

Long-Distance Reflexives and the Binding Square of Opposition

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1 Introduction¹

We present data showing that, unlike other long-distance anaphors widely documented in the literature, the Portuguese *ele próprio* is not subject-oriented. This supports a reformulation of Principle Z, encompassing subject-oriented and non subject-oriented long-distance anaphors, which shows up as the fourth binding principle.

The striking internal congruence of the resulting four principle based Binding Theory cogently makes it apparent that the binding symmetries are far more rich than the distributional symmetry between anaphors and pronouns assumed to be the only one to hold by most of the research of the last three decades. In particular, adequate formalization of those symmetries

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uncovers a classical square of oppositions between the four principles, which not only conspicuously enhances our understanding of binding phenomena as it opens new promising paths of inquiry on the possible subjacent logical and quantificational structure of Binding Theory.

We also discuss how the data involving the Portuguese long-distance anaphor add to the growing evidence that the generalisations which mainstream approaches to long-distance anaphora are crucially based on are most likely not to be empirically grounded.

2 The Irreducibility of Long-Distance Anaphora

Long-distance anaphors have recently been a major focus of inquiry for three principle based theories of binding: they are expressions that have to get their interpretation from suitable antecedents occurring either inside or outside the relevant local domain. This constraint however is not accounted for by any of the three "classic" binding principles, set up mostly on the basis of empirical evidence from the English language: following Pollard and Sag (94), Principle A requires o-binding by a suitable antecedent occurring in the relevant local domain; Principles B and C have to do with o-freeness.

The continued insistence in taking the distributional symmetry between (short-distance) anaphors and pronouns as the empirical touchstone which the Binding Theory should mostly account for has had its impact, both theoretically and methodologically, on the shape of the mainstream attempts to deal with long-distance anaphora. In accordance to the unique central role assigned to this distributional symmetry, the phenomenon of long-distance anaphora has been given a sort of marginal status and has been taken in GB framework as being but a successive-cyclic association of short-distance "links"².

This has had the side effect of funneling attention to a specific set of empirical correlations which, in turn, became the "standard" empirical touchstone for the GB research on long-distance anaphora. However different the several alternative proposals may be in their little details, they all share the common stance that the central facts to be accounted for in studying long-distance anaphora gravitate around the correlation between so called morphologically simple anaphors, long-distance binding, subject-orientedness and binding blocking by intervening subjects. In their essential aspects, the different accounts run like this: the simplex anaphors have some sort of inflectional deficit which must be supplemented by some kind of local "link" (e.g., movement, coindexing, etc.) to the Inflection of the local

² Some examples: for Cole and Sung (94) (as well as for the many references cited therein) the anaphor undergoes head movement to Infl at LF; for Huang and Tang (91) there is no head movement but adjunction to IP; for Progovac (93) the movement is replaced by coindexation with the Agr node. All this short-distance "links" support a long-distance relation by means of recursive concatenation.

subject - this explains subject-orientedness; links of the same sort across different clauses successively subordinated may be connected - this explains long-distance; in some languages like Chinese, the concatenation of these links is interrupted when there is an upwards subject which does not support the relevant kind of link - this explains the blocking of long-distance binding by intervening subjects.

Taking aside the blocking effect, which has been thoroughly discussed only for the Chinese language, the relevant correlations, assumed to be universal, may thus be conspicuously stated in the following table:

	Subject-oriented	Not Subject-oriented	Morphological simplicity	Morphological complexity
Short-distance reflexives		X		X
Long-distance reflexives	X		X	

2.1 The Portuguese LD Reflexive

In this connection an interesting discovery our research has lead us to is that Portuguese has a long-distance reflexive which does not pattern like predicted above.

In Portuguese, *si próprio* ('SI own') is the third person short-distance anaphor and *ele* ('he') is the third person pronoun. It is well known that their behaviour as dependent reference expressions follows closely the behaviour of English *himself* and *he*, respectively. As we are going to show with (1)-(7), what is new is that, on a par with these two expressions, Portuguese has also the long-distance anaphor *ele próprio* ('he own').

The contrast in (1) illustrates that, like short-distance anaphors, *ele próprio* is a dependent reference expression which requires an antecedent (with identical features of person, number and gender).

- (1) O Carlos_i gosta dele próprio*_{j/i}.
 the Carlos likes of_he own
 'Carlos likes himself.'

Contrast (1)/(2)b., in turn, shows that *ele próprio* must be o-bound. (2)a./b. illustrates the parallelism between *ele próprio* and the short-distance anaphor, and (2)b./c. the difference between *ele próprio* and the pronoun, with respect to the requirement of o-binding by the antecedent.

- (2) a. * [As pessoas que falaram com a Ana_i] gostam de si própria_j.
 the people who talked with the Ana like of SI own
 '[People who talked with Ana_i] like herself_i.'

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- b. * [As pessoas que falaram com a Ana_i] gostam dela própria_i.
the people who talked with the Ana like of_she own
'[People who talked with Ana_i] like herself_i.'
- c. [As pessoas que falaram com a Ana_i] gostam dela_i.
the people who talked with the Ana like of_she
'[People who talked with Ana_i] like her_i.'

The examples of (3) illustrate the long-distance ability of *ele próprio*;

- (3) a. O Pedro_i convenceu a Ana de [que o Carlos_j gosta dele próprio_{i/j}].
the Pedro convinced the Ana of that the Carlos likes of_he own
'Pedro_i convinced Ana [that Carlos_j likes him_i/himself_j].'
- b. O João_i disse-me [que tu achas [que o Carlos_j gosta dele próprio_{i/j}]].
the João told me that you think that the Carlos likes of_he own
'João_i told me [that you think [Carlos_j likes him_i/himself_j]].'

and the contrast in (4) is meant to reinforce the evidence for the long-distance anaphoric behaviour of *ele próprio*, as it shows that, also when coindexed with an antecedent outside the local domain, *ele próprio* requires to be o-bound, contrarily to what happens with regards to pronouns.

- (4) a. * [O apartamento que o Carlos ofereceu à Ana_i] mostra que ele pensa nela própria_i.
the apartment that the Carlos offered to_the Ana shows that he thinks in_she own
'[The apartment that Carlos offered to Ana_i] shows that he cares about herself_i.'
- b. [O apartamento que o Carlos ofereceu à Ana_i] mostra que ele pensa nela_i.
the apartment that the Carlos offered to_the Ana shows that he thinks in_she
'[The apartment that Carlos offered to Ana_i] shows that he cares about her_i.'

Data collected in (1)-(4) support standard tests for checking the anaphoric nature of long-distance dependent reference expressions. As far as Portuguese is concerned, there is another test that can be done: as this language has direct object clitic doubling, one should check which kind of clitic (anaphoric or pronominal) the phrase containing *ele próprio* can double.

- (5) a. O Pedro_i viu-se a si próprio_i no espelho.
the Pedro saw-CLIT.ANAF to SI own in_the mirror
'Pedro_i saw himself_i in the mirror.'
- b. O Pedro_i viu-se a ele próprio_i no espelho.
the Pedro saw-CLIT.ANAF to he own in_the mirror
'Pedro_i saw himself_i in the mirror.'
- c. * [A mãe do Pedro_i] viu-se a ele próprio_i no espelho.
the mother of_the Pedro saw-CLIT.ANAF to he own in_the mirror
'[Pedro's_i mother] saw himself_i in the mirror.'
- (6) a. [O pai da Ana_i] viu-a a ela_i no espelho.
the father of_the Ana saw-CLIT.PRON to she in_the mirror
'[Ana's_i father] saw her_i in the mirror.'
- b. [O pai da Ana_i] viu-a a ela própria_i no espelho.
the father of_the Ana saw-CLIT.PRON to she own in_the mirror
'[Ana's_i father] saw her_i in the mirror.'

The data show that *ele próprio* can double both kind of clitics. Interestingly, it is apparent that *ele próprio* assumes an anaphoric behaviour if it doubles anaphoric clitics (cf. contrast in (5)), and that it assumes a pronominal behaviour if it doubles pronominal clitics (cf. (6)), which shows that the properties of the clitics somehow prevail over the properties of *ele próprio*. Although this does not help supporting any claim about the anaphoric or pronominal nature of *ele próprio*, it is worth noting that even when doubling pronominal clitics if locally o-commanded, *ele próprio* keeps its inability to support deictic reference:

- (7) a. O Pedro viu-a a ela no espelho.
the Pedro saw-CLIT.PRON to she in_the mirror
'Pedro saw her in the mirror.'
- b. * O Pedro viu-a a ela própria no espelho.
the Pedro saw-CLIT.PRON to she own in_the mirror
'Pedro saw herself in the mirror.'

After having shown that *ele próprio* is a long-distance anaphor, we turn now to its distinctive feature of not being subject-oriented. Examples in (8) illustrate that this expression may have antecedents which are not subjects:

- (8) a. O Pedro descreveu a Maria_j a ela própria_j.
the Pedro described the Maria to she own
'Pedro described Maria to herself.'
- b. O Pedro convenceu a Ana_i de que o Carlos gosta dela própria_i.
the Pedro convinced the Ana of that the Carlos likes of_she own
'Pedro convinced Ana_i that Carlos likes her_j.'

- c. O Pedro disse à Ana_i que o Carlos gosta da própria_i.
 the Pedro said to_the Ana that the Carlos likes of_she own
 'Pedro said to Ana_i that Carlos likes her_i.'

The data collected in this section show thus that there is a long-distance anaphor in Portuguese which, contrarily to the correlation assumed to be universal by GB accounts of long-distance reflexives, is morphologically complex (with overt full inflection paradigm) and is not subject-oriented.

2.2 World Reflexivity

The question which follows naturally and deserves subsequent scrutiny is whether *ele próprio* is an isolated exception to the "standard" correlation assumed in mainstream accounts of long-distance anaphora.

2.2.1 Long-Distance Reflexives

The long-distance reflexive *sig* of Icelandic provides a good example of the "standard" correlation: it is morphologically simple and it is subject-oriented (Cole and Sung (94):(11)):

- (9) Jón_i sagði Maríu_j að þú elskadist sig_i/*_j.
 Jon told Maria that you loved-SUB self
 'Jon_i told Maria_j that you loved him_i/*_j.'

Browsing the available literature on long-distance reflexives, it is however not hard to find several counterexamples to that correlation.

In Finnish the long-distance reflexive *hän itse* is subject-oriented but it is morphologically complex³ (van Steenbergen (91):(11)):

- (10) Pekka_i sanoi Jusille_j Mattin katsovan häntä itseään_i/*_j.
 Pekka said Jussi Mattin-GEN watch-PTC-GEN he self-POSS
 'Pekka_i said to Jussi_j that Matti watched him_i/*_j.'

Chinese *ziji* is morphologically simple but it turns out not to be subject-oriented (Cole and Wang (96):(4)):

- (11) Zhangsan_i yiwei Lisi_j hui ba ni_k ling hui ziji_i/j/k de jia.
 Zhangsan think Lisi will BA you lead back self DE home
 'Zhangsan_i thought Lisi_j would take you_k back to his/your home_i/j/k.'

Together with *ele próprio*, the above long-distance reflexives actually exhibit all the possible correlations between morphological complexity/simplicity and subject/non subject-orientedness:

Subject-oriented	Not Subject-oriented	Morphological simplicity	Morphological complexity
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³ Differently from Portuguese, in Finnish the long-distance ability seems to be possible only across non tensed clauses successively subordinated. For details see van Steenbergen (91).

X		X		Icelandic
X			X	Finnish
	X	X		Chinese
	X		X	Portuguese

2.2.2 Short-Distance Reflexives

Coming now to short-distance reflexives, English *himself* is the classic illustration of the "standard" correlation: it is morphologically complex and it is not subject-oriented. But also for this type of reflexives, a search on the available literature reveals that the possibilities are not confined to that set up.

Subject-oriented	Not Subject-oriented	Morphological simplicity	Morphological complexity	
	X		X	English
X			X	Norwegian, Icelandic
	X	X		Hungarian
X		X		Czech

Norwegian *seg selv* and Icelandic *sjálfur sig* are complex but subject-oriented (Koster and Reuland (91):12-13). Hungarian *maga* is not subject-oriented but is not complex (Marácz (89) referred to in Koster and Reuland (91):19). Finally, Czech *se* is subject-oriented and morphologically simple (Toman (91)).

A few important conclusions follow thus from these observations. First, it is clear that the GB account of long-distance anaphora is inaccurate and useless: on the one hand, it explicitly excludes three quarters of the possible correlations between morphological complexity and subject-orientedness, both for long and short-distance reflexives; on the other hand, given the explanatory machinery it uses, that approach can hardly be said, though being defective, to be on the right track or to admit subsequent improvement. The idea of reducing long-distance anaphora to a recursive effect of some sort of short-distance relation appears thus to be excessively theory driven to the detriment of empirical adequacy.

Second and more important, as it becomes clear from crosslinguistic examination that subject-orientedness is not correlated either to long or short-distance anaphoric binding, we are taught that there is no reason to bring the eventual solution for subject-orientedness into the formulation of binding principles.

3 The Fourth Principle

Building on Pollard and Sag (92a) proposal, Xue, Pollard and Sag (94) sketched a treatment of long-distance anaphora whose major innovative feature is its departure from the desideratum of reducing long-distance binding to a recursive effect of short-distance relations. They take into account data involving Chinese *ziji*, which is classified as a z-pronoun, and they observe that "z-pronouns must be o-bound" (Principle Z), adding the "provisional" stipulation that "antecedents of z-pronouns should be subjects".

What we argue for in this section is that this is a suitable basis to set up a generalised account of long-distance anaphora provided that, on the one hand, a more empirically adequate formulation is given to Principle Z, and on the other hand, separate treatments of binding and subject-orientedness requirements are established.

3.1 Long-Distance Exemption

One of the most interesting features of Pollard and Sag's research on Binding is the discovery that there are contexts where anaphors turn out to be exempt from the usual locality requirement on their dependent interpretation. This led to give the form of a conditional statement to Principle A, "An anaphor must be locally o-bound *if it is locally o-commanded*.", which defines the exemption contexts as those where the anaphor is not locally o-commanded.

In this connection, checking whether there are also exemption contexts for long-distance anaphors and whether they are the same as those for short-distance anaphors is the experiment that it is naturally called for here.

As to Portuguese, it is easy to verify that, in close parallel with short-distance reflexives, *ele próprio* is exempt from the binding requirement if it is not o-commanded, and that it may have then logophoric interpretation.

- (12) a. Ele próprio pagou a conta.
he own paid the bill
'He paid the bill.'
- b. [Se o Carlos_i gostasse da Ana], ele próprio_i lho diria.
if the Carlos liked of_the Ana, he own CLITICS:to_her_it tell
'[If Carlos_i liked Ana], he_i would tell it to her.'
- c. O amigo da Ana_i disse que o jornalista [que ela própria_i convidou] pagou a conta.
the friend of_the Ana said that the journalist that she own invited paid the bill
'Ana's_i friend said that the journalist [she_i invited] paid the bill.'
- d. * O jornalista [que viu a Ana_i] disse ao Carlos que ela própria_i dançou na festa.
the journalist who saw the Ana told to_the Carlos that she own danced in_the party

The grammatical examples (12)a.-c. show that when the reflexive is not o-commanded, it is not required to be o-bound: in (12)a. *ele próprio* has no possible antecedent, in which case it is able to support a deictic use; in (12)b. and c. the reflexive has an antecedent which does not o-command it. These data should be put in contrast with (12)d., (2)b. or (4)a., where o-commanded but not o-bound occurrences of *ele próprio* are not grammatical.

These data thus strongly suggest that Principle Z should be given the following definition:

- (13) *Principle Z*
An o-commanded anaphoric pronoun⁴ must be o-bound.

This formulation of Principle Z, which applies to Portuguese, is very likely to have a general character. Let us reappraise the data available in the literature about a language of such an unrelated language family as Chinese⁵. Consider contrast (14), taken from Xue *et al.* (94):(11),(21).

- (14) a. [Zhangsan_i de xin] biaoming Lisi_j hai-le ziji*_{i/j}.
Zhangsan DE letter indicate Lisi harm-ASP self
'[Zhangsan's_i letter] indicates that Lisi_j harmed *him_i/himself_j.'
- b. [Zhangsan_i de hua] anshi [Lisi_j de xin] zai yingshe ziji?_{i/j}.
Zhangsan DE speech imply Lisi DE letter ASP allude-to self
'[Zhangsan's_i words] implied that [Lisi's_j letter] was alluding to him?_i/himself_j.'

Xue *et al.* explain this contrast on the basis of an analogy with the unlike-person blocking effect assumed to hold in Chinese for discourse anaphora. The impossibility of *ziji* being bound by *Zhangsan* in (14)a., but not in (14)b., is said to be, on a par with "...the unlike-person blocking,...a pragmatic or discourse processing effect of animate blocking".

We propose however a different tentative explanation in the light of the new Principle Z. We take the contrast of (14) as possible evidence showing that also in Chinese the requirement of o-binding for long-distance reflexives only holds in case the reflexive is o-commanded. The point here is to understand that, just like *ziji* is [+animate] and requires a [+animate] antecedent, also its o-commanders must be [+animate] in order to qualify as o-commanders for the application of Principle Z. Therefore, in (14)a. the coindexing *Zhangsan/ziji* is ruled out because, as *ziji* is o-commanded by

⁴ We have been using interchangeably *long-distance reflexive* and *long-distance anaphor*. In view of the usual classification of NPs in terms of the \pm ANAPHORIC and \pm PRONOMINAL features, we use the term *anaphoric pronoun* in the definition of Principle Z.

⁵ For some languages, however, like Finnish (see footnote 3), some restriction should be imposed as regards the domain where Principle Z holds. See Branco (98) for discussion on how this can be done in a principled way.

Lisi, the long-distance anaphor is required to be o-bound and this constraint is not satisfied under this coindexing. In (14)b., in turn, the coindexing with *Zhangsan* or *Lisi* would be acceptable due to the fact that *ziji* is not o-commanded (by a [+animate] o-commander) and it is therefore exempt from binding requirements, which allows it to logophorically pick antecedents which do not o-command it.

An important consequence of this solution seems to be that we can dispense with Xue *et al.*'s assumption that, on a par with "syntactic *ziji*", ruled by Principle Z, there is a "discourse *ziji*" whose apparent distinctive feature would be its ability to allow subcommanding antecedents.

It will be interesting to check the adequacy of our hypothesis against further empirical evidence designed by linguists speaking Chinese and other languages which have long-distance anaphors. Xue *et al.* (94):(26) seems, though, to provide yet a further piece of evidence which supports our analysis. It repeats an example due to Wang (90) where *ziji* needs not to have a (commanding or subcommanding) antecedent:

- (15) Mama de shu ye bei ziji de pengyou touzoule.
 mother DE book also BEI self DE friend steal-ASP
 'Mother's_i book was also stolen by his_k friend.'

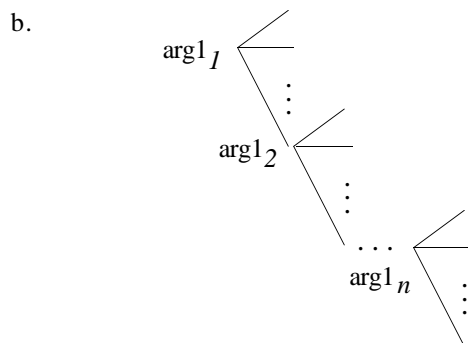
In (15) *ziji* is not o-commanded (by a [+animate] o-commander) and, apparently, like *ele proprio* in (12)a., it seems to be able to support a deictic use in the absence of overtly available antecedents in the sentence.

3.2 Dissociating LD Anaphora and Subject-Orientedness

Turning now to the issue of subject-orientedness, we argue that this property can be explained on the basis of an independent principled account without resorting to any specific, provisional or not, stipulation. We suggest that the new Principle Z be articulated with the proposal that the obliqueness hierarchy relevant to Binding Theory may have a non-linear ordering, independently motivated in Branco (96). This solution builds on Manning and Sag (95) proposal for dissociating argument structure (coded in the new ARG-S feature) and grammatical relations (coded in the previous SUBCAT feature), and for checking binding principles in the former and subcategorization principles in the latter.

Following Branco (96), obliqueness hierarchies may be given a non-linear ordering where subjects are the only o-commanders of any other argument, both in single (exemplified in (16)a. with a feature schemata in AVM format) and multiclausal (sketched in (16)b. in a slightly modified Hasse diagram) constructions:

- (16) a. [ARG-S < *arg1*, {*arg2* ... , *argn*} >]



Accordingly, in languages with subject-orientedness, hence with a non linear obliqueness hierarchy in the ARG-S value of predicators, plausibly by virtue of parametric choice, Principle Z as stated in (13) makes the correct predictions as only subjects can be the o-binders of any other argument.

Notice that it may also happen that the distinction between predicators having a linear obliqueness order and predicators having a non linear obliqueness order be active within a particular language, as it seems to be case for Dutch (Bredenkamp (96):(3.26)):

- (17) a. Jan_i vertelde Piet_j een verhaal over zichzelf_{i/*j}.
 Jan told Piet a story about self
- b. Jan_i vroeg Piet_j een verhaal over zichzelf_{i/j}.
 Jan asked Piet a story about self

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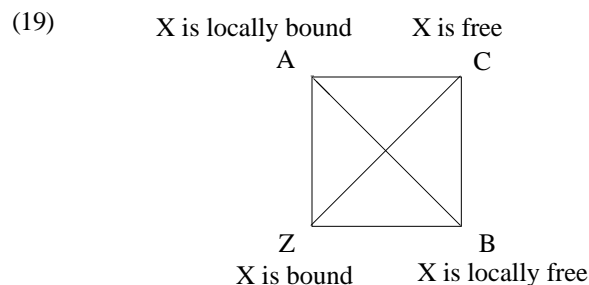
We come then to a point where it is possible and important to note that the merits of the new Principle Z can be assessed not only in terms of its empirical adequacy, but also in terms of its impact in the whole set up of the Binding Theory. Principle Z naturally appears now not as a mere extra binding constraint, but as the fourth principle of the Theory, on an equal footing with the three "classic" Principles A, B and C, given the striking natural symmetry between the four principles.

- (18) A: A *locally o-commanded* anaphor must be *locally o-bound*.
 Z: An *o-commanded* anaphoric pronoun must be *o-bound*.
 B: A personal pronoun must be *locally o-free*.
 C: A nonpronoun must be *o-free*.

Both anaphoric and non anaphoric expressions have now two binding principles ruling them, and the different senses in which the opposition local vs. non local should be taken seems to receive a more fine-tuned clarification: Principle Z shows up as the non local (extended) variant of

Principle A, in the same sense that Principle C could have been taken as the non local (extended) variant of Principle B; but also Principle B may be taken as the non local (complement) variant of Principle A in the same sense that Principle C may be taken as the non "local" (complement) variant of Principle Z.

The elegance and heuristic value of the cross symmetries now suggested can be fully uncovered if the exact correlations between the four principles are made evident in a more formally precise way. Should the constraints expressed by the binding principles be stripped away from the reference to the type of items they apply to and cleaned up from their procedural mood, it turns out that the Binding Theory lends itself to be arranged under the form of a classical square of oppositions:



There are two pairs of *contradictory* constraints (one is true iff the other is false), which are formed by the corners related across diagonals, (A, B) and (C, Z); one pair of *contrary* constraints (they can be both false but they cannot be both true) made up from the corners related by the upper horizontal edge, (A, C); one pair of *compatible* constraints (they can be both true but cannot be both false), including the corners related by the lower horizontal edge, (Z, B); and two pairs of *subcontrary* constraints (the first coordinate implies the second, but the second does not imply the first), formed by the corners of the vertical edges, (A, Z) and (C, B).

Consequently, by enlarging our sample of data to encompass both subject-oriented and non subject-oriented long-distance anaphors, it is a more general and empirically adequate account of long-distance anaphora we obtain. But notably it is an unexpectedly more integrated Binding Theory one is led to, as well, we would like to stress. And it is not unlikely that the formal oppositions between the four principles now made evident may be but the starting point for an inquiry into unsuspected properties of binding phenomena. Questions like

Does (19) signal a subjacent quantificational structure to the Binding Theory? Is there a corresponding Square of Duality? Does the universal nature of Binding Theory stem in any interesting way from its possible quantificational structure? Will this justify a new standpoint on dependent reference confluent with the lexicalization of binding requirements (in line with Dalrymple (93))?

appear to be calling for undertaking promising new paths of research on the nature of the meaning of nominal dependent reference expressions⁶.

5 Conclusions

A generalised approach to long-distance anaphora was developed by means of a new formulation of Principle Z in articulation with the adoption of non-linear obliqueness for subcategorization lists.

This led to a significant reshuffling of our understanding of the internal congruence of Binding Theory, in general, and to a more fine-tuned and formally precise characterisation of the distinction local vs. non local in binding requirements, in particular. As the binding principles have been shown to constitute a logical square of oppositions, new directions for the research on Binding may have been suggested as well.

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⁶ For subsequent research on these issues and positive answers to some of these questions see Branco (98).

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