Agreement in LFG: Some Basic Elements

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[1]This overview draws substantially on the materials for an advanced course on agreement jointly presented with Mary Dalrymple at the Christchurch LFG Winter school in 2005.

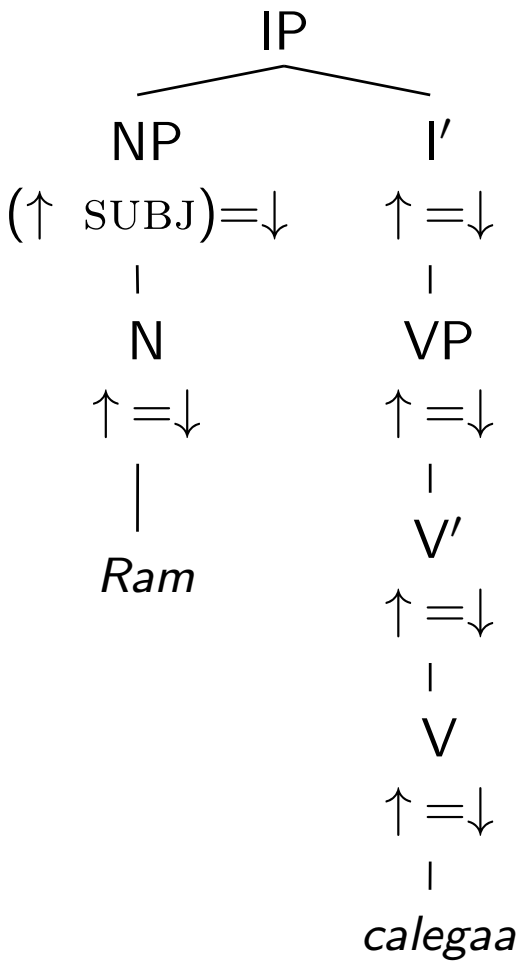
Outline

1. Agreement at functional structure
2. Multiple feature bundles: INDEX and CONCORD

- in LFG agreement relations hold at the level of f-structure
- in the basic LFG approach, feature governance and feature agreement are not distinct (but see Barlow and Ferguson (1988); Zwicky (1986)), a single mechanism of governance is used: morphosyntactic features of words constrain f-structure directly

- Predicate agreement: constraints on form of argument imposed by predicate
- Modifier agreement: constraints on form of head imposed by modifier
- Basic (overly simple) assumptions:
  - Noun phrases have a single set of agreement (person, number, gender) features,
  - with atomic values,
  - described by equality.

(1) Ram calegaa
Ram-MASC will.go-MASC3SG (Hindi)



(2) *Sita calegaa
FEM will.go-MASC3SG

(3) a. $(f\ \text{SUBJ}) = g$

b. calegaa
$(f\ \text{PRED}) = \text{`GO}\langle\text{SUBJ}\rangle\text{'}$
$(f\ \text{SUBJ PERS}) = 3$
$(f\ \text{SUBJ NUM}) = \text{SG}$
$(f\ \text{SUBJ GEND}) = \text{MASC}$
$(f\ \text{SUBJ CASE}) = \text{NOM}$

c. Ram
$(g\ \text{PRED}) = \text{`RAM'}$
$(g\ \text{PERS}) = 3$
$(g\ \text{NUM}) = \text{SG}$
$(g\ \text{GEND}) = \text{MASC}$
$(g\ \text{CASE}) = \text{NOM}$

d. Sita
$(g\ \text{GEND}) = \text{FEM}$

(4) Ram calegaa
Ram-MASC will.go-MASC3SG

$$f:\begin{bmatrix}\textsc{pred} & \text{`GO}\langle\textsc{subj}\rangle\text{'} \\ \textsc{subj} & g:\begin{bmatrix}\textsc{pred} & \text{`Ram'} \\ \textsc{pers} & 3 \\ \textsc{num} & \textsc{sg} \\ \textsc{gend} & \textsc{masc} \\ \textsc{case} & \textsc{nom}\end{bmatrix}\end{bmatrix}$$

Object and subject agreement

(5) ma tăm kălaŋ wel-sə-ŋil-am
I those reindeer kill-T-DU-1SG
(Nikolaeva, 1999, Northern Ostyak)
'I killed these (two) reindeer.'

(6) a. wel-sə-ŋil-am

$$(f\ \textsc{pred}) = \text{`}\textsc{kill}\langle\textsc{subj},\textsc{obj}\rangle\text{'}$$
$$(f\ \textsc{subj}\ \textsc{pers}) = 1$$
$$(f\ \textsc{subj}\ \textsc{num}) = \textsc{sg}$$
$$(f\ \textsc{obj}\ \textsc{num}) = \textsc{dual}$$

b. $(f\ \textsc{subj}) = g$

c. ma

$$(g\ \textsc{pred}) = \text{`}\textsc{pro}\text{'}$$
$$(g\ \textsc{pers}) = 1$$
$$(g\ \textsc{num}) = \textsc{sg}$$

d. $(f\ \textsc{obj}) = h$

e. kălaŋ $\quad (h\ \textsc{pred}) = \text{`}\textsc{reindeer}\text{'}$

(7) ma tăm kălaŋ wel-sə-ŋil-am
I those reindeer kill-T-DU-1SG

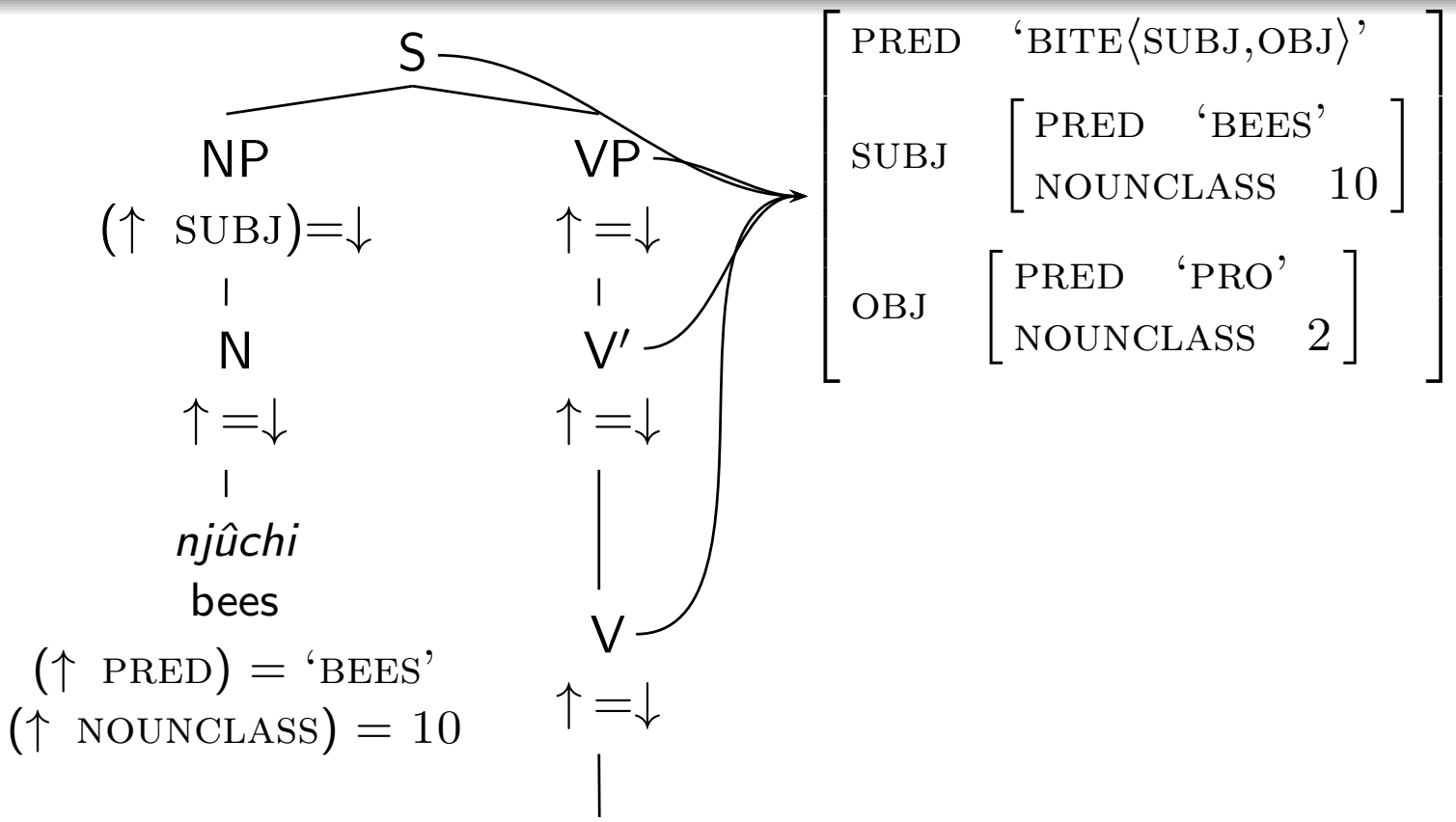
$$f:\begin{bmatrix}\textsc{pred} & \text{`}\textsc{kill}\langle\textsc{subj},\textsc{obj}\rangle\text{'} \\ \textsc{subj} & g:\begin{bmatrix}\textsc{pred} & \text{`}\textsc{pro}\text{'} \\ \textsc{pers} & 1 \\ \textsc{num} & \textsc{sg}\end{bmatrix} \\ \textsc{obj} & h:\begin{bmatrix}\textsc{spec} & \text{`}\textsc{these}\text{'} \\ \textsc{pred} & \text{`}\textsc{reindeer}\text{'} \\ \textsc{num} & \textsc{dual}\end{bmatrix}\end{bmatrix}$$

Agreement and pronominal incorporation

Bresnan and Mchombo (1987), Bresnan (2001): Chichewa

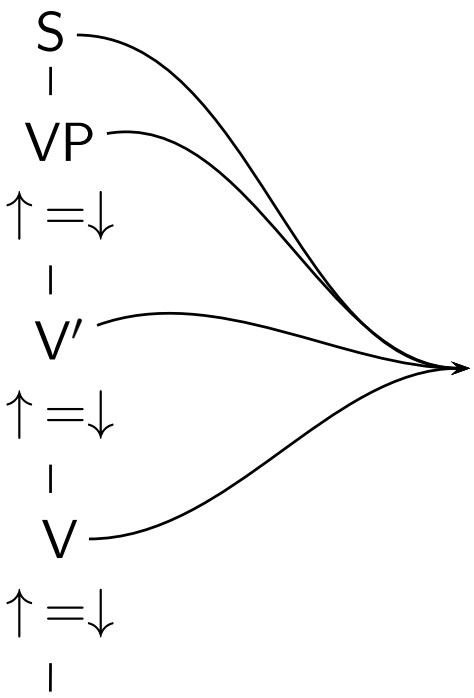
(8) njûchi zi-ná-wá-lum-a
bees SUBJ-PAST-OBJ-bite-INDICATIVE
'The bees bit them.'

(9) *zi-ná-wá-lum-a* $(\uparrow \text{PRED}) = \text{'BITE}\langle\text{SUBJ,OBJ}\rangle\text{'}$
$((\uparrow \text{SUBJ PRED}) = \text{'PRO'})$
$(\uparrow \text{SUBJ NOUNCLASS}) = 10$
$(\uparrow \text{OBJ PRED}) = \text{'PRO'}$
$(\uparrow \text{OBJ NOUNCLASS}) = 2$


S
NP
(↑ SUBJ)=↓
N
↑=↓
njûchi
bees
(↑ PRED) = 'BEES'
(↑ NOUNCLASS) = 10
VP
↑=↓
V′
↑=↓
V
↑=↓
zi-ná-wá-lum-a
SUBJ-PAST-OBJ-bite-INDICATIVE
(↑ PRED) = 'BITE⟨SUBJ,OBJ⟩'
((↑ SUBJ PRED) = 'PRO')
(↑ SUBJ NOUNCLASS) = 10
(↑ OBJ PRED) = 'PRO'
(↑ OBJ NOUNCLASS) = 2
PRED 'BITE⟨SUBJ,OBJ⟩'
SUBJ PRED 'BEES'
NOUNCLASS 10
OBJ PRED 'PRO'
NOUNCLASS 2

(10)

zi-ná-wá-lum-a
SUBJ-PAST-OBJ-bite-INDICATIVE
'They bit them.'



$$\begin{bmatrix} \text{PRED} & \text{`BITE}\langle\text{SUBJ,OBJ}\rangle\text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`PRO'} \\ \text{NOUNCLASS} & 10 \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{`PRO'} \\ \text{NOUNCLASS} & 2 \end{bmatrix} \end{bmatrix}$$

zi-ná-wá-lum-a

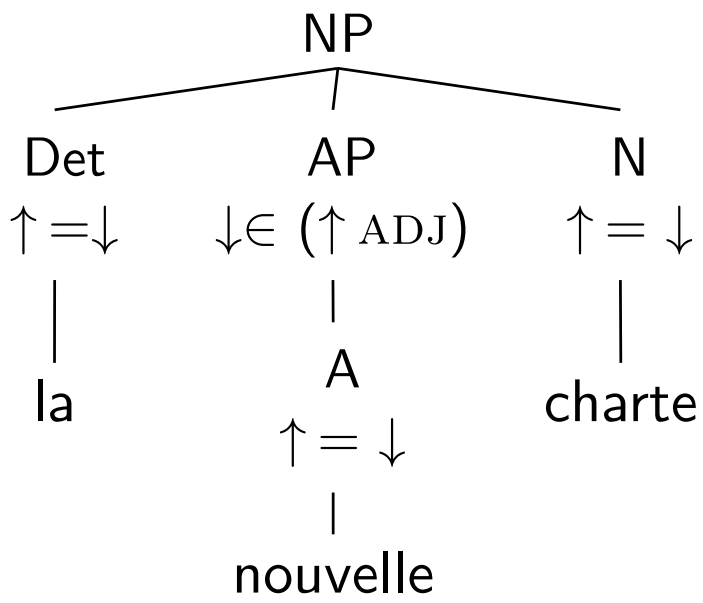
SUBJ-PAST-OBJ-bite-INDICATIVE

$(\uparrow \text{PRED}) = \text{`BITE}\langle\text{SUBJ,OBJ}\rangle\text{'}$
$((\uparrow \text{SUBJ PRED}) = \text{`PRO'})$
$(\uparrow \text{SUBJ NOUNCLASS}) = 10$
$(\uparrow \text{OBJ PRED}) = \text{`PRO'}$
$(\uparrow \text{OBJ NOUNCLASS}) = 2$

Head-Modifier Agreement (Concord)

(11) la nouvelle charte (French)
FEM new.FSG charter.FSG

(12)



$$\begin{bmatrix} \text{PRED} & \text{'CHARTER'} \\ \text{GEND} & \text{FEM} \\ \text{NUM} & \text{SG} \\ \text{SPEC} & \text{DEF} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'NEW'} \end{bmatrix} \right\} \end{bmatrix}$$

(13) Inside-out statements associated with attributive adjectives:

nouvelle $(\uparrow \text{PRED}) = \text{`NEW'}$
$((\uparrow \text{ADJ} \in \uparrow) \text{NUM}) = \text{SG}$
$((\uparrow \text{ADJ} \in \uparrow) \text{GEND}) = \text{FEM}$

(14) Set-membership symbol $\in$ as attribute:

$\downarrow \in (\uparrow \text{ADJ})$

$(\uparrow \text{ADJ} \in) = \downarrow$

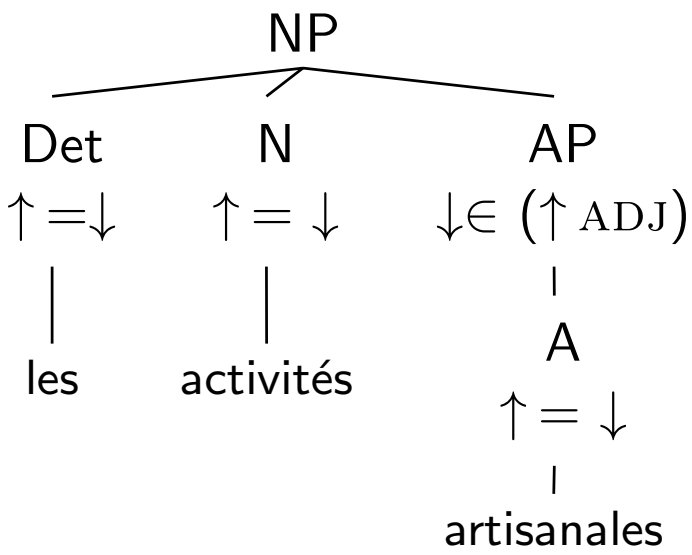
(15) Inside-out expression:

$(af) = g$ holds if and only if g is an f-structure, a is a symbol, and the pair $\langle a, f \rangle \in g$.
$(\epsilon\ f) \equiv f$, where ϵ is the empty string.
$(saf) \equiv (s\ (a\ f))$ for a symbol a and a (possibly empty) string of symbols s.

(16) la cohésion sociale
FSG cohesion.FSG social.FSG

(17) les activités artisanales
the.PL activity.FPL craft.FPL

(18)



(19)

$$\begin{bmatrix} \text{PRED} & \text{'ACTIVITY'} \\ \text{GEND} & \text{FEM} \\ \text{NUM} & \text{PL} \\ \text{SPEC} & \text{DEF} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'CRAFT'} \end{bmatrix} \right\} \end{bmatrix}$$

- The approach is independent c-structure assumptions and c-structure configurations.
- There are cases which suggest feature agreement rather than a cospecificational approach

Constraining Equations and Existential Statements, Generalisations

(20) $(f\ \textsc{comp}\ \textsc{asp}) =_c \textsc{perf}$

(21) Constraining equation:

$(f\ a) =_c\ v$ holds if and only if f is an f-structure, a is a symbol, and the pair $\langle a, v \rangle$ is in the minimal solution for the defining equations in the f-description of f.

(22) $(\uparrow \textsc{tense})$

Path descriptions and templates can be used for stating agreement generalisations. Otoguro (2006)

Default forms

Welsh verbs fully inflect for the agreement features of their pronominal subjects, which are optional, but appear in (default) 3SG form with lexical NPs and other non-pronominal subjects.

(23) Darllenasant (nhw) y llyfr.
read-PRET.3PL they the book
They read the book.

(24) Darllenodd y plentyn/plant/(hi) y llyfr.
read-PRET.3SG the child/children/she the book
She/the child/the children read the book.

One approach - constrain the 3PL form so that it requires the subject to be pronominal and make the lexical entry for the 3SG form disjunctive:

(25) *darllenasant*

$$
\begin{aligned}
&(\uparrow \textsc{pred}) = \text{`}\textsc{read}\text{'} \\
&(\uparrow \textsc{subj num}) = \textsc{pl} \\
&(\uparrow \textsc{subj pers}) = 3 \\
&((\uparrow \textsc{subj pred}) = \text{`}\textsc{pro}\text{'}) \\
&(\uparrow \textsc{subj pred fn}) =_c \textsc{pro}
\end{aligned}
$$

The 3SG form (default) form must explicitly exclude a 3PL pronoun

(26) *darllenodd*

$$
\begin{array}{l}
(\uparrow \text{ PRED}) = \text{`READ'} \\
(\uparrow \text{SUBJ PERS}) = 3 \\
\{ (\uparrow \text{SUBJ NUM}) = \text{SG} \\
((\uparrow \text{SUBJ PRED}) = \text{`PRO'}) \\
(\uparrow \text{SUBJ PRED FN}) =_c \text{PRO} \\
| (\uparrow \text{SUBJ PRED FN}) \neq \text{PRO}) \}
\end{array}
$$

- it might seem unfortunate that the "least marked" verbform has the most complicated lexical entry

In Irish - a less simple system - analytic forms stand in where there are gaps in synthetic paradigms - synthetic forms must be selected if available. Person/number inflections are incorporated pronouns (McCloskey and Hale, 1984).

(27)

	sing	*plur*	Ulster: Conditional
1	chuirfinn	chuirfimis	
2	chuirfeá	chuirfeadh sibh	
3	chuirfeadh sé M/sí F	chuirfeadh siad	

(28) Chuirfidis isteach ar an phost sin. (Connacht)
put.COND.3PL in on the job that
They would apply for that job. (MH:490)

(29) *Chuirfidis na léachtóirí uilig isteach ar an phost sin.
put.COND.3PL the lecturers all in on the job that
(Connacht)
All the lecturers would apply for that job. (MH:490)

But note that if available, a synthetic form pre-empts an analytic form (morphological blocking):

(30) Chuirfinn isteach ar an phost sin.
put.COND.1SG in on the job that
I would apply for that job. (MH:491)

(31) *Chuirfeadh mé isteach ar an phost sin.
put.COND I in on the job that
I would apply for that job. (MH:491)

Principle of Morphological Blocking (Andrews, 1990)

(32) Suppose the structure S has a preterminal node P occupied by a lexical item l_1, and there is another lexical item l_2 such that the f-structure determined by the lexical entry of l_1 properly subsumes that determined by the lexical entry of l_2, and that of l_2 subsumes the f-structure associated with P in S (the complete structure, after all unifications have been carried out). Then S is blocked. (Andrews 1990: 519).

(33)
$$\begin{bmatrix} \text{PRED} & \text{`PUT}\langle \text{SUBJ,PRT,OBL} \rangle \\ \text{TENSE} & \text{COND} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`PRO'} \\ \text{PERS} & 1 \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \text{OBL} & \ldots. \end{bmatrix}$$

(34) *chuirfinn* $(\uparrow \text{PRED}) = \text{`PUT}\langle\text{SUBJ,PRT,OBL}\rangle\text{'}$
$(\uparrow \text{TENSE}) = \text{COND}$
$(\uparrow \text{SUBJ NUM}) = \text{SG}$
$(\uparrow \text{SUBJ PERS}) = 1$
$(\uparrow \text{SUBJ PRED}) = \text{`PRO'}$

(35)
$$\begin{bmatrix} \text{PRED} & \text{`PUT}\langle\text{SUBJ,PRT,OBL}\rangle\text{'} \\ \text{TENSE} & \text{COND} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`PRO'} \\ \text{PERS} & 1 \\ \text{NUM} & \text{SG} \end{bmatrix} \end{bmatrix}$$

(36) *chuirfeadh* $(\uparrow \text{PRED}) = \text{`PUT}\langle\text{SUBJ,PRT,OBL}\rangle\text{'}$
$(\uparrow \text{TENSE}) = \text{COND}$

(37)
$$\begin{bmatrix} \text{PRED} & \text{`PUT}\langle\text{SUBJ,PRT,OBL}\rangle \\ \text{TENSE} & \text{COND} \end{bmatrix}$$

An alternative may be to state blocking as a lexical specification:

(38) *chuirfeadh* $(\uparrow \textsc{pred}) = \text{`}\textsc{put}\langle\textsc{subj},\textsc{prt},\textsc{obl}\rangle\text{'}$
$(\uparrow \textsc{tense}) = \textsc{cond}$
$(\uparrow \textsc{subj pers}) \neq 1$
$\neg[(\uparrow \textsc{subj pers}) = 2$
$(\uparrow \textsc{subj num}) = \textsc{sg}]$

Distinguishing Distributive and Non-distributive Agreement

Singular determiner and **plural** verb agreement with coordinated singular nouns:

(39) a. That boy and girl *is/are my friends.

b. *those boys and girl (not CCA)

This boy and girl have become skilled at setting the places for their classmates at snacktime. (http://www.edvid.com/infant.asp)
In this type of "marriage" . . . *a man and woman* who *have* lived together for a certain period of time and who *hold themselves* to be husband and wife *are* considered to be married even without a license and a formal ceremony.
(http://www.itslegal.com/infonet/family/common.html)

Two agreement features, INDEX and CONCORD (Kathol, 1999; Sadler, 1999, 2003; Corbett, 2001; Wechsler and Zlatić, 2000; King and Dalrymple, 2004)

In English: INDEX controls verb agreement, CONCORD controls determiner agreement (Wechsler and Zlatić, 2000)

(40) 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)

Coordinate singular nouns like *boy and girl* behave as if they had a singular CONCORD value but a plural INDEX value. This explains why coordinated singular nouns require:

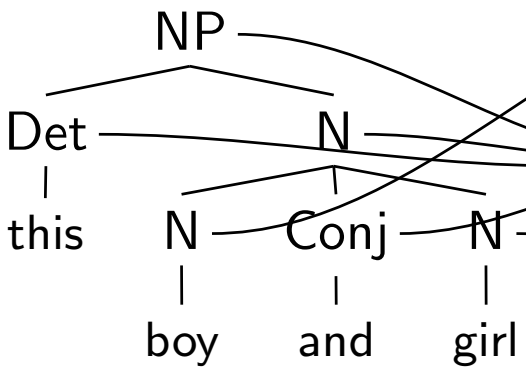
- a singular determiner
- plural verb agreement

(41) a. INDEX agreement with a coordinate phrase depends on the INDEX features of the coordinate phrase as a whole. INDEX is nondistributive.

b. CONCORD agreement with a coordinate phrase depends on the CONCORD features of each conjunct. CONCORD is distributive.

English Concord Determiners

(42) this boy and girl this: (↑ CONCORD NUM) = SG



$$\left[\begin{array}{ll} \text{SPEC} & \text{'THIS'} \\ \text{INDEX} & [\text{NUM} \quad \text{PL}] \\ \left\{\begin{array}{l} \left[\begin{array}{ll} \text{PRED} & \text{'BOY'} \\ \text{CONCORD} & [\text{NUM} \quad \boxed{\text{SG}}] \\ \text{INDEX} & [\text{NUM} \quad \text{SG}] \end{array}\right] \\ \left[\begin{array}{ll} \text{PRED} & \text{'GIRL'} \\ \text{CONCORD} & [\text{NUM} \quad \boxed{\text{SG}}] \\ \text{INDEX} & [\text{NUM} \quad \text{SG}] \end{array}\right] \end{array}\right\} \end{array}\right]$$

Verb "are" requires plural INDEX:

(43) This boy and girl *are* my friends.

are: $(\uparrow \text{SUBJ INDEX NUM}) = \text{PL}$

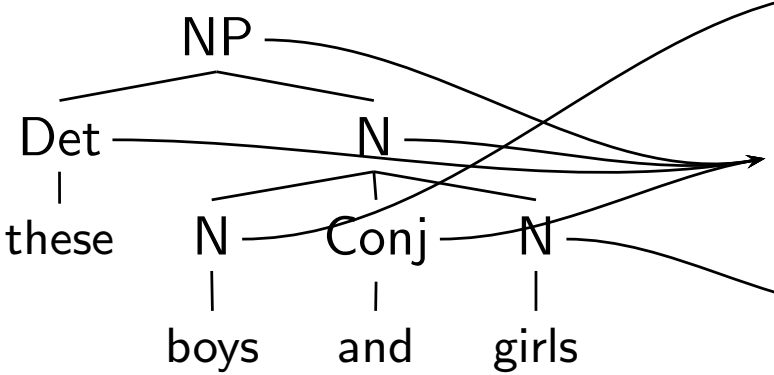
(44) *these boy and girl these: $(\uparrow \text{CONCORD NUM}) = \text{PL}$

$$\left[\begin{array}{l}
\text{SPEC} \quad \text{`THESE'} \\
\text{INDEX} \quad \left[\text{NUM} \quad \text{PL}\right] \\
\left\{\begin{array}{l}
\left[\begin{array}{l}
\text{PRED} \quad \text{`BOY'} \\
\text{CONCORD} \quad \left[\text{NUM} \quad \boxed{\text{SG/PL}}\right] \\
\text{INDEX} \quad \left[\text{NUM} \quad \text{SG}\right]
\end{array}\right] \\
\left[\begin{array}{l}
\text{PRED} \quad \text{`GIRL'} \\
\text{CONCORD} \quad \left[\text{NUM} \quad \boxed{\text{SG/PL}}\right] \\
\text{INDEX} \quad \left[\text{NUM} \quad \text{SG}\right]
\end{array}\right]
\end{array}\right\}
\end{array}\right]$$

Similarly: Finnish demonstrative *tämä*, Hindi-Urdu singular determiner *wah* require singular CONCORD.

(45) these boys and girls

these: (↑ CONCORD NUM) = PL



$$\begin{bmatrix} \text{SPEC} & \text{'THESE'} \\ \text{INDEX} & [\text{NUM} \quad \text{PL}] \\ \left\{ \begin{bmatrix} \text{PRED} & \text{'BOY'} \\ \text{CONCORD} & [\text{NUM} \quad \boxed{\text{PL}}] \\ \text{INDEX} & [\text{NUM} \quad \text{PL}] \end{bmatrix} \right. & \\ \left. \begin{bmatrix} \text{PRED} & \text{'GIRL'} \\ \text{CONCORD} & [\text{NUM} \quad \boxed{\text{PL}}] \\ \text{INDEX} & [\text{NUM} \quad \text{PL}] \end{bmatrix} \right\} & \end{bmatrix}$$

(46) *this boys and girls this: (↑ CONCORD NUM) = SG

$$\left[\begin{array}{l}
\text{SPEC} \quad \text{`THIS'} \\
\text{INDEX} \quad \left[\text{NUM} \quad \text{PL}\right] \\
\left\{\left[\begin{array}{l}
\text{PRED} \quad \text{`BOY'} \\
\text{CONCORD} \quad \left[\text{NUM} \quad \boxed{\text{SG/PL}}\right] \\
\text{INDEX} \quad \left[\text{NUM} \quad \text{PL}\right]
\end{array}\right]\right. \\
\left.\left[\begin{array}{l}
\text{PRED} \quad \text{`GIRL'} \\
\text{CONCORD} \quad \left[\text{NUM} \quad \boxed{\text{SG/PL}}\right] \\
\text{INDEX} \quad \left[\text{NUM} \quad \text{PL}\right]
\end{array}\right]\right\}
\end{array}\right]$$

Similarly: Finnish demonstrative *nämä*, Hindi/Urdu demonstrative *we* require plural CONCORD.

(47) *this boy and girls

$$\left[\begin{array}{ll}\text{SPEC} & \text{`THIS'} \\ \text{INDEX} & \left[\text{NUM} \quad \text{PL}\right] \\ \left\{\begin{array}{l}\left[\begin{array}{ll}\text{PRED} & \text{`BOY'} \\ \text{CONCORD} & \left[\text{NUM} \quad \boxed{\text{SG}}\right] \\ \text{INDEX} & \left[\text{NUM} \quad \text{SG}\right]\end{array}\right] \\ \left[\begin{array}{ll}\text{PRED} & \text{`GIRL'} \\ \text{CONCORD} & \left[\text{NUM} \quad \boxed{\text{SG/PL}}\right] \\ \text{INDEX} & \left[\text{NUM} \quad \text{SG}\right]\end{array}\right]\end{array}\right.\end{array}\right]$$

Some determiners do not specify CONCORD agreement. Such determiners allow mixed coordination:

(48) a. the boy/the boys

b. my friend/my friends

(49) a. [The animal action consists of a cat and two poodles.]
The cat and dogs are seen throughout the film doing various behavioral stunts.
(http://www.ahafilm.info/movies/moviereviews.phtml?fid=7095)

b. *The man and boys* were walking down Maryhill Road in Glasgow when the boys ran away in front, leaving him holding the family dog on a leash.
(http://news.bbc.co.uk/hi/english/uk/newsid_354000/354831.str

c. *My dog and cats* eat poultry bones every day.
(www.critterchat.net/feedingnat.htm)

(50) a. [We have two dogs, one kitten, a lizard, and assorted fish.] *The dogs and cat* are all rescues, from the street or the pound.
(http://www.gmee.com/pets/about.html)

b. [A boy went out to check on his pigs ... and ran back to the farmhouse to get his father, who was there with some other men.] *The men and boy* returned to the area in their pickups with weapons.
(http://www.n2.net/prey/bigfoot/stories/woodward.htm)

c. I enjoy collecting children's literature and playing with *my dogs and cat*: Lucy, Desi and Smokey.
(http://www.mcps.org/fbranch/2000first/burnette.html)

(51) the dog and cats

$$\left[\begin{array}{ll} \textsc{spec} & \text{`the'} \\ \textsc{index} & \left[\textsc{num} \quad \textsc{pl}\right] \\ \left\{\begin{array}{l} \left[\begin{array}{ll} \textsc{pred} & \text{`dog'} \\ \textsc{concord} & \left[\textsc{num} \quad \textsc{sg}\right] \\ \textsc{index} & \left[\textsc{num} \quad \textsc{sg}\right] \end{array}\right] \\ \\ \left[\begin{array}{ll} \textsc{pred} & \text{`cat'} \\ \textsc{concord} & \left[\textsc{num} \quad \textsc{pl}\right] \\ \textsc{index} & \left[\textsc{num} \quad \textsc{pl}\right] \end{array}\right] \end{array}\right. \end{array}\right]$$

(52) The dog and cats *were* inoculated yesterday.

Similarly: Georgian demonstrative *es*, Armenian demonstrative *ais* do not specify number agreement.

Index and Concord Agreement

Brazilian Portuguese: determiner *o* specifies singular INDEX. Compatible with singular noun, but cannot refer to a group:

(53) a. o cachorro
the-SG dog-SG
'the dog'

b. *o cachorro e gato
the-SG dog-SG and cat-SG
'the dog and cat'

c. o cachorro e o gato
the-SG dog-SG and the-SG cat-SG
'the dog and the cat'

(54)

$$\left[\begin{array}{ll} \text{SPEC} & \text{`O'} \\ \text{INDEX} & \left[\text{NUM} \quad \boxed{\text{SG/PL}}\right] \\ \left\{\begin{array}{l} \left[\begin{array}{ll} \text{PRED} & \text{`CACHORRO'} \\ \text{CONCORD} & [\text{NUM} \quad \text{SG}] \\ \text{INDEX} & [\text{NUM} \quad \text{SG}] \end{array}\right] \\ \left[\begin{array}{ll} \text{PRED} & \text{`GATO'} \\ \text{CONCORD} & [\text{NUM} \quad \text{SG}] \\ \text{INDEX} & [\text{NUM} \quad \text{SG}] \end{array}\right] \end{array}\right. \end{array}\right]$$

Compatible with coordinate phrase referring to an individual:

(55)

o presidente e diretor da Air France
the-SG president and director of Air France
'the president and director of Air France'

(56) Boolean *and* (my friend and colleague): Number of coordinate phrase matches number of conjunct

$$(\uparrow \text{INDEX NUM}) = (\uparrow \in \text{INDEX NUM})$$

(57)

$$\left[\begin{array}{ll} \textsc{spec} & \text{`O'} \\ \textsc{index} & \left[\textsc{num} \quad \boxed{\textsc{sg}}\right] \\ \left\{\begin{array}{l} \left[\begin{array}{ll} \textsc{pred} & \text{`PRESIDENTE'} \\ \textsc{concord} & \left[\textsc{num} \quad \textsc{sg}\right] \\ \textsc{index} & \left[\textsc{num} \quad \textsc{sg}\right] \end{array}\right] \\ \left[\begin{array}{ll} \textsc{pred} & \text{`DIRETOR'} \\ \textsc{concord} & \left[\textsc{num} \quad \textsc{sg}\right] \\ \textsc{index} & \left[\textsc{num} \quad \textsc{sg}\right] \end{array}\right] \end{array}\right. \end{array}\right]$$

Similarly: German determiners *mein* and *der* specify singular INDEX.

Typology: Agreement systems

(58) CONCORD systems: English, Finnish, Hindi

a. Singular determiner:
$(\uparrow \text{CONCORD NUM}) = \text{SG}$

b. Plural determiner:
$(\uparrow \text{CONCORD NUM}) = \text{PL}$

The singular determiner may be used with singular nouns and with coordinate structures in which each conjunct is singular. The plural determiner may be used with plural nouns and with coordinate structures in which each conjunct is plural.

(59) CONCORD and INDEX systems: Brazilian Portuguese, German

a. Singular determiner:
$(\uparrow \text{CONCORD NUM}) = \text{SG}$
$(\uparrow \text{INDEX NUM}) = \text{SG}$

b. Plural determiner:
$(\uparrow \text{CONCORD NUM}) = \text{PL}$
$(\uparrow \text{INDEX NUM}) = \text{PL}$

This is the most restrictive system, imposing INDEX agreement (and, redundantly, CONCORD agreement) in the singular case, and CONCORD agreement (and, redundantly, INDEX agreement) in the plural case. The singular determiner cannot be used with coordinated nouns whose index is plural; it is compatible only with singular nouns and coordinated singular nouns that refer to a single individual, phrases like *my friend and colleague*. The plural determiner can be used only with plural nouns and conjoined plurals, but not with coordinations in which one or more conjuncts is singular.

(60) INDEX systems:

a. Singular determiner:
$(\uparrow \text{INDEX NUM}) = \text{SG}$

b. Plural determiner:
$(\uparrow \text{INDEX NUM}) = \text{PL}$

The INDEX system is unique in allowing plural determiners with singular coordinate nouns. This system disallows coordinate singular nouns with singular determiners except when a single individual is referred to, as in Brazilian Portuguese and German.

(61) Russian:

*èta/*ètot mužčina i ženščina
this-F.SG/this-M.SG man-SG and woman-SG
'this man and woman'

(62)

moj/ètot drug i kollega
my-SG/this-SG friend-SG and colleague-SG
'my/this friend and colleague'

Further Work on INDEX/CONCORD

- Kazana (2011) provides extensive discussion of NP-internal agreement patterns involving INDEX and CONCORD in Modern Greek
- An analysis of Welsh numeral noun constructions positing an INDEX/CONCORD mismatch is presented in Mittendorf and Sadler (2005).
- An analysis of Russian predicate agreement is given in Hahm and Wechsler (2007)
- Some ideas about gender polarity in MSA are presented in Sadler (2010) and Dalrymple and Sadler (2004)

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