On a Type-Based Analysis of Feature Neutrality and the Coordination of Unlikes

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Overview

- Two related problems:
  - Feature Neutrality
  - Coordination of Unlikes
- A common solution:
  - Expand the set of possible values for a feature

Neutrality

- Sometimes, the answer to the question *A or B?* is *Both!*
  - Is the period in the following sentence an abbreviation-final period, or a sentence-final period?

    (1) Dukakis had been Governor of MA and Bentsen a Senator from Tex.

Case Neutrality

- What is the case of *Frauen* in (2)?

(2)

Er	findet	und	hilft	Frauen
he	finds	and	helps	women.ACC/DAT

(3)

*Er	findet	und	hilft	Männer
he	finds	and	helps	men.ACC

Neutrality vs. Ambiguity

- A word that appears to be compatible with multiple feature values can be either neutral or ambiguous with respect to that value.
- **Ambiguity** describes a situation where the *lexical entry* is compatible with both values; any individual token of a word with an ambiguous feature value may only act as though it has **one** of the possible values.
- **Neutrality** describes a situation where the *word tokens* themselves are compatible with both values; thus a word with a neutral feature value may act as though it simultaneously has **both** feature values.

Example of Feature Ambiguity

(4)

*Sie	singt	und	singen.
She/they	sings.SING	and	sings.PL

- The word *Sie* is ambiguous between $\begin{bmatrix}\text{NUM} & \text{pl}\end{bmatrix}$ and $\begin{bmatrix}\text{NUM} & \text{sg}\end{bmatrix}$; hence it cannot occur in a context where it must be both singular and plural.
- The problem of predicting whether a given feature will take ambiguous or neutral values is still largely an open question; see (Zaenen and Karttunen 1984) and (Pullum and Zwicky 1986) for two attempts.

Underspecification?

- Neutrality cannot be represented by underspecification.
- The form must act as if it had both feature values:

(5)

*Er	findet	und	hilft	Männer.
He	finds	and	helps	men.ACC

(6)

*Er	findet	und	hilft	Kindern.
He	finds	and	helps	children.DAT

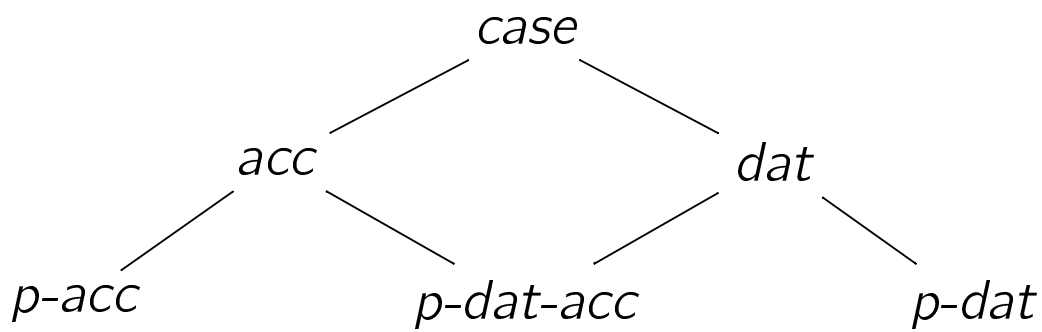
The Ingria Problem

- Ingria (1990) used this data to criticize one of the fundamental aspects of the treatment of concord in constraint-based frameworks: the idea that a single object should be shared between the two representations involved.
- The lack of a treatment of this phenomenon has been seen as a critical drawback to HPSG.

A Solution

- Levine et al. (2001) presents an analysis of case consistency in English parasitic gap constructions that can be adapted to the general case of feature neutrality.
- The general idea: augment the type hierarchy to explicitly contain neutral type values.

Example



- Types for linguistic objects (words): *p-dat*, *p-dat-acc*, *p-acc*.
- Other types (*dat*, *acc*, *case*) are only appropriate for descriptions (selectional restrictions).

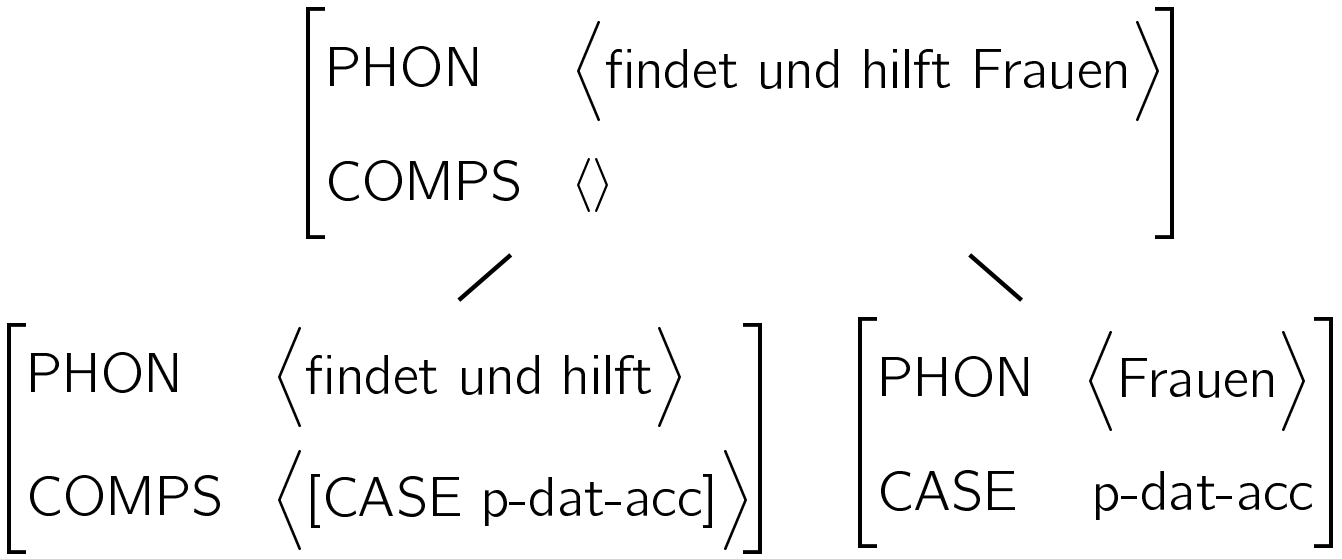
Coordinate Constituent Structure

- Assume a variant of the phrase structure for coordinations originally proposed by (Sag et al. 1985) for GPSG.
- The valence features of the coordinate mother are structure-shared with the valence features of all daughters.
- *coord-phrase* $\rightarrow \begin{bmatrix} \text{VAL} & \boxed{2} \\ \text{DTRS} & \left\langle \begin{bmatrix} \text{VAL} & \boxed{2} \end{bmatrix}, \begin{bmatrix} \text{VAL} & \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix}$

Example

- $\begin{bmatrix} \text{PHON} & \langle \text{findet} \rangle \\ \text{COMPS} & \langle [\text{CASE acc}] \rangle \end{bmatrix}$
- $\begin{bmatrix} \text{PHON} & \langle \text{hilft} \rangle \\ \text{COMPS} & \langle [\text{CASE dat}] \rangle \end{bmatrix}$
- $\begin{bmatrix} \text{PHON} & \langle \text{findet und hilft} \rangle \\ \text{COMPS} & \langle [\text{CASE p-dat-acc}] \rangle \end{bmatrix}$

Example (Cont.)



The Coordination of Unlikes

- Earliest analyses of coordination dealt with **like** coordination: $XP \rightarrow XP\ and\ XP$
- What about sentences like these? (Sag et al. 1985)

  (7) He is a Republican and proud of it. [NP and AP]

  (8) She has become a banker and very conservative. [NP and AP]

  (9) He is healthy and of sound mind. [AP and PP]

  (10) I am both expecting to get the job and of the opinion that it is desirable. [VP and PP]

  (11) I consider that a rude remark and in very poor taste. [NP and PP]

Coordinate NP Case in German

- In German, the coordination of a dative and an accusative NP cannot be the complement of a dative or accusative verb. Complements which coincide or overlap in case, however, are allowed.

(12)

*Er	findet	Männer	und	Kindern.
He	finds	men.ACC	and	children.DAT

(13)

*Er	hilft	Männer	und	Kindern.
He	helps	men.ACC	and	children.DAT

(14)

Er	findet	Männer	und	Kinder.
He	finds	men.ACC	and	children.ACC

(15)

Er	hilft	Männern	und	Frauen.
He	helps	men.DAT	and	women.ACC/DAT

Coordinate NP Case in Russian

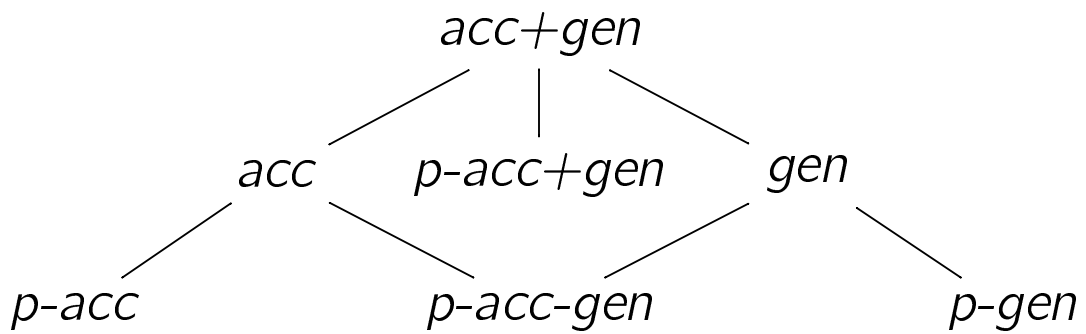
- Under some circumstances, the coordination of a genitive and an accusative NP in Russian may be the complement of (among others) the verb 'expect' (example from (Levy 2001)).

(16)

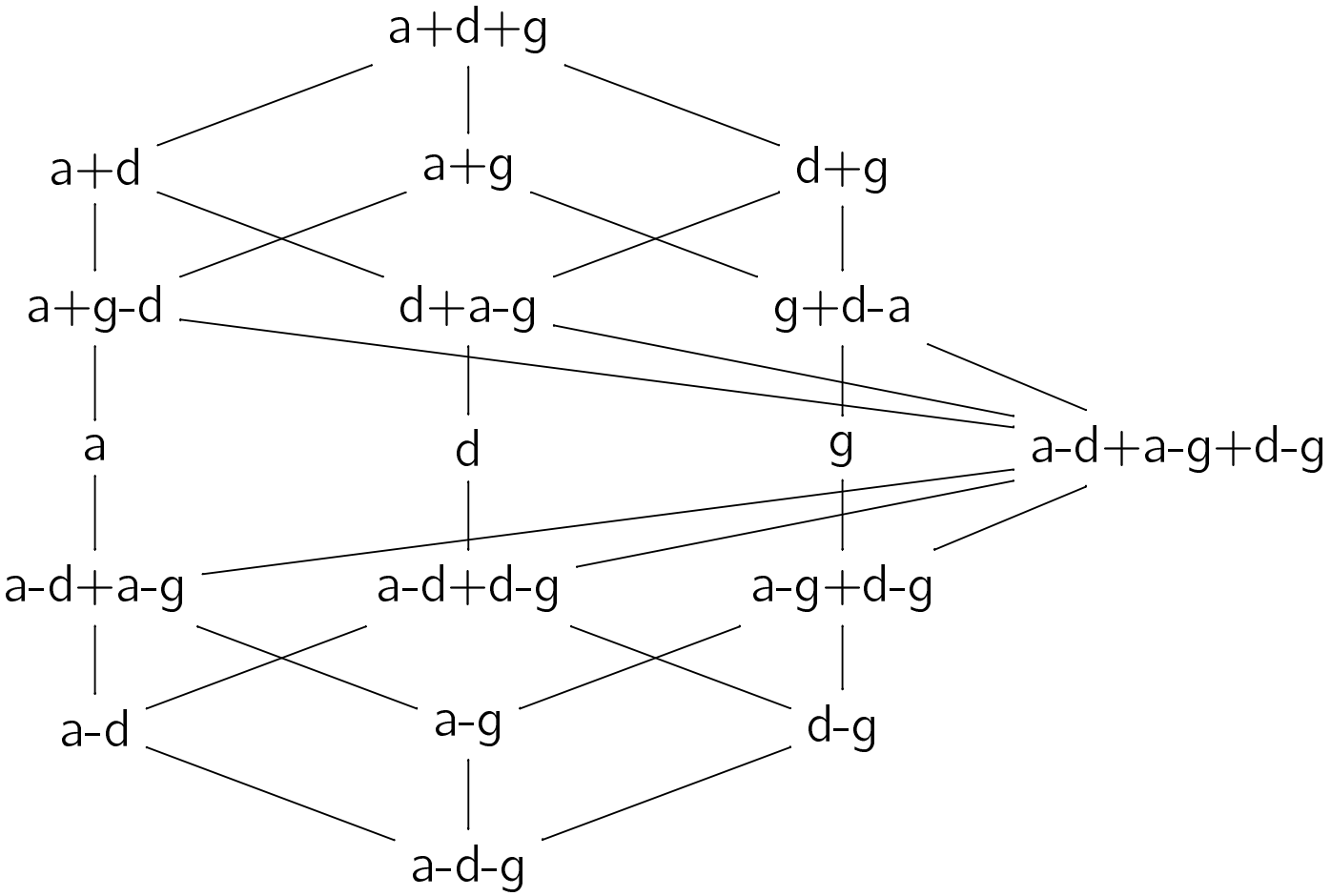
Včera	ves'	den'	on	ožidal	svoju
yesterday	all	day	he	expected	self's.ACC
podrugu	Irinu	i	zvonka	ot	svoego
girlfriend.ACC	Irina.ACC	and	call.GEN	from	self's
brata	Grigorija				
brother	Gregory				

Adding Coordinate Types to the Type Hierarchy

- Both *Männer und Kindern* and *podrugu i zvonka*, being noun phrases, need to have CASE values.
- For the latter NP, we need a subtype of *case* that is not a subtype of *acc* or *gen*.



Three Cases



Illustration

- Core Idea: anything can coordinate, but only some coordinations are acceptable arguments in a given syntactic construction.
- $\left[\text{CASE p-acc+gen}\right]$ can be selected by $\left[\text{CASE case}\right]$ or $\left[\text{CASE p-acc+gen}\right]$.
- $\left[\text{CASE p-acc}\right]$ can be selected by $\left[\text{CASE case}\right]$, $\left[\text{CASE acc}\right]$, or $\left[\text{CASE p-acc}\right]$.
- $\left[\text{CASE p-acc-gen}\right]$ can be selected by $\left[\text{CASE case}\right]$, $\left[\text{CASE acc}\right]$, $\left[\text{CASE gen}\right]$, or $\left[\text{CASE p-acc-gen}\right]$.

Illustration (Cont.)

- $\left[\text{CASE p-acc}\right]$ and $\left[\text{CASE p-acc}\right]$ conjoin to $\left[\text{CASE p-acc}\right]$.
- $\left[\text{CASE p-acc}\right]$ and $\left[\text{CASE p-acc-gen}\right]$ conjoin to $\left[\text{CASE p-acc}\right]$.
- $\left[\text{CASE p-acc}\right]$ and $\left[\text{CASE p-gen}\right]$ conjoin to $\left[\text{CASE p-acc+gen}\right]$.

become

- Having dealt with coordinations of unlike case, we can turn to coordinations of unlike parts of speech.
- Recall that *become* can take NPs and APs, but not PPs or VPs, as arguments.(Sag et al. 1985)

  (17) Connie has become of the opinion that we should get out.

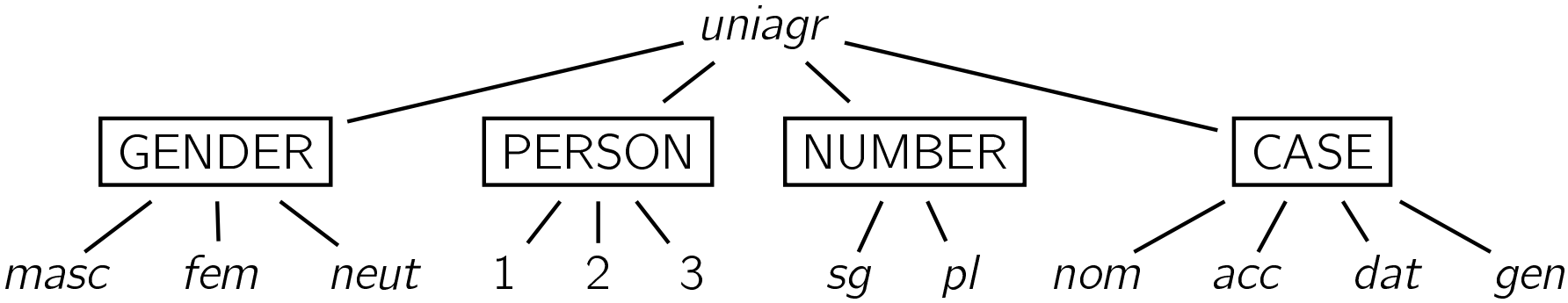
  (18) Tracy became awarded a prize.

  (19) Chris will became talking to colleagues.
- We can therefore conclude that *become* selects for *np+ap* complements.

A Future Issue

- Neutrality across features: the German determiner *der* is nominative singular or genitive plural (but not genitive singular or nominative plural).
- One simple idea: just fold agreement features into one new feature.

Feature Folding



Feature Folding (cont.)

- The result: seventy-two basic *uniagr* types, ranging from masc.1.sg.nom to neut.3.pl.gen.
- Each subset of these seventy-two types could represent a potential neutralization.
- There are 2^{72}, or 4.72×10^{21} possible subsets of seventy-two elements.
- Many people feel that this is an uncomfortably large number of types.

Conclusion

- The "Ingria Problem" is an illusion that has no impact on HPSG.
- Adding types to directly represent neutral and coordinate items is all HPSG needs to account for unlike coordination and neutrality within a feature.
- More work is needed to find the optimal way to handle more complex cases.

References

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