Apposition and Coordination in Australian Languages: An LFG Analysis

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Abstract

It is well known that Australian languages make heavy use of nominal apposition. However there is little discussion in the theoretical literature of how such appositional structures should be analysed syntactically. We present a range of data from Australian languages illustrating how multiple nominals share a single gramamtical function within the clause. We argue that such constructions should be treated as set-valued grammatical functions in LFG. Sets as values for functions are well-established in LFG and are used in the representation of adjuncts, and also in the representation of coordination. In many Australian languages, coordination is expressed asyndetically, that is, by nominal juxtaposition with no overt coordinator at all. We argue that the syntactic similarity of all of these juxtaposed constructions (coordinations and appositions alike) motivates an analysis in which they are treated similarly in the syntax, but suitably distinguished in the semantics. We show how this can be achieved within LFG, providing a unified treatment of juxtaposition in Australian languages, and demonstrating the strength of the modular Lexical-Functional Grammar approach.

1 Introduction

Australian languages are characterised by a prevalence of appositional (juxtaposed) NP structures expressing a wide range of construction types, including pronoun-noun appositions, part-whole constructions, generic-specific constructions and inclusory constructions (e.g. Blake (1987)).[1] Such appositional nominal structures in Australian languages have received very little attention in the theoretical literature. In fact, there is relatively little discussion of apposition in the theoretical literature at all (notable exceptions being de Vries (2006); Van Eynde (2005)), despite the fact that apposition in European languages has received a reasonable amount of descriptive attention (see for example, Quirk et al. (1985); Meyer (1992); Acuña-Fariña (1999)). In this paper we seek to redress this imbalance by providing an analysis of NP appositions in Australian languages in Lexical-Functional Grammar (LFG), which exploits the flexible architecture of LFG to capture the syntactic similarities of the various juxtaposed NP constructions while allowing them to be suitably distinguished in the mapping to the semantics.

Australian languages also commonly use juxtaposition to express NP coordination, meaning that there is often little difference in the surface syntax between apposed and coordinated NPs. Thus, we argue that these construction types – both apposition and coordination alike

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– should be treated similarly in the syntax but differentiated in the mapping to the semantics; an approach that is possible using the modular framework of LFG. Our analysis builds on the standard LFG approach to coordination (Kaplan and Maxwell, 1988; Dalrymple and Kaplan, 2000; Dalrymple, 2001) in which coordinated NPs are treated as set-valued grammatical functions at f-structure. We argue that NP appositions, in which multiple nominals in juxtaposition share a single grammatical function in the clause, should likewise be treated as sets at f-structure, providing a unified analysis of a range of NP juxtapositions common to many Australian languages. The differences between the various appositional and coordinative constructions are then captured in the mapping to the semantics, which we discuss in some detail in §6. Our approach not only provides a natural and unified account of NP juxtaposition in Australian languages, but suggests an approach to apposition more generally in which apposed constituents are treated as syntactically analogous to coordinated constituents, capturing the syntactic similarities between the construction types that have been noted in the literature on apposition in other languages such as English (Quirk et al., 1985; Meyer, 1992; de Vries, 2006).

2 Appositional constructions

The following exemplify a range of different interpretations associated with juxtaposed nominal structures in Australian languages, all of which are frequently analysed as appositional constructions in Australian language descriptions (e.g. Blake (1979, 1983, 1987, 2001); Evans (1995); Heath (1978, 1984)). These constructions all have in common the fact that they involve the juxtaposition of nominal elements having both the same referent and the same grammatical function, as evidenced by the fact that the nominals involved are all inflected for the same case feature. Furthermore, in all of these cases there is little evidence that one or other nominal can be identified as the syntactic head of the construction. Obviously languages will differ in terms of the range of constructions that they encode with NP juxtaposition, but those exemplified here are fairly typical. In (1) we see a generic-specific construction, with the generic noun 'elasmobranch' juxtaposed to the specific noun 'shark'; (2) exemplifies a part-whole construction with the whole nominal ('bundle') juxtaposed to the part nominal ('fighting stick');[2] and (3) and (4) illustrate two variants of straightforward appositional constructions – a nominal-nominal appositional construction in (3) in which 'old man' is apposed to 'husband' in subject function,[3] and a nominal-pronominal appositional construction in (4) in which the coordinated NP 'those men and women' is apposed to the coreferential third person plural pronoun *bi-l-da*.[4]

[2]These appositional nominal structures are distinguished from part-whole possessive constructions, which are also often expressed with juxtaposition of nominals, but which clearly constitute a head-modifier construction.

[3]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 1998a).

[4]The abbreviations used in examples are: A 'transitive subject'; ABS 'absolutive'; ACC 'accusative'; ACT 'actual'; APASS 'antipassive'; ASS 'associative'; CON 'continous'; DAT 'dative'; DU 'dual'; ERG 'ergative'; EXC 'exclusive'; EX 'exclusive'; FUT 'future'; IMPF 'imperfective aspect'; INC 'inclusive'; INCH 'inchoative'; LOC 'locative'; MLOC 'modal locative'; M 'masculine'; NEUT 'neuter'; NM 'nominaliser'; NOM 'nominative'; NON-

(1) *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)

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

(3) *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, 1998a, 133: Wambaya)

(4) *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)

Appositional nominal structures are extremely common in Australian languages, as noted by Blake (1987: 77) who states that juxtaposed nominals referring to the same entity "may be in parallel, each contracting its own relationship with the verb." Indeed, some researchers have gone so far as to claim for particular Australian languages that they have no noun phrases at all, with all nominals existing in apposition. This is the analysis given by Blake (1983) for Kalkatungu, for example; and by Heath (1978) for Ngandi in which "noun phrases which have more than one constituent are typically formed by apposition" (p. 52). Even languages with clear NP structures for head-modifier relations have a range of appositional nominal constructions. For example, Evans (1995: 247) in discussing the Kayardild constructions exemplified in (1) and (2) above, states that "there are no syntactic reasons for considering one nominal to be the head, and it is better to treat them as apposed nominals".

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, 1988a)), 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:

(5) *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: Kayardild)

SING 'non-singular'; NP 'non-past'; P 'past'; PL 'plural'; PRES 'present'; PROP 'proprietive'; RECIP 'reciprocal'; SG 'singular'; SUB 'subject'; TWD 'directions towards'; VE 'vegetable'.

Although inclusory constructions have much in common with the appositional constructions exemplified in (1) to (4) above, they differ in that the features of the whole construction are those of only one of the constituent parts – namely the superset pronoun. We return to a discussion of inclusory constructions and their relationship to appositional juxtapositions in §7.

Returning to the appositional structures which are the focus of this section, we can characterise them as nominal constructions in which one or more nominal elements having the same (or similar) referent serve together as a single argument, with no clear evidence of syntactic dependency or subordination. Appositions are therefore syntactically similar to coordinations, differing only in the semantic requirement that appositional elements have similar reference, as reflected in the following definitions (Crystal 1997):

> **apposition:** A traditional term retained in some models of GRAMMATICAL description for a sequence of units which are CONSTITUENTS at the same grammatical LEVEL, and which have an identity or similarity of REFERENCE (p. 24)
>
> **coordination:** A term in GRAMMATICAL analysis to refer to the process or result of linking LINGUISTIC UNITS which are usually of equivalent SYNTACTIC status. (p. 93)

In fact, in many of these Australian languages NP coordination is encoded using exactly the same juxtaposed structure, as we shall now see.

3 Coordination by Juxtaposition

In very many Australian languages nominal coordination is also expressed by juxtaposition of nominals, as in (6) - (9) below. Coordination in these languages is therefore asyndetic, that is, does not involve a coordinating affix, particle or word.

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

(7) *Gaj-ba ngurru manganyma yangaji.*
eat-FUT 1PL.INC(NP) tucker.III(ACC) meat.I(ACC)
'Let's eat the bread and meat.' (Nordlinger, 1998a, 257: Wambaya)

(8) *Ngayirni babi-rni ngiji-nginyi-nu kujkarrana yaminju-nu, nyu-rruku nyinawarra.*
1SG.ERG older.brother-ERG see-1DL.EXC-did two(M) shooting.star-did 2SG-went this.way
My brother and I saw two shooting stars when you'd gone. (Pensalfini, 2003, 178: Jingulu)

(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: Nyangumarta)

The juxtaposed constructions in these examples are distinguished from appositional nominals as exemplified in §2 only by virtue of the fact that the two nominals do not have the same referent. In some examples, this is reflected in the verbal agreement morphology which agrees with the resolved features of plural (9) or dual (8). Compare these with the Wambaya appositional construction, repeated in (10) below, in which the auxiliary shows singular number agreement (*gin-amany*). If the auxiliary had dual number agreement here (*gurl-amany*), the NP would be interpreted as a coordination ('(her) husband and the old man').

(10) *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, 1998a, 133: Wambaya)

Apart from this semantic difference, such asyndetic coordinations appear to be structurally identical to the appositional constructions discussed in §2, suggesting that all of these juxtaposed constructions – both appositions and coordinations – should be treated as having the same syntactic structure. In fact, the observation that apposition and coordination are syntactically similar is found elsewhere in the literature, for example by Quirk et. al. (1985), de Vries (2006) and Meyer (1992), who observes that "while there are clear semantic differences between the two relations [i.e. apposition and coordination – LS & RN], syntactically the relations are quite similar" (p. 45). This suggests that what is appropriate for appositional structures is an analysis as a multiply-headed structure in the syntax, in which each element is independently fulfilling the same grammatical function in parallel, similar to that usually assumed for coordination. In §5 we show how this can be captured in Lexical Functional Grammar (LFG) by extending the standard analysis of coordination to account for the appositional NP structures in Australian languages as well, providing both a natural account of these constructions and a unified account of juxtaposition in Australian languages. First, however, we review the standard treatment of coordination in LFG and show how it can be extended to account for the asyndetic coordination structure exemplified above.

4 LFG Analysis of Coordination

LFG is a lexicalist constraint-based syntactic framework which posits two co-present levels of syntactic representation: c-structure, which encodes phrase structural relations (of precedence and dominance) between elements, and f-structure, which represents a level of internal

syntactic structure based on grammatical functions, modelling predicate argument relations. C-structures are represented by phrase structure trees of a familiar sort and f-structures are represented by attribute value matrices. C-structures and f-structures (corresponding to a given string) are interrelated by means of a mapping function ϕ, which places elements of c-structure (in the domain) in correspondence with f-structures. The mapping is expressed by means of equations associated with lexical items and phrase structure nodes. The relation between c-structure and f-structure is many-to-one and onto (f-structures can arise which are not related to specific c-structure nodes, and more than one c-structure node can correspond to a single f-structure). Of particular interest is the f-structure which is the minimal structure satisfying a collection of constraints associated with the (c-structure) of a given utterance (the minimal model): this is the f-structure associated with that utterance. F-structures are subject to well-formedness constraints, notably those of *completeness* and *coherence*, which ensure that all and only the arguments of a predicate are present (as values of subcategorisable grammatical functions) in the f-structure projected by a predicate. For comprehensive introductions to the formalism see Bresnan (2001); Dalrymple (2001); Falk (2001).

The framework provides a highly modular and flexible framework for syntactic description: in particular it has proved to be sufficiently flexible to provide an appropriate tool for modelling the syntax of widely divergent languages ranging from the highly configurational to the radically non-configurational. A significant body of work has developed LFG analyses of phenomena in Australian Aboriginal languages (Simpson and Bresnan, 1983; Simpson, 1991; Austin and Bresnan, 1996; Nordlinger, 1998b).

A simple sentence such as (11) would have the f-structure (12). F-structures are simple attribute-value matrixes, where values can be atomic or complex. A particular feature of LFG is the use of set-valued attributes (that is, the value of the attribute is a *set* of f-structures), as in the case of the grammatical function ADJunct in (12), alongside atomic and complex valued features (TENSE and SUBJ respectively in (12)).

(11) Kim wept yesterday.

(12)
$$\begin{bmatrix} \text{SUBJ} & \left[\text{PRED} \quad \text{`KIM'}\right] \\ \text{ADJ} & \left\{\left[\text{PRED} \quad \text{`YESTERDAY'}\right]\right\} \\ \text{TENSE} & \text{PAST} \\ \text{PRED} & \text{`WEEP}< \text{SUBJ} >\text{'} \end{bmatrix}$$

When a property is asserted to hold of a set, how it behaves will depend on the nature of the property: the majority of properties are *distributive* and such a feature is an attribute of every member of the set. The grammatical functions are distributive, thus *Kim* is the SUBJ of both the f-structure of *shout* and of the f-structure of *cry* in the (set of) f-structures for *Kim shouted and cried*. As we will see below, agreement features and the CONJ feature are non-distributive: when a feature is non-distributive it and its value are a property of the set as a whole.

A standard analysis of NP coordination in LFG (Dalrymple and Kaplan, 2000; Dalrymple, 2001) assumes a c-structure coordination schema along the lines of (13) in which each coordinand is defined as belonging to a set-valued f-structure by virtue of the annotation $\downarrow \in \uparrow$.[5]

(13)
$$\begin{array}{lllll} \text{NP} \rightarrow & \text{NP} & \text{CONJ} & \text{NP} \\ & \downarrow \in \uparrow & & \downarrow \in \uparrow \end{array}$$

The representation of a coordinate structure involves a hybrid object, that is, a set which additionally may itself have properties alongside the elements or members of the set. Consider the representation of (14), given in (15):

(14) John and I met.

(15)
$$\left[\begin{array}{ll} \text{PRED} & \text{'MET<SUBJ>'} \\ \text{SUBJ} & \textit{ji:} \left[\begin{array}{l} \left\{\begin{array}{l} \textit{j:} \left[\begin{array}{ll} \text{PRED} & \text{'JOHN'} \\ \text{INDEX} & \left[\begin{array}{ll} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{array}\right] \end{array}\right] \\ \textit{i:} \left[\begin{array}{ll} \text{PRED} & \text{'PRO'} \\ \text{INDEX} & \left[\begin{array}{ll} \text{NUM} & \text{SG} \\ \text{PERS} & 1 \end{array}\right] \end{array}\right] \end{array}\right\} \\ \text{CONJ} \quad \text{AND} \\ \text{INDEX} \quad \left[\begin{array}{ll} \text{PERS} & 1 \\ \text{NUM} & \text{PL} \end{array}\right] \end{array}\right] \end{array}\right]$$

In (15), each conjunct contributes an f-structure to the set of f-structures which is the value of the SUBJ attribute (labelled *j* and *i* in (15)). Additionally, the SUBJ (labelled *ji*) has some features which express properties of the set as a whole - in this example, the feature CONJ with the value AND and the INDEX feature which expresses the PNG agreement features of the coordinate structure as a whole (as noted above, agreement features are taken to be non-distributive). A common pattern of agreement with coordinate NPs involves syntactic resolution, whereby the agreement features of all the conjuncts are taken into account in 'calculating' the agreement features of the coordinate structure as a whole. Dalrymple and Kaplan (2000) develop an approach to syntactic feature resolution using set valued agreement features and the simple operation of set union. Thus for example, if PERS features are represented as shown in (16), set union gives the standard resolution pattern for this feature. Features such as CONJ and INDEX

[5]This is an instance of a more general coordination scheme which combines like constituents, phrasal or lexical.

are non-distributive (i.e. resolving) while most features, including grammatical functions such as SUBJ and OBJ, as already noted, are distributive. [6]

(16) $\{$S,H$\}$ (1ST) $\cup$ $\{$H$\}$ (2ND) = $\{$S,H$\}$ (1ST)
$\{$S,H$\}$ (1ST) $\cup$ $\{\}$ (3RD) = $\{$S,H$\}$ (1ST)
$\{$H$\}$ (2ND) $\cup$ $\{\}$ (3RD) = $\{$H$\}$ (2ND)
$\{\}$ (3RD) $\cup$ $\{\}$ (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):

(17) $\{$M$\}$ (MASC) $\cup$ $\{$M$\}$ (MASC) = $\{$M$\}$ (MASC)
$\{$M$\}$ (MASC) $\cup$ $\{\}$ (FEM) = $\{$M$\}$ (MASC)
$\{\}$ (FEM) $\cup$ $\{\}$ (FEM) = $\{\}$ (FEM)

As shown in (18), 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 (in the following, IND abbreviates INDEX).[7]

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

Resolution of the NUM feature, on the other hand, is not purely syntactic, as shown by the mimimally contrasting examples in (19), to which we return briefly in §8.

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

In LFG it is possible to associate a collection of f-descriptions (or equations) with a name in a template definition. The rule schema can then call the template. This simple and convenient abbreviatory device has a number of useful properties. For example, because templates can call other templates, they can be organised to express linguistic generalisations succinctly (see Dalrymple et al. (2004) for further discussion). The PERS and GEND equations for NP coordination can be expressed in a template:

[6] Distributive features are defined as follows:
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)

[7] The original formulation of syntactic resolution in Dalrymple and Kaplan (2000) does not refer to INDEX but simply to the individual PERS and GEND agreement features. Since then, a distinction between two sets of agreement features, INDEX and CONCORD has been postulated, see King and Dalrymple (2004), and we have updated the treatment of syntactic resolution here to be consistent with this later work.

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

We can therefore represent (18) more simply as in (21), in which each NP has been associated with the coordination template in (20):

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

4.1 Asyndetic Coordination

As we saw in §3, NP coordination in Australian languages is frequently encoded by juxtaposition, without any explicit marker of coordination. It seems reasonable to assume that such coordinate structures receive precisely the same syntactic treatment as (14) above, so that they differ only in the presence (or absence) of a coordinator. This suggests the c-structure schema in (22) for nominal coordination. In (22) X is a categorial metavariable ranging over N and NP,[8] otherwise it differs from the standard schema in (13) above only in lacking a CONJ feature. We defer full discussion of the agreement constraints (for the non-distributive INDEX features) to §6, but assume for the moment that the agreement template NP-CNJT is associated with each daughter node, as in (21).

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

The f-structure corresponding to the coordinated subject in (9) (repeated here) is then that in (24), with resolved INDEX features but no CONJ feature in the outer f-structure.

(23) *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: Nyangumarta)

[8] It is often impossible to tell whether coordination has taken place at the phrasal or lexical level in some of the data we have, and both are certainly possible. In some cases, the presence of a demonstrative will sometimes make clear the level at which elements are juxtaposed, but in general, 'bare' Ns can have in any case have referential NP meanings and constitute a full NP on their own.

(24)
$$\begin{bmatrix} \text{INDEX} & \begin{bmatrix} \text{PERS} & 3 \\ \text{NUM} & \text{PL} \end{bmatrix} \\ \left\{ \begin{bmatrix} \text{PRED} & \text{`GOANNA'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix} \right. \\ \left. \begin{bmatrix} \text{PRED} & \text{`KANGAROO'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{DUAL} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

Another interesting feature of NP coordination in Australian languages, consistent with the freedom of word order often characteristic of these languages, is that coordination structures can be discontinuous, as in the following examples. That these are truly coordinations (and not afterthoughts, for example) is readily established by such things as discourse context (Blake, 2001) and the fact that the verb shows resolved agreement (as in (25)).

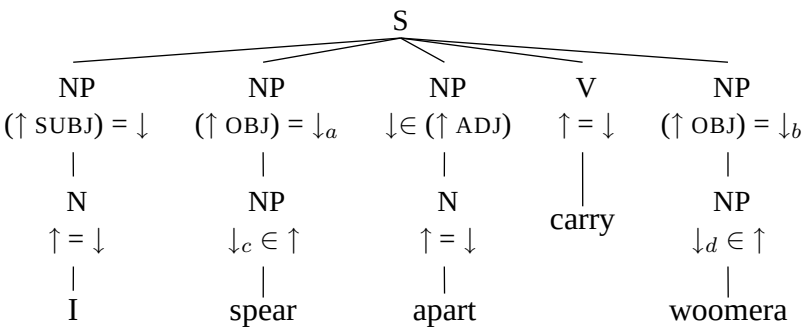
(25) *Kintja-(ng)ku=yana intji-mi-ngi-yu ntiya-(ng)ku tjipa-yi kurlayingu-thu.*
female-ERG=and pelt-FUT-me-they.DU stone-ERG this-ERG male-ERG
'The girl and boy will both pelt me with stones.' (Blake, 2001, 423: Kalkatungu)

(26) *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' (Gaby, 2006, 320: Kuuk Thaayorre)

Our analysis will combine straightforwardly with the standard approach to discontinuity and non-configurationality in LFG to account for these cases. In LFG c-structure nodes are generally optional – by the Principle of Economy, only those nodes which are motivated by overt lexical material (or by some semantic requirement) are present (Bresnan, 2001).

In an example like (26) the two parts of the coordinate structure appear separated by the verb and its modifier: each is represented at c-structure as a coordinate structure with just one daughter present (27).

(27)



In non-configurational structures, the grammatical functions to be assigned to an element of c-structure are not identified in configurational terms but by morphological means. In the example at hand, it is the case marking on the nominals which indicates the SUBJ (marked ERG) and the (discontinuous) OBJ (marked ACC). Since in principle, a wide range of different annotations might be compatible with a string of categories we assume NP under S are freely annotated (↑ GF) = ↓where GF is a meta-variable over the relevant set of grammatical functions. It is the case markers which identify which grammatical function a nominal element maps to (Simpson, 1991; Austin and Bresnan, 1996; Nordlinger, 1998c).

The two ACC-marked NPs under S will both independently co-specify the OBJ f-structure (as shown by the labels *a* and *b* in (27), and contribute elements to the (coordinate) set.

(28)
$$\begin{bmatrix} \text{PRED} & \text{`CARRY<SUBJ, OBJ>'} \\ \text{ADJ} & \{[\,\text{PRED} \quad \text{APART}\,]\} \\ \text{OBJ} & a, b: \begin{bmatrix} \left\{ \begin{array}{l} c: \begin{bmatrix} \text{PRED} & \text{`SPEAR'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix} \\ d: \begin{bmatrix} \text{PRED} & \text{`WOOMERA'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix} \end{array} \right\} \\ \text{INDEX} \quad \begin{bmatrix} \text{PERS} & 3 \\ \text{NUM} & \text{PL} \end{bmatrix} \end{bmatrix} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`PRO'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 1 \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

If we choose to associate some other annotation with the ACC marked NPs (treating one or both of them as contributing the whole OBJ function, for example), no complete and coherent f-structure would be produced. Our analysis of asyndetic coordination thus extends to account straightforwardly for the possibility of discontinuous coordinations in these languages.

5 Analysis of Apposition

Our proposal is that appositional nominal structures should be treated as syntactically identical to coordinations – namely, as hybrid structures at f-structure – with the differences between them captured in the mapping to the semantics. Representation as members of a set directly captures the intuition about appositional structures: that they are co-heads, and do not stand

in a syntactic dependency relation with one another. Furthermore, the fact that both coordinations and appositions are treated similarly in the syntax captures the structural similarities between them that have been observed in the literature (e.g. Quirk et al (1985), Meyer(1992), de Vries(2006)). 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.

On this view, the f-structure corresponding to the apposition in (3), repeated in (3), is as in (30). Apart from the value of the non-distributive (INDEX) features of the set (which we discuss below), the f-structure in (30) is structurally identical to that associated with the coordination in (9) ((24) repeated as (31)).

(29) *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, 1998a, 133: Wambaya)

(30) **Apposition:**

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

(31) **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.[9] In fact,

[9]Note that we are concerned here only with the lack of *syntactic* differences. There may well be intonational or other differences between the two construction types.

as discussed in §2 above, the nominal phrase in (29) is itself ambiguous between a coordinative and an appositional interpretation, disambiguated only by the verbal morphology. 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).

Thus, we propose that both appositional and coordinative constructions are licensed by the basic phrase structure schema in (32), with different annotations depending on issues of feature resolution and semantics, as discussed in detail in the following section. Appositional and coordinate structures differ syntactically, on this view, purely in terms of the overall agreement features of the structure as a whole. Structurally, they are identical.

(32) $\mathrm{X} \longrightarrow \underset{\downarrow \in \uparrow}{\mathrm{X}} \quad , \quad \underset{\downarrow \in \uparrow}{\mathrm{X}}$

Finally, note that all of the apposition types (generic-specfic, standard appositional, part-whole construction) can be also discontinuous, as exemplified with the generic-specific construction in (33).

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

This will follow directly from the analysis of discontinuous coordinate constructions discussed in §4 above. Namely we assume that each element in the c-structure rule is optional, under the Principle of Economy of Expression (Bresnan, 2001, 91), thereby allowing each nominal to constitute an NP on its own in the c-structure, while still contributing to a set at f-structure.

6 Computing Meanings: Semantic Composition

6.1 Coordinate Meanings

As we have seen, nominal juxtapositions can have coordinate meanings, involving syntactic feature resolution and the construction of a coordinate semantics. Coordinate agreement can be captured in the template (20), repeated below as (34), following Dalrymple and Kaplan (2000), which will suffice for present purposes as our focus is not on the details of agreement

itself.[10] This template is associated with each constituent in the phrase structure rule, as in (35), where we have coordinate readings.

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

(35) $\text{X} \longrightarrow \underset{\substack{\downarrow \in \uparrow \\ @\text{NP-CNJT}}}{\text{X}} , \underset{\substack{\downarrow \in \uparrow \\ @\text{NP-CNJT}}}{\text{X}}$

We now turn to the semantics, and in particular to semantic composition, that is, how meanings are associated with (and derived from) the syntactic structures we are discussing. It is generally assumed in LFG that semantic composition involves reference to f-structures, that is, to representations of syntactic predicate-argument structure, rather than c-structures. Thus despite the widely varying c-structures that languages have, their semantics is largely invariant, in that the same sorts of meanings are encoded by a diverse range of external syntactic structures. [11]

The predominant approach to semantic composition in LFG, which we adopt here, uses linear logic for meaning assembly. The meanings themselves will be represented as simple predicate logic expressions. These can be viewed as abbreviatory shorthand for more elaborate meaning expressions. Our focus here is primarily on the process of meaning assembly, that is, how meanings are associated with syntactic structures, and in particular on the syntax-semantics interface.

In the glue (linear logic) theory of semantic composition instructions for combining meanings are stated as premises in a logical deduction. The order of composition is therefore determined only as the logic itself determines it (and thus details of syntactic structure, such as the phrasal composition, are not important). A crucial aspect of the use of glue, or linear logic, for meaning assembly is its resource sensitivity: once a premise is used, it is used up and no longer available for subsequent steps in the deduction. The approach is therefore motivated by the observed resource sensitivity of natural language interpretation. A highly accessible introduction to meaning composition in LFG is provided by Dalrymple (2001, chapter 9), on which this brief outline is based. In this approach meaning constructors are associated primarily with lexical items (though they can also be associated with phrase structure nodes in rules).

Meaning constructors have two parts: they are made up of a meaning on the left hand side and a logical formula over semantic structures corresponding to that meaning on the right

[10] Many Australian languages distinguish four or more genders (e.g. MA, FEM, NEUT, VEG) and exhibit defaults and underspecification in gender agreement, and thus it is likely that several interesting issues will arise in the formulation of the details of gender resolution and gender agreement in such languages. For an approach to gender using complex GEND features rather than set-valued features, see Dalrymple et al. (2007).

[11] Of course this is not to deny that other sources of linguistic information, or other types of linguistic structure, are relevant to the process of semantic composition and interpretation. The modular correspondence-based architecture of LFG allows non-syntactic levels of representation such as prosodic structure and information structure (which models discourse relations) to provide important information guiding semantic interpretation. Constraints arising through multiple projections may combine to determine the meaning of a given utterance.

hand side (semantic structures are related to f-structures by the projection σ). Consider as an example the meaning constructor associated with the lexical entry for *yawned* given in Dalrymple (2001, 233) and shown in (36).

(36) *yawned*, V: $(\uparrow \text{PRED}) = \text{`YAWN} < \text{SUBJ} > \text{'}$
$\lambda X.yawn(X) : (\uparrow \text{SUBJ})_\sigma \multimap \uparrow_\sigma$

The meaning side of the constructor in (36) gives the meaning of *yawn* as one-place predicate (of course, other more complex meanings can be substituted for FOPL expressions if required). Meaning expressions are typed (so that the constant *Kim*, for example, is of type *e*): type information will determine how meaning expressions combine with others. The glue side uses linear implication: ($\multimap$) is an implication which can be read as saying that if the meaning resource for the SUBJ is available then it can be consumed to produce the meaning of the sentence.[12] Finally it is standard practice to introduce labels as names of meaning constructors to ease reference to them, a practice we will adopt. Thus the meaning constructor for the individual *Kim* might be labelled as **Kim** :

(37) **Kim** $Kim: \uparrow_\sigma$

As for the semantics of NP coordination, Dalrymple (2001) associates the semantic contribution **g-and** (group-forming *and*) in (38) with the coordinator *and* in its lexical entry (40). In the meaning constructor, recall that the left hand side is a meaning expression and the right hand side is a glue constructor for resource sensitive semantic construction using linear implication. On the meaning side, the lambda expression denotes the group forming function - here a function from two individuals to the group containing those individuals. On the glue side, **g-and** consumes the semantics of one conjunct $(\uparrow \in)_\sigma$ and produces a function from the semantics of the other conjunct to the semantics of the coordinate structure as a whole. 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 (39). Since our primary focus here is on binary coordination, we will have no more to say about coordination involving multiple conjuncts.

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

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

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

[12] As well as linear implication, linear logic uses so-called multiplicative conjunction ($\otimes$), a form of conjunction, and the of course operator (!), which permits a premise to be used without being consumed.

Following Dalrymple (2001) and the arguments presented therein, we take it that NP coordination is correctly characterised in this way as group formation. However in the case of asyndetic coordination, there is no coordinator in the structure with which to associate the semantics of **g-and**.

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, we restrict ourselves to binary coordination, and define the NUM resolution as in the template in (41). 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. Note that since this makes reference to elements of the (coordinate) f-structure, rather that to c-structure daughters, NUM resolution will operate correctly in cases of discontinuous coordination as well as cases of contiguous coordination by simple juxtaposition.

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

To complete the interpretation of nominal juxtapositions as coordinative, we need to associate the template BINARY and the meaning constructor **g-and** with the phrase structure rule in (35) (restricting attention to cases of binary coordination). Since there is no coordinator, in asyndetic coordination we arbitrarily associate them with one of the daughter constituents. The phrase structure rule for juxtaposed NPs in coordination, is therefore that in (42).[13]

(42) X $\longrightarrow$ X $\downarrow \in \uparrow$ @NP-CNJT @BINARY **g-and** , X $\downarrow \in \uparrow$ @NP-CNJT

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.

6.2 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

[13] In cases of discontinous coordination, if neither part of the discontinuous structure is associated with these annotations, meaning construction will fail, whereas if both parts are associated with these annotations, meaning construction will also fail because there will be unconsumed premises. Therefore nothing more needs to be added to ensure that only the right combination of annotations is selected.

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 (43), which is associated with each of the daughter constituents in the appositional phrase structure rule, as in (44). 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).

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

(44) $\text{X} \longrightarrow \underset{\substack{\downarrow \in \uparrow \\ @\text{NP-APPOS}}}{\text{X}} \quad \underset{\substack{\downarrow \in \uparrow \\ @\text{NP-APPOS}}}{\text{X}}$

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 it is proposed in the literature that nouns have both INDEX GEND features (usually relevant to phenomena such as predicate argument agreement) and CONCORD GEND features (potentially relevant to agreement within a NP, that is, cases of head modifier agreement), and these may not match (Wechsler and Zlatić, 2003; King and Dalrymple, 2004). 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 NEUT.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 potentially arise 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. In sum, very little is known about gender agreement in the languages we are concerned with, and neither is the relevance of the distinction between INDEX and CONCORD features yet established for these languages. Should plausible examples of gender mismatch 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)):

(45) **b-and** $\lambda X.\lambda Y.X \sqcap Y$

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:

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

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:

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

In order to see how this works, consider the nominal apposition in the now familiar Wambaya example (3). The semantics associated with each of the nominals in this construction is given in (48) and (49).

(48) *garidi-ni* (husband.I-ERG):

$\lambda X.husband(X)$: $(\uparrow_\sigma \text{ VAR}) \multimap (\uparrow_\sigma \text{ RESTR})$

(49) *bungmanyi-ni* (old.man.I-ERG):

$\lambda X.old.man(X)$: $(\uparrow_\sigma \text{ VAR}) \multimap (\uparrow_\sigma \text{ RESTR})$

The meaning constructor (46), associated with the "appositional" use of the juxtaposition schema, consumes (48) and (49) to produce another nominal meaning, as follows:

(50) *garidi-ni bungmanyi-ni* ((husband.I-ERG old.man.I-ERG):

$\lambda X.old.man(X) \wedge husband(X)$:
$(\uparrow_\sigma \text{VAR}) \multimap (\uparrow_\sigma \text{RESTR})$

Note that in these languages, a bare nominal such as (48) or (49) (or indeed (50)) may be interpereted predicatively, but may also be given a range of NP meanings in context (e.g. 'the old man', 'an old man', 'old men'). 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.[14]

Other appositional constructions discussed in §2, such as generic-specific and part-whole constructions are also straghtforwardly accounted for by this analysis. These constructions are likewise licensed by the appositional phrase structure rule (47), which is fully consistent with the consensus view on the Australianist tradition that treats such constructions as consisting of apposed nominals (e.g. Blake 1987, Evans 1995, Heath 1978, etc.).

The f-structure corresponding to the juxtaposed (generic-specific) construction in (52) is given in (53). Standard nominal lexical entries along the lines of (48) for *wanku-ya* (elasmobranch-MLOC) and *kulkiji-y* (shark-MLOC) combine with the appositional meaning constructor to give (54):

(52) *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)

[14]Our account of the semantics of apposition *per se* must also be extended to deal with examples in which it is clear that full NPs (e.g. of type e) occur in apposition, as in the following:

(51) *ngada bala-thu niwan-ju naljirndirri-wu, marrwa-wu niya rabi-ju*
I.NOM hit-POT him-MPROP scrub turkey-MPROP near-MPROP he-NOM get up-POT
I'll shoot him, the scrub turkey, he'll fly up nearby (Evans, 1995, 239: Kayardild)

We take this to be unproblematic, but leave full explication for further research.

(53)
$$\left[\begin{array}{l} \text{INDEX} \quad \left[\begin{array}{ll}\text{PERS} & 3\\ \text{NUM} & \text{SG}\end{array}\right] \\ \left\{\begin{array}{l}\left[\begin{array}{ll}\text{PRED} & \text{`ELASMOBRANCH'}\\ \text{INDEX} & \left[\begin{array}{ll}\text{NUM} & \text{SG}\\ \text{PERS} & 3\end{array}\right]\end{array}\right] \\ \left[\begin{array}{ll}\text{PRED} & \text{`SHARK'}\\ \text{INDEX} & \left[\begin{array}{ll}\text{NUM} & \text{SG}\\ \text{PERS} & 3\end{array}\right]\end{array}\right]\end{array}\right\}\end{array}\right]$$

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

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 general "coordinate" nominal rule (29) as follows:

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

7 Inclusory Constructions

In §2 above, we introduced the inclusory construction – another type of appositional construction common to many Australian languages. In this section we show how our account of appositional constructions given above provides a natural account of inclusory constructions also. Inclusory constructions are constructions typically involving two juxtaposed elements, one a pronominal referring to the group as a whole and the other a (pro)nominal picking out a subset of the group.[15] Examples include the following:

[15]There are actually two types of inclusory construction. The first, exemplified here, involves two juxtaposed NP elements. The second involves a verb-coded superset pronoun and just one NP element, as in the example below. Singer (2001) refers to these as Type 1 and Type 2 respectively.

(i) *nyari-bu-ydhi-ni* *rni-yul-pula*
1DU.EX-hit-RECIP-P.CON M.SG-Aboriginal-DUAL
'I and a [aboriginal] man were fighting.' (Heath, 1978, 291:Ngandi)

Our focus here is on Type 1 inclusory constructions, since they involve the apposition of two nominal elements. However, our analysis of Type 1 inclusory constructions can be extended to this second type through the association of the properties of the superset pronominal with the verbal agreement morphology, including the specification that the features of the verb-inflected pronominal be equal to the features of the set (see below). For issues of space, however, we leave exemplification of this extension of the analysis for future work.

(55) *Tjirlpi-lu* *nyupali* *kati-ku-nti*
old.manERG.NAME 2DU.(ERG) take-FUT-MAYBE

'You and the Old Bloke might take (us).' (lit. 'you two, including the old bloke, might take (us)') (Goddard, 1985, 101: Yankunytjatjara)

(56) *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)

Inclusory constructions (also called 'plural pronoun constructions' in the literature) are found in languages from many different families (Schwartz, 1988a,b; McNally, 1993; Lichtenberk, 2000; Bril, 2004), and are described for Australian languages in Singer (2001, 2005). The correct analysis of the inclusory construction has been the source of some debate in the literature. Schwartz (1988b,a) analyses the inclusory construction as deriving from a coordination construction, as do Hale (1966, 1973) and Nash (1986) in their analysis of inclusory constructions in the Australian language Warlpiri. Singer (2001), on the other hand, argues that the inclusory construction in Australian languages is a distinct construction type, albeit similar in some respects to coordination constructions, based on the fact that the inclusory construction is an endocentric construction with the features of one of the elements (i.e. the superset pronominal) being identical to the features of the whole argument. This is shown most clearly in a language with verbal agreement, as in the following from Nunggubuyu:

(57) *nurru=wa-ng* *ma:gurn nurru*
we(EX.PL)killed.it [name] we(EX.PL)

M and us killed it (buffalo) (Heath, 1984, 542: Nunggubuyu)

In terms of their surface syntax, (Type 1) inclusory constructions generally consist of two juxtaposed nominal elements, and are therefore syntactically similar to the other appositional constructions we have discussed above. Indeed, many language descriptions treat them as a type of appositional construction similar to part-whole and/or generic-specific constructions (e.g. Dench 1995, Evans 1995, among others). We therefore propose that they should likewise be analysed as sets at f-structure, capturing their syntactic similarity with apposition and coordination constructions.

Inclusory constructions are a particularly interesting case, however, as the features of the set overall are identical to the features of one member of the set (the pronominal), in which the features of the other member must be included. Thus, inclusory constructions are a composite of the coordination and appositional schemas presented in (42) and (47) 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 subset member carries the coordination template (specifying that its INDEX features must be a subset of the INDEX features of the whole).[16]

(58) $\mathrm{X} \longrightarrow \underset{\substack{\downarrow \in \uparrow \\ @\text{NP-APPOS}}}{\mathrm{X}} \quad , \quad \underset{\substack{\downarrow \in \uparrow \\ @\text{NP-CNJT}}}{\mathrm{X}}$

(59)
$$\begin{bmatrix} \text{INDEX} & \begin{bmatrix} \text{PERS} & 1 \\ \text{NUM} & \text{DUAL} \end{bmatrix} \\ \left\{ \begin{bmatrix} \text{PRED} & \text{`DADDY'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{SG} \\ \text{PERS} & 3 \end{bmatrix} \end{bmatrix} \right. \\ \left. \begin{bmatrix} \text{PRED} & \text{`PRO'} \\ \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{DUAL} \\ \text{PERS} & 1 \end{bmatrix} \end{bmatrix} \right\} \end{bmatrix}$$

Thus, our analysis of apposition in Australian languages extends directly to inclusory constructions, correctly capturing the fact that these various juxtaposed construction types are syntactically similar in many Australian languages.[17] Moreover, this analysis captures the various characteristics of the inclusory construction discussed in the literature. The fact that inclusory constructions are similar to coordination constructions is captured by the fact that, like coordination constructions, inclusory constructions are represented as sets at f-structure. The endocentricity of the inclusory construction (Singer 2001), namely that the features of the whole argument are identical to those of the superset pronominal, is captured by the fact that the pronominal carries the apposition template, which specifies that the features of the individual member are carried up to the set as a whole. The inclusory nature of the construction is captured by the fact that the other element must have features which form a subset of the features of the set.[18]

Treating inclusory constructions as sets at f-structure is further supported by the fact that in some Australian languages they can be marked with suffixes that explicitly indicate set

[16]This phrase structure rule is written to allow either ordering of the two elements (as indicated by the comma between the two NPs). However in some languages it may be necessary to fix the ordering of the two elements in the case of inclusory constructions.

[17]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 one of its members. We leave a detailed discussion of the semantics of the inclusory for future research.

[18]Note that, even in languages in which the two elements can appear in either order, the nature of the templates will ensure that the apposition template is associated with the superset pronominal and the coordination template with the subset (pro)nominal. This is because, were the associations to be reversed and the coordination template to be associated with the superset pronominal, its features would not be a subset of the features of the set (in this case, the features of the subset (pro)nominal).

membership. In Yidiny the 'one of a group' suffix *-ba* is used in both coordination constructions (60) and inclusory constructions (61):

(60) *darnggidarnggi:ba yaburruba galing*
old.woman-*ba*(ABS) young.girl-*ba*(ABS) go-PRES
'An old woman (being one of a group of people) and a girl (being another member of a group) are going.' (Dixon, 1977, 177: Yidiny)

(61) *nganytyi bunya:ba galing*
1NON-SING woman-*ba* go-PRES
'A woman and I (and some others) are going.' (Dixon, 1977, 178: Yidiny)

Thus, our analysis of apposition and asyndetic coordination in Australian languages extends naturally to inclusory constructions also, capturing the similarities amongst these constructions types and providing a unified analysis of the NP juxtaposition that is so prevalent in these languages.

8 Boolean Coordination

Before closing we turn briefly to the topic of boolean coordination in non-Australian languages. The conjunction of singular nominals generally forms a plural noun phrase in English, under (some form of) group forming coordination, but this is not always the case. As the SG verb agreement in the following example indicates, 'vice-president' and 'president-elect' refer here to the same individual. This boolean or joint reading is in contrast to (63) which involves a split or group-forming reading.

(62) The vice-president and president-elect is eating pizza (King and Dalrymple, 2004, 75)

(63) The vice-president and president-elect are eating pizza

As King and Dalrymple (2004) show (see also Heycock and Zamparelli (1999, 2000)) languages differ in terms of the distribution of these reading: languages such as English permit both joint and split readings (with singular nouns) under a single determiner such as *the*, or *this* while others permit only joint readings in these circumstances (such as Italian, Portuguese and German). The German (64), for example, has just a joint reading.

(64) *mein bester Freund und Mann*
my-M.SG best friend-M.SG and husband-M.SG
my best friend and husband (King and Dalrymple, 2004, 93: German)

The distinction between split and joint readings is most evident with singular conjuncts, but is also relevant in terms of the interpretation of coordinate structures with plural conjuncts, as in *five philosophers and linguists*, which has a number of interpretations including the joint reading under which each individual (of 5) is both a linguist and a philosopher.

King and Dalrymple (2004) propose that the distinction between split and joint readings involves two different semantics for *and*, **boolean-and** and **group-and**. For King and Dalrymple (2004), the former is associated with the syntactic INDEX requirement stated in (65),[19] while group-forming *and* simply requires a plural INDEX. The INDEX NUM feature basically encodes the number of individuals the phrase refers to.

(65) *boolean and* $(\uparrow \text{INDEX NUM}) = (\uparrow \in \text{INDEX NUM})$

It is sometimes suggested that accounts of nominal coordination should involve just one semantics, in terms either of group forming or boolean coordination (for example, Heycock and Zamparelli (2000) propose one underlying semantics for *and* and associate different (semantic) procedures with various (abstract) syntactic features in English and Italian NPs). Similarly the use of the conjunctive coordinator *and* to conjoin alternative descriptions of a single individual might seem idiosyncratic. However our proposal provides further support for the existence of both group forming and boolean *and* in nominal coordination by placing the existence of boolean coordination (that is, the joint reading of *my friend and colleague*) in a rather different crosslinguistic context. We have argued that appositions, inclusories and (standard) conjunctions may all be associated with precisely the same syntactic device (of asyndetic coordination or juxtaposition). On our view, then, 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 in the former (and note that in English, overt conjunctions, particularly *or* may occur in appositions). It is thus syntactically coordinated (having a hybrid f-structure), but semantically appositional (having no feature resolution and appositional (i.e. boolean) semantics).

9 Conclusion

We have shown how the range of juxtaposed NP constructions in Australian languages can be accounted for relatively straightforwardly within the constraint-based lexicalist formalism of LFG. We have developed an account in which nominal-nominal sequences all have essentially the same f-structure, but correspond to 3 different feature association patterns, as in (66)-(68), and map onto a range of different semantics correlated with these three different patterns. In the case of coordinate constructions, the INDEX features of the elements in the set-valued f-structure stand in a subset relation to the INDEX of the set itself. In the case of appositional constructions, the INDEX features of the elements are equivalent, and are also equivalent to those of the set itself. Inclusory constructions involve one element of the set having the same

[19] Additionally there is a semantic requirement (unformulated) which requires all conjuncts to have the same number.

INDEX features as the set itself, while the other element in the set stands in a subset relation to the overall INDEX.

(66) **coordination – X ⊃ Y, Z**

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

(67) **apposition – X = Y = Z**

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

(68) **inclusory – X = Y ⊃ Z**

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

The flexible architecture of LFG thus 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) in a simple and intuitive way.[20] One of the implications of our analysis of Australian nominal-nominal constructions is that appositions are structurally the same as coordinations in the syntax. Similar suggestions have been made in the literature, outside of the Australianist and LFG contexts, notably in a descriptive context by Quirk et al. (1985); Meyer (1992) and others. Indeed in recent theoretical work, de Vries (2006) argues that appositive relative clauses (and other appositions) in Dutch and English should be treated as what he calles 'specifying coordination', and analysed structurally as involving CoP phrases.

[20] 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.

While we are in agreement with the general thrust of the argument that apposition has much in common with coordination, the attempt to capture the similarities (and differences) in terms of c-structure (and with a syntax-semantics interface which maps from c-structure to semantic structure) has a number of potentially unfortunate consequences, requiring the postulation of null Co nodes (to head appositional (coordinate) structures which are not marked by overt coordinators), which our proposal avoids. Nonetheless, it is interesting that work in very different frameworks is converging on the view that apposition is, at least syntactically, a type of coordination.

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