that some verbs are more naturally interpretable as reflexive than others, and that this distinction determines whether or not an element like SELF, serving as an intensifier or focus marker is needed. I refer to Volkova and Reuland (2014) for an overview and assessment. The main problem with these approaches is that so far, no independent criteria have been provided to support these classifications. There is no independent test for *self- or other-directedness* (or *+/-natural reflexivity*) as a relevant property of verbs. For instance, would *ontwapenen* ‘disarm’ be prototypically other-directed or self-directed? Hard to tell, but it allows a SE-anaphor. Quite surprisingly from this perspective, *branden*, which is highly unpleasant if it happens to you, should be categorized as intrinsically self-directed (or naturally reflexive), since it allows a SE-anaphor too, as in *Jan brandde zich* ‘Jan burnt himself’. Why would *bewonderen* ‘admire’ convenient as self-admiration is, be other-directed as the obligatoriness of a SELF-anaphor would seem to indicate? Moreover, for many languages the “marked reflexive form” simply doesn’t have the properties of an intensifier, focus marker, etc. Russian uses *sebja*, many languages use bodypart expressions such as ‘his head’, ‘his body’. There is no non-arbitrary correlation between the meaning of such expressions and intensification (note that even in English, the proper intensifier is *himself*, etc. not bare *self*). There is a language, Zande, which puts the reflexive argument in a PP (Schladt 2000). The conclusion must be that such approaches simply don’t work. That’s why one has to look for firmer ground to explain the special status of reflexivity.<sup>17</sup>

### 5.1 Deriving the need for licensing: Indistinguishability of Indistinguishables (IDI)

In order to explain why reflexivity requires licensing let’s go back to the representation of reflexivity in (20), repeated here as (27):

(27) DP ( $\lambda x$  (V x, x))

A crucial aspect of (27) is that we see two identical objects in a local domain: the two occurrences of the variable *x*. As discussed Reuland (2011a), this is the source of the prohibition of Brute Force Reflexivization. In order to make a distinction between occurrences of ‘identicals’ a representation minimally needs

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<sup>17</sup> Schlenker (2005) proposes a potentially interesting semantic approach. However, his proposal is incompatible with the observed cross-linguistic variation (see Volkova and Reuland 2014 for discussion). Another idea one occasionally finds in the literature is that special forms are used for pragmatic reasons (Levinson 2000), or in order to avoid ambiguity. However, absence of special markings in pronominal interpretation is standard outside the local domain, so even from such perspectives the question arises what makes local domains special.


structure or order. Neither of these are present, though, at the level where syntactic representations are handed over to the interpretation system (the C-I interface, Chomsky 1995). Order is a property of the expression system ('Phonetic Form'), but not of syntax, or the interpretation system. So, order is unavailable at the relevant point of the derivation. Formal structure is typically a syntactic property. In the mapping of syntactic structure onto the phonetic representation, all structure is erased unless directly phonetically interpretable. Similarly, in the mapping from syntactic structure onto the relevant semantic representation the existing structure is erased unless a particular sub-structure has a counterpart in the semantics. This is reflected in Chomsky's (1995) proposal that only 'Terms', i.e., Maximal projections, and Heads are visible for the interpretation system. But it also underlies the idea that after being handed over to the interpretation system, the internal structure of a constituent is no longer visible to the syntactic computational system, and in fact reduced to an atom as in Arsenijević and Hinzen (2012). For present purposes I will stay with Chomsky's proposal, and specifically assume that intermediate structures are invisible, as indicated in (28). Thus, translating *DP V pronoun* at the C-I interface involves the steps in (28):

$$(28) \quad [{}_{VP} x [{}_{V} V_{\theta 1, \theta 2} x]] \rightarrow [{}_{VP} V_{\theta 1, \theta 2} "x x"] \rightarrow * [{}_{VP} V_{\theta 1, \theta 2} x]$$

1
2
3

The second step with the two tokens of *x* in "*x x*" is virtual (hence put in brackets). With the breakdown of structure, and the absence of order, stage 2 has no status in the computation. Hence, eliminating *V'* leads directly to stage 3. Consider then the effect of reflexivization on the two arguments of a transitive verb such as *bewonderen* 'admire', and its counterparts in other languages, with a simplex anaphor (SE-anaphor) such as *zich* as the object argument.

(29) a. Alice  $\lambda x$  [<sub>bewondert $\theta 1, \theta 2$</sub>  *x* *x*] + *zich*



b. Alice  $\lambda x$  [<sub>bewondert $\theta 1, \theta 2$</sub>  *x*] + *zich*

?

Role 1? Role 2?

In the local domain of the verb, after identification by binding the two argument variables can no longer be distinguished, hence the principle of *Indistinguishability of Indistinguishables* (IDI) – which is just a logical principle, not specific to language - applies, and they are identified. Consequently, the mechanism discharging thematic roles faces an indeterminacy: it requires two arguments and finds only one.

## 5.2 Modes of licensing

As discussed in Reuland (2011a), this predicament can be resolved in two ways. One option is the *bundling* operation on argument structure proposed by Reinhart and Siloni (2005), the other involves a protection strategy, which can manifest itself in a variety of ways. I will start with bundling.

### 5.2.1 Bundling

As follows from the discussion so far, any process ensuring that two roles of a predicate end up on one argument will do to represent reflexivity. Bundling does precisely this. The Theta System (TS) of Reinhart (2002), Marelj (2004) and Reinhart & Siloni (2005) provides a general theory of thematic roles (see section 8) for more details), and operations on argument structure. It captures, for instance, well-known lexical alternations such as that between *John opened the door* – *The door opened*, or *John worried about his health* – *His health worried John*. One of the operations TS provides is *Bundling of  $\theta$ -roles*. The Bundling operation reduces the internal argument of a two-place predicate and bundles the internal role (theme) and the external role (agent) into a composite agent-theme role. Thus, the bundling operation accounts for the valence reduction effects that so often show up in reflexives cross-linguistically.

- (30) Bundling:  
 a.  $V_{acc}(\theta_1, \theta_2) \rightarrow R_s(V)(\theta_{1,2})$   
 (where  $\theta_{1,2}$  stands for the Bundling of  $\theta_1$  and  $\theta_2$ )  
 b.  $V[Agent]_1[Theme]_2 \rightarrow V[Agent-Theme]_1$

Reinhart and Siloni note an intriguing cross-linguistic generalization to the effect that bundling in the lexicon is restricted to (subsets of) Agent-Theme verbs.

- (31) *Restriction on (lexical) bundling*  
 Bundling is restricted to Agent-Theme verbs

Thus, one finds bundling with verbs such as English *wash* or Dutch *verdedigen* 'defend', but not with verbs such as Dutch *bewonderen* 'admire', Russian *nenavidet* 'hate', which are all *subject experiencer* verbs. Given this there is no well-formed derivation for \**Alice bewondert zich* in (29). As it is, it violates IDI, and bundling is no alternative.

Although Reinhart and Siloni don't provide an explanation for this restriction, it has a clear advantage over the earlier attempts to characterize the class of lexically reflexive verbs that I referred to in the beginning of this section: *It can be assessed independently*.

Bundling may also affect the Case assigning properties of the predicate. In Reinhart and Siloni's system, the bundling (+reduction) operation applies to transitive verbs that assign accusative Case.<sup>18</sup> It is parameterized in the following respect: Languages vary as to whether bundling also eliminates the accusative (e.g. English, Hebrew), as illustrated by English *John washed*, or leaves a Case residue that still has to be checked, for instance by a nominal affix as in Russian *Ivan pomylsja*, or by an expletive such as Dutch *zich*. That is, according to TS, *zich* in *Jack waste zich* is only there to check the residual case left by the Bundling operation. It has no independent argument status. Thus, to make this explicit, at the interface *Ivan pomylsja*, or *John washed* have the structure in (32):

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<sup>18</sup> See Marelj and Reuland (2016) for discussion of how this view can be reconciled with insights from Distributed Morphology.

(32) DP ( $\lambda x$  ([<sub>VP</sub> V<sub>[Agent-Theme]</sub> x])

One of the facts supporting the idea that Bundling reduces the internal argument of a two-place predicate is the wax museum context of Jackendoff (1992), mentioned earlier. As Jackendoff notes, *himself* in (33a) can be interpreted either as the person Ringo or as Ringo's wax statue. Crucially, however, in (33b) a statue interpretation is not available.

- (33) a. {Upon a visit to Mme Tussaud wax museum,} *Ringo washed himself*.  
(Theme: <sup>OK</sup>Ringo, <sup>OK</sup>Ringo's statue)
- b. {Upon a visit to Mme Tussaud wax museum,} *Ringo washed*.  
(Theme: <sup>OK</sup>Ringo, \*Ringo's statue)

The simplest account is to say that there is no object projected in this case. However, even if one would wish to argue for a null-object (which then would have a special and restricted distribution) it cannot be a semantic argument. Interestingly, the same contrast is found in Dutch between reflexives with *zichzelf* and *zich* (Reuland 2001). Reuland and Winter (2009) and Reuland (2011a) present formal details and an explicit semantics for these expressions, which will be summarized in section 5.2.3.<sup>19</sup> In Russian the same contrast obtains between reflexives with *sebjä* and *sja*. Note that proxy-readings may be absent in a wider range of contexts, including long-distance anaphors (Giorgi 2007). In section 8 I will come back to this issue.

Another test involves object comparison (Zec 1985, Dimitriadis and Que 2009, Dimitriadis and Everaert 2014):

- (34) a. Bill washes himself more often than John.  
b. Bill washes more often than John.

The sentence in (34a) has two readings. One is that Bill washes Bill more often than John washes John (subject comparison); the other one is that Bill washes Bill more often than Bill washes John. In (34b), however, object comparison is impossible. It doesn't allow the reading that Bill washes Bill more often than Bill washes John. Since in (34a) object comparison is available the predicate must have an object argument to enter the comparison. Again, the simplest answer to the question of why object comparison is impossible in (34b) is that there is no object argument to start with. The same pattern obtains in Dutch, similarly arguing against the argument status of the object *zich*.

### 5.2.2 Protection strategies

The other option is the use of a *protection* strategy. Such a strategy ensures that the two x-s are not on the same grid, and hence IDI does not apply.

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<sup>19</sup> See also Volkova and Reuland (2014: fn 27).

A very common instantiation of protection is that the bound element is embedded in an argument, for instance as a possessive. We find this in the use of self-anaphors, such as English *himself*, Dutch *zichzelf*, but also bodypart 'reflexives' such as Basque *bere burua* 'his head', Georgian *tav tavis* 'his body', Limbum *zhii tu* 'his head', etc.

The syntactic structure is, then, as in (35a), the logical syntax structure as in (35b). This is the alternative that is available to express reflexivity of verbs such as *bewonderen* 'admire', as in (35c). (Note, that although the 'anaphor as a whole' is on the same grid as the antecedent, the bound *Pron* is not.)

- (35) a. DP V [Pron [N]]  
 b. DP ( $\lambda x$  (V x  $f_N(x)$ ))  
 c. Alice ( $\lambda x$  (x bewondert [x zelf])) (=  $f_{\text{SELF}}(x)$ )

The only limitation on the choice of N in this strategy is that  $f_N(x)$  should have a value so that it can stand proxy for the DP binding the pronoun. The fact that we find so much variation in this domain, is simply due to the fact that there are so many formal means with the same effect, from embedding in a DP, to embedding in a PP as in Zande (Schladt 2000), see Reuland (2011a) for discussion.

Another form of protection is one in which the anaphor is not directly bound by the subject, but covalued with it by another process. This is what we see with clitics in Romance. One of the puzzles reflexive clitics (such as French *se* and Italian *si*) raise is that, despite their similarity to SE-anaphors like Dutch *zich*, they behave like complex anaphors in that they give rise to proxy-interpretations (see Labelle 2008, Reuland 2008, 2011a) and can be used with all verbs, including subject experiencer verbs (Reinhart and Siloni 2005). Their behavior follows from one simple property, namely their defining property as syntactic clitics: after first merger in complement position they move into the functional domain. Thus they create an A'-A dependency, which is interpreted as an operator-variable configuration (see Baauw and Delfitto 2005, and Marelj and Reuland, 2016, for further discussion). The idea is illustrated in (36):

- (36) DP ( $\lambda x$  (si ( $\lambda y$  (V x y))))

Being a clitic, *si* is an argument with its own  $\lambda$ -abstract. Covaluation between the two arguments of the predicate is, then, brought about by an Agree relation between the subject DP and *si*. Therefore the arguments remain formally distinct and IDI does not apply. In more structural terms, after syntactic cliticization (and QR-ing the subject) the structure in (37) obtains, where the cliticized copy of *si* A'-binds the argument copy of *si* hence protecting the latter from being A-bound by the subject DP:

- (37) DP<sub>x</sub> [ x            [si T] ... V (y<sub>si</sub>) ]  
           A                    A'            A

Such an intervening A'-position can also be located in other positions within the structure. For instance, the following option will do as well, where D A'-binds a

variable within the NP that is its complement, and is subsequently covalued with the envisaged antecedent DP by Agree, again yielding an A-A'-A configuration.

$$(38) \quad \text{DP}_x \left[ \begin{array}{c} x \\ A \end{array} \right] \text{ V } \left[ \begin{array}{c} \text{DP} \\ A' \end{array} \right] \text{ D } \left[ \begin{array}{c} \text{NP} \\ A \end{array} \right] \text{ YD } ] ]$$

Such a configuration has been argued to obtain in the case of German *sich* (Reuland 2011a), but, as we will see, it also obtains in one of the varieties of Zhuang discussed by Schadler (this issue). In this variety - Mashan Zhuang - there is a position in the left periphery of an N-projection that has to be filled, whereas in the other one - Qinzhou Zhuang - this is not the case. Thus, in Mashan Zhuang, what looks like a bare pronominal is actually a complex expression with the pronoun moved into a position in the left periphery. This yields an A'-position within the nominal projection that breaks the chain (like clitics do within the TP in e.g. Romance). In Qinzhou Zhuang, on the other hand, there is no trigger for raising the pronoun to a higher position, hence what we see as bare is indeed bare, and an IDI violation obtains in case of a locally bound pronominal without protection.

In fact, another conceivable strategy could even consist in *separation*, realizing the two arguments on different grids as in (39).

$$(39) \quad \text{DP V}_1 [\text{V}_2 \text{ Pron}]$$

Although, to my knowledge, no clear cases of the latter strategy have been observed, it is an option to keep in mind in the course of cross-linguistic investigation (Martin Everaert, personal communication, notes that verbal reflexive markers such as *KoL* in Tamil and Telugu are auxiliaries diachronically).

### 5.2.3 Protecting versus enforcing

So far, we only mentioned the role of *self* in SELF-anaphors, and that of body-part nouns in bodypart anaphors as protectors against the effect of IDI. However, this is not all they do. In fact, the CBT just focuses on the fact that elements like *himself* have to be bound. The same applies to body-part anaphors such as Georgian *tav tavis*, etc. In terms of Schadler (2014), they not only *license* reflexivity, they also *enforce* it. And as noted, they introduce proxy-readings. As already argued in Reinhart and Reuland (1991), although in somewhat different terms, the role of SELF as enforcing reflexivity of the predicate follows from obligatory head movement onto V, as illustrated in (40):

$$(40) \quad \text{The queen complained that Max} \quad \begin{array}{c} \text{(self)-invited himself for a drink} \\ \uparrow \quad \quad \quad | \\ \hline \end{array}$$

Informally, *self* inherently represents a reflexive relation (every *self* is some individual's *self*), and adjoining it to V intersects this reflexive relation with the relation expressed by V, enforcing reflexivity, see below. The proxy-reading arises as follows. As is easily seen, pronouns generally allow proxy-readings (see, e.g. Safir 2004). This can be formally expressed using an insight from Jacobson



(2009), who proposes that pronouns denote the identity function  $\langle ee \rangle$ , rather than being elements of type  $\langle e \rangle$ . Building on this, Reuland and Winter (2009) propose that non-reflexive pronouns like *he*, instead of simply denoting the identity function on entities denote a Skolem function: a function from entities to entities that takes a relation as a parameter. The formal definition is given in (41).

- (41) A function  $f$  of type  $\langle ee \rangle$  with a relational parameter  $R$  is a Skolem function if for every entity  $x$ :  $R(x, f_R(x))$  holds.

It is proposed that the context provides a proxy relation (PR), describing the possible proxies  $\lambda y.PR(x,y)$  of any entity  $x$  referred to. This parameter determines the range for each possible entity argument of the Skolem function. It is stipulated that any proxy relation must be reflexive.

Consider, then, the anaphor *himself*. The only substantial difference that is assumed between *self* and other relational nouns is syntactic. The noun *self* is able to combine with Skolem functions denoted by non-reflexive pronouns independently of genitive case (e.g. *his self/himself* vs. *his parent/\*him parent*). The unmarked option is that the noun *self* composes with the Skolem function denoted by the pronoun. The noun *self* covertly incorporates into the transitive predicate (as happens overtly in *self-hater*) and contributes a proxy relation to the non-reflexive pronoun through Jacobson's Z function in its "proxied" version:

- (42)  $Z^{PR} = \lambda R. \lambda f. \lambda x. R(x, f_{PR}(x))$

In this version of the Z function, it provides the Skolem function  $f$  with its parameter. The denotation of a VP like *undress himself* is obtained using the structure *self-undress him*, analyzed as in (43):

- (43)  $Z^{self}(undress)(him) = Z^{self}(undress)(f)$   
 $= \lambda x. undress(x, f_{self}(x)) = \lambda x. x \text{ undress one of } x \text{'s}$   
 self proxies (by definition of  $f$  as a Skolem function)

As discussed by Reuland and Winter, and in Reuland (2011a), this carries over to bodypart nouns, thus offering a general account of the process of reflexivization.

Note that this procedure by itself is neutral as to whether the interpretation procedure involving *self* (or a counterpart) is (covertly or overtly) syntactic (hence sensitive to syntactic constraints), or just part of the compositional semantics. On in the former case (as in English) does the question arise what triggers it. Reuland (2011a) discusses a number of options for the factor triggering this *self*-movement, and concludes that the simplest trigger would be economy: encoding the dependency between anaphor and antecedent in narrow syntax is less costly than doing so in the interpretive system, hence chosen *if available*.

What is crucial here is that the proxy-set is not determined in the computational system, but, rather, pragmatically. Thus, nothing in the system prevents a

situation where a plurality stands proxy for an individual contained in that plurality. As we will see, this possibility contributes to the solution of a puzzle arising in Volkova's contribution in this issue.

As this discussion shows, licensing and enforcing are contributed by distinct properties of an anaphoric expression. This leads to a conclusion and a prediction.

- (44) a. *Conclusion*  
Licensing reflexivity and enforcing reflexivity are distinct properties of an expression.
- b. *Prediction*  
There should be cases where licensing and enforcing are dissociated.

That is, one should find 'anaphoric elements', broadly conceived, that license reflexivity, but don't enforce it. For instance, if a complex anaphoric expression contains a pronominal element that is translatable as a variable, and another component that introduces complexity, but does not by itself contribute reflexivity (for instance, because it is not relational), it is expected to protect/license, but not enforce. Similarly, if the component introducing complexity is in a position from which it cannot syntactically or semantically compose with the predicate it should not be able to reflexivize the latter, but only act as a licenser. (See the discussion of Malayalam *taan tanne* in Reuland 2001, 2011a, and of Dutch *zichzelf* and English *himself* as ECM subjects in Reuland 2011a: 108, 250-251). Schadler (2014) and Volkova (2014, and this issue) present more of these cases with extensive discussion. Such facts show that any theory of anaphora must be able to accommodate this distinction.

#### *6 Non-local binding and the role of the left periphery*

One of the puzzles for our understanding of binding consists in a difference between local and non-local binding, where, roughly, the latter stands for a binding dependency across the nearest subject. As noted in section 2.4.2, the complementarity between SE-anaphors and pronominals in the local domain, is obviated in the non-local domain, and the question is why. In Reuland (2011a) it is shown how this difference can be accounted for. A pivotal role is played by the way finiteness is encoded in the left periphery.

Since Rizzi (1997) a substantial amount of evidence has been presented that the way in which linguistic expressions are related to the discourse system is encoded in the left periphery of the clause (see, for instance, Bianchi 2001, Sigurðsson 2011, Haegeman 2010, Delfitto and Fiorin 2011). I will not review this evidence here. But I will present a summary based on Reuland (2011a) and Reuland (to appear) of how the feature for finiteness plays a pivotal role in the encoding of non-local binding of SE-anaphors. The account shows why complementarity is obviated and why SE-anaphors may be bound across infinitival clause boundaries, but not across a finite one.

In the cartographic approach the Complementizer system (C-system) has an internal structure providing the links between the lower and the higher clause. Specifically, the C-system, in addition to whatever expresses Force (i.e. whether it is a question, a declarative, etc.) contains at least one element,  $C^{Fin}$  representing the feature  $\pm$  finite and, an element  $C^T$  representing the feature  $\pm$  Tense. It is the interplay between these elements that provides the optionality in infinitival clauses that has to be accounted for.  $C^{Fin}$  and  $C^T$  act as two sides of the same coin.  $C^{Fin}$  and  $C^T$  are treated as separate heads, with the proviso that they are equidistant with respect to T. Assuming the general mechanism for the formation of feature chains summarized in section 4, if  $C^{Fin}$  has the value +finite, it will value  $T_{AGR}$ , and hence ultimately SE if it is merged above  $T$ -SE chain and extends it.

Consequently, economy – preferring SE to be valued as early as possible - will leave no choice, and the  $C^{Fin}$ - $T$ -SE chain will be formed. Hence, as soon as the chain formation process reaches the first finite clause, the subject of the latter becomes the obligatory binder as required. Thus, a finite sentence boundary provide a cap on the binding possibilities of a SE-anaphor embedded in it.

In infinitival clauses, however, both  $C^{Fin}$  and  $C^T$  are deficient (represented as  $C^{Fin}$  and  $C^{-T}$ ). It is  $C^{Fin}$  that is involved in transmitting control, as argued by Bianchi. At the point where the elements from the C-system have to be merged, the controller has not yet been merged. Hence at this point there is no economy preference as to whether the  $T$ -SE chain is linked to  $C^{Fin}$  or to  $C^{-T}$ . It is this optionality that explains the lack of complementarity we started out with. If a  $C^{Fin}$ - $T$ -SE chain is formed SE will be subsequently valued by the controller when it is merged in the matrix clause (or the derivation will be cancelled if the controller that is merged that is not 3<sup>rd</sup> person). But, alternatively, nothing prevents the  $T$ -SE chain from being linked to  $C^{-T}$ . If so, a  $C^{-T}$ - $T$ -SE chain is formed. Within the  $C^{-T}$ - $T$ -SE chain SE does not receive a value. Hence, a value can only be assigned once a higher source can be accessed.

As further elements are merged to build the higher structure, the  $C^{-T}$ - $T$ -SE chain will be extended with the higher  $V$ ,  $v$ ,  $T$ , etc., and the process repeats itself. If the matrix clause is finite, SE will end up being valued by the matrix subject. If the matrix clause is non-finite, we have the same indeterminacy as just discussed, and higher potential antecedents can be accessed. Note, that if the  $C^{-T}$ - $T$ -SE path is chosen, subsequent merger of a controller will value  $C^{Fin}$  and hence PRO. However this will be 'too late' to value the SE-anaphor.

The relevant part of the configuration is illustrated in (45):

- (45) Jon bad Maria [<sub>CP</sub> ... { $C^{Fin}$   $C^{-T}$ }] [<sub>TP</sub> PRO T [<sub>vP</sub> v ...V seg/ham ]]]  
 John asked Maria to V SE

If a  $C^{-T}$ - $T$ -seg chain is formed, this chain can be extended so as to include *bad* 'asked' and its functional material, facilitating long-distance binding. *Maria*/PRO is skipped and *Jon* ends up as *seg*'s antecedent. If a  $C^{Fin}$ - $T$ -seg chain is formed we have a configuration facilitating local binding and *Maria* (via  $C^{Fin}$  and PRO) ends

up as the antecedent. Thus, the crucial factor in infinitival clauses is the *timing* of control versus the valuation of SE, mediated by C<sup>Fin</sup> and C<sup>T</sup> and the indeterminacy of the choice between them.

The configuration in (45) also explains the lack of complementarity between SE-anaphors and pronominals in cases of non-local binding (the option where *ham* is bound by *Jon*). As summarized in section 4 pronominals are forbidden to tail feature chains encoding their binding. A derivation where the formation of such a chain is 'attempted' is *cancelled*. However, in the long-distance case of (45) the indeterminacy in the C-system entails that a C<sup>Fin</sup>-T-*ham* chain can be formed which ends at C<sup>Fin</sup> (since, as we saw, in this derivation the link with the next higher clause employs C<sup>T</sup>, rather than C<sup>Fin</sup>), and is such that *ham* is free within that chain. It is, therefore, not a chain 'attempting' to encode binding of *ham* by *Jon*. Hence the derivation is not cancelled and nothing prevents *ham* from eventually ending up being bound by *Jon*.<sup>20</sup>

As we will see in the contribution by Volkova, in the Uralic languages she discusses we find patterns that are similar, in that there is latitude in binding across infinitival clause boundaries, but finite clauses provide a firm cap.

#### 7 On the morpho-syntax of anaphoric expressions

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<sup>20</sup> This non-complementarity holds for Mainland Scandinavian (both in control infinitives and in ECM bare infinitival complements (see Thráinsson 1979, and Everaert 1986), and Dutch and German (with non-local binding restricted to bare infinitives (see Everaert 1986, Reuland 2011a). In Icelandic, however, we do find complementarity between bound *sig* and bound pronominals in the infinitival domain, though not in the subjunctive domain (see Everaert 1986, Thráinsson 1991). This can be seen by comparing *Petur<sub>i</sub> bað Jens<sub>j</sub> (um) [að PRO<sub>j</sub> raka<sub>inf</sub> sig<sub>i/j</sub>/ hann<sub>\*i/\*j</sub>]* 'Peter asked Jens to shave him', and *Jón<sub>i</sub> sagði [að éj hevði<sub>subj</sub> svikið sig<sub>i</sub>/hann<sub>i</sub>]* 'John said that I had betrayed him'. Everaert (1986: 281-284) provides a detailed account of this pattern in terms of a pre-minimalist conception of chain formation. As discussed in the main text, in the approach of Reuland (2011a), the main property of Mainland Scandinavian allowing complementarity to be obviated is the split within the C- system between C<sup>Fin</sup> and C<sup>T</sup> as separate heads – be it equidistant from T. A minimal variation is to have them realized as one head, with both –Fin and –T as accessible features. If so, the computation allowing intervening (PRO) subjects to be skipped is still available. However, if both are realized on one head, this means that this head cannot be bypassed in the chain formation process. Hence, attempting to bind the pronominal will result in a cancellation, leaving only the simplex anaphor as an option. Clearly, the analysis of this contrast depends on a stipulation. However, some difference will have to be stipulated anyway. Crucially, what we have is just a minor difference in the functional structure, possibly related to a more general distinction on the analytic-synthetic dimension. As already envisaged in Everaert (1986), no major binding specific parameter is involved.

As noted in section 4, crucial for the current approach is the Feature Determinacy Thesis (FDT). Recent years, however, have shown a change in the perspective on the relation between form and interpretation in the language system. In the model assumed in Chomsky (1995), syntax (the computational system of human language,  $C_{HL}$ ), was seen as essentially effecting the mapping between the interfaces with the form (PF) and interpretation (Conceptual-Intentional) systems. In this system this mapping is mediated by the lexicon - viewed as an inventory of minimal form-meaning pairs. From that perspective, the relation between form and meaning is symmetrical.

With the development of Distributed Morphology (DM, Halle and Marantz 1993, Marantz 1997 and subsequent work) this perspective changed. Initially, DM just argued that there is no qualitative difference between derivational and inflectional morphology; derivational affixation and inflectional affixation were both taken to fall under the basic syntactic operation Merge. Subsequent developments led to a strict separation between functional material and the conceptual part of a lexical item, arguing that the latter falls outside linguistics proper and rather belongs to an 'encyclopedia' (see, for instance, Borer 2005). Such an approach comes down to eliminating the traditional notion of a lexicon. In this view it can no longer play the pivotal role it played in Chomsky's (1995) model and earlier ones. Instead the form-meaning relation became skewed, giving rise to a conception where the primacy lies with a computational system (concerned with syntax and much of the interpretation system), coupled with processes of externalization, which provides linguistic representations with a realization in the domain of form, in brief, *spell-out*.

In principle nothing in this perspective on externalization is fundamentally incompatible with the FDT. For instance, within DM it would be quite reasonable to assume that the systematic absence of a number marking in let's say SE-anaphors like *zich* tells us something about the way the interpretative system will handle them. In practice, though, much work in this model assumes a highly unconstrained relation between syntactic form and spell-out.

This is particularly striking in work on binding theory. An illustrative example is provided by Zwart (2002). Much like in current work such as Kratzer (2009), Zwart assumes that pronouns and anaphors originate syntactically as a general "unspecified" pronoun (a 'minimal pronoun' in Kratzer's terms). The precise shape of anaphoric elements (pronoun, SELF anaphor, SE anaphor, etc.) is determined by spell-out rules. In Zwart's approach these spell-out rules are language specific. Thus, in one language a certain combination of morpho-syntactic features may be realized as a SE anaphor, in another language as a SELF-anaphor, and in yet another language as a pronominal, with all these differences just representing arbitrary variation, which does not reflect differences in morpho-syntactic structure. In Kratzer's view, which seems less extreme, the minimal pronoun becomes endowed with the phi-features of its antecedent by Agree; these phi-features then determine the way it is spelled-out, which obscures possible differences in the source.<sup>21</sup>

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<sup>21</sup> The need to keep such differences accessible for the computation made Rooryck and VandenWyngaerd (2011) introduce an annotation distinguishing

Recently, Drummond et al. (2011: 399) articulated the consequences of the DM perspective as follows: “the form of the anaphor plays no real role in the interpretation afforded”. Taken literally, this is a truism, of course. As we know since Saussure, the form *stol* tells us little about its interpretation. Minimally we have to know that it is Russian, where it means table, rather than Dutch, where it stands for a type of bread, but even given this, the relation remains arbitrary. But this is not the point.

The point is that the morpho-syntactic make-up of a pronominal element does tell us something significant about its behaviour. In language after language we find that fully specified pronominal elements behave differently from underspecified pronominal elements. In language after language we find that complex anaphors behave differently from simplex anaphors. Any linguistic theory should be able to capture such facts. A theory that makes such facts inaccessible to investigation by stipulating opacity is self-defeating.

That anaphoric expressions are transparent as expressed by the FDT should be no more controversial than that the differences between the verbal inflectional systems in Italian and in English, or the diachronic change in this system from Old to Middle French have always been taken to tell us something about the presence or absence of null-subjects. No systematic investigation of any functional domain is possible without hypothesizing a minimal amount of transparency in the form-meaning mapping, of course subject to the normal caveats of all empirical investigation.

Relegating the formal differences between let's say English and Dutch anaphors to superficial differences in their spell-out conventions, will make it impossible to understand the availability of logophoric interpretations of English *himself* versus their absence in the case of Dutch *zichzelf*. The same would apply to anaphor binding across the subject of ECM clauses, which is available for Dutch SE-anaphors, but not for English *himself*.<sup>22</sup>

As should be clear from the discussion in Reuland (2011a) these facts have straightforward explanations. Moreover, Kratzer's approach would make it impossible to account for the contrast between pronominals and dedicated SE-anaphors, since the latter, once endowed with a full set of phi-features, should be indistinguishable in their realization from standard pronominals. In fact, phi-

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original values from values resulting from Agree, in violation of the inclusiveness condition (Chomsky 1995).

<sup>22</sup> See for instance the contrasts in (i):

- (i) a. De jongens<sub>i</sub> waren bang dat die foto's van \*zich<sub>i</sub>/\*zichzelf in de verkoop zouden komen (litt. in the sale would come).  
b. The boys<sub>i</sub> were afraid that these pictures of themselves<sub>i</sub> would be on sale.  
c. Zij<sub>i</sub> hoorden mij over zich<sub>i</sub> praten.  
d. \*They<sub>i</sub> heard me talk about themselves<sub>i</sub>

feature deficient anaphors should not even exist (see Reuland 2010 for discussion). So, if read as pertaining to the morpho-syntactic make-up of an anaphor, Drummond et al's statement is just false. We will have to assume, then, that spell-out rules obey the conditions imposed by the necessary transparency.

Thus, in this particular form the DM conception of the lexicon cannot be maintained for a variety of reasons. Its consequences for the concepts interface have been shown to be highly problematic in Reinhart and Siloni (2005), Horvath and Siloni (2002, 2016). Too loose constraints on spell-out also have plainly unacceptable consequences as we just saw.

The challenge is then to develop a system that retains the core insight of DM but gives a principled status to this transparency. Achieving this is an important task for the future. However, it would lead us beyond the scope of the present contribution. Hence I will leave this issue for now, and return to a discussion I started in section 5.1, namely the status of IDI.

#### *8 Variables and arguments: On deriving the IDI*

Our discussion of IDI has raised two types of issues. One issue concerns the simplified nature of the V-projection used in the discussion in (28). In a nutshell, what happens if we assume a more articulated V-shell structure, for instance, along the lines of Kratzer (1996)? This question is directly relevant to the argument, but as we will see it is easily answered. The other issue, raised by Alexis Dimitriadis (personal communication) does not immediately affect the argument, but is less trivial. In a nutshell, it goes as follows. Consider a transitive use of *admire*, as in *John admires Cindy*. So, at some point we have (46):

$$(46) \quad \underset{1}{[VP \text{ Jo } [{}^vV_{\theta 1, \theta 2} \text{ Ci}]]} \rightarrow \underset{2}{[VP V_{\theta 1, \theta 2} \text{ Jo Ci}]}$$

The assumption underlying the appeal to IDI is that semantic roles are not features that are marked on the objects they are assigned to. That is, after the structure is erased, the two occurrences of *x* in (27) discussed in section 5.1 and the second stage of (28) - both repeated below - cannot be subsequently be distinguished by a putative marking for the feature  $\theta 1$ , or  $\theta 2$  respectively.

$$(27) \quad DP (\lambda x (V x, x))$$

$$(28) \quad \underset{1}{[VP x [{}^vV_{\theta 1, \theta 2} x]]} \rightarrow \underset{2}{([VP V_{\theta 1, \theta 2} "x x"])} \rightarrow \underset{3}{* [VP V_{\theta 1, \theta 2} x]}$$

This is all well. But, if such information is lost at the interface, how do we still represent at stage 2 in (46) that it is John who carries the external role and Cindy who carries the internal one, and not vice versa?

As I will show now, this follows straightforwardly from the difference between variables and lexical arguments.

##### *8.1 Some background issues*

One of the issues that often remains implicit in the discussion of the mapping of narrow syntax representations onto logical syntax is the status of variables. What kind of linguistic objects are they, and what is their relation to the expressions that are supposed to give rise to them?

Intuitively, predicates are the linguistic expression of a concept. As should be uncontroversial, the concept expressed by verbs such as, for instance, *kiss* or *admire* reflects a relation between participants. Participants may appear here in a role as agents, patients, experiencers, etc., in standard terms, as bearers of *thematic roles*. The question is how properties of concepts, and specifically the roles of participants may be visible to the grammatical system. Reinhart (2000/2016, 2002), and Reinhart and Siloni (2005) argue that visibility proceeds via a narrow channel. They propose an analysis of these roles in terms of two primitive notions:  $\pm$  cause, and  $\pm$  mental involvement, abbreviated as  $[\pm c, \pm m]$ . It is only in terms of these two features, that these thematic roles are visible to the grammatical system.<sup>23</sup>

Since any verbal concept may be used in a variety of different situations with different participants, it seems warranted to say that verbal concepts have *openings* – no more than 'holes' -, slots to be filled by arguments reflecting these participants. And, as one moves toward grammar, these openings are reflected in *open positions* in grammatical representations.

Consider, then, the representation of a 2-place predicate like *admire* in (47a). Intuitively, it just has two 'openings', indicated by  $\theta_1$  and  $\theta_2$ , with the subscripts just mnemotechnical devices, with no presumption of order. Abstracting away from the role of factors such as Tense relating it to coordinates in time and space, *admire* is a *propositional function*, yielding a proposition once its arguments are fixed. The canonical notation in logical semantics for this intuition is as in (47b), where the  $\lambda$ -operators provide the technical means to control this argument filling operation. Note, however, that  $\lambda$ -operators lack an independent status in the syntax – in no language do we find corresponding morphological objects. Moreover, the notation using the different variable names  $x$  and  $y$  is prone to introducing the presumption of non-identity, which is absent in the original intuition. It is therefore crucial that, whatever notational conventions one may adopt to represent the openings in (47a), one keeps in mind that they should just represent open positions awaiting to be filled.

- (47) a.  $\text{admire}_{\theta_1, \theta_2} (\theta_1, \theta_2)$   
 b.  $\lambda x (\lambda y (\text{admire}_{\theta_1, \theta_2} x, y))$

So, reasoning with the notation in (47a), these openings must be associated with two different thematic roles, here experiencer and subject matter. In Reinhart's

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<sup>23</sup> Note, that there is no 1-to-1 correspondence between traditional theta-labels and feature clusters in TS. Depending on the precise semantics of the verb an experiencer may show up as either  $[\pm m]$  or  $[-c \pm m]$ ; subject matter as  $[-c \pm m]$  or just  $[-m]$ .

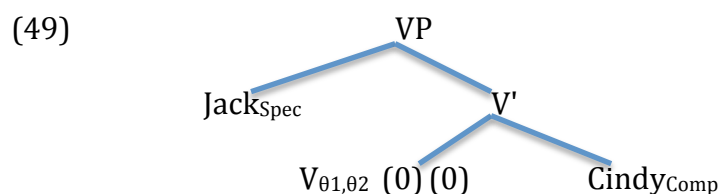


system the feature clusters representing the thematic roles carry specific merging instructions for their arguments, as in (48).

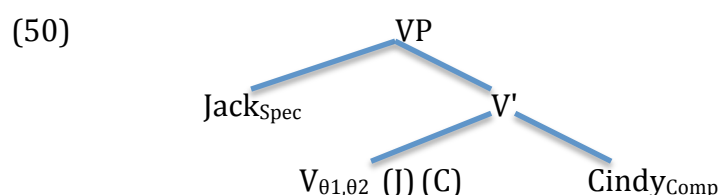
- (48) **CS merging instructions:**
- Arguments realizing [-] clusters merge internally (i.e. merge first);
  - Arguments realizing [+] clusters merge externally.
  - When nothing rules this out, merge externally.

A [+] cluster is a cluster all of whose features have the value “+” and a [-] cluster is a cluster all of whose features have the value “-”.

In the case under consideration we are dealing with an experiencer role and a subject matter role. The former is [+m], the latter is [-c-m] (see Marelj 2004 for discussion). Hence the argument bearing it will be merged internally and, by (48b), the experiencer will merge externally, giving rise to the configuration in (49).



The interpretation process involves filling V's open positions with the interpretation of what is in <Comp> – here *Cindy*, and of what is in <Spec>, here *Jack*. Technically, this is implemented by function application on an expression like (47b). Conceptually one could imagine that this 'filling' takes place by creating a link between the arguments and the opening. In line with the standard conception of function application I will take it that the argument is effectively copied into the open position of the verb. More precisely, I will be assuming that what is copied is the argument in the form in which it is handed over to the interpretation system, thus, the semantic object corresponding to it. So, in accordance with the merging instructions, first  $\theta 2$  will be discharged, by *Cindy*, and then  $\theta 1$  will be discharged by *Jack*.



### 8.2 IDI and the status of phi-feature bundles

Let's now see what happens in the case of an object pronoun/simplex anaphor. According to standard assumptions, bound pronouns/simplex anaphors are also taken to represent variables. For instance, in a sentence like (51a), the quantificational expression *no soldier* is taken to A-bind the possessive pronominal of the object, as in (51b), in line with Reinhart's definition of A-binding.

- (51) a. No farmer hates his cat  
 b. No farmer ( $\lambda x$  [x hates x's cat])

Both argumental occurrences of x are taken to be in a 'segmental' position in the linguistic representation. The former represents the result of applying QR to *no farmer*, the latter results from translating the pronoun as a variable ending up being bound by the latter. Thus, in addition to reflecting the open positions in predicates, *variables are also the semantic counterparts of pronouns*. Clearly, the two uses of the term variable should be unified.<sup>24</sup>

Morpho-syntactically, a pronoun is just a bundle of phi-features. It lacks lexical content. And since it only consists of phi-features it has a 'variable' interpretation. Taking seriously the idea that it is a variable, it follows that it is just little more than the hole in a predicate. In fact, it is a hole modulo what the phi-features contribute. This is the basic intuition expressed in analyses where phi-features are essentially treated as presuppositional (see, for instance, Heim 2008 for an analysis and relevant references, and see also Giorgi 2007 for an analysis of 'long-distance' anaphors as unsaturated argument positions).<sup>25</sup> Thus, setting aside, for the moment, the deictic use of pronominals, pronouns (including SE-anaphors) are just variables that trigger presuppositions expressed by their phi-features. This means that they really don't saturate the position they occupy by themselves (as already expressed in Reinhart 1983). In fact, this is also the essence of the intuition expressed by Jacobson (1999) to interpret pronouns as the identity function  $\langle ee \rangle$ . In brief, whatever pronominals and simplex anaphors do syntactically (for instance, check formal features such as Case), semantically they *don't saturate* argument positions.<sup>26</sup>

Consider now what this entails for the interpretation of a verbal projection in case the <Comp> position is occupied by a mere phi-feature bundle (pronominal

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<sup>24</sup> The idea that binding involves the open positions in a predicate comes close to an intuition that is already found in Williams (1985, 1987), although elaborated there in a different way.

<sup>25</sup> Note that even though phi-features encode presuppositions, they are still subject to PRD, hence the chain condition effects are preserved under this interpretation.

<sup>26</sup> This may seem controversial for syntacticians, but it is in fact the same intuition as reflected in the following quote from Malte Zimmermann (handout Universität Potsdam, SoSe 2009 MM3 Cross-Linguistic Semantics):

"FA (Function Application, EJR) saturates an argument position for good, unless the argument is a variable. In that case, the argument position can be 'opened up' again by lambda-or predicate abstraction, for instance in case of bound variables":

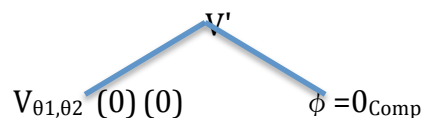
(2) a. Every student<sub>i</sub> adores *herself*. b.  $\forall x$  [student(x)]: x adores x"

So what the text proposal amounts to is requiring that the consequences of this fact be taken seriously. It is not so much a matter of 'opening up' again, but at the relevant initial stage of the derivation pronouns are really valueless.

like *him* or simplex anaphor like *zich*). Crucially, such expressions are equally open as the open positions in the predicate. So, just like the original open position of the predicate does not discharge a theta-role under anybody's approach, if one takes seriously the analysis of pronouns as variables, the null hypothesis should be that they don't either, unless some additional factor enables them to. I will hypothesize that this additional factor is binding. Thus, pronouns can be used to discharge a theta-role, but they can only do so after being bound, at the stage where the binder appears.

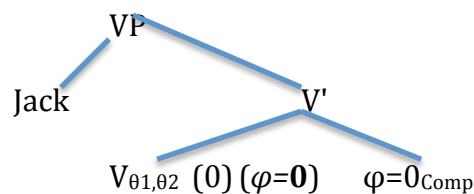
So, consider the way the structure is being built starting from (52) with a pronoun in object position.

(52)



At this point the linking rules apply. Let's assume, as stated above, that the  $\theta_2$  (subject matter) is [-m] and  $\theta_1$  (experiencer) [-c+m]. Consequently, the argument for the former will have to merge internally, and the one for the latter externally. Note, we have to be a bit careful here given the fact that the pronoun does not (yet) qualify as an argument. However the internal position is at least the place where the verb expects its argument to show up, and where the pronoun will be available the moment it is bound. Next, with *Jack* as the experiencer the latter will merge externally, as in (53) (and note this also goes through for other verb classes, such as agent-theme verbs).

(53)

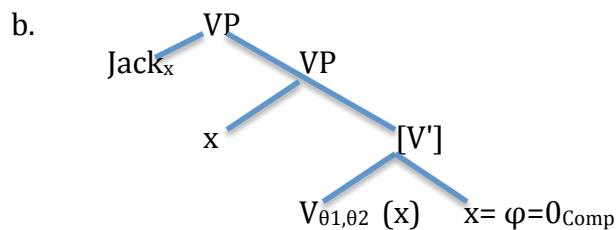
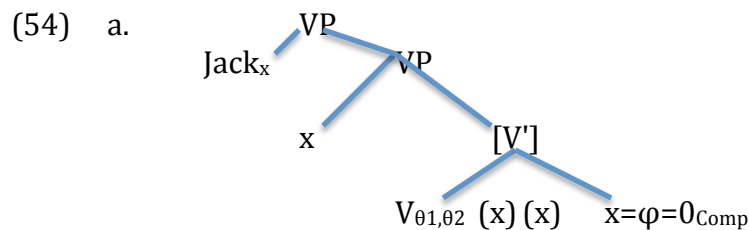


But note now that  $\theta_2$  has not been discharged. The verbal concept still has two open positions at this point. That the slot for the internal argument is still open is indicated by the bold face on the 0.

Although semantically the pronoun is not much more than an open position, it does have an important grammatical role. Grammatical operations may access the features of the pronoun. For instance, it may check Case; the values it may receive can be restricted in terms of person, gender en number, etc. In a nutshell, it makes the open position visible for the grammar, even if it doesn't saturate it.

At this point there are two options. One is that the open position of the internal argument 'percolates' up, giving an unsaturated VP, with the lack of saturation being inherited by all higher projections, until a suitable binder is merged. The other one that concerns us here is that the one available argument *Jack* is used to saturate both the external and the internal arguments.

For purposes of exposition the open positions will be rendered as variables to represent binding. Specifically, both the internal and the external argument positions are taken to contain variables that are *A*-bound by *Jack* (after quantifier raising, adjoining it to VP). This yields the representation in (54a) and (54b), with the square brackets around *V'* indicating that – not being a term – it will be erased at the C-I interface. Unlike the case where the object has lexical content, no theta-role is discharged prior to the merger of the external argument. Consequently, this is an IDI configuration; the two variable tokens will be indistinguishable and identified as in (54b), and indeterminacy of theta-role assignment will obtain. Consequently, this derivation (unlike the alternative where the complement position remains open to end up being valued at a later stage), is ruled out.

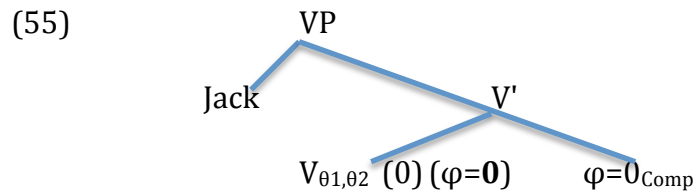


Summarizing, the difference between contentful arguments on the one hand and SE-anaphors and pronominals on the other is that the former can be used to saturate an open position and discharge a theta-role immediately – hence no indeterminacy arises – whereas the latter can be used to saturate the open position/discharge a theta-role only after their binder has been merged, which is precisely the reason that an indeterminacy arises.

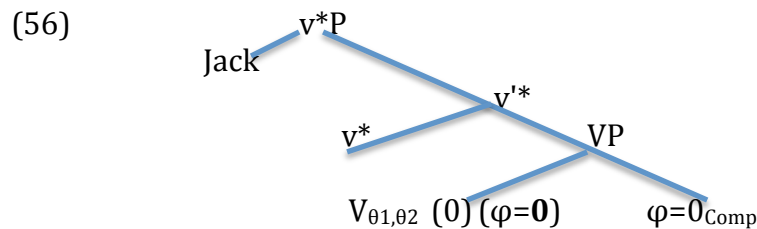
So far, I used a simplified representation of the verbal projection. There are, however, convincing reasons to assume a further articulation, into, minimally a *v\** ('little *v*') and a *V*-domain (see Chomsky 1995 and much subsequent work). There has since been considerable debate, though, about the status of *v\**. Is it a strictly functional projection, or does it contribute part of the argument structure such as causativization, as proposed in Kratzer (1996), and much subsequent work in Distributed Morphology? Horvath and Siloni (2002, 2016) argue convincingly that the latter interpretation cannot be correct. Here I will be following Horvath and Siloni, and adopt Reinhart's position that the verb's integral argument structure is part of the entry that is inserted. *v\** is projected as an element that is licensed by properties of the verb's argument structure, and in

turn mediates in the licensing of the external argument, but it does not by itself contribute causativization (see Marelj and Reuland, 2016, and Reinhart 2000/2016 + appendix for some more discussion).

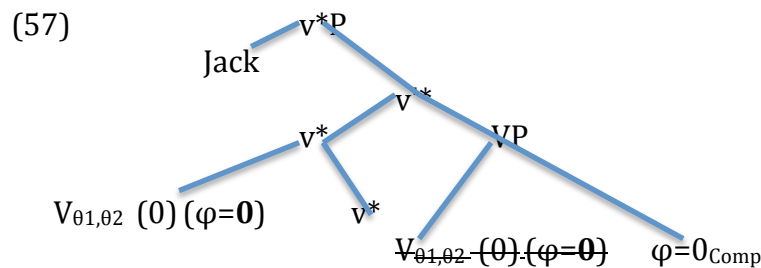
This being said, I will now briefly illustrate that the above argument immediately carries over to structures with a more articulate verbal projection. Consider then as a starting point (53), repeated here as (55).

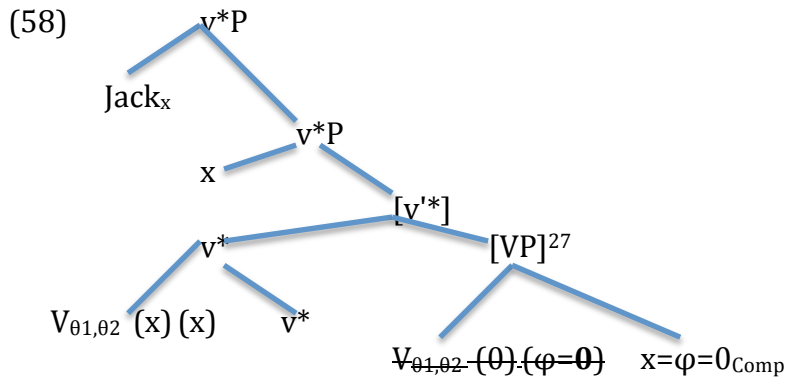


It is easily seen that nothing changes in the argument if  $v^*$  is merged to the VP, and *Jack* would subsequently move to Spec  $v^*$ . Consider then the alternative in which *Jack* is not merged at the VP-stage, but after merger of  $v^*$ , as in (56).



Under this option V will only be able to discharge its role(s) to *Jack* after movement to  $v^*$  (for sake of concreteness represented here by an adjunction configuration), but all the same the configuration in (57) results at this point, which gives rise to the IDI violation in (58).





In a nutshell, pronouns (including *zich*) face a timing problem: at the first time they could get a role they cannot bear one, at the moment they can bear a role – i.e. when they are bound – it is too late to escape the effect of IDI. I trust that it will be clear that this implementation carries over to Ditransitives given the roll-up effect of V-movement.

The above analysis is expected to apply to all elements that are pure phi-feature bundles. If so, it may seem to raise a question about pronominals in their 'free' - referential - use. One option is an analysis in which they end up being existentially bound as a last resort operation (Chierchia and McConnell-Ginet. 2000). If so, the theta-role will be discharged the moment binding takes place. Since the variable will at no moment be identified with the other variable of the predicate, no IDI effect will obtain. Syntax-based variants of this line would include linking to a discourse related position in the left periphery. For present purposes, however, such variants are indistinguishable from a Chierchia-style approach. A yet different line would be one in which referentially used pronouns differ from pronouns as variables, by their internal structure.<sup>28</sup> For instance, if nominal expressions contain in their left periphery a position for marking referentiality (Longobardi, 2001), one could assume that in Referential pronouns N-to-D movement has taken place, interpreted as a iota-operator. If so, the theta-role can be discharged, but binding by another element is no longer available. What is, then, available are chestnuts of the type *I know what Mary and Oscar have in common. Mary admires him and Oscar admires him too*, where *him*=Oscar. But here we have just coreference, and no IDI effect obtains.

<sup>27</sup> Note that I am assuming that in this more articulated shell structure VP – lacking an independent head - does not qualify as an interpretable term.

<sup>28</sup> Since under both options theta-discharge would be postponed until very late in the derivation, one may wonder about the compatibility with phase theory, which might seem to require closing the phase much earlier. This however reflects a general problem for the standard conception of phase theory, since under all counts it must allow for phases in which a variable is interpreted very late, as in *Every linguist got distracted after he read about phases for the first time*. Clearly, under no existing account can the interpretation of the *after* clause be completed before *Every linguist* is merged.

Finally, let's consider the contrast between SE-anaphors and reflexive clitics in Romance discussed in Marelj and Reuland (2016). One of the puzzles reflexive clitics raise, is that despite the fact that they appear to solely consist of phi-features, they do give rise to proxy-interpretations, and can be used with all verbs, including subject experiencer verbs. Their behavior follows from one simple property: after first merger they move into the functional domain. This movement creates an A'-A dependency, which is interpreted as an operator-variable relation (see Baauw and Delfitto 2005, and Marelj and Reuland 2016 for further discussion). It is sufficient to assume that the initial target for movement is below the position where the subject will be first merged. If so, the variable in the position of first merge of the clitic will be protected from identification with the variable in the position of the external argument, and an IDI configuration will not arise. Whether or not this is sufficient for the theta-role of the internal argument to be discharged or whether that will have to wait until the reflexive clitic itself gets valued by Agree can be left open for the moment. Crucial is that the timing problem we discussed doesn't arise.

### 9. Summary

Let's summarize then the main ingredients of the approach sketched (see also Reuland 2016):

1. A distinction between binding and co-valuation (Heim 1982, Reinhart 1983).
2. A definition of A-binding as in (17).
3. An Agree-based derivation to encode interpretive dependencies in syntax, (modulo cancellation as an effect of PRD), as in section 4.

Comment: This obviates the use of syntactic indices. It comes for free given standard properties of Agree. It replaces the chain condition of Reinhart and Reuland (1993). The maximal binding domain for SE-anaphors is given by finiteness. Due to PRD and cancellation, it requires no transderivational comparison to account for complementarity effects where these obtain.

4. Cross-linguistic differences in binding domains follow from the interaction with other components of the grammar (Not discussed here, but see Reuland (2011a: ch. 8)).

5. Reflexivization by SELF-anaphors and their kin, as in (42,43). It is preferred by economy, and applies if possible.

Comment: This principle replaces condition A in Reinhart and Reuland (1993).

6. IDI effect on the representation of reflexive predicates.

Comment: This effect obtains by necessity, and replaces condition B of Reinhart and Reuland (1993).

7. Licensing by bundling as in (30), restricted to Agent-theme verbs.

Comment: This restriction is a descriptive generalization yet to be derived from more fundamental principles.

8. Licensing by protection.

Comment: Protection involves derivations that are independently possible, hence its availability comes for free.

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