

Anaphoric Binding in Modern Greek

Maria Lapata
Centre for Cognitive Science
University of Edinburgh
mlap@cogsci.ed.ac.uk

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Miriam Butt and Tracy Holloway King (Editors)

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1 Introduction

Chomsky's (1986) principle A has been an influential attempt to provide a unified account of the binding properties of referentially dependent elements such as reflexive and reciprocal pronouns. It is known, however, that certain anaphors may take as antecedents c-commanding NPs outside the minimal clause containing the anaphor (e.g. the antecedents of picture noun anaphors and possessive reciprocals and reflexives) and may be discourse-bound (i.e. no local binder is required) (Thráinsson (1976), Pollard and Sag (1994), Reinhart (1983)), thus contradicting the main claims of principle A.

Crosslinguistic studies (Hellan (1988), Manzini (1983), Dalrymple (1993), Huang (1983), Iatridou (1986), Sportiche (1986), Bresnan et al. (1985)) provide evidence for a range of anaphoric elements whose behaviour cannot be accounted for straightforwardly by Chomsky's (1986) principle A. Attempts to account for such anaphors within the GB framework (redefinition of the binding domain, movement operations (e.g. movement of anaphors to AGR at LF), stipulation of further conditions like the i-within-i condition etc.) seem to lack any theory external motivation and fail to provide a unified treatment of anaphoric binding.

Corpus data from Modern Greek (MG) provide evidence that the range of possible anaphoric elements is much more varied than can be captured by a simple division into three types (reflexives, reciprocals, and pronominals). In this paper we present data which casts some doubts on a purely configurational account of anaphoric binding. We show how the properties of MG anaphors can be straightforwardly accounted for by formulating constraints directly associated with the lexical properties of the anaphors themselves (Dalrymple (1993)). Furthermore, we show how the relation between anaphors and their antecedents can be accounted for by making reference to a ranking of grammatical functions and thematic roles.

2 Anaphors in Modern Greek

MG displays a variety of anaphoric elements which are not only typologically different but also differ in terms of their binding requirements. As shown in examples¹ (1) and (5) the reciprocal *o enas ton alo* 'each other' and the reflexive *i parti tu* 'himself', in accordance with principle A, need an antecedent in the domain containing the anaphor, the verb and its subject (cf. the ungrammatical (3) and (7)). In contrast to the reciprocal *o enas ton alo* 'each other' the reflexive *tin parti tu* 'himself' can occur in a subject position bound to the the object NP (cf. sentences (2) and (6)). These two anaphors can occupy an argument (as shown in (1) and (5)) or a non-argument position (cf. examples (4) and (8)).

- (1) Ta sarkofaga_i trone to ena to alo_i.
the carnivores eat-3pl the each the other
'Carnivores eat each other.'
- (2) * To ena to alo_i trone ta sarkofaga_i.
the each the other eat-3pl the carnivores
'Each other eat carnivores.'
- (3) * Ta agoria_i lene pos ta koritsia_j misun to ena to alo_i.
the boys say-3pl that the girls hate-3pl the each the other
'Boys say that girls hate each other.'

¹Unless stated otherwise the example sentences were taken from the European Corpus Initiative Multilingual Corpus I (ECI/MCI) and simplified for clarification purposes. Sentences with asterisks were provided by the author.

- (4) pro_i agorasan ta vivlia o enas tu alu_i.
bought-3sg the books the each the other's
'They bought each other's books.'
- (5) I Eleni_i kitai mono tin parti tis_i.
the Eleni looks-3sg after only the self her
'Eleni looks only after herself.'
- (6) Mono i parti tis_i tin endiaferi tin Eleni_i.
Only the self her her interests-3sg the Eleni
'Only herself interests Eleni.'
- (7) * O Petros_i nomizi pos i Eleni_j kitai mono tin parti tu_j.
the Petros thinks-3sg that the Eleni looks-3pl after only the self his
'Petros thinks that Eleni looks only after himself.'
- (8) O Petros agorazi vivlia mono gia tin parti tu.
the Petros buys-3sg books only for the self his
'Petros buys books only for himself.'

The reflexive *monos tu* 'himself' and the reciprocal *metaksi tus* 'each other' both occur in adjunct positions² (cf. the sentences in (9)–(11) and (15)–(17)) and must corefer with the subject or object of the minimal clause containing the anaphor, a syntactic predicate and its coarguments (cf. examples (12), (14), (18), (20) and the ungrammatical (13), (19)). These two anaphors do not occupy argument positions as Chomsky's (1986) binding theory would predict: they are modifiers of the sentential subject but not subjects or objects themselves.

- (9) O anthropos bori pro_i na zisi monos tu_i.
the man can-3sg SUBJ lives-3sg alone his
'Man can live on his own.'
- (10) O anthropos_i monos tu_i bori pro_i na zisi.
the man alone his can-3sg SUBJ lives-3sg
'Man on his own can live.'
- (11) Monos tu_i o anthropos_i bori pro_i na zisi.
alone his the man can-3sg SUBJ lives-3sg
'On his own man can live.'
- (12) I Eleni_j apilise tin Ana_i pos pro_i tha pai spiti moni tis_i.
the Eleni threatened-3sg the Ana that will go-3sg home alone her
'Eleni threatened Ana that she will return home on her own.'
- (13) * I Eleni_j apilise tin Ana_i pos pro_j tha pai spiti moni tis_i.
the Eleni threatened-3sg the Ana that will go-3sg home alone her
'Eleni threatened Ana that she will return home on her own.'
- (14) Thelo na miliso ston Petros_i mono tu_i.
want-1sg SUBJ talk-1sg to the Petros alone his
'I want to talk to Petros alone.'

²We assume here that position variation is a test for adjuncthood.

- (15) Ta pedia_i simfonisan metaksi tus_i.
the children agreed-3pl between them
'The children agreed between themselves.'
- (16) Ta pedia_i metaksi tus_i simfonisan.
the children between them agreed
'The children between themselves agreed.'
- (17) Metaksi tus_i ta pedia_i simfonisan.
between them the children agreed-3pl
'Between themselves the children agreed.'
- (18) I gonis_j nomizun pos ta pedia_i ehun kati kino metaksi tus_j.
the parents think-3pl that the children have-3pl something common between them
'Parents think that children have something in common.'
- (19)* I gonis_j nomizun pos ta pedia_i ehun kati kino metaksi tus_j.
the parents think-3pl that the children have-3pl something common between them
'Parents think that children have something in common.'
- (20) O Petros berdevi ta didima_i metaksi tus_j.
the Petros confuses the twins between them
'Petros confuses the twins.'

The reflexive *o eaftos tu* 'himself' can be bound both in a local and a larger domain: in (21) it is coindexed with the subject NP and bound within the sentence domain, as principle A would predict, in (22) it is coindexed with the object NP, in (23), (24) it is in subject position and bound to the object NP, thus violating principle A, while in (25), (26) it is bound to an antecedent outside its governing category.

- (21) I Ana_i sevete ton eafto tis_i.
the Ana respects-3sg the self her
'Ana respects herself.'
- (22) I Eleni_i milise stin Ana_j gia ton eafto tis_{i/j}.
the Eleni spoke-3sg to the Ana about the self her
'Eleni spoke to Ana about herself.'
- (23) O eaftos tu_i aresi tu Petru_i.
the self his pleases-3sg the Petros
'Himself pleases Petros.' (Everaert and Anagnostopoulou 1997: 48)
- (24) Den tin endiaferi tin Ana_i o eaftos tis_i katholu.
not her interests-3sg the Ana the self her at all
'Herself does not interest Ana at all.'
- (25) pro_i ehis di fotografies tu eaftu su_i otan pro_i genithikes?
have-2sg seen pictures the self your when were born-2sg
'Have you seen pictures of yourself when you were born?'
- (26) pro_i thelo na eksereuniso auti tin pleura tu eaftu mu_i.
want-1sg SUBJ explore-1sg this the side the self my
'I want to explore this side of myself.'

The reflexive *o idhios* ‘himself’ also contradicts principle A: it requires to be disjoint from elements in the local domain containing a verbal predicate and its subject (cf. the ungrammatical (28)) but has to be coreferent with an element in a larger domain (as shown in (27), (29) and (30)). Note that the anaphor *o idhios* ‘himself’, when contained in a subordinate clause may be bound to the subject or the object of a matrix clause (cf. sentences (29) and (30)).

(27) O Petros_i sinedese ta eglimata tu Yani_j me ta eglimata tu idiu_{i/j*}.
 the Petros related-3sg the crimes the Yani to the crimes the himself
 ‘Petros related Yanis’ crimes to his own crimes.’

(28)* O Yanis_i agapa ton idhio_i.
 the Yanis loves-3sg the himself
 ‘Yannis loves himself.’ (Iatridou 1986: 768)

(29) O Yanis_i theli i Maria na voithisi ton idhio_i.
 the Yanis wants-2sg the Maria SUBJ helps-3sg the himself
 ‘Yanis wants Maria to help him.’ (Iatridou 1986: 767)

(30) O Petros ipe stin Ana_i pos i idhia_i tha ton voithisi.
 the Petros told-3sg to the Ana that the herself will him help-3sg
 ‘Petros told Ana that she will help him.’

In sum, the anaphor *o enas ton alo* ‘each other’ must be bound within a local domain to the subject of the same predicate or within a larger domain (cf. the examples in (1)–(4)). The reflexive *tin parti tu* ‘himself’ must be bound to an argument (subject or object) of the local domain or to the subject of a larger domain (cf. the sentences in (5)–(8)). The reflexive *monos tu* ‘himself’ and the reciprocal *metaksi tus* ‘each other’ must be bound to an argument of the clause containing the verbal predicate and its arguments (cf. (9), (14) and (15)–(20)). The reflexive *o eaftos* ‘himself’ must be either coreferent with a coargument (cf. examples (21)–(24)) or bound in the domain containing the verbal predicate and its arguments (cf. the examples in (25)–(26)). The reflexive *o idhios* must be bound either in the domain containing a syntactic predicate and its arguments or to an argument which is outside the local domain containing the anaphor, a verbal predicate and its arguments (cf. the examples in (27)–(30)).

3 Binding Constraints in LFG

Theories which assume a universally fixed distribution of anaphors and pronouns with respect to their antecedents cannot straightforwardly account for languages with multiple anaphors such as MG. An alternative proposal has been put forward by Dalrymple (1993) according to which constraints on anaphoric binding are not expressed in terms of general principles holding invariably for all anaphoric elements but are directly associated with the lexical properties of the anaphors themselves.

The constraints associated with the anaphoric elements specify (a) coreference requirements (positive constraints) or disjointness requirements (negative constraints), (b) the syntactic domain in which the anaphor may be bound or free (domain constraints) and (c) the required grammatical function (e.g., SUBJ, OBJ, OBL_θ) of the antecedent (antecedent constraints). Dalrymple (1993) specifies four possible syntactic domains:

- **Nucleus:** a syntactic predicate and its arguments;

- **Minimal Complete Nucleus (MCN)**: a nucleus necessarily containing the anaphor and a subject;
- **Minimal Finite Domain (MFD)**: a minimal finite domain containing the anaphor and its antecedent;
- **Root S**: the entire sentence containing the anaphor and its antecedent.

Binding constraints are defined at the level of feature structure (f-structure) of Lexical Functional Grammar (LFG, Bresnan (1998)) and expressed in terms of the grammatical concepts of predicate (PRED), subject (SUBJ) and tense (TENSE). They are stated as binding equations which define the permissible relations between the f-structure of an anaphoric or pronominal element and the elements with which it may or may not corefer. These constraints are formally expressed by “inside-out” functional uncertainty equations (Dalrymple (1993)) which define an infinite disjunction over the possible f-structures which may contain the anaphor or the pronoun. An expression lexically associated with the anaphor picks out a set of less embedded f-structures which must be the antecedent of the anaphoric element, or f-structures with which the antecedent may not corefer.

Consider the the equation in (31) with respect to the feature structure in (32): the expression in (31) may pick out any grammatical function (GF) which contains f_5 and through which there is a path to f_5 expressed by $(GF^* GF5)$, such as the grammatical function GF1 of feature structures f_1, f_2, f_3 and f_4 .

$$(31) ((GF^* GF5) f_5) GF1$$

$$(32) \quad f_1: \left[\begin{array}{cc} GF1 & f_6 \\ GF2 & f_2: \left[\begin{array}{cc} GF1 & f_7 \\ GF3 & f_3: \left[\begin{array}{cc} GF1 & f_8 \\ GF4 & f_4: \left[\begin{array}{cc} GF1 & f_9 \\ GF5 & f_5 \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right]$$

Binding requirements are generally expressed as in (33), where DomainPath refers to the path containing the anaphor, AntecedentPath refers to the path containing its antecedent; the variable X (standing for PRED, SUBJ or TENSE) encodes the requirement that there is no f-structure in the DomainPath GF having the feature X. The equation in (33) also requires that the anaphor has the same semantic representation with its antecedent³.

$$(33) ((\text{DomainPath GF } \uparrow) \text{AntecedentPath})_\sigma = \uparrow_\sigma \neg(\rightarrow X)$$

In order to assure that the application of binding constraints yields grammatical results Dalrymple (1993) assumes the existence of additional principles/conditions on the anaphor-antecedent relation such as the f-command condition given in (34) below, the locality condition (binding equations refer to local elements, never exclusively to non-local ones), the noncontainment condition (possible or impossible antecedents for an anaphor may not contain the anaphor), thematic superiority (thematic condition on the acceptability of certain antecedents).

³The semantic representation of the anaphor is expressed by \uparrow_σ , whereas the semantic representation of the antecedent is $((\text{DomainPath GF } \uparrow) \text{AntecedentPath})_\sigma$.

- (34) For any occurrences of the functions α , β in an f-structure F, α f-commands β if and only if α does not contain β and every f-structure of F that contains α contains β .
(Bresnan 1982: 333)

4 Modern Greek anaphors revisited

In what follows we show how the inventory of constraints outlined in the previous section can account for the distribution of MG anaphors. There are three distinct domains within which MG anaphors must be bound/free: (a) a domain containing a syntactic predicate and its coarguments, namely the nucleus following Dalrymple’s (1993) terminology, (b) a domain containing a main and subordinate clause where the anaphor is located in the subordinate clause and bound to an argument in the main clause, this is what Dalrymple (1993) calls root S domain, and (c) a minimal domain which contains a predicate, its arguments and a subject, namely the minimal complete nucleus. The following generalisations can be made with respect to the restrictions MG anaphors impose on their antecedents and the domain in which they have to be bound/free:

- the reciprocal *o enas ton alo* ‘each other’ requires to be bound to the SUBJ of the same PRED or to the SUBJ of the MCN domain;
- the reflexive *i parti tu* ‘himself’ requires to be bound to an argument of the same PRED; it can also be bound to the SUBJ of the MCN domain;
- the reciprocal *metaksi tus* ‘each other’ and the reflexive *monos tu* ‘himself’ must be bound to an argument in the MCN domain;
- the reflexive *o eaftos tu* ‘himself’ when contained in the nucleus must be bound to the argument of the same PRED; it may also be bound to an argument in the MCN domain;
- the anaphor *o idhios* ‘himself’ imposes simultaneous binding requirements: when contained in the root S it cannot corefer with any element in the domain containing a PRED and its arguments; when contained within the MCN domain it has to be bound to a SUBJ.

The properties of the anaphoric elements in MG are summarized in table 1. Based on their distributional patterns MG anaphors can be further grouped in three distinct classes. The first class comprises of the anaphors *o eaftos tu* ‘himself’ and *o enas ton alo* ‘each other’: they can be bound either in the nucleus or the MCN domain. The second class includes the anaphors *monos tu* ‘himself’ and *metaksi tus* ‘each other’: they can be bound only within the MCN domain. Finally, the anaphor *o idhios* ‘himself’ forms its own class.

The constraints associated with the MG anaphors are given in equations (35), (36), (39), (40), (43), (46), (47) and (50)–(52). Multiple positive binding requirements are specified for the anaphors *o enas ton alo* ‘each other’, *tin parti tu* ‘himself’, *o eaftos tu* ‘himself’, *monos tu* ‘himself’ and *metaksi tus* ‘each other’. A negative requirement is specified for the anaphor *o idhios* ‘himself’. The equations in (35), (36) state that the antecedent of *o enas ton alo* ‘each other’ when contained within the nucleus must appear within the f-structure containing the PRED of which the anaphor is an argument. As shown in (37), which is the f-structure for sentence (1), the only possible antecedent for the f-structure labelled f_2 is f_1 . When contained within the MCN domain its antecedent must be a SUBJ (cf. the constraint in (36) and the f-structure for example (4) in (38)).

- (35) *o enas ton alo*: bound to SUBJ in nucleus and coreferent with
 $((\text{DomainPath GF } \uparrow) \text{SUBJ})_\sigma = \uparrow_\sigma$
 $\neg(\rightarrow\text{PRED})$

	Bound to	Disjoint from
<i>o enas ton alo</i>	(a) SUBJ in nucleus (b) SUBJ in MCN	
<i>i parti tu</i>	(a) argument in nucleus (b) SUBJ in MCN	
<i>metaksi tus</i>	argument in MCN	
<i>monos tu</i>	argument in MCN	
<i>o eaftos tu</i>	(a) argument in nucleus (b) argument in MCN	
<i>o idhios</i>	(a) SUBJ in MCN (b) argument in root S	syntactic coargument

Table 1: Properties of MG anaphors

- (36) *o enas ton alo*: bound to SUBJ in MCN and coreferent with
 $((\text{DomainPath GF } \uparrow) \text{SUBJ})_{\sigma} = \uparrow_{\sigma}$
 $\neg(\rightarrow\text{SUBJ})$

- (37)
$$\left[\begin{array}{l} \text{PRED} \quad \text{'eat } \langle(\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle\text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad f_1: \left[\text{PRED} \quad \text{'carnivors}_i\text{' } \right] \\ \text{OBJ} \quad f_2: \left[\text{PRED} \quad \text{'each other}_i\text{' } \right] \end{array} \right]$$

- (38)
$$\left[\begin{array}{l} \text{PRED} \quad \text{'buy } \langle(\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle\text{' } \\ \text{TENSE} \quad \text{PAST} \\ \text{SUBJ} \quad f_1: \left[\text{PRED} \quad \text{'pro}_i\text{' } \right] \\ \text{OBJ} \quad f_2: \left[\begin{array}{l} \text{PRED} \quad \text{'books'} \\ \text{POSS} \quad \left[\text{PRED} \quad \text{'each other}_i\text{' } \right] \end{array} \right] \end{array} \right]$$

The equations in (39), (40) specify that when contained within the nucleus the anaphor *i parti tu* ‘himself’ is bound to an antecedent bearing the grammatical function of SUBJ or OBJ (cf. the simplified f-structure in (41) for sentence (6)), whereas when the anaphor is found within the MCN domain it must seek an antecedent which is a subject. The only available antecedent for the anaphor *i parti tu* ‘himself’ in (42), the f-structure for sentence (8), is the f-structure labelled f_1 .

- (39) *i parti tu*: bound to argument in nucleus and coreferent with
 $((\text{DomainPath GF } \uparrow) \text{GF})_{\sigma} = \uparrow_{\sigma}$
 $\neg(\rightarrow\text{PRED})$

- (40) *i parti tu*: bound to SUBJ in MCN domain and coreferent with
 $((\text{DomainPath GF } \uparrow) \text{SUBJ})_{\sigma} = \uparrow_{\sigma}$
 $\neg(\rightarrow\text{SUBJ})$

$$(41) \left[\begin{array}{l} \text{PRED} \quad \text{'interest } \langle (\uparrow \text{SUBJ}), (\uparrow \text{OBJ}) \rangle \text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad f_1: \left[\text{PRED} \quad \text{'herself}_i \right] \\ \text{OBJ} \quad f_2: \left[\text{PRED} \quad \text{'Eleni}_i \right] \end{array} \right]$$

$$(42) \left[\begin{array}{l} \text{PRED} \quad \text{'buy } \langle (\uparrow \text{SUBJ}), (\uparrow \text{OBJ}) \rangle \text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad f_1: \left[\text{PRED} \quad \text{'Petros}_i \right] \\ \text{OBJ} \quad \left[\text{PRED} \quad \text{'books'} \right] \\ \text{ADJ} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'FOR } \langle (\uparrow \text{OBJ}) \rangle \text{' } \\ \text{OBJ} \quad f_2: \left[\text{PRED} \quad \text{'himself}_i \right] \end{array} \right] \end{array} \right]$$

As shown in (43) the anaphors *monos tu* ‘himself’ and *metaksi tus* ‘each other’ must seek an antecedent within the MCN domain. As shown below in the f-structure (44) for sentence (13), there is no possible antecedent for *monos tu* ‘himself’ within the MCN domain represented by f-structure f_4 , and the sentence is ungrammatical. In contrast to equations (39), (40) the constraint in (43) does not impose any restrictions on the grammatical function of the antecedent, it can be SUBJ, OBJ, or OBL_θ (cf. f-structure (45) for example sentence (20), where the anaphor *metaksi tus* ‘each other’ is bound to the object of the verbal predicate).

$$(43) \text{ } \textit{monos tu}, \textit{metaksi tus}: \text{ bound to argument in MCN domain and coreferent with } \\ ((\text{DomainPath GF } \uparrow) \text{GF})_\sigma = \uparrow_\sigma \\ \neg(\rightarrow \text{SUBJ})$$

$$(44) \left[\begin{array}{l} \text{PRED} \quad \text{'threaten } \langle (\uparrow \text{SUBJ}), (\uparrow \text{OBJ}), (\uparrow \text{COMP}) \rangle \text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad \left[\text{PRED} \quad \text{'Eleni}_i \right] \\ \text{OBJ} \quad f_4: \left[\text{PRED} \quad \text{'Ana}_j \right] \\ \text{COMP} \quad f_3: \left[\begin{array}{l} \text{PRED} \quad \text{'go home } \langle (\uparrow \text{SUBJ}) \rangle \text{' } \\ \text{TENSE} \quad \text{FUT} \\ \text{SUBJ} \quad f_2: \left[\text{PRED} \quad \text{'pro}_j \right] \\ \text{ADJ} \quad f_1: \left[\text{PRED} \quad \text{herself}_i \right] \end{array} \right] \end{array} \right]$$

$$(45) \left[\begin{array}{l} \text{PRED} \quad \text{'confuse } \langle (\uparrow \text{SUBJ}), (\uparrow \text{OBJ}) \rangle \text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad \left[\text{PRED} \quad \text{'Petros'} \right] \\ \text{OBJ} \quad f_1: \left[\text{PRED} \quad \text{'twins}_i \right] \\ \text{ADJ} \quad f_2: \left[\text{PRED} \quad \text{'between them}_i \right] \end{array} \right]$$

Multiple constraints are specified for the reflexive *o eaftos tu* ‘himself’: when contained within the nucleus it must be bound to an argument of the same PRED (cf. the f-structure of example (21) in (48) where the anaphor *o eaftos* ‘himself’ is bound to the SUBJ *Ana*); when contained in the MCN domain it must be bound to an argument of the syntactic PRED. Consider the f-structure in (49) for sentence (25): the MCN domain is represented by the f-structure labelled f_3 and the anaphor *o eaftos tu* ‘himself’ is bound to the subject which is represented by the f-structure labelled f_2 and contained within f_3 .

(46) *o eaftos tu*: bound to argument in NUCLEUS and coreferent with
 $((\text{DomainPath GF } \uparrow) \text{GF})_\sigma = \uparrow_\sigma$
 $\neg(\rightarrow\text{PRED})$

(47) *o eaftos tu*: bound to argument in MCN domain and coreferent with
 $((\text{DomainPath GF } \uparrow) \text{GF})_\sigma = \uparrow_\sigma$
 $\neg(\rightarrow\text{SUBJ})$

(48)
$$\left[\begin{array}{l} \text{PRED} \quad \text{'respect } \langle(\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle\text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad f_2: \left[\text{PRED} \quad \text{'Ana}_i\text{' } \right] \\ \text{OBJ} \quad f_1: \left[\text{PRED} \quad \text{'herself}_i\text{' } \right] \end{array} \right]$$

(49)
$$f_3: \left[\begin{array}{l} \text{PRED} \quad \text{'see } \langle(\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle\text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{ASPECT} \quad \text{'imperfective'} \\ \text{SUBJ} \quad f_2: \left[\text{PRED} \quad \text{'pro}_i\text{' } \right] \\ \text{OBJ} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'pictures'} \\ \text{POSS} \quad f_1: \left[\text{PRED} \quad \text{'yourself}_i\text{' } \right] \end{array} \right] \\ \text{TEMP} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'were born } \langle(\uparrow \text{SUBJ})\rangle\text{' } \\ \text{SUBJ} \quad \left[\text{PRED} \quad \text{'pro}_i\text{' } \right] \end{array} \right] \end{array} \right]$$

Both positive and negative constraints are specified for the reflexive *o idhios* ‘himself’: the constraint in (50) is a negative requirement on the domain within which the anaphor is bound, namely it has to be disjoint from coarguments within the nucleus domain. The f-structure labelled f_2 in (53), the f-structure for example (28), is not a possible antecedent for the anaphor *o idhios* ‘himself’. The equation in (51) specifies that the anaphor must be bound to a SUBJ when contained within the MCN domain. Finally, the equation in (52) states that the anaphor has to be bound to an argument in the root S domain. The only admissible antecedent for the anaphor *o idhios* ‘himself’ in (54), the f-structure for sentence (29), is the f-structure labelled f_3 and not f_2 .

(50) *o idhios*: free from argument in nucleus domain and non coreferent with
 $((\text{DomainPath GF } \uparrow) \text{GF})_\sigma = \uparrow_\sigma$
 $\neg(\rightarrow\text{PRED})$

(51) *o idhios*: bound to a SUBJ in the MCN domain and coreferent with
 (DomainPath \uparrow SUBJ) $_{\sigma} = \uparrow_{\sigma}$
 $\neg(\rightarrow$ SUBJ)

(52) *o idhios*: bound to an argument in the root S domain and coreferent with
 (DomainPath \uparrow GF) $_{\sigma} = \uparrow_{\sigma}$

(53)
$$\left[\begin{array}{l} \text{PRED} \quad \text{'love } \langle(\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle\text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad f_2: \left[\text{PRED} \quad \text{'Yanis}_i\text{' } \right] \\ \text{OBJ} \quad f_1: \left[\text{PRED} \quad \text{'himself}_i\text{' } \right] \end{array} \right]$$

(54)
$$\left[\begin{array}{l} \text{PRED} \quad \text{'want } \langle(\uparrow \text{SUBJ}), (\uparrow \text{COMP})\rangle\text{' } \\ \text{TENSE} \quad \text{PRES} \\ \text{SUBJ} \quad f_3: \left[\text{PRED} \quad \text{'Yanis}_i\text{' } \right] \\ \text{COMP} \quad \left[\begin{array}{l} \text{PRED} \quad \text{'voithao } \langle(\uparrow \text{SUBJ}), (\uparrow \text{OBJ})\rangle\text{' } > \\ \text{SUBJ} \quad f_2: \left[\text{PRED} \quad \text{'Maria}_j\text{' } \right] \\ \text{OBJ} \quad f_1: \left[\text{PRED} \quad \text{'himself}_i\text{' } \right] \end{array} \right] \end{array} \right]$$

5 Anaphoric Prominence

The constraints given in the previous section are lexically associated with individual anaphoric elements and allow to express formally restrictions on their binding domains and antecedents. The range of constraints developed by Dalrymple (1993) is valuable in the sense that it makes crosslinguistic predictions on the typology of anaphoric elements and their constraints. Furthermore, since binding constraints are defined in terms of f-structure, they are applicable across languages thus avoiding an approach where binding principles are parametrized on a language-by-language basis.

However, these binding constraints as formulated in the previous section do not take into account the grammatical function of the anaphoric element itself. Consider for example constraints (39) and (46). They do not specify whether the anaphor has to be a subject, an object or an adjunct and consequently, the sentences below are predicted to be well-formed: in (55) the reflexive *o eaftos tu* is bound within the minimal complete nucleus containing a predicate (the verb *milise* ‘spoke’) and its arguments (the NP *Ana* and the reflexive *ton eafto tis* ‘herself’). The same is true for examples (56) and (57): the reflexives *o eaftos tu* ‘himself’ and *i parti tu* ‘himself’ are bound within the MCN domain to an argument of the syntactic predicate. A similar problem arises if we take English into account. If we assume, along with Bresnan et al. (1985) and Dalrymple (1993), that the reflexive *himself* must be bound within the MCN, then the examples in (58) and (59) are predicted to be grammatical.

(55)* I Eleni milise ston eafto tis_i gia tin Ana_i.
 the Eleni spoke-3sg to the self her about the Ana
 ‘Eleni spoke to herself about Ana.’

(56) * *O eaftos tis_i sevete tin Ana_i.*
 the self her respects-3sg the Ana
 ‘Herself respects Ana.’ (Everaert and Anagnostopoulou 1997: 48)

(57) * *I parti_i mu kitai mono tin Eleni_i.*
 the self my looks-3sg after only the Eleni
 ‘Myself only looks after Eleni.’

(58) *Himself_i washes John_i. (Everaert and Anagnostopoulou 1997: 44)

(59) *Bill told himself_i about John_i. (Dalrymple 1993: 167)

The ungrammaticality of the sentences in (58), (59) follows if we assume a relative ranking among grammatical functions (Bresnan (1998)). The hierarchy given in (60) ranks the subject as the most prominent function. The relative prominence on f-structures is determined via the notion of syntactic rank given in (61). The relation between an anaphor and its antecedent is defined in terms of the binding principle shown in (62).

(60) **Functional Hierarchy:**
 SUBJ > OBJ > OBJ_θ > OBL_θ > COMPL > ADJUNCT (Bresnan 1998: 178)

(61) **Syntactic Rank:**
 For all f-structure elements A, B: A outranks B if A and B belong to the same f-structure and A is more prominent than B on the functional hierarchy (60), or A outranks some C which contains B. (Bresnan 1998: 178)

(62) **Binding:**
 A binds B if A outranks B and A and B are coindexed. B is bound/free if some/no A binds B. (Bresnan 1998: 179)

Consider now the examples in (58), (59): the NP *John* in (58) is coindexed with the reflexive *himself* in but cannot bind it (OBJ is less prominent than SUBJ according to (60)). In (59) the NP *John* cannot bind the anaphor *himself*, even though it is coindexed with it, since it does not outrank it (the function OBL_{about} is less prominent than the OBJ function). Syntactic rank can also explain the MG data in (55), (56). In all cases the anaphoric element is coindexed with a less prominent antecedent and therefore cannot be bound to it. However, syntactic rank cannot account for the examples below. In examples (23) and (6), repeated here as (63) and (64), the anaphors *o eaftos tu* ‘himself’ and *tin parti tu* ‘himself’ occupy subject positions and are coindexed and bound to the less prominent objects *tu Petru* and *tin Eleni*. Contrary to the syntactic rank in (60), the oblique antecedent *sti Maria* in (65) binds the object reflexive *ton eafto tis* ‘herself’ but not vice-versa (cf. example (66)).

(63) *O eaftos tu_i aresi tu Petru_i.*
 the self his like-3sg the Petros
 ‘Himself pleases Petros.’ (Everaert and Anagnostopoulou 1997: 48)

(64) *Mono i parti tis_i tin endiaferi tin Eleni_i.*
 Only the self her her interests-3sg the Eleni
 ‘Only herself interests Eleni.’

(65) Ediksa sti Maria ton eafto tis (ston kathrefti).
 showed-1sg to the Maria the self her (in the mirror)
 ‘I showed to Maria herself in the mirror.’ (Dimitriadis 1995: 97)

(66) * Ediksa ston eafto tis ti Maria (ston kathrefti).
 showed-1sg to the self her the Maria (in the mirror)
 ‘I showed to herself Maria in the mirror.’ (Dimitriadis 1995: 97)

These facts suggest that the relation of the anaphor and its antecedent in MG is not determined on the basis of syntactic rank but in terms of thematic prominence (see among others Jackendoff (1972), Dalrymple (1993), Wilkins (1988), Everaert and Anagnostopoulou (1997) for a similar proposal). The examples in (63)–(66) can be straightforwardly accounted for if we adopt a thematic hierarchy along the lines of (67) and the notion of thematic rank given below.

(67) **Thematic Hierarchy:**
 AGENT > EXPERIENCER > GOAL/SOURCE/LOCATION/BENEFACTOR > THEME
 (Grimshaw 1990: 8)

(68) **Thematic Rank:**
 For all f-structure elements A, B: A outranks B if A and B belong to the same f-structure and A is more prominent than B on the thematic hierarchy (67), or A outranks some C which contains B.

In (63) the antecedent *tu Petru* is thematically more prominent than the reflexive *o eaftos tu* ‘himself’ (EXPERIENCER > THEME) and thus binding is allowed. The same is true for (63) where the reflexive *tin parti tu* ‘himself’ bears the thematic role of THEME and is bound by a thematically more prominent antecedent (EXPERIENCER). In (65) a GOAL antecedent (*sti Maria* ‘to Mary’) binds a THEME reflexive (*ton eafto tu* ‘himself’). The thematic prominence approach also accounts for the ungrammaticality of the sentences in (55)–(57): in (55) a THEME antecedent (*tin Ana* ‘Ana’) binds a less prominent GOAL reflexive; in (56), (57) a THEME antecedent binds an EXPERIENCER reflexive.

A thematic approach fails, however, to account for the unacceptability of the English sentences below: in (69) a THEME binds an EXPERIENCER, whereas in (70) a THEME binds a GOAL which is inconsistent with the thematic hierarchy in (67) (cf. EXPERIENCER > GOAL > THEME). Note, however, that the ungrammaticality of these sentences is accounted for in terms of functional prominence: the object *Peter* in (69) fails to bind the prominent reflexive (SUBJ > OBJ), whereas the oblique *Bill* cannot bind the object reflexive (OBJ > OBL_θ).

(69) *Himself_i pleases Peter_i.

(70) *Mary_i talked to himself_j about Bill_j. (Pollard and Sag 1994: 264)

Evidence from MG and English shows that the relation between the anaphor and its antecedent can be accounted for by assuming a relative ranking of grammatical functions for English and a relative ranking of thematic roles for MG. We predict thus that languages are not only parametrized in terms of the constraints that determine the distribution of anaphoric elements but also in terms of the prominence relation that holds between the anaphor and its antecedent: languages like English opt for syntactic prominence, whereas languages like Greek opt for thematic prominence.⁴

⁴One might speculate that syntactic rank is responsible for binding relations in configurational languages (cf.

6 Conclusions

In this paper, we argued in favour of a non-configurational account of anaphoric binding. Using Modern Greek as a test case, we showed how the binding properties of MG anaphors can be lexically specified and formally expressed by functional uncertainty equations (Dalrymple (1993)). We demonstrated that anaphoric binding constraints in MG apply in three domains: the nucleus, the MCN and the root S domain.

Furthermore, we demonstrated that in Modern Greek the relation of the anaphor and its antecedent is determined via thematic prominence and predicted that languages are parametrized in that anaphoric relations can be expressed by syntactic or thematic rank. This generalization correctly accounts for the behaviour of English and Greek anaphors with respect to their antecedents.

Languages with multiple anaphoric elements like MG provide evidence for a theory of anaphoric binding which is expressed in terms of a typology of constraints and a hierarchy of thematic/syntactic roles rather than making reference to configurational notions like governing category and c-command.

References

- Bresnan, Joan. 1982. *The Mental Representation of Grammatical Relations*. Cambridge MA: The MIT Press.
- Bresnan, Joan. 1998. Lexical-Functional Syntax. Unpubl. ms., Stanford University.
- Bresnan, Joan, Per-Kristian Halvorsen, and Joan Maling. 1985. Logophoricity and Bound Anaphors. Unpubl. ms., Stanford University.
- Chomsky, Noam. 1986. *Knowledge of Language: its Nature, Origins and Use*. New York: Praeger.
- Dalrymple, Mary. 1993. *The Syntax of Anaphoric Binding*. Stanford: CSLI Publications.
- Dimitriadis, Alexis. 1995. Dative Clitics and Case Licensing in Standard and Macedonian Greek. In Audra Dainora, ed., *Papers from the 31st Annual Meeting of the Chicago Linguistic Society*, volume 2: Parasession on clitics. Chicago.
- Everaert, Martin and Elena Anagnostopoulou. 1997. Thematic Hierarchies and Binding Theory: Evidences from Modern Greek. In Francis Corblin, Danièle Godard, and Jean-Marie Marandin, eds., *Empirical Issues in Formal Syntax and Semantics: Selected Papers from the Colloque de Syntaxe et de Sémantique de Paris (CSSP 1995)*, 43–59. Bern: Peter Lang.
- Grimshaw, Jane. 1990. *Argument Structure*. Cambridge, MA: MIT Press.
- Hellan, Lars. 1988. *Anaphora in Norwegian and the Theory of Grammar*. Foris Publications: Dordrecht.
- Huang, C.-T. James. 1983. A Note on the Binding Theory. *Linguistic Inquiry* 14(3): 554–560.
- Iatridou, Sabine. 1986. An Anaphor not Bound in Its Governing Category. *Linguistic Inquiry* 17(4): 766–772.
- Jackendoff, Ray. 1972. *Semantic Interpretation in Generative Grammar*. Cambridge, MA: MIT Press.

English), whereas thematic rank accounts for binding relations in languages that are not strictly configurational (cf. Modern Greek).

- Lapata, Maria. 1992. Anaforikopiisi sti Nea Eliniki [Pronominalization in Modern Greek]. Unpubl. ms., Athens University.
- Manzini, Maria Rita. 1983. On Control and Control Theory. *Linguistic Inquiry* 18(3): 421–447.
- Pollard, Carl and Ivan Sag. 1994. *Head Driven Phrase Structure Grammar*. Chicago and Stanford: The University Chicago Press and CSLI Publications.
- Reinhart, Tanya. 1983. *Anaphora and Semantic Interpretation*. Chicago: The University of Chicago Press.
- Sportiche, Dominique. 1986. Zibun. *Linguistic Inquiry* 17(2): 369–374.
- Thráinsson, Hóskuldur. 1976. Reflexives and Subjunctives in Icelandic. In *Sixth Annual Meeting of the North Eastern Linguistic Society*, 225–239.
- Wilkins, Wendy. 1988. Thematic Structure and Reflexivization. *Syntax and Semantics* 21: 191–213.