

# HPSG: Agreement

Doug Arnold  
doug@essex.ac.uk

## 1 The Phenomenon

“The term agreement commonly refers to some systematic covariation between a semantic or formal property of one element and a formal property of another.” Steele (1978, 610),

- (1) a. She is/\*are/\*am foolish. (subj-verb)
- b. She is a fool/\*fools. (pred ns)
- c. These cats/\*cat chased a \*mice/mouse. (det-n)
- d. She admires herself/\*themselves. (reflexives)
- e. This is [the man who/\*which I saw] (rel pronouns)
- f. Whose are those? (pointing to trousers)
- g. Whose is that? (pointing to a shirt)

A general principle: Functors may agree with nominal arguments. (e.g. Keenan and Faltz (1985, p27)).

## 2 Approaches

- A purely semantic approach Dowty and Jacobson (1989);
- Derivational Approaches
- Constraint Based Approaches (‘Unification’)

### 2.1 Purely Semantic Approach

Dowty and Jacobson (1989) suggest a purely semantic account.

No mechanisms of linguistic theory at all are used to link controller and agreeing form. They are just interpreted separately, and agreement failure will lead to semantic strangeness. The property denoted by *is foolish/a fool* can only be applied to singular entities (not collections), *washed herself* can only be predicated of an NP that denotes a female.

(See below for attractions and problems).

### 2.2 Derivational Approaches

- agreement features are inherent in the controller, ...
- ... where they are fully specified.

A *fully specified* bundle of (morpho-syntactic) agreement features is copied from agreement controller to target.

This leads to redundancy in the lexicon, and missed generalizations.

In French, adjectives agree with subjects in number and gender:

- (2) Il est heureux / \*heureuse  
    He is happy (masc) / happy (fem)

This means that *Je* must have two lexical entries:

- (3) a. Je suis heureux (masc)
- b. Je suis heureuse (fem)

Cf. also some languages will require multiple empty pronouns to trigger different kinds of agreement.

This will lead to a huge, unmotivated, explosion in languages where agreement controllers do not vary in form. Pollard and Sag (1994, 62ff)

German adjectives may agree with nominals for person, number, and case. But typically, nouns do not have as many distinct lexical forms as the paradigm would suggest (cf. *Tisch* 'table'):

	SING	PLUR
NOM	Tisch	Tische
GEN	Tisches	Tische
DAT	Tisch	Tischen
ACC	Tisch	Tische

The following simple account is not available if forms must be fully specified:

Tisch	MASC	SING	¬GEN
Tisches	MASC	SING	GEN
Tische	MASC	PLUR	¬DAT
Tischen	MASC	PLUR	DAT

## 2.3 Constraint Based Approaches

### 2.3.1 In General

Constraint based approaches rely on the possibilities of underspecification and unification: it does not matter where the information originates, if it stated that the agreement features on a verb and its subject are the same, then they will become so.

In some cases it will seem as if information is moving from controller to target, in others it will seem to be the reverse, but this appearance is an artifact.

- (4) a. The salmon swims.
  - b. The salmon swim.
  - c. These salmon swim.
  - d. This salmon swims.
- (5) The boys walk.
- (6) a. The salmon [<sub>S</sub> that had been ... ] was ...
  - b. The salmon [<sub>S</sub> that was ... ] had been ...

(e.g. LFG Kaplan and Bresnan (1982), GPSG, Gazdar et al. (1985)), Sag and Wasow (1999))

### 2.3.2 HPSG

The account in Pollard and Sag (1994) involves three different kinds of agreement:

- 'index' agreement;
- syntactic agreement (e.g. for CASE);
- pragmatic.

Index agreement is syntactic in that it is sensitive to syntactic configurations and units (e.g. bounded). It is semantic in the sense that indices are semantic objects. NUM, PERS, and GEN are part of the internal

structure of indices, which are used to track the entities that are being talked about or quantified over. There can also be ‘background’ conditions on what parameters containing the indices can be anchored to.

The CONTENT of *she* contains an index which is NUM:sing, PERS:3rd, and GEN:feminine; the CONTEXT contains the background condition that this index must be anchored to something female.

### 3 Problems for Syntactic Accounts: Agreement Mismatches

- Reference Transfer
  - (7) a. The hash-browns at table five \*is/are getting cold.
  - b. The hash-browns at table five is/\*are getting angry.
- Wh-ever Constructions: agreement is with the referent of the NP (‘singular’), not the NP itself (which seems to be plural):
  - (8) a. (( Whoever’s dogs ) are running around ) is/\*are in trouble.
  - b. Anyone whose dogs are running around is/\*are in trouble.
- Relative Pronouns
  - (9) a. The soldiers *who* where trained at Sandhurst . . .
  - b. The soldiers *which* where made of lead . . .
- Singular Plurals
  - (10) Steak and chips appeals/?appeal to me.
- Collectives
  - (11) a. The committee is/are settling the issue to its/their satisfaction.
  - b. \*A new committee have been set up.

### 4 Problems for purely Semantic Accounts

- (12) \*The committee are voting itself a pay rise.
- (13) \*The committee is voting themselves a pay rise.
- (14) The committee has voted itself a pay rise.  
But most of them are overpaid anyway.
- (15) That dog looks so stupid, it would bite itself/\*himself.  
. . . But in fact, he is actually quite clever.
- (16) The spaghetti is/\*are ready.
- (17) The noodles \*is/are ready.
- (18) The *Skylark* righted itself/herself.
- (19) The boat \*who/which sank herself...
- (20) Vous êtes belle.  
You(pl) are(pl) pretty(sing).

Agreement is to do with ‘mode of individuation’, but is not entirely determined by it. There are restrictions related to binding and deixis; at least two factors are probably involved.

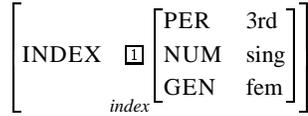
## 5 HPSG treatment

### 5.1 Basic Idea

Agreement arises because of:

- restrictions on indices;
- background conditions (pragmatics);
- syntactic agreement (e.g. case concord)

- *she*, CONTENT:



- *she*, CONTEXT:



- (cf. *I* is  $\left[ \begin{array}{cc} \text{PER} & 1\text{st} \\ \text{NUM} & \text{sing} \end{array} \right]_{\text{index}}$ , and the index anchors only to speakers (i.e. the index must be identified with the SPEAKER index in the CONTEXT);
- plural noun indices anchor only to things that are individuated as aggregates;
- singular noun indices anchor only to non-aggregates;
- the index of *faculty* anchors to either;
- for grammatical gender languages, an entity can anchor an index only if the index is compatible with the index of a noun that can describe the entity (hence French *Il* cannot be used to refer to tables);
- a proper noun like *John* is *not* specified as GEND:masc, this is just a naming convention.

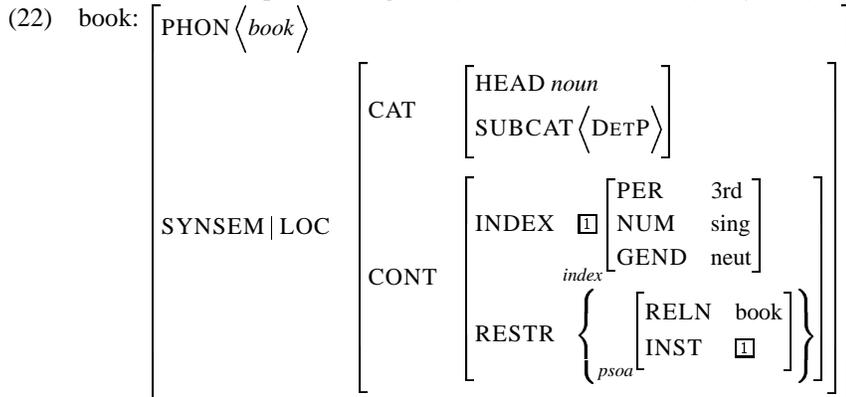
## 5.2 Applications

1. Verb-Argument agreement occurs because verbs restrict indices of arguments, via their SUBCAT lists, and CONTENTS (cf. *walk* vs *walks*): to be a third person singular verb is just to assign third person singular agreement to one's subject.
2. Pronoun Antecedent agreement occurs because binding involves identity of indices (co-indexation), hence agreement features.

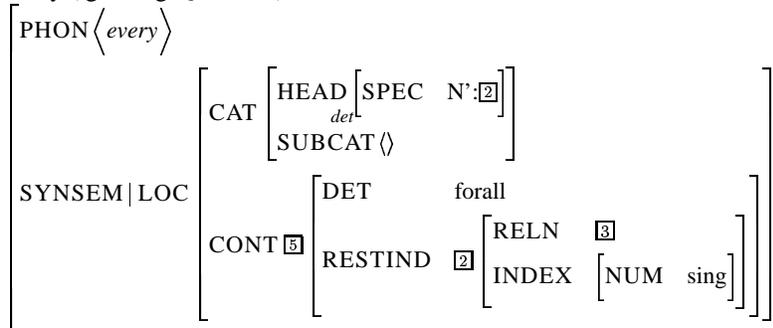
- (21) a.  $She_i$  loves  $her_i$ /\* $his_i$  mother  
 b. Every  $girl_i$  loves  $her_i$  mother.  
 c.  $John_i$  loves  $her_i$  mother.

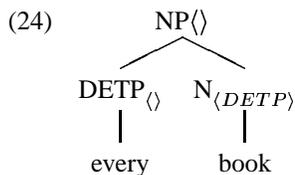
(Example (21b) indicates why it is misleading to talk about *co-reference* in relation to pronouns and their antecedents).

3. Det-N agreement occurs because specifiers select heads, and heads subcategorize specifiers, restrictions on the index of the N are possible (e.g. *every man* vs *all men*, *every/all faculty*, *no man/men*).



- (23) every (ignoring QSTORE):





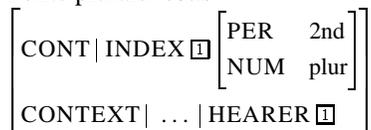
4. Purely semantic agreement is also possible, e.g. *who* vs *which* does not involve agreement features, but background restrictions on the index (thus, there is no agreement feature HUMAN in English). cf: boats are female, but not human:

(25) The boat \**who/which* sank herself. . .

5. HFC plays no role in agreement: restrictions on subjects are inherited from V to VP by the SUBCAT principle, inheritance of agreement features between N and NP follows from the SEMANTICS Principle. (cf. CASE, which is a HEAD feature – hence case features can differ between pronoun and antecedent).

6. Case-concord is a form of purely syntactic agreement.

7. Polite plurals: *Vous*



8. Infelicity is possible if conflicting CONTEXT restrictions arise (cf. honorific agreement).

9. Interactions of pragmatic ('semantic') agreement with coindexation (?syntactic?)

(26) *Vous êtes belle*  
 You(pl) are(pl) beautiful(sing)

- (27) a. *vous*: NP<sub>[PER:2nd, NUM:pl]</sub>  
 b. *êtes*: SUBCAT: < [NP]<sub>[NUM:pl]</sub>, VP<sub><NP></sub> >  
 c. *belle*: SUBCAT: < [NP]<sub>[1][GEND:fem]</sub> >  
 (context: [1] must anchor to a non-aggregate)  
 Note, **not**: SUBCAT: < [NP]<sub>[NUM:sing, GEND:fem]</sub> >.

## 6 Open Issues

Anchoring conditions that specify that/how anchorings respect agreement features have to be spelled out. For example, there must be a relation between the INDEX and contextual restrictions, to rule out the following (a 2nd person item anchored to the speaker).



But we have to allow, e.g. *vous* above.

- Principles: What *sorts* of agreement are theoretically (im)possible.
- Spelling out rules – morphological or phonological effects.
- Can we really manage without “ACCORD” features for syntactic agreement? Related questions:
- Grammatical vs natural gender in German:

(28) a. \**Ich sah den Hund. Sie war schön.*  
 I saw the dog(masc). She was beautiful

b. *Ich sah das Mädchen, als es/sie hereinkam.*  
 I saw the girl(neut), when it/she came in

- Is English plural ‘natural’, or ‘grammatical’ (i.e. what sorts of pragmatic constraint operate)?

- English Plural:  
(29) \*Kim and Sandy is carrying a piano.
- Behaviour of *family* vs *faculty*.
- Coordination and agreement, e.g. agreement of verb and coordinate subjects.
- The section of Huddleston and Pullum (2002) on agreement has many problematic examples.

## 7 Reading

See Pollard and Sag (1994, Ch2). For more recent discussions, see Kathol (1999), and Wechsler and Zlatić (2001).

## References

- David Dowty and Pauline Jacobson. Agreement as a semantic phenomenon. In Joyce Powers and K de Jong, editors, *Proceedings of Fifth Eastern States Conference on Linguistics (ECSOL '88)*, pages 95–101, Ohio State University, 1989.
- G. Gazdar, E. Klein, and G.K. Pullum, editors. *Order Concord and Constituency*. Foris Pub., Dordrecht, 1983.
- Gerald Gazdar, Ewan Klein, Geoffrey Pullum, and Ivan Sag. *Generalized Phrase Structure Grammar*. Blackwell, 1985.
- Rodney Huddleston and Geoffrey K Pullum, editors. *The Cambridge grammar of the English language*. Cambridge University Press, Cambridge, 2002.
- Ronald M. Kaplan and Joan Bresnan. Lexical-Functional Grammar: A formal system for grammatical representation. In Joan Bresnan, editor, *The Mental Representation of Grammatical Relations*, pages 173–281. The MIT Press, Cambridge, MA, 1982. Reprinted in Mary Dalrymple, Ronald M. Kaplan, John Maxwell, and Annie Zaenen, eds., *Formal Issues in Lexical-Functional Grammar*, 29–130. Stanford: Center for the Study of Language and Information. 1995.
- Andreas Kathol. Agreement and the syntax-morphology interface in HPSG. In Robert Levine and Georgia Green, editors, *Studies in Current Phrase Structure Grammar*, pages 223–274. Cambridge University Press, 1999.
- E. Keenan and L. Faltz. *Boolean Semantics for Natural Language*. D. Reidel, Dordrecht, 1985.
- Carl J. Pollard and Ivan A. Sag. An information-based theory of agreement. In D. Brentari and al, editors, *Papers on the Parasession on Agreement from the 24th Regional Meeting of the Chicago Linguistic Society*, volume 24, Chicago, Illinois, 1988. CLS, CLS. Also published in slightly revised form as CSLI Report 88-132. Stanford: Center for the Study of Language and Information.
- Carl J. Pollard and Ivan A. Sag. *Head-Driven Phrase Structure Grammar*. University of Chicago Press, Chicago, 1994.
- Ivan A Sag and Thomas Wasow. *Syntactic Theory: a Formal Introduction*. Number 92 in CSLI Lecture Notes. CSLI Publications, 1999.
- Susan Steele. Word order variation: a typological study. In Joseph H. Greenberg, Charles A. Ferguson, and Edith A. Moravcsik, editors, *Universals of Human Language: IV: Syntax*, pages 585–623. Stanford University Press, Stanford, 1978.
- Stephen Wechsler and Larisa Zlatić. A theory of agreement and its application to serbo-croatian. *Language*, pages 391–423, 2001. URL <http://uts.cc.utexas.edu/~wechsler/agreement.ps>.