

## Day 4: HPSG approaches to information structure

- HPSG in a nutshell
- Approaches to information structure:
  - Engdahl and Vallduví (1996) and Engdahl (1999)
  - De Kuthy (2002) and De Kuthy and Meurers (2003)
- Issues for future work and discussion



1/68

## The signature of an HPSG grammar

### The signature

- defines the ontology ('declaration of what exists'):
  - which kind of objects are distinguished, and
  - which properties of which objects are modelled.
- consists of
  - the **type hierarchy** (or sort hierarchy) and
  - the **appropriateness conditions**, defining which type has which appropriate attributes (or features) with which appropriate values.

HPHG in a nutshell

3/68

## HPHG in a nutshell

An **HPHG grammar** formally consists of

- I. the **signature** as declaration of the domain, and
- II. the **theory** constraining the domain.

The theory, from a linguistic perspective, consists of

- a) a **lexicon**: licensing basic words
- b) **lexical rules**: licensing derived words
- c) **immediate dominance (ID) schemata**: licensing constituent structure
- d) **linear precedence (LP) statements**: constraining word order
- e) a set of **grammatical principles**: expressing generalizations about linguistic objects

HPHG in a nutshell

2/68

## Descriptions

A **description language** and its abbreviating **AVM notation** is used to talk about sets of objects. Descriptions consists of three building blocks:

- **Type** descriptions single out all objects of a particular type, e.g., *word*
- **Attribute-value pairs** describe objects that have a particular property. The attribute must be appropriate for the particular type of object, and the value can be any kind of description, e.g., [SPOUSE [NAME *Mary*]]
- **Tags** (structure sharing) to specify **token identity**, e.g.  $\boxed{\text{ }}$

Complex descriptions are obtained through conjunction ( $\wedge$ ), disjunction ( $\vee$ ) and negation ( $\neg$ ). In the AVM notation, conjunction is implicit.

HPHG in a nutshell

4/68

## The theory of an HPSG grammar

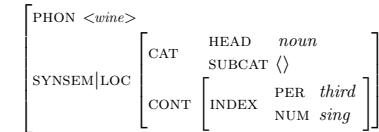
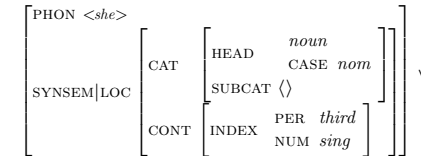
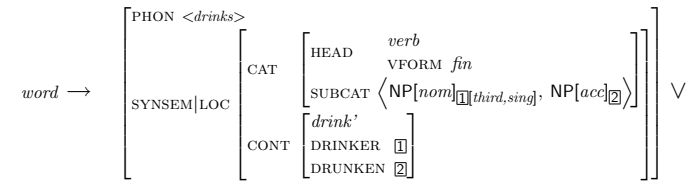
A **theory** is a set of description language statements, often referred to as the constraints.

- The theory singles out a subset of the objects declared in the signature, namely those which are grammatical.
- A linguistic object is admissible with respect to a theory iff it satisfies each of the descriptions in the theory and so does each of its substructures.

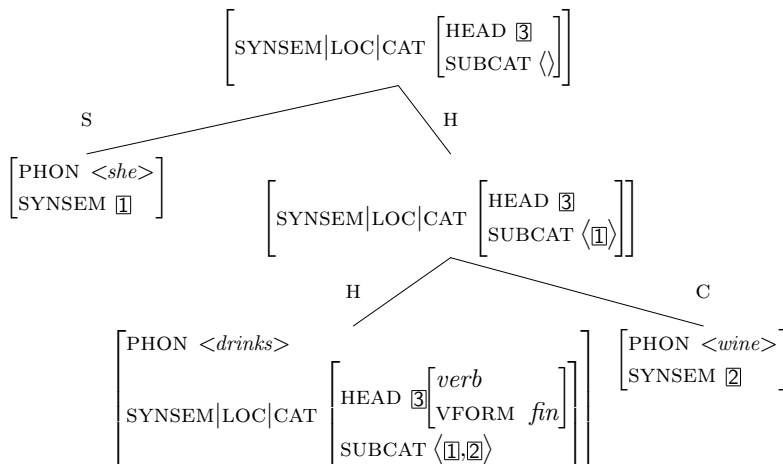
Note that *HPSG models* linguistic objects, i.e., *total objects* as they exist in the world, not potentially partial knowledge about the world. Every linguistic object thus is total with respect to the ontology declared in the signature. Formally, the feature structures used as models are required to be

- *totally well-typed*: Every node has all the attributes appropriate for its type and each attributes has an appropriate value.
- *sort-resolved*: Every node is of a maximally specific type.

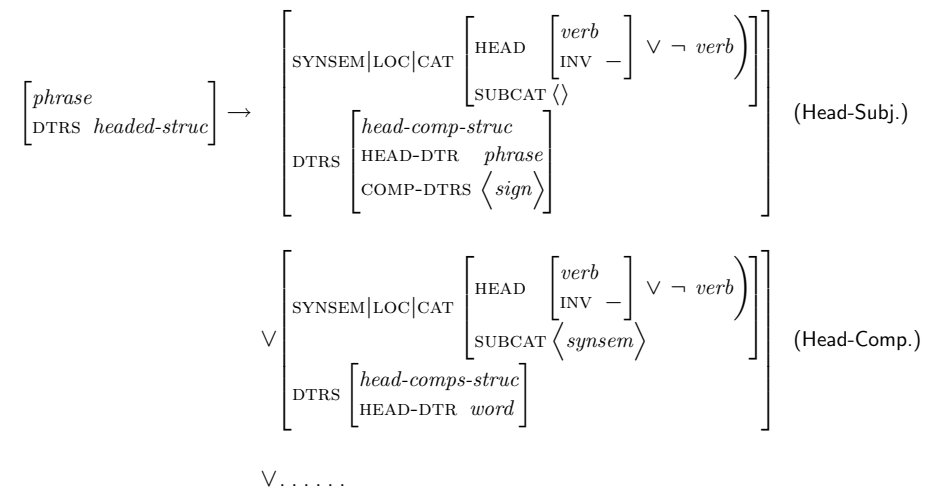
## Example lexicon



## Sketch of an example analysis



## Immediate Dominance Principle (for English):



## An example principle: The Head-Feature Principle (HFP)

$$\left[ \begin{array}{l} \textit{phrase} \\ \text{DTRS } \textit{headed-structure} \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{SYNSEM|LOC|CAT|HEAD} \\ \text{DTRS|HEAD-DTR|SYNSEM|LOC|CAT|HEAD} \end{array} \right] \left[ \begin{array}{l} \boxed{1} \\ \boxed{1} \end{array} \right]$$

## The interface between prosody and information structure

- Following Bolinger (1958), Engdahl and Vallduví assume that focus and link (topic) are each marked by a pitch accent: A accent (falling contour) and B accent (fall-rise).
- The connection between intonation and information structure is expressed in HPSG by extending the PHON value with a feature ACCENT and specifying:

$$\textit{word} \rightarrow \left[ \begin{array}{l} \text{PHON|ACCENT } A \\ \text{SYNSEM|LOC} \left[ \begin{array}{l} \text{CONTENT} \\ \text{CONTEXT|INFO-STRUC|FOCUS} \end{array} \right] \end{array} \right] \left[ \begin{array}{l} \boxed{1} \\ \boxed{1} \end{array} \right] \vee$$

$$\left[ \begin{array}{l} \text{PHON|ACCENT } B \\ \text{SYNSEM|LOC} \left[ \begin{array}{l} \text{CONTENT} \\ \text{CONTEXT|INFO-STRUC|GROUND|LINK} \end{array} \right] \end{array} \right] \left[ \begin{array}{l} \boxed{1} \\ \boxed{1} \end{array} \right] \vee$$

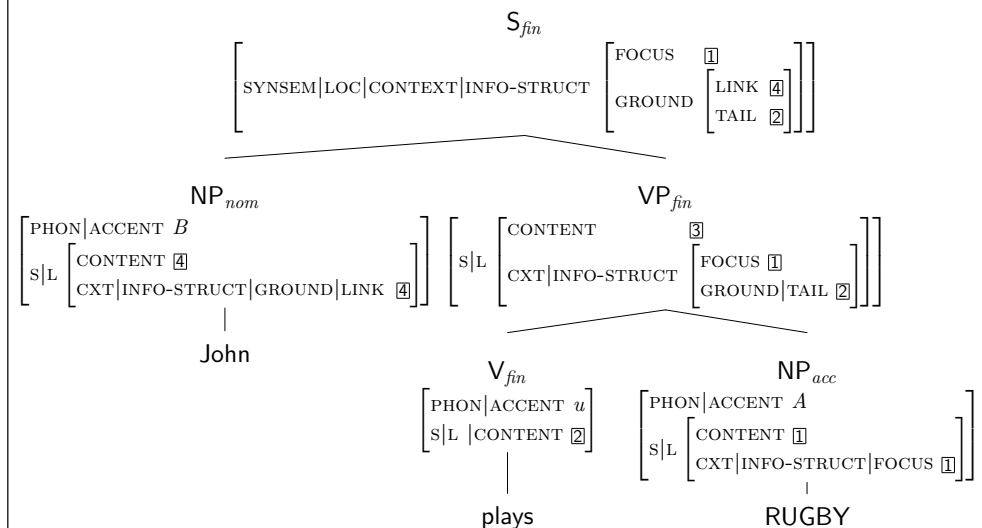
$$\left[ \begin{array}{l} \text{PHON|ACCENT } \textit{unaccented} \\ \text{SYNSEM|LOC} \left[ \begin{array}{l} \text{CONTENT} \\ \text{CONTEXT|INFO-STRUC } \textit{info-struct} \end{array} \right] \end{array} \right] \left[ \begin{array}{l} \textit{content} \\ \textit{info-struct} \end{array} \right]$$

## The approach to information structure of Engdahl and Vallduví

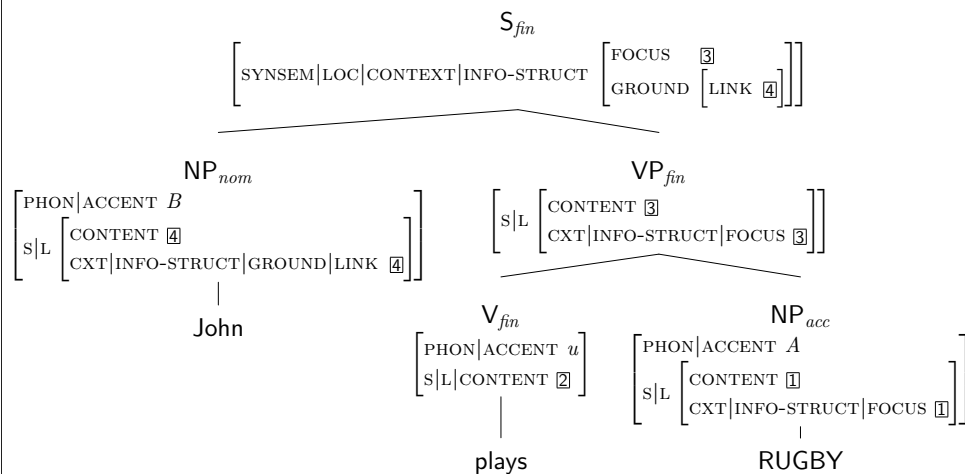
- The approach of Engdahl and Vallduví (1996) is built on the information packaging theory of Vallduví (1992), and they assume the same partitioning of *focus* and *ground*, with the *ground* further divided into *link* and *tail*.
- Engdahl (1999) encodes this approach by enriching HPSG signs with the following information structure representation:

$$\left[ \begin{array}{l} \textit{sign} \\ \text{SYNSEM|LOCAL|CONTEXT} \left[ \begin{array}{l} \text{INFO-STRUC} \left[ \begin{array}{l} \text{FOCUS } \textit{content} \\ \text{GROUND} \left[ \begin{array}{l} \text{LINK } \textit{content} \\ \text{TAIL } \textit{content} \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right]$$

## An example analysis: Narrow object focus

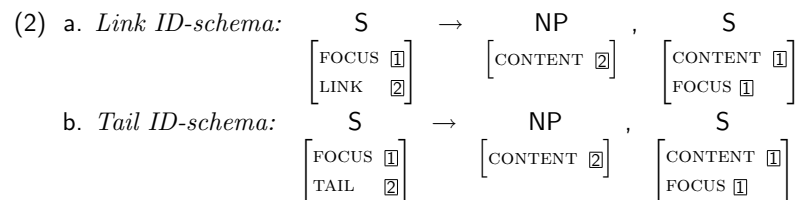


## An example analysis: Wide VP focus



## Word order and information structure

- In their work on Catalan, Engdahl and Vallduví (1996) observe that there is a correlation between the position in the sentence and the information status:
  - Link material is left-dislocated and tail material is right-dislocated.
  - What remains inside the core clause is interpreted as focal.
- To account for this correlation, the ID schemata for Catalan that license dislocation also constrain the informational status of the daughters.



- The word order is constrained so that a constituent whose LINK value is instantiated precedes the FOCUS, which in turn precedes a TAIL, if there is one.

## Information structure values of phrases

- Engdahl and Vallduví (1996) propose that the general ID schemata for English should be enriched by instantiation principles for the INFO-STRUC features.
- These principles are not fully formulated and include notions such as “not instantiated”, which cannot be interpreted in the standard HPSG architecture (Pollard and Sag 1994).
- Focus projection for English is specified so that focus can only project from the most oblique (i.e., rightmost) complement daughter.

Note that this focus projection principle also licenses focus projection from the subject with intransitive verbs, as in (1).

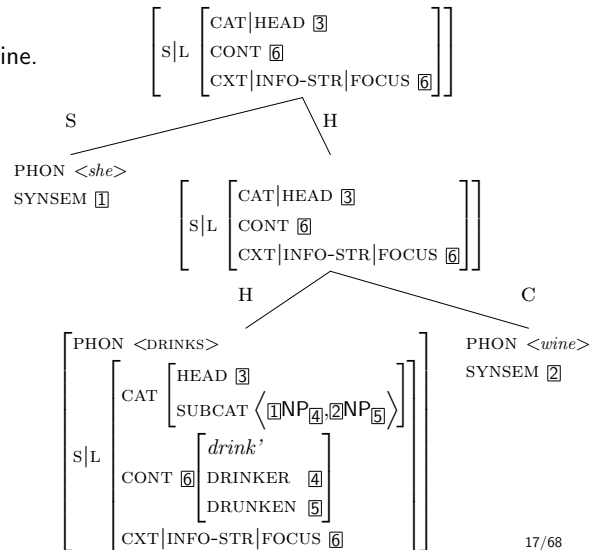
- (1) a.  $\llbracket \text{Your MOTHER} \rrbracket_F$  phoned.  
 b.  $\llbracket \text{Your MOTHER phoned.} \rrbracket_F$

## Problems with *content* as the value of information features

- Engdahl (1999) does not discuss the nature of the CONTENT that is structure-shared with the INFO-STRUC features FOCUS, LINK, and TAIL.
- It is important to note that this cannot be the traditional CONTENT representation of HPSG proposed in Pollard and Sag (1994):
  - Under their approach, the semantics of a phrase is already assembled in the lexical specifications of the semantic head. The CONTENT of the mother and the semantic head daughter are structure shared, i.e., identical.
  - This leads to unwanted results in the cases of narrow focus on the verb and VP focus, since in both cases the focus value is identical to the focus value of an all-focus utterance, as illustrated on the next page.

### Incorrect focus values I: narrow focus

(3) Q: Does she hate wine?  
A: No, she  $\llbracket$ DRINKS $\rrbracket_F$  wine.



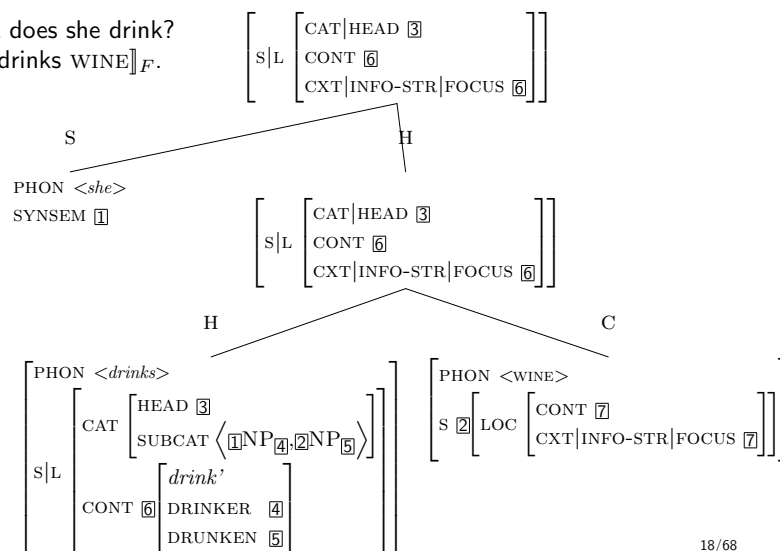
### Open issues in the approach of Engdahl and Vallduví

The following aspects of the approach need to be rethought:

- Where in a *sign* is the INFO-STRUC appropriately placed?
- What are appropriate values for the information structure features FOCUS and GROUND?
- Proper principles determining the distribution of INFO-STRUC in the tree need to be formulated.

### Incorrect focus values II: VP focus

(4) Q: What does she drink?  
A: She  $\llbracket$ drinks WINE $\rrbracket_F$ .



### Our approach to information structure in HPSG

- Two empirical challenges from the grammar of German
  - I. Accounting for *context-effects* on the grammaticality of *NP-PP Split* (De Kuthy 2002)
  - II. Explaining the *definiteness effect* that is observable when subjects occur as part of fronted non-verbal constituents (De Kuthy and Meurers 2003)
- We address these empirical challenges by
  - investigating information structure requirements for partial fronting
    - \* focus and focus projection
    - \* connecting focus projection to what can be fronted
  - developing an HPSG account taking as its starting point the approach of Engdahl and Vallduví (1996)

## Phenomenon I: NP-PP Split in German

### Fronting of a PP

- (5) *Über Syntax* hat Sarah [ein Buch] ausgeliehen.  
about syntax has Sarah a book borrowed  
'Sarah borrowed a book on syntax.'

### Fronting of a partial NP

- (6) [Ein Buch] hat Sarah *über Syntax* ausgeliehen.  
a book has Sarah about syntax borrowed  
'Sarah borrowed a book on syntax.'

## Context effects affecting the NP-PP Split

- (8) Gestern wurde in der Bibliothek eine Anzahl von Linguistikbüchern geklaut.  
Vor allem Semantikbücher verschwanden dabei.  
'Yesterday, a number of linguistics books were stolen from the library. Mostly books on semantic disappeared.'

*Über Syntax* wurde jedoch [nur ein einziges Buch] geklaut.  
on syntax was however only one single book stolen

'There was, however, only one book on syntax stolen.'

- (9) Gestern war Klaus seit langem mal wieder in der Bibliothek.  
'Yesterday, Klaus went to the library.'

# [Ein Buch] wollte er dort *über Syntax* ausleihen.  
a book wanted he there on syntax borrow

'He wanted to borrow a book on syntax there.'

## Lexical restrictions affecting the NP-PP Split

- (7) a. \* *Über Syntax* hat Sarah [ein Buch] geklaut.  
on syntax has Sarah a book stolen  
'Sarah stole a book on syntax.'
- b. \* [Ein Buch] hat Sarah *über Syntax* geklaut.  
a book has Sarah about syntax stolen  
'Sarah stole a book on syntax.'

## Accounting for the context effect

To account for the context effects, we

- explore possible focus-background structures of NP-PP split
- develop an information-structure component for HPSG
- formulate constraints on the focus-background structures of NP-PP split which interact with the syntactic account

## Information structure in German

**Primitives:** We assume a division into *focus* and *background*, following the perspective that the new, information-bearing part of the sentence is the central aspect of information structure (cf., e.g., Sgall et al. 1986; Stechow 1981).<sup>1</sup>

**Manifestation:** German is a so-called intonation language in which focused constituents are signaled by pitch accent (Féry 1993).<sup>1</sup>

- The syllable bearing the pitch accent is called the *focus exponent*.<sup>1</sup>
- Only one syllable is stressed by a pitch accent, but through *focus projection* larger parts of a sentence can be focused.

## Focus-background structures of NP-PP split

- Which questions are compatible with which accents in the NP-PP split examples?
- We have investigated:
  - Fronted PPs
    - \* accent on the partial NP
    - \* accent on the PP
  - Fronted partial NPs
    - \* accent on the partial NP
    - \* accent on the PP
- Based on this empirical investigation we conclude: The split NP and PP cannot both be part of the same focus projection or the background.

## Pitch accents in German

### Narrow Focus

(10) What did Karl give to the child?

- a. Karl hat dem Kind [das BUCH\]<sub>F</sub> geschenkt.  
Karl has the child the book given  
'Karl has given the book to the child.'

### Multiple focus construction

(11) Who travels where?

- a. [GABI/]<sub>F</sub> fährt [nach BERLIN\]<sub>F</sub>.  
Gabi travels to Berlin

### Topic accent – I-topicalization

(12) Who slept?

- a. [GESCHLAFEN/]<sub>T</sub> hat [KEINER\]<sub>F</sub> von uns, aber . . .  
slept has no-one of us but . . .

## Fronted PPs – accent on the NP (I)

### Only focus on NP possible

(13) a. What did Sarah borrow about Mozart?

Über Mozart hat Sarah [ein BUCH\]<sub>F</sub> ausgeliehen.  
about Mozart has Sarah a book borrowed

b. What did Sarah borrow?

# [Über Mozart]<sub>F</sub> hat Sarah [ein BUCH\]<sub>F</sub> ausgeliehen.  
about Mozart has Sarah a book borrowed

c. What happened?

# [Über Mozart hat Sarah ein BUCH\ ausgeliehen.]<sub>F</sub>  
about Mozart has Sarah a book borrowed

## Fronted PPs — accent on the NP (II)

### Multiple focus construction and i-topicalization

- (14) a. About which composer did Sarah borrow what?  
[Über MOZART/] <sub>F</sub> hat Sarah [ein BUCH] <sub>F</sub> ausgeliehen.  
about Mozart has Sarah a book borrowed
- b. What did Sarah borrow about famous composers?  
[Über MOZART/] <sub>T</sub> hat Sarah [ein BUCH] <sub>F</sub> ausgeliehen.  
about Mozart has Sarah a book borrowed

## Fronted NPs – accent on the PP

### Only focus on PP possible

- (16) a. About what did Sarah borrow a book?  
Ein Buch hat Sarah [über MOZART] <sub>F</sub> ausgeliehen.  
a book has Sarah on Mozart borrowed
- b. What did Sarah borrow?  
# [Ein Buch] <sub>F</sub> hat Sarah [über MOZART] <sub>F</sub> ausgeliehen.  
a book has Sarah on Mozart borrowed
- c. What did Sarah do?  
# [Ein Buch] <sub>F</sub> hat Sarah [über MOZART \ ausgeliehen.] <sub>F</sub>  
a book has Sarah on Mozart borrowed

## Fronted PPs – accent on the PP

### Only focus on PP possible

- (15) a. About what did Sarah borrow a book?  
[Über MOZART] <sub>F</sub> hat Sarah ein Buch ausgeliehen.  
about Mozart has Sarah a book borrowed
- b. What did Sarah borrow?  
# [Über MOZART] <sub>F</sub> hat Sarah [ein Buch] <sub>F</sub> ausgeliehen.  
about Mozart has Sarah a book borrowed
- c. What did Sarah do?  
# [Über MOZART] <sub>F</sub> hat Sarah [ein Buch ausgeliehen.] <sub>F</sub>  
about Mozart has Sarah a book borrowed

## Fronted NPs – accent on the PP (II)

### Multiple focus construction and i-topicalization

- (17) a. About which composer did Sarah borrow what?  
[Ein BUCH/] <sub>F</sub> hat Sarah [über MOZART] <sub>F</sub> ausgeliehen.  
a book has Sarah about Mozart borrowed
- b. Material about which composer did Sarah borrow?  
[Ein BUCH/] <sub>T</sub> hat Sarah [über MOZART] <sub>F</sub> ausgeliehen.  
a book has Sarah about Mozart borrowed



## Fronted NPs – accent on the NP

### Only focus on NP possible

- (18) a. What did Sarah borrow about Mozart?  
[Ein BUCH]<sub>F</sub> hat Sarah über Mozart ausgeliehen.  
a book has Sarah about Mozart borrowed
- b. What did Sarah borrow?  
# [Ein BUCH]<sub>F</sub> hat Sarah [über Mozart]<sub>F</sub> ausgeliehen.  
a book has Sarah about Mozart borrowed
- c. What did Sarah do?  
# [Ein BUCH]<sub>F</sub> hat Sarah [über Mozart ausgeliehen.]<sub>F</sub>  
a book has Sarah about Mozart borrowed

## Counterexamples to the Specificity Effect

Pafel (1993) shows that specificity of NP does not always disallow fronting of an embedded PP.

- (20) a. *Über Syntax* hat Karl nur **dieses**, aber nicht **jenes** Buch gelesen.  
on syntax has Karl only this but not that book read  
'Karl only read this book on syntax and not that one.'
- b. [Nur dieses Buch] hat Karl *über Syntax* gelesen.  
Only this book has Karl on syntax read  
'Karl only read this book on syntax.'

Our idea: Reduce this specificity effect to information structure principles.

## The Specificity Effect

Müller (1996) and others claim that NP-PP split exhibits a specificity effect, a classical restriction on extraction (Fiengo and Higginbotham 1981).

- (19) a. \* *Über Syntax* hat Karl [**das** Buch] gelesen.  
on syntax has Karl the book read  
'Karl read the book on syntax.'
- b. ?? [**Das** Buch] hat Karl *über Syntax* gelesen.  
the book has Karl on syntax read

## The pragmatics of definite determiners

We need to distinguish of two classes of definite NPs:

- a) Definite NPs which have as antecedent a discourse referent introduced via the utterance of a preceding NP and thus are discourse old or strongly familiar (Roberts 2003) and have to be part of the background of a sentence.
- b) Definite NPs which are used deictically, endophorically or as a semantic definite (i.e., which are weakly familiar, Roberts 2003), which are often not discourse old and can thus be in the focus of a sentence.

## a) Definite NPs which refer to entities present in the discourse

(21) Yesterday, I saw an interesting book on syntax at Osiander.

a. Ich habe mir [das Buch über Syntax] heute gekauft.  
I have me the book on syntax today bought  
'Today, I bought this book on syntax.'

b. # *Über Syntax* habe ich mir [das Buch] heute gekauft.  
on syntax have I me the book today bought

The entire definite NP including the embedded PP in (21b) is in the background of the sentence → ungrammaticality expected.

## An HPSG analysis

We couch our analysis in the HPSG approach to the information structure-syntax interface developed in De Kuthy (2002), taking Engdahl and Vallduví (1996) as a starting point, but extending it as spelled out here and in the following:

### The value of the information structure features

- The values of the `INFO-STRUC` features are chunks of semantic information.
- The language Ty2 of two-sorted type theory is chosen as the semantic object language, as proposed in Sailer (2000).
- The values of `FOCUS` and `TOPIC` in the information structure are lists of Ty2 expressions, called *meaningful expressions*.

## b) Definite NPs which do *not* refer to such present entities

Such NPs can be in the focus of an utterance:

(22) What did you buy at Osiander?

Ich habe mir das Buch über Syntax gekauft, das Du mir letztlich  
I have me the book on syntax bought which you me recently  
empfohlen hast.  
recommended have  
'I bought the book on syntax that you recommended to me very recently.'

This supports a definite NP in the focus, with the PP in the background:

(23) What did you borrow on syntax?

*Über Syntax* habe ich mir [das Buch, das Du mir empfohlen  
on syntax have I me the book which you to me recommended  
hast,] ausgeliehen.  
has borrowed  
'On Syntax I borrowed the book that you recommended to me.'

## Location of information structure in signs

- Information structure as part of *local* objects as assumed by Engdahl and Vallduví (1996) is problematic in connection with unbounded dependencies.
- In long-distance dependencies, only the filler should contribute to the information structure of a sentence, not the trace.
- Information structure as part of *synsem* object would only make sense if it played a role in syntactic selection.
- Conclusion: Information structure should be appropriate for *sign* objects.

<i>sign</i>	
PHON	<i>list</i>
SYNSEM	<i>synsem</i>
INFO-STRUC	<i>info-struct</i>



## Relating pitch accents and lexical information structure

$$\begin{array}{l}
 \text{word} \rightarrow \left[ \begin{array}{l} \text{PHON|ACCENT} \quad \textit{falling-accent} \\ \text{SS|LOC|CONT|LF} \quad \textcircled{1} \\ \text{STRUC-MEANING} \quad \text{FOCUS} \langle \textcircled{1} \rangle \\ \quad \quad \quad \text{TOPIC} \langle \rangle \end{array} \right] \\
 \\
 \vee \left[ \begin{array}{l} \text{PHON|ACCENT} \quad \textit{rising-accent} \\ \text{SS|LOC|CONT|LF} \quad \textcircled{1} \\ \text{STRUC-MEANING} \quad \left( \begin{array}{l} \text{FOCUS} \langle \rangle \\ \text{TOPIC} \langle \textcircled{1} \rangle \end{array} \right) \\ \quad \quad \quad \vee \\ \quad \quad \quad \left( \begin{array}{l} \text{FOCUS} \langle \textcircled{1} \rangle \\ \text{TOPIC} \langle \rangle \end{array} \right) \end{array} \right] \\
 \\
 \vee \left[ \begin{array}{l} \text{PHON|ACCENT} \quad \textit{unaccented} \\ \text{STRUC-MEANING} \quad \text{FOCUS} \langle \rangle \\ \quad \quad \quad \text{TOPIC} \langle \rangle \end{array} \right] \\
 \\
 \vee \dots
 \end{array}$$

An information structure account of NP-PP Split (De Kuthy 2002)

45/68

## Footnote for the formally inclined: Relation definitions

$$\begin{array}{l}
 \textit{collect-focus} \langle \rangle := \langle \rangle. \\
 \textit{collect-focus} \left( \left[ \begin{array}{l} \text{FIRST} \left[ \text{STRUC-MEANING|FOCUS} \langle \textcircled{1} \rangle \right] \\ \text{REST} \textcircled{2} \end{array} \right] \right) := \left[ \begin{array}{l} \text{FIRST} \textcircled{1} \\ \text{REST} \quad \textit{collect-focus} \textcircled{2} \end{array} \right].
 \end{array}$$

$$\begin{array}{l}
 \textit{a-dtr} \left[ \begin{array}{l} \text{HEAD-DTR} \textcircled{1} \end{array} \right] := \textcircled{1}. \\
 \textit{a-dtr} \left[ \begin{array}{l} \text{NON-HEAD-DTRS} \quad \textit{element} \textcircled{1} \end{array} \right] := \textcircled{1}.
 \end{array}$$

$$\begin{array}{l}
 \textit{element} \left[ \begin{array}{l} \text{FIRST} \textcircled{1} \end{array} \right] := \textcircled{1}. \\
 \textit{element} \left[ \begin{array}{l} \text{REST} \textcircled{2} \end{array} \right] := \textit{element} \textcircled{2}.
 \end{array}$$

An information structure account of NP-PP Split (De Kuthy 2002)

47/68

## The information structure of phrases

Focus projection principles define which parts of the sentence can be in the focus given a particular pitch accent placement.

**Focus projection in NPs and PPs:** If the rightmost constituent in a PP or NP is focused, the entire NP or PP can be.

$$\begin{array}{l}
 \textit{phrase} \rightarrow \left[ \begin{array}{l} \text{STRUC-MEANING|FOCUS} \textcircled{1} \oplus \textit{collect-focus} \textcircled{2} \\ \text{HEAD-DTR|STRUC-MEANING|FOCUS} \textcircled{1} \\ \text{NON-HEAD-DTRS} \textcircled{2} \end{array} \right] \\
 \\
 \vee \left[ \begin{array}{l} \text{PHON|PHON-STR} \textcircled{1} \oplus \textcircled{2} \\ \text{SS|LOC} \quad \text{CAT|HEAD} \quad \textit{noun} \vee \textit{prep} \\ \quad \quad \quad \text{CONT|LF} \textcircled{3} \\ \text{STRUC-MEANING|FOCUS} \langle \textcircled{3} \rangle \\ \textit{a-dtr} \left( \left[ \begin{array}{l} \text{PHON|PHON-STR} \quad \textcircled{2} \\ \text{SS|L|CONT|LF} \quad \textcircled{4} \\ \text{STRUC-MEANING|FOCUS} \langle \textcircled{4} \rangle \end{array} \right] \right) \end{array} \right] \\
 \\
 \vee \dots
 \end{array}$$

An information structure account of NP-PP Split (De Kuthy 2002)

46/68

## Example analyses: information structure in NP-PP split

(25) a. Was hat Sarah über welchen Komponisten ausgeliehen?

'About which composer did Sarah borrow what?'

[Über MOZART/] <sub>F</sub> hat Sarah [Ein BUCH\] <sub>F</sub> ausgeliehen.  
 about Mozart has Sarah a book borrowed

b. Was hat Sarah über berühmte Komponisten ausgeliehen?

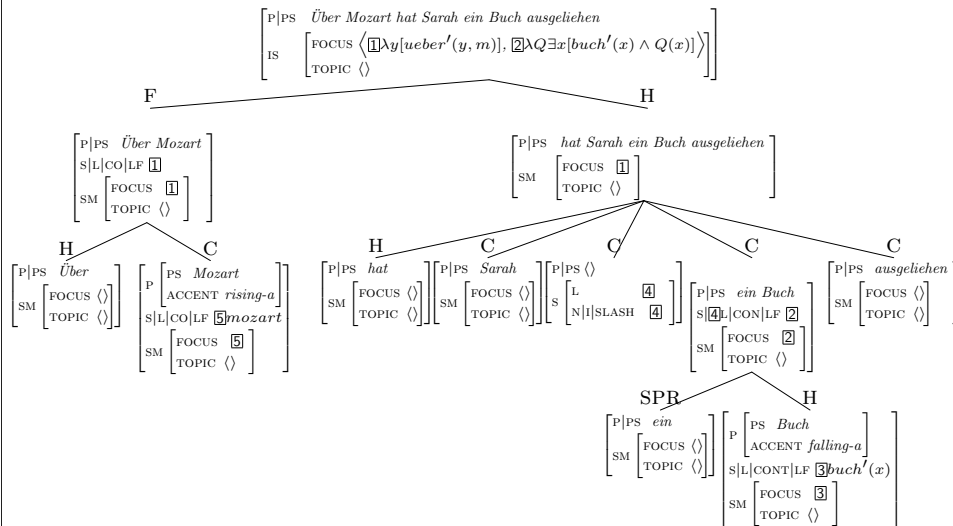
'What did Sarah borrow about famous composers?'

[Über MOZART/] <sub>T</sub> hat Sarah [ein BUCH\] <sub>F</sub> ausgeliehen.  
 about Mozart has Sarah a book borrowed

An information structure account of NP-PP Split (De Kuthy 2002)

48/68

## A multiple-focus structure



An information structure account of NP-PP Split (De Kuthy 2002)

49/68

## A context principle

- (26) a. What did Sarah borrow?  
 # [Über Mozart]<sub>F</sub> hat Sarah [ein BUCH\]<sub>F</sub> ausgeliehen.  
 about Mozart has Sarah a book borrowed
- b. What happened?  
 # [Über Mozart hat Sarah ein BUCH\ ausgeliehen.]<sub>F</sub>  
 about Mozart has Sarah as book borrowed

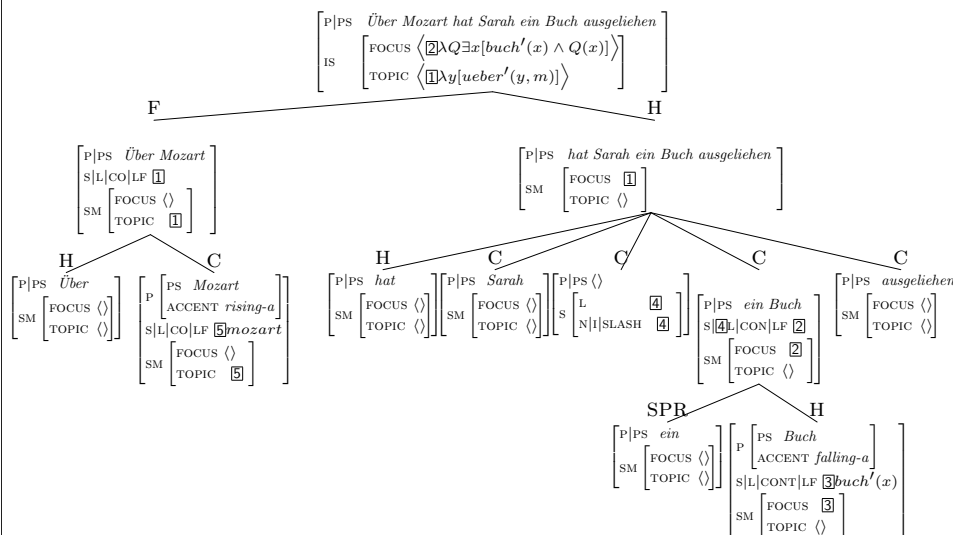
**A principle:** In an utterance, in which a PP occurs separate from an NP, either the PP or the NP must be in the focus or in the topic of the utterance, but they cannot both be part of the topic or the same focus projection.

⇒ This is a construction specific principle which nevertheless establishes a general pattern. Further research is needed to determine whether it can be applied to partial constituents in general.

An information structure account of NP-PP Split (De Kuthy 2002)

51/68

## A topic-focus structure



An information structure account of NP-PP Split (De Kuthy 2002)

50/68

## Phenomenon II: Subjects fronted as part of non-finite VPs

A subject in German can sometimes be realized inside a fronted non-finite verbal constituent (Kratzer 1984, Grewendorf 1989, Haider 1990):

- (27) [Ein Außenseiter gewonnen] hat hier noch nie.  
*a<sub>nom</sub>* outsider won has here still never  
 'An outsider has never won here yet.'

This option is only available for subjects of raising verbs (Meurers 2000, ch. 10):

- (28) [Ein Außenseiter zu gewinnen] scheint hier eigentlich nie.  
*a<sub>nom</sub>* outsider to win seems here actually never  
 'An outsider never actually seems to win here.'
- (29) \* [Ein Außenseiter zu gewinnen] versuchte hier noch nie.  
*a<sub>nom</sub>* outsider to win tried here actually never  
 'An outsider never actually tried to win here.'

An information structure account to definiteness requirements in VP (De Kuthy and Meurers 2003)

52/68

## The definiteness effect

Definite subjects appear to be excluded from this construction (Kratzer 1984):

- (30) \* [Der Außenseiter gewonnen] hat hier noch nie.  
 the outsider won has here still never

But there are some rarely noted counterexamples to this definiteness effect:

- (31) a. [Die Hände gezittert] haben ihm diesmal nicht. (Höhle 1997, p.114)  
 the hands trembled have him this time not  
 'This time his hands didn't tremble.'
- b. [Das Telefon geklingelt] hat hier schon lange nicht mehr.  
 the telephone rang has here yet long not anymore  
 'The telephone hasn't been ringing here in a long time.'

Our Idea: Explore the information structure requirements of the construction, since definiteness connects to the familiarity of discourse referents.

## Connecting focus projection to possible frontings

The subject of those verbs which allow their subject to be the focus exponent can also be included as part of a fronted verbal constituent:

- (34) a. # [[Ein POLITIKER hat das Volk belogen.]]<sub>F</sub>  
 a<sub>nom</sub> politician has the people lied to
- b. \* [[Ein Politiker belogen] hat das Volk noch nie.
- (35) a. [[Ein HUND bellt.]]<sub>F</sub>  
 a<sub>nom</sub> dog barks
- b. [Ein Hund gebellt] hat hier noch nie.  
 a dog barked has here yet never
- (36) a. [[Dem Präsidenten ist ein FEHLER unterlaufen.]]<sub>F</sub>  
 the<sub>dat</sub> president is a<sub>nom</sub> mistake crept in
- b. [Ein Fehler unterlaufen] ist dem Präsidenten bisher noch nie.  
 an error crept in is the president so far still never

This connection turns out to be a rediscovery: Webelhuth (1990, p. 53)

## Focus projection

The focus exponent in an all-focus sentence normally is one of the arguments of the main verb, but not the subject (Stechow and Uhmman 1986):

- (32) Was ist denn hier für eine Aufregung? / What's all the excitement about?
- a. [[Ein Politiker hat das VOLK belogen.]]<sub>F</sub>  
 a<sub>nom</sub> politician has the people lied to
- b. # [[Ein POLITIKER hat das Volk belogen.]]<sub>F</sub>  
 a<sub>nom</sub> politician has the people lied to

In certain cases the subject *can* be the focus exponent (Uhmman 1991):

- (33) Was ist denn hier für ein Lärm? / What's all the noise about?
- a. [[Ein HUND bellt.]]<sub>F</sub>  
 a<sub>nom</sub> dog barks
- b. [[Dem Präsidenten ist ein FEHLER unterlaufen.]]<sub>F</sub>  
 the<sub>dat</sub> president is a<sub>nom</sub> mistake crept in  
 'The president made a mistake.'

## An information structure requirement for fronted VPs

Webelhuth (1990, p. 53) concludes that we can explain this connection if we assume that a fronted verbal constituent has to be focused.

- (37) What has never happened here?  
 [[Ein AUSSENSEITER gewonnen]]<sub>F</sub> hat hier noch nie.  
 an outsider won has here yet never
- (38) What has never happened to an outsider?  
 # [Ein Außenseiter [GEWONNEN]]<sub>F</sub> hat hier noch nie.
- (39) Who has never won here?  
 # [[Ein AUSSENSEITER]<sub>F</sub> gewonnen] hat hier noch nie.

In addition, we observe that *only* the fronted constituent must be focused:

- (40) What's all the excitement about?  
 # [[Ein AUSSENSEITER gewonnen] hat hier noch nie]]<sub>F</sub>

## The information structure of phrases revisited

On slide 46 we discussed focus projection for the nominal domain, defining which parts of the sentence can be focus given a particular pitch accent placement.

For the verbal domain, the regularities are known to be influenced by a variety of factors, such as the word order and lexical properties of the verbal head (cf., e.g., Stechow and Uhmman 1986).

Since verbs need to be able to lexically mark which of their arguments can project focus when they are accented, we introduce the boolean-valued feature FOCUS-PROJECTION-POTENTIAL (FPP) for objects of type *synsem*.

Example: *lieben* (love) allows projection from the object but not the subject:

$$\left[ \begin{array}{l} \text{PHON} \langle \textit{lieben} \rangle \\ \text{ARG-S} \left\langle \begin{array}{l} \text{LOC|CAT|HEAD} \left[ \begin{array}{l} \textit{noun} \\ \text{CASE } \textit{nom} \end{array} \right] \\ \text{FPP } \textit{minus} \end{array} \right\rangle, \left[ \begin{array}{l} \text{LOC|CAT|HEAD} \left[ \begin{array}{l} \textit{noun} \\ \text{CASE } \textit{acc} \end{array} \right] \\ \text{FPP } \textit{plus} \end{array} \right] \right\rangle \end{array} \right]$$

An information structure account to definiteness requirements in VP (De Kuthy and Meurers 2003)

57/68

## A context principle for partial VP fronting

**Webelhuth's generalization:** In an utterance with a fronted verbal constituent, the entire fronted verb phrase must be in the focus of the utterance (nothing more, nothing less).

**Formalization:**

*head-filler-phrase*  
NON-HEAD-DTR|SYNSEM|LOC|CAT|HEAD *verb* →

$$\left[ \begin{array}{l} \text{INFO-STRUC|FOCUS } \textit{element} \text{ [1]} \\ \text{NON-HEAD-DTR} \left[ \begin{array}{l} \text{STRUC-MEANING|FOCUS [1]} \\ \text{SYNSEM|LOC|CONT|LF [1]} \end{array} \right] \end{array} \right]$$

An information structure account to definiteness requirements in VP (De Kuthy and Meurers 2003)

59/68

## A focus projection principle for the verbal domain

$$\textit{phrase} \rightarrow \left[ \begin{array}{l} \text{STRUC-MEANING|FOCUS [1] } \oplus \textit{collect-focus} \text{ [2]} \\ \text{HEAD-DTR|STRUC-MEANING|FOCUS [1]} \\ \text{NON-HEAD-DTRS [2]} \end{array} \right]$$

$$\vee \left[ \begin{array}{l} \text{SYNSEM|LOC} \quad \text{CAT|HEAD } \textit{verb} \\ \quad \quad \quad \text{CONT|LF [3]} \\ \text{STRUC-MEANING|FOCUS } \langle \text{[3]} \rangle \\ \text{NON-HEAD-DTRS } \langle \dots, \left[ \begin{array}{l} \text{SYNSEM} \quad \text{FPP } \textit{plus} \\ \text{LOC|CONT|LF [4]} \end{array} \right], \dots \rangle \\ \quad \quad \quad \left[ \text{STRUC-MEANING|FOCUS } \langle \text{[4]} \rangle \right] \end{array} \right]$$

∨ . . .

e.g., focus projection in nominal domain, p. 46

An information structure account to definiteness requirements in VP (De Kuthy and Meurers 2003)

58/68

## The information structure of partial VP fronting Example analysis

(41) [[Ein AUSSENSEITER gewonnen]]<sub>F</sub> hat hier noch nie.  
an outsider won has here still never  
'An outsider has never won here yet.'

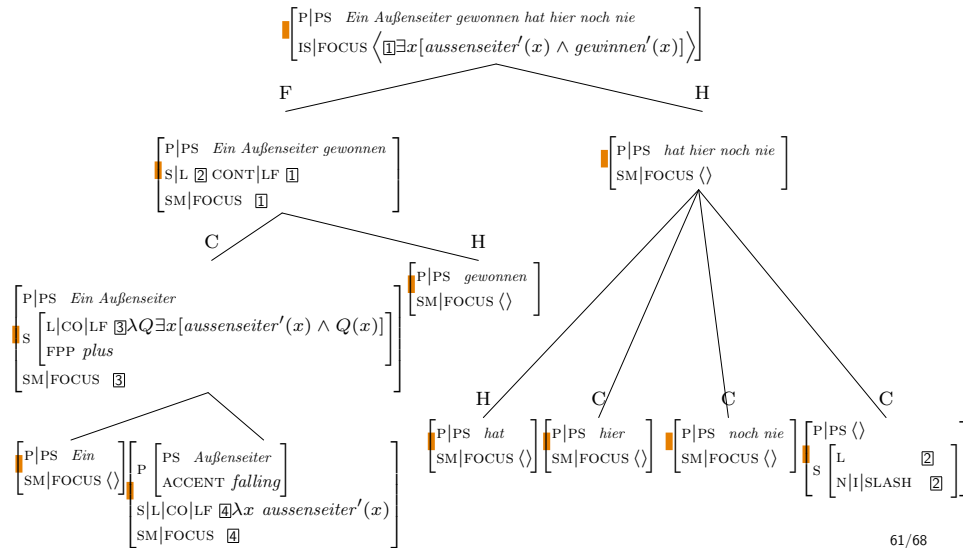
The relevant part of the lexical entry of *gewinnen* (to win):

$$\left[ \begin{array}{l} \text{PHON} \langle \textit{gewinnen} \rangle \\ \text{ARG-S} \left\langle \begin{array}{l} \text{FPP } \textit{plus} \\ \text{LOC|CAT|HEAD|CASE } \textit{nom} \end{array} \right\rangle \end{array} \right]$$

An information structure account to definiteness requirements in VP (De Kuthy and Meurers 2003)

60/68

## Sketch of an analysis tree for example (41)



61/68

## Explaining the definiteness effect and its counterexamples

As discussed on slide 36, one can distinguish two classes of definite NPs:

- Definite NPs which have as antecedent a discourse referent introduced via the utterance of a preceding NP and thus are discourse old and have to be part of the background of a sentence.
- Definite NPs which are used deictically, endophorically or as a semantic definite, which are often not discourse old and can thus be in the focus of a sentence.

The counterexamples to the definiteness effect all involve the second type!

Webelhuth's generalization that a fronted verbal constituent has to be focused thus correctly predicts that such a constituent can only contain definite subjects of type b), which can be focused.

Open issues

63/68

## Returning to the definiteness effect

Exactly those definite subjects which can be the focus exponent can also be part of the fronted verbal projection:

- (42) a. \* [Der Außenseiter gewonnen] hat hier noch nie.  
the outsider won has here still never

b. Was ist denn hier für ein Lärm? / What's all the noise here?  
# [[Der AUSSENSEITER gewinnt.]]<sub>F</sub>  
the outsider wins
- (43) a. [Die Hände gezittert] haben ihm diesmal nicht. (Höhle 1997, p. 114)  
the hands trembled have him this time not

b. Was ist denn hier für eine Aufregung? / What's the matter?  
[[Dem Präsidenten zittern die HÄNDE.]]<sub>F</sub>  
the<sub>dat</sub> president tremble the<sub>nom</sub> hands

An information structure account to definiteness requirements in VP (De Kuthy and Meurers 2003)

62/68

## Open issues: I-Topicalization

Webelhuth's claim that fronted verbal constituents have to be focused must be modified to allow i-topicalization as a possible intonation pattern:

- (44) Hat hier je ein Außenseiter gewonnen? / Did an outsider ever win here?

a. Nein, [[ein /AUSSENSEITER gewonnen]]<sub>T</sub> hat hier noch NIE\, aber es  
no an outsider won has here still never but it  
haben schon viele Erstplatzierte verloren.  
have yet many first placed lost

b. Nein, [ein Außenseiter [[/GEWONNEN]]<sub>T</sub>] hat hier noch NIE\, aber es  
no an outsider won has here still never but it  
sind schon viele auf dem zweiten Platz gelandet.  
are already many on the second place arrived

Perhaps the generalization is not that the fronted constituent must be focused but that it must be a uniform information unit?

Open issues

64/68



## Open issues: Focus projection and intransitive verbs

Uhmann (1991): Some verbs allow the subject to be the focus exponent (cf. p. 54):

- (45) Was ist denn hier für ein Lärm? / What's all the noise here?
- a. [[Ein HUND bellt.]]<sub>F</sub>  
a dog barks
  - b. [[Ein KIND weint.]]<sub>F</sub>  
a child cries
  - c. [[Das TELEPHON klingelt.]]<sub>F</sub>  
the telephone rings
- (46) a. [Ein Hund gebellt] hat hier noch nie.  
a dog barked has here yet never
- b. [Ein Kind geweint] hat hier noch nie.  
a child cried has here yet never
- c. [Das Telefon geklingelt] hat hier schon lange nicht mehr.  
the telephone rang has here yet long not anymore

## Open issues: Partial fronting with ditransitive verbs

Does this also provide an explanation for partial fronting with ditransitives?

- (49) Was ist denn hier für eine Aufregung? / What's the matter here?
- a. [[Der Clown hat einem Kind ein MÄRCHEN erzählt!]]<sub>F</sub>  
the clown has a<sub>dat</sub> child a fairytale told
  - b. # [[Der Clown hat einem KIND ein Märchen erzählt!]]<sub>F</sub>  
the clown has a<sub>dat</sub> child a fairytale told
- (50) a. [Ein Märchen erzählt] hat der Clown einem Kind schon lange nicht mehr.  
a fairytale told has the clown a child already long not anymore
- b. \*? [Einem Kind erzählt] hat der Clown ein Märchen schon lange nicht mehr.  
a child told has the clown a fairytale already long not anymore

## Open issues: Focus projection and intransitive verbs (cont.)

So how about the case where focus projects from the verb?

- (47) Was ist denn hier für eine Aufregung? / What's the matter here?
- a. [[Ein Linguist ARBEITET.]]<sub>F</sub>  
a linguist works
  - b. [[Ein Bettler GEIGT.]]<sub>F</sub>  
a beggar plays the violin
- (48) a. \* [Ein Linguist gearbeitet] hat früher auf dieser Stelle.  
a linguist worked has earlier in this position
- b. \* [Ein Bettler geigt] hat hier nur selten.  
a beggar played the violin has her only rarely

Example (48a) is taken from Grewendorf (1989, p. 25), who uses it to argue that only ergative subjects can be fronted. As shown by (27) on p. 52 that cannot be the right explanation.

## Open issues: Focus as a discontinuous constituent

There seem to be cases where the focus does not correspond to a syntactic constituent.

- (51) Was ist denn mit Tim passiert? / What happened to Tim?
- a. [[Ein HUND hat]]<sub>F</sub> ihn [[gebissen.]]<sub>F</sub>  
a dog has him bitten
  - b. [[Ein Hund hat]]<sub>F</sub> ihn [[GEBISSEN.]]<sub>F</sub>  
a dog has him bitten  
'A dog bit him.'

How can one account for focus projection in such cases?

## References

- Bolinger, Dwight (1958). A Theory of Pitch Accent in English. *Word* 14, 109–149.
- De Kuthy, Kordula (2002). *Discontinuous NPs in German — A Case Study of the Interaction of Syntax, Semantics and Pragmatics*. Stanford, CA: CSLI Publications.
- De Kuthy, Kordula and Walt Detmar Meurers (2003). The secret life of focus exponents, and what it tells us about fronted verbal projections. In Stefan Müller (ed.), *Proceedings of the Tenth Int. Conference on HPSG*. Stanford, CA: CSLI Publications, pp. 97–110. <http://ling.osu.edu/~dm/papers/dekuthy-meurers-hpsg03.html>.
- Engdahl, Elisabet and Enric Vallduví (1996). Information Packaging in HPSG. In Claire Grover and Enric Vallduví (eds.), *Studies in HPSG*. Edinburgh: The University of Edinburgh, vol. 12 of *Edinburgh Working Papers in Cognitive Science*, pp. 1–31.
- Engdahl, Elisabet (1999). Integrating Pragmatics into the Grammar. In Lunella Mereu (ed.), *Boundaries of Morphology and Syntax*. Amsterdam: John Benjamins, pp. 175–194.
- Féry, Caroline (1993). *German Intonational Patterns*. No. 285 in *Linguistische Arbeiten*. Tübingen: Max Niemeyer Verlag.
- Fiengo, Robert and James Higginbotham (1981). Opacity in NP. *Linguistic Analysis* 7(4), 395–421.
- Grewendorf, Günther (1989). *Ergativity in German*. No. 35 in *Studies in Generative Grammar*. Dordrecht: Foris Publications.
- Grewendorf, Günther and Wolfgang Sternefeld (eds.) (1990). *Scrambling and Barriers*. Amsterdam: John Benjamins Publishing Co.
- Haider, Hubert (1990). Topicalization and Other Puzzles of German Syntax. In Grewendorf and Sternefeld (1990), pp. 93–112.
- Höhle, Tilman N. (1997). Vorangestellte Verben und Komplementierer sind eine natürliche Klasse. In Christa Dürscheid, Karl Heinz Ramers and Monika Schwarz (eds.), *Sprache im Fokus. Festschrift für Heinz Vater zum 65. Geburtstag*. Tübingen: Max Niemeyer Verlag, pp. 107–120.
- Jacobs, Joachim (1983). *Fokus und Skalen. Zur Syntax und Semantik der Gradpartikel im Deutschen*. Tübingen: Max Niemeyer Verlag.
- Kratzer, Angelika (1984). On Deriving Syntactic Differences between German and English. Ms. (incomplete), TU Berlin, Institut für Linguistik, 47 pp.
- Krifka, Manfred (1992). A Compositional Semantics for Multiple Focus Constructions. In Joachim Jacobs (ed.), *Informationsstruktur und Grammatik*, Opladen: Westdeutscher Verlag, pp. 17–54.
- Meurers, Walt Detmar (2000). *Lexical Generalizations in the Syntax of German Non-Finite Constructions*. No. 145 in *Arbeitspapiere des SFB 340*. Tübingen: Universität Tübingen. (= Ph. D. thesis, Universität Tübingen, 1999). <http://ling.osu.edu/~dm/papers/diss.html>.

- Müller, Gereon (1996). *Incomplete Category Fronting*. Habilitationsschrift, Universität Tübingen, Tübingen. Published as SFS-Report 01–96.
- Pafel, Jürgen (1993). Ein Überblick über die Extraktion aus Nominalphrasen im Deutschen. In Franz-Josef d'Avis, Sigrid Beck, Uli Lutz, Jürgen Pafel and Susanne Trissler (eds.), *Extraktion im Deutschen I*, Tübingen: Universität Tübingen, Arbeitspapiere des SFB 340 Nr. 34, pp. 191–245.
- Pollard, Carl and Ivan A. Sag (1994). *Head-Driven Phrase Structure Grammar*. Chicago, IL: University of Chicago Press.
- Roberts, Craige (2003). Uniqueness in Definite Noun Phrases. *Linguistics and Philosophy* 26, 287–350.
- Sailer, Manfred (2000). *Combinatorial Semantics and Idiomatic Expressions in Head-Driven Phrase Structure Grammar*. Ph.D. thesis, Universität Tübingen. <http://www.sfs.uni-tuebingen.de/~mf/neudiss/>.
- Sgall, Petr, Eva Hajičová and Jarmila Panevová (1986). *The meaning of the Sentence in Its Semantic and Pragmatic Aspects*. Prague and Dordrecht: Academia and Reidel.
- Stechow, Arnim von (1981). Presupposition and Context. In U. Mönnich (ed.), *Aspects of Philosophical Logic*, Dordrecht: Reidel, vol. 147 of *Synthese Library*, pp. 157–225.
- Stechow, Arnim von and Susanne Uhmman (1986). Some Remarks on Focus Projection. In Werner Abraham and Sjaak de Meij (eds.), *Topic, Focus, and Configurationality*, Amsterdam: John Benjamins Publishing Co., pp. 295–320.
- Uhmman, Susanne (1991). *Fokusphonologie - Eine Analyse deutscher Intonationskonturen im Rahmen der nicht-linearen Phonologie*, vol. 252 of *Linguistische Arbeiten*. Tübingen: Max Niemeyer Verlag.
- Vallduví, Enric (1992). *The Informational Component*. New York, NY: Garland.
- Webelhuth, Gert (1990). Diagnostics for Structure. In Grewendorf and Sternefeld (1990), pp. 41–75.