APPOSITION AS COORDINATION: EVIDENCE FROM AUSTRALIAN LANGUAGES

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Abstract

Using data from a range of Australian languages, in this paper we argue for an analysis of various nominal appositional structures as syntactic coordinations (i.e. as hybrid f-structures) in LFG. We show that this provides a simple and straightforward account of the surface syntactic similarities among a range of juxtaposed construction types, while the differences between the constructions can be accounted for in the mapping to the semantics. We propose meaning constructors to capture the semantic differences between coordination and apposition.[1]

1 Introduction

Using data from a range of Australian languages, in this paper we argue for an analysis of various nominal appositional structures as syntactic coordinations (i.e. as hybrid f-structures) in LFG. We show that this provides a simple and straightforward account of the surface syntactic similarities among a range of juxtaposed construction types, while the differences between the constructions can be accounted for in the mapping to semantic structure. We propose meaning constructors to capture the semantic differences between coordination and apposition, adapting the standard treatment of the semantics of NP coordination to asyndetic coordination and providing a first proposal for a semantics for appositions of these types in LFG.

The present paper is organised as follows. In Section 2 we outline the LFG analysis of coordination by way of background. Section 3 introduces the use of simple nominal juxtaposition structures in Australian languages and the range of interpretations which they receive. In section 4 we provide an analysis of the syntax and semantics of these constructions which captures both their similarities and the differences between them. Section 5 then briefly discusses the occurrence of discontinuous juxtapositions and how they fit into our proposal. We conclude in section 6 with some remarks of a quite preliminary nature which situate our work within a wider perspective.

2 LFG Analysis of Coordination

A standard LFG analysis of coordination (Dalrymple and Kaplan, 2000; Dalrymple, 2001) assumes the coordination schema in (1)[2] mapping onto a hybrid f-structure containing both a set of f-structures, corresponding to the conjuncts, and a number of non-distributive features, for example the CONJ feature, representing the conjunction, and the resolved agreement features. The f-structure corresponding to the subject NP in the Spanish example (2) from Dalrymple and Kaplan (2000) is therefore as in (3):

(1) $\text{XP} \longrightarrow \underset{\downarrow \in \uparrow}{\text{XP}} \quad \text{CONJ} \quad \underset{\downarrow \in \uparrow}{\text{XP}}$

[1]We gratefully acknowledge the financial support of the British Academy in funding this work as part of the project *Coordination Strategies in Australian Aboriginal Languages* (SG-39545).

[2]Where X ranges over categories such as NP, VP, N, V etc.

(2) *Jose y yo hablamos.*
Jose and I speak.PRES.1PL
'Jose and I are speaking.'

(3)
$$\begin{bmatrix} \text{INDEX} & \begin{bmatrix} \text{PERS} & 1 \\ \text{NUM} & \text{PL} \end{bmatrix} \\ \text{CONJ} & \text{'AND'} \\ \left\{ \begin{bmatrix} \text{PRED} & \text{'JOSE'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'PRO'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 1 \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

The distinction between distributive and non-distributive properties is introduced in Dalrymple and Kaplan (2000): if a *distributive* property (e.g. case marking) holds of a set it must hold of every member of the set (i.e. each member of the set must have the same value for these features); *nondistributive* properties (e.g. the CONJ feature), on the other hand, hold of the set itself (and therefore appear in the outer layer of the hybrid structure). These are defined in (4).

(4) For any *distributive* property P and set s, $P(s)$ iff $\forall f \in s.P(f)$.
For any *nondistributive* property P and set s, $P(s)$ iff P holds of s itself.
(Dalrymple and Kaplan, 2000, 779)

As shown in (3) one of the characteristic properties of coordination is the presence of a non-distributive index for the whole set, calculated from the conjuncts via principles of feature resolution (here, 1SG and 3SG are resolved to 1PL). Dalrymple and Kaplan (2000) propose a mechanism for syntactic feature resolution of the non-distributive (INDEX) PERS and GEND features involving closed sets as feature values and 'combining' values by set union. For example, if first person is represented as {S,H}, second person as {H} and third person as the empty set, {}, then the following holds:

(5) {S,H} (1ST) ∪ {H} (2ND) = {S,H} (1ST)
{S,H} (1ST) ∪ {} (3RD) = {S,H} (1ST)
{H} (2ND) ∪ {} (3RD) = {H} (2ND)
{} (3RD) ∪ {} (3RD) = {} (3RD)

Similarly, a two gender (M, F) system with resolution to the masculine works as follows (with MASC corresponding to the set {M} and FEM to the empty set):

(6) {M} (MASC) ∪ {M} (MASC) = {M} (MASC)
{M} (MASC) ∪ {} (FEM) = {M} (MASC)
{} (FEM) ∪ {} (FEM) = {} (FEM)

As shown in (7), the coordination schema for NP coordination in a language with syntactic feature resolution involves simple f-descriptions which ensure that the PERS and GEND features of each NP conjunct be a subset of the PERS and GEND features of the set.

(7) NP $\longrightarrow$

NP	CONJ	NP
$\downarrow \in \uparrow$		$\downarrow \in \uparrow$
$(\downarrow \text{PERS}) \subseteq (\uparrow \text{PERS})$		$(\downarrow \text{PERS}) \subseteq (\uparrow \text{PERS})$
$(\downarrow \text{GEND}) \subseteq (\uparrow \text{GEND})$		$(\downarrow \text{GEND}) \subseteq (\uparrow \text{GEND})$

Resolution of the NUM feature, on the other hand, is not purely syntactic, as shown by the following mimimally contrasting examples:

(8) The president and chief executive are attending the meeting in Beirut.
The president and chief executive is attending the meeting in Beirut.

Cases of boolean coordination, as in (8b), thus show NUM resolution to be semantically based — for a language such as English, when the *and* involved in an NP coordination is so-called 'group-forming' *and* (as in (8a) and the Spanish (3)) it can be associated with an equation specifying that $(\uparrow \text{INDEX NUM}) = \text{PL}$ (Dalrymple, 2003).

3 Nominal Juxtaposition in Australian Languages

In many Australian languages NP coordination is achieved through simple juxtaposition. In the following Nyangumarta example, the coordinated subject 'the two kangaroos and one goanna' is encoded by the juxtaposition of the NPs 'two kangaroos' and 'one goanna', with no coordinator relating them. The fact that these are to be interpreted as a single coordinated NP, however, is made clear by the verbal morphology, which agrees with the resolved features of third person plural.

(9) *Pala-nga ngatu jarri-nya-pinti-ngi, mima-nikinyi-yi puluku, kujarra*
that-LOC stationary INCH-NM-ASS-LOC wait.for-IMPF-3PL.SUB 3DU.DAT two
kangkuru-jirri waraja yalapara.
kangaroo-DU one goanna.
'And there, on the finishing line, the two kangaroos and one goanna waited for those two.' (Sharp, 2004, 315, (9.61):Nyangumarta)

It seems reasonable to assume that such coordinate structures receive precisely the same syntactic treatment as (2) above, so that they differ only in the presence/absence of a coordinator. If this is correct, then the f-structure corresponding to the coordinated subject in (9) is that in (10), with resolved INDEX features but no CONJ feature in the outer f-structure.

(10)
$$\left[\begin{array}{l} \text{INDEX} \left[\begin{array}{ll}\text{PERS} & 3\\ \text{NUM} & \text{PL}\end{array}\right] \\ \left\{\begin{array}{l}\left[\begin{array}{ll}\text{PRED} & \text{`GOANNA'}\\ \text{INDEX} & \left[\begin{array}{ll}\text{NUM} & \text{SG}\\ \text{PERS} & 3\end{array}\right]\end{array}\right] \\ \left[\begin{array}{ll}\text{PRED} & \text{`KANGAROO'}\\ \text{INDEX} & \left[\begin{array}{ll}\text{NUM} & \text{DUAL}\\ \text{PERS} & 3\end{array}\right]\end{array}\right]\end{array}\right\}\end{array}\right]$$

While this seems to give a straightforward treatment of asyndetic NP coordination, Australian languages with such NP coordination structures frequently use juxtaposition in a range of other 'appositional-like' constructions as well, such as appositive modifier constructions, generic-specific constructions, part-whole constructions, among others.[3] The following exemplify a range of different interpretations associated with nominal juxtapositions: with the exception of the coordination in (11) all of these are frequently analysed as appositional constructions in Australian language descriptions (e.g. Blake 1979, 1983, 2001, Evans 1995, Heath 1978, 1984, etc.).[4] These constructions all have in common the fact that they involve the juxtaposition of NP elements in the same grammatical function, as evidenced by the fact that the nominals involved are all inflected for the same case feature. In (11) we see a straightforward nominal coordination; in (12) we see a generic-specific construction, with the generic noun *wanku-ya* juxtaposed to the specific noun *kulkiji-y*; (13) exemplifies a part-whole construction with the whole nominal ('bundle') juxtaposed to the part nominal ('fighting stick'); and (14) and (15) illustrate two variants of straightforward appositional constructions – a nominal-nominal appositional construction in (14) in which 'old man' is apposed to 'husband' in subject function,[5] and a nominal-pronominal appositional construction in (15) in which the coordinated NP 'those men and women' is apposed to the coreferential third person plural pronoun *bi-l-da*.

(11) *Niya* *kurrka-tha* *barruntha-ya* *wuran-ki* *nguku-y.*
3SG.NOM take-ACT yesterday-LOC food-MLOC water-MLOC
'Yesterday he took (with him) food and water.' (Evans, 1995, 250:Kayardild)

[3]Note that it is often hard to determine from the data available whether these constructions involve juxtaposed NPs or juxtaposed Ns: the presence of a demonstrative will sometimes make this clear, but in general, 'bare' Ns can have referential NP meanings and constitute a full NP on their own. The syntactic analysis we present applies equally well to either structural possibility and we simply use variables in our phrase structure rules to range over both category options (see §4).

[4]Obviously languages will differ in terms of the range of constructions that they encode with NP juxtaposition. Those exemplified here, however, are fairly typical.

[5]Note that the two apposed nominals come before the auxiliary *gin-amany* here, showing them to jointly belong to an NP constituent since the Wambaya auxiliary must always be the second constituent in the clause (Nordlinger 1998).

(12) *Dathin-a dangka-a niya wumburung-kuru raa-ja wanku-ya*
that-NOM man-NOM 3SG.NOM spear-PROP spear-ACT elasmobranch-MLOC
kulkiji-y.
shark-MLOC
'That man speared a shark with a spear.' (ibid, 244: Kayardild)

(13) *kawuka jardiyali*
bundle fighting.stick
'a bundle of fighting sticks' (ibid, 249: Kayardild)

(14) *Garidi-ni bungmanyi-ni gin-amany yanybi.*
husband.I-ERG old.man.I-ERG 3SG.M.A-P.TWD get
'(Her) old man husband came and got (her).' (Nordlinger, 1998, 133: Wambaya)

(15) *Dathin-a maku-wa bithiin-da bi-l-da warra-j.*
that-NOM woman-NOM man-NOM 3-PL-NOM go-ACT
'Those men and women are going.' (Evans, 1995, 249: Kayardild)

A further type of juxtaposed construction common to Australian languages is the inclusory construction (Singer, 2001, 2005) (also known in the literature as the 'plural pronoun construction' (Schwartz, 1988)), in which a plural pronoun referring to the superset is combined with a subset nominal. In many languages the inclusory construction involves simple juxtaposition of the two elements, as in the following from Kayardild:

(16) *Nga-rr-a kajakaja warra-ja thaa-th.*
1-DU-NOM daddy.NOM go-ACT return-ACT
'Daddy and I will go' (lit. 'We two, including daddy, will go') (Evans 1995:249)

Appositional structures, in which we loosely group the non-coordinated examples above, have received very little attention in the LFG literature and as a consequence the analysis of these constructions, and their potential structural relationship to NP coordination, raises a number of interesting issues. In particular, (i) how are the various juxtaposed constructions related syntactically in these languages?; (ii) how is coordination to be defined in these languages as distinct from other juxtaposed constructions?; (iii) how are all of these juxtaposed constructions to be analysed? It is to these questions that we turn in the remainder of this paper.

4 Analysis of syntactic juxtapositions

In very many cases there appear to be no clear *syntactic* grounds for distinguishing between coordinations (on the one hand) and other (mainly appositional) uses to which syntactic juxtapositions can be put. Case marking patterns and phrase structure constraints (where

these exist) are generally consistent across all such juxtaposed constructions, and indeed all are consistent with the general definitions of coordination in the literature, such as the following:

> An element in construction with a coordinate constituent must be syntactically construable with each conjunct[6] (Wasow)
>
> The term *coordination* refers to syntactic constructions in which two or more units of the same type are combined into a larger unit and still have the same semantic relations with other surrounding elements (Haspelmath, 2004, 34)
>
> A coordination is a construction consisting of two or more members which are equivalent as to grammatical function, and bound together at the same level of structural hierarchy by means of a linking device[7] (Dik, 1968, 25)

The fact that these nominal coordinations and appositions show no *syntactic* distinctions suggests an analysis that treats them as essentially a single type of syntactic construction that can be associated with a range of different semantics. More specifically, we propose an analysis in LFG in which juxtaposed constructions such as those exemplified in (11-16) above are treated as f-structure coordinations as in (10), that is, as involving hybrid f-structures as the value of a single grammatical function.[8] The various constructions may differ at f-structure, as we shall see, in terms of the agreement features of the set (i.e. whether they involve feature resolution or not), and then are further differentiated in the mapping to the semantic structure. Thus, we propose that all of these constructions are licensed by the basic phrase structure schema in (17), with different annotations depending on issues of feature resolution and semantics, as discussed in detail in the following sections. In this schema we use X as a metavariable ranging over the categories N, N' and NP. In other words, the basic schema allows juxtapositions of any of these categories, just as long as the juxtaposed elements are of the same categorial type (NP with NP, N with N, etc.).

(17) $\mathrm{X} \longrightarrow \begin{array}{cc} \mathrm{X} & \mathrm{X} \\ \downarrow \in \uparrow & \downarrow \in \uparrow \end{array}$

4.1 Coordination vs. Apposition

On this view, the f-structure corresponding to the apposition in (14) is as in (18). Apart from the value of the non-distributive (INDEX) features of the set, this f-structure is structurally identical to that associated with the coordination in (9) ((10) repeated as (19)).

[6] Note that this assumes that a coordination is structurally a single constituent, and thus does not allow for discontinuous coordination (cf. §5).

[7] Note that this definition is in fact strictly inapplicable even to our regular coordination examples in that it requires the presence of an overt coordinator.

[8] Of course, an f-structure coordination analysis may not be appropriate for other types of nominal juxtapositions (e.g. possessive and other clearly modificational structures), nor for all types of 'appositional' constructions cross-linguistically. We are focussing here on the constructions exemplified above, particularly on appositive modifier constructions (called appositions in the Australianist literature).

(18) **Apposition:**

$$\begin{bmatrix} \text{INDEX} & \begin{bmatrix} \text{PERS} & 3 \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \left\{ \begin{bmatrix} \text{PRED} & \text{`HUSBAND'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{`OLD.MAN'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

(19) **Coordination:**

$$\begin{bmatrix} \text{INDEX} & \begin{bmatrix} \text{PERS} & 3 \\ \text{NUM} & \text{PL} \end{bmatrix} \\ \left(\begin{bmatrix} \text{PRED} & \text{`GOANNA'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{`KANGAROO'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{DUAL} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix} \right) \end{bmatrix}$$

This analysis directly reflects the fact that there is no visible syntactic distinction within the nominal strings themselves between nominal coordination and nominal apposition. In fact, the nominal phrase in (14) is itself ambiguous between a coordinative and an appositional interpretation, disambiguated only by the verbal morphology. In Wambaya (14) the auxiliary form *gin-amany* '3SG.M.A-P.TWD' determines that the SUBJ is 3SG. If this example meant 'the old man and her husband (they)....' then the finite auxiliary would be encoded with 3DU. Crucially, the formal differences lie only in the agreement features of the set; there is no visible syntactic distinction within the nominal structure itself. Thus, as far as the syntax is concerned, our analysis needs to be able to account for the fact that the same nominal f-structure may sometimes involve feature resolution (i.e. in a coordination structure), and sometimes not (i.e. in an appositional structure).

4.2 Coordinate Meanings

As we have seen, nominal juxtapositions can have coordinate meanings, involving syntactic feature resolution and the construction of a coordinate semantics. For present purposes, we follow Dalrymple and Kaplan (2000) in our analysis of feature resolution but clearly the details of syntactic GEND resolution will differ considerably in a language like Wambaya which distinguishes four genders (e.g. MA, FEM, NEUT, VEG), and exhibit defaults and underspecification in gender agreement. The template for feature resolution in coordinate structures given in (20) simply introduces the annotations proposed by Dalrymple and Ka-

plan (2000) and discussed in §2 above.[9] This template is associated with each constituent in the phrase structure rule, as in (21).

(20) NP-CNJT: $(\downarrow \text{IND PERS}) \subseteq (\uparrow \text{IND PERS})$
$(\downarrow \text{IND GEND}) \subseteq (\uparrow \text{IND GEND})$

(21) X $\longrightarrow$ X $\downarrow \in \uparrow$ @NP-CNJT X $\downarrow \in \uparrow$ @NP-CNJT

As for the semantics of NP coordination, Dalrymple (2001) associates the semantic contribution **g-and** (group-forming *and*) in (22) with the coordinator. The semantics of **g-and** forms a plural individual from two individuals (in the glue, it consumes a meaning of type e and produces a resource which will consume a meaning of type e to produce a meaning of type e). For more than binary coordination, a further semantic contribution **g-and2**, involving the ! (of course) operator, can be used any number of times (including zero), each time adding an individual into the group.

(22) **g-and** λ X. λ Y. { X,Y } :
$(\uparrow \in)_{\sigma<e>} \multimap [(\uparrow \in)_{\sigma<e>} \multimap \uparrow_{\sigma<e>}]$

(23) **g-and2** λ X. λ Y. { X } $\cup$ Y :
$!(\uparrow \in)_{\sigma<e>} \multimap [\uparrow_{\sigma<e>} \multimap \uparrow_{\sigma<e>}]$

(24) *and* $(\uparrow \text{CONJ}) = \text{AND}$
[g-and]
[g-and2]

The situation in our case is a little more complicated, however as there is no coordinator in the structure to associate the semantics of **g-and** with.

Notice also that in languages (such as these) with three number distinctions (singular, dual and plural), it is not possible simply to associate the use of the group-forming semantics with NUM resolution to PL, because the syntactic NUM of a group containing just a pair is DU. For present purposes, which are largely illustrative, we restrict ourselves to binary coordination, and define the NUM resolution as in (25). This captures the generalisation that *either* the overall number is DU (i.e. when two singular nominals are coordinated) *or* (at least) one of the constituents is non-singular, in which case the overall number is PL.

(25) BINARY: $\{(\uparrow \in \text{INDEX NUM}) \neq \text{SG} \wedge (\uparrow \text{INDEX NUM}) = \text{PL}\}$
$\mid (\uparrow \text{INDEX NUM}) = \text{DUAL}$

[9] Templates are a simple and convenient means of naming a collection of f-descriptions. Because templates can call other templates, they can be organised to express linguistic generalisations succinctly. See Dalrymple et al. (2004).

To complete the interpretation of nominal juxtapositions as coordinative, we need to associate the template BINARY and **g-and** with the phrase structure rule in (21) (restricting attention to cases of binary coordination). Since there is no coordinator to associate them with, we arbitrarily associate them with one of the daughter constituents.

(26) X $\longrightarrow$

X	X
$\downarrow \in \uparrow$	$\downarrow \in \uparrow$
@NP-CNJT	@NP-CNJT
@BINARY	
g-and	

Our analysis of the juxtapositions with coordinate semantics is thus analogous to the analysis of (non-juxtaposed) coordinate constructions in other languages (Dalrymple and Kaplan 2001, Dalrymple 2001). In the next section we see how this same general approach can also provide an analysis of appositional juxtapositions.

4.3 Appositional Meanings

In appositional juxtapositions the juxtaposed constituents are co-referential and there is no feature resolution at the level of the set: the features of the set are the same as the features of each of the members. Thus, in our terms, appositional constructions generally involve INDEX sharing between the set and the members of the set, as well as the construction of an appositional semantics.

In order to capture the sharing of INDEX features between the set members and the set itself, we define the appositional template in (27), which is associated with each of the daughter constituents in the appositional phrase structure rule, as in (28). This template ensures that the INDEX features of each daughter constituent are shared with the INDEX features of the set (i.e. a set containing two 3SG daughters will likewise have 3SG INDEX features).

(27) NP-APPOS*:* $(\downarrow \text{IND}) = (\uparrow \text{IND})$

(28) X $\longrightarrow$

X	X
$\downarrow \in \uparrow$	$\downarrow \in \uparrow$
@NP-APPOS	@NP-APPOS

In the interests of clarity, we assume here that all INDEX features in appositional constructions will be shared between the members and the set. This is potentially an oversimplification, since it may well be the case that there will be instances of appositions in which the f-structures may differ in one or more INDEX features despite being descriptions of the same real world entity. A circumstance where this might arise could be where apparent person mismatches are allowed in appositonal structures (e.g. in the English 'us linguists', 'you children'). A further tricky area concerns gender, where a complicating factor in the interpretation of appositional data is the fact that nouns have both INDEX GEND

and CONC GEND features, and these may not match. Well-known cases of 'mismatch' nouns include the Serbo-Croatian collective nouns of the second declension, such as *deca* 'children', which are analysed as FEM.SG CONCORD but NE.PL INDEX by Wechsler and Zlatić (2003). The potential for non-matching between CONCORD and INDEX in GEND complicates the interpretation of putative mismatches in appositional structures in the languages we are concerned with, because of course it may be the case that such examples involve nouns differing in CONCORD GEND but not in INDEX GEND. Other cases of gender mismatch in appositional constructions could possibly come from generic-specific constructions in which hyponyms and hypernyms clearly belong to different gender classes (e.g. VEgetable and NEuter), but we leave investigation of whether this occurs to further research. Should plausible examples emerge, these constructions could be captured by modifying the above analysis in a number of ways. One possibility would be to have only one daughter in the appositional phrase structure rule contribute INDEX features to the set (i.e. be associated with the NP-APPOS template above), with the INDEX features of the other daughter only partially shared, or not shared at all.

Turning now to the semantics of appositional constructions, as a first approximation we take the semantics of appositional juxtapositions to be basically intersective (applying to property-denoting nominal (rather than NP) meanings). One possibility is something comparable to boolean *and* (as in the joint reading of *five linguists and philosophers*), taking two sets of properties and intersecting them (see Dalrymple (2004)):

(29) **b-and** λ X. λ Y. X $\sqcap$ Y

An alternative, which is the one we will follow here, is to model the semantics of apposition on the semantics of nominal modification, as follows:

(30) **appos** λ Q. λ P. λ X. Q(X) $\wedge$ P(X):
$[\,((\uparrow \in)_\sigma \text{ VAR}) \multimap ((\uparrow \in)_\sigma \text{ RESTR})\,] \multimap$
$[\,[((\uparrow \in)_\sigma \text{ VAR}) \multimap ((\uparrow \in)_\sigma \text{ RESTR})\,]$
$\multimap [\,(\uparrow_\sigma \text{ VAR}) \multimap (\uparrow_\sigma \text{ RESTR})\,]\,]$

On the meaning side, this is a function which applies to two nominal ($< e, t >$) meanings and produces an abstraction over a logical conjunction of predications holding of this individual (so it takes two nominal meanings and produces a nominal meaning, where nominal meanings are of type $< e, t >$). On the glue side the meaning constructor consumes one nominal contribution and then the other nominal contribution to produce the meaning of the NP as a whole.

We can therefore complete our analysis of appositional juxtapositions by arbitrarily associating the **appos** semantics with some daughter in the appositional phrase structure rule:

(31) X $\longrightarrow$ X X
$\downarrow \in \uparrow$ $\downarrow \in \uparrow$
@NP-APPOS @NP-APPOS
appos

In order to see how this works, consider the nominal apposition in the Wambaya example (14). The semantics associated with each of the nominals in this construction is given in (32) and (33).

(32) *garidi-ni (*husband.I-ERG*)* λ X. husband(X): ($\uparrow_\sigma$ VAR) $\multimap$ ($\uparrow_\sigma$ RESTR)

(33) *bungmanyi-ni (*old.man.I-ERG*)* λ X. old.man(X): ($\uparrow_\sigma$ VAR) $\multimap$ ($\uparrow_\sigma$ RESTR)

(30) consumes (32) and (33), which results in the following nominal meaning:

(34) *garidi-ni bungmanyi-ni* λ X. old.man(X) $\wedge$ husband(X):
($\uparrow_\sigma$ VAR) $\multimap$ ($\uparrow_\sigma$ RESTR)

Note that in these languages, a bare nominal such as (32) or (33) (or indeed (34)) may be interpereted predicatively, but may also be given a range of NP meanings in context (e.g. 'the boy', 'a boy', 'boys') - pronouns and demonstratives may occur in "determinizing" function but are by no means obligatory in the production of full (referential) NP meanings. In these cases, where there are no demonstratives or pronouns, we take it that additional meaning constructors (not associated with lexical material) must be available to lift nominals into the appropriate range of NP meanings.[10]

To summarise, we can account for the use of syntactic juxtaposition to encode both coordinate and appositional constructions by making two alternative sets of annotations available for the "coordinate" NP rule, (26) and (31), as follows:

- Annotate each dtr @NP-CNJT and some dtr @BINARY and **g-and** ; **OR**
- Annotate each dtr @NP-APPOS and some dtr **appos**

4.4 Other juxtaposed constructions

This analysis also provides a straightforward account of the other juxtaposed constructions discussed in §2, namely generic-specific, part-whole and inclusory constructions. Generic-specific and part-whole constructions are simply appositional-like structures, licensed by (31). This treatment is consistent with Australianist descriptions that treat such constructions as consisting of apposed nominals (e.g. Blake 1983, Evans 1995, Heath 1978, etc.).

The f-structure corresponding to the juxtaposed (generic-specific) construction in (35) is given in (36).[11] Standard nominal lexical entries along the lines of (32) for *wanku-ya* (elasmobranch-MLOC) and *kulkiji-y* (shark-MLOC) combine with the appositional meaning constructor to give (37):

[10] Our account of the semantics of apposition *per se*, on the other hand, must be extended to deal with examples in which it is clear that full NPs (e.g. of type e) occur in apposition.

[11] Each member of the set in (36) is marked for modal case (which contributes information to the sentential f-structure).

(35) *Dathin-a dangka-a niya wumburung-kuru raa-ja wanku-ya*
that-NOM man-NOM 3SG.NOM spear-PROP spear-ACT elasmobranch-MLOC
kulkiji-y.
shark-MLOC
'That man speared a shark with a spear.' (Evans, 1995, 244: Kayardild)

(36)
$$\left[\begin{array}{l} \text{INDEX} \quad \left[\begin{array}{ll}\text{PERS} & 3\\ \text{NUM} & \text{SG}\end{array}\right] \\ \left\{\begin{array}{l}\left[\begin{array}{ll}\text{PRED} & \text{'ELASMOBRANCH'}\\ \text{INDEX} & \left[\begin{array}{ll}\text{NUM} & \text{SG}\\ \text{PERS} & 3\end{array}\right]\end{array}\right] \\ \left[\begin{array}{ll}\text{PRED} & \text{'SHARK'}\\ \text{INDEX} & \left[\begin{array}{ll}\text{NUM} & \text{SG}\\ \text{PERS} & 3\end{array}\right]\end{array}\right]\end{array}\right\}\end{array}\right]$$

(37) *wanku-ya kulkiji-y* (elasmobranch-MLOC shark-MLOC)
λ X. elasmobranch-fish(X) $\wedge$ shark(X): ($\uparrow_\sigma$ VAR) $\multimap$ ($\uparrow_\sigma$ RESTR)

Inclusory constructions are a particularly interesting case as the features of the set overall are identical to the features of one member of the set, but not the other. Consider the following example:

(38) *Nga-rr-a kajakaja warra-ja thaa-th.*
1-DU-NOM daddyNOM go-ACT return-ACT
'Daddy and I will go' (lit. 'We two, including daddy, will go') (Evans, 1995, 249: Kayardild)

In these constructions a pronominal referring to the superset (here 'we two') is juxtaposed with a nominal representing just one member of the set (here 'daddy') (see Singer 2001 for discussion). The INDEX features of the whole are those corresponding to the INDEX features of the pronominal, in which the features of the single member must be included. Thus, inclusory constructions are a composite of the coordination and appositional schemas presented in (26) and (31) above. The constituent corresponding to the superset pronominal carries the appositional template (specifying that its INDEX features are identical to the INDEX features of the whole) and the constituent corresponding to the single member carries the coordination template (specifying that its INDEX features must be a subset of the INDEX features of the whole).

(39) NP $\longrightarrow$ NP , NP
$\downarrow \in \uparrow$ $\downarrow \in \uparrow$
@NP-APPOS @NP-CNJT

(40) **inclusory**:

$$\begin{bmatrix} \text{INDEX} & \begin{bmatrix} \text{PERS} & 1 \\ \text{NUM} & \text{DUAL} \end{bmatrix} \\ \left\{ \begin{bmatrix} \text{PRED} & \text{'DADDY'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix}, \begin{bmatrix} \text{PRED} & \text{'PRO'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{DUAL} \\ \text{PERS} & 1 \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

The semantics of the inclusory is that one member denotes a group and the other member of the set contributes a further restriction over the group by providing a specification about a member of the group.

4.5 Summary of analysis

The range of juxtaposed NP constructions in Australian languages can be accounted for relatively simply with an account in which nominal-nominal sequences have the same essential f-structure, but correspond to 3 different feature resolution patterns, as in (39)-(41), and map onto a range of different semantics correlated with these three different patterns.

(41) **coordination – X ⊇ Y, Z**

$$\begin{bmatrix} \text{INDEX} & [\text{X}] \\ \left\{ \begin{bmatrix} \text{INDEX} & [\text{Y}] \end{bmatrix}, \begin{bmatrix} \text{INDEX} & [\text{Z}] \end{bmatrix} \right\} \end{bmatrix}$$

(42) **apposition – X = Y, Z**

$$\begin{bmatrix} \text{INDEX} & [\text{X}] \\ \left\{ \begin{bmatrix} \text{INDEX} & [\text{Y}] \end{bmatrix}, \begin{bmatrix} \text{INDEX} & [\text{Z}] \end{bmatrix} \right\} \end{bmatrix}$$

(43) **inclusory – X = Y ⊇ Z**

$$\begin{bmatrix} \text{INDEX} & [\text{X}] \\ \left\{ \begin{bmatrix} \text{INDEX} & [\text{Y}] \end{bmatrix}, \begin{bmatrix} \text{INDEX} & [\text{Z}] \end{bmatrix} \right\} \end{bmatrix}$$

This approach exploits the flexible architecture of LFG to account for the fact that these constructions are structurally similar – all consisting of juxtaposed nominals in the c-structure, and hybrid structures in the f-structure – yet semantically distinct. This seems to capture the intuition that appositions are closely related to coordinations, while still permitting us to capture the (mainly semantic) difference between coordination and apposition.

5 Discontinuity

Of course, these being Australian languages, all of the structures can also be discontinuous. The following examples illustrate discontinuous coordination constructions (44), generic-specific constructions (45), and inclusory constructions (46):

(44) *Ngul ngay kirk kempthe kal-m thul=yuk*
then 1SG(ERG) spear(ACC) apart carry-P.IPFV woomera(ACC)
'I used to carry spears and woomeras separately' (Kuuk Thaayorre, Gaby 2006)

(45) *Ngayika ati-ntji ari-li thuwarr-ku.*
I meat-DAT eat-APASS snake-DAT
'I'm eating snake.' (Blake, 2001, 419, ex 8: Kalkatungu)

(46) *Wey, ngali yancm ngan waanharr iipal*
hey 1DU:EXCLNOM go:P.IPFV relative e.brother from.there
'Hey, my brother and I have come here' (Kuuk Thaayorre, Foote 1977, cited in Gaby 2006)

While we do not have the space for detailed discussion here, the occurrence of discontinuous coordinations and appositions is not problematic. Our analysis will extend straightforwardly to these cases on the (rather standard) assumption that each daughter constituent in the phrase structure rule is optional, thereby allowing for each one to occur alone in an NP in the c-structure, and be unified into a hybrid structure at f-structure.[12]

6 Conclusion and broader implications

The flexible architecture of LFG provides a unified syntactic account of a range of juxtaposed nominal constructions common to Australian languages, while still capturing their semantic differences. In this paper we have shown how the use of hybrid f-structures can be extended beyond true (semantically) coordinated constructions to generic-specific, part-whole and other types of appositional constructions also, making a distinction between syntactic coordination (hybrid structures) and semantic coordination (corresponding to feature resolution and coordinate semantics). This approach has a number of broader implications:

[12]This will, of course, raise some technical issues such as ensuring that the relevant GF is a set, however such issues seem resolvable, and so we do not consider them to be an impediment to the analysis in principle.

(i) **syntactic vs. semantic coordination:**
This distinction between syntactic and semantic coordination allows for constructions that are both syntactically and semantically coordinated (i.e. true coordinations), semantically coordinated without being a coordinated structure in the syntax (i.e. Nyangumarta compounds (47)); and syntactically coordinated without being instances of semantic coordination (i.e. the appositional-like structures discussed above).[13]

(47) *Pipi-japartu-lu partany kalku-rnikinyi pulu.*
mother-father-ERG child keep-IMPF 3DU.SUB
The mother and the father (the parents) looked after the child (Nyangumarta, Sharp 2004: 312 (9.50))

(ii) **boolean coordination:**
So called boolean coordination, such as the English *my friend and colleague*, *the president and commander-in-chief*, is no longer an outlier construction, but can now be seen in the context of a wider set of data. On our view, boolean coordination can be considered to be essentially similar to the appositional juxtapositions we discuss, the only difference being the presence of an overt coordinator. It is thus syntactically coordinated (having a hybrid f-structure), but semantically appositional (having no feature resolution and appositional semantics).

(iii) **application beyond Australian languages;**
One of the implications of our analysis of Australian nominal-nominal constructions is that appositions are syntactically the same as coordinations – the only difference being that there is resolution of features in the f-structure with the latter but not the former. Similar suggestions have been made in the literature, outside of the Australianist and LFG contexts (Quirk et al., 1985; Koster, 2000; de Vries, 2006; Van Eynde, 2005).

While it remains for further research to determine the extent to which our analysis can be applied to languages outside of the Australian context, it provides a way to capture this association between apposition and coordination in LFG terms.

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[13] cf. Culicover and Jackendoff (1997, 2005) and Yuasa and Sadock (2002) who also discuss mismatches between 'syntactic' and 'semantic' coordination, although, in LFG terms their data is relevant to mismatches between c-structure and f-structure, rather than between f-structure and semantic structure, which is our concern here.

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