

The Syntax-Prosody Interface in Lexical Functional Grammar

Lexicon

S-FORM	P-FORM	SEGMENTS	MET. FRAME
wo	[vo:]	/v o:/	$(\sigma)_\omega$
i	[ə]	/ə/	$=\sigma$
sie	[sə]	/s ə/	$=\sigma$
nō	[nō:]	/n ɔ:/	$(\sigma)_\omega$

p-structure

PHRASING	$(\iota(\sigma)_\omega)$	$=\sigma$	$=\sigma$	$(\sigma)_\omega$	$(\sigma)_\omega(\iota)$
SEGMENTS	/vo:/	/ə/	/sə/	/nō:/	/han/
V.-INDEX	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇

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Motivation



Frequent mismatches between syntax and prosody

syntactic: [Drink] [a pint] [of milk] [a/per day]
prosodic: (Drink a) (pint a) (milk a) (day)

Courtesy of Frans Plank

The syntax-prosody interface in the overall architecture

„What is the best way to allocate the generative capacity of language, so as to account for the observed relations between sound and meaning?” (Jackendoff 2010, 584).

Assumption:

Modules of grammar are placed between abstract notions of form and meaning

production (generation) → **MEANING** ... syntax – prosody ... **FORM** ← *comprehension* (parsing)

Development of a syntax-prosody interface which is

- modular
- computationally tractable
- applicable to ‘naturally occurring data’

Phenomena discussed in the thesis

Different language phenomena to challenge different aspects of the architecture

From the perspective of *comprehension*:

- **German genitive-dative alternation**: Investigation of how syntactic ambiguities can be resolved with reference to prosodic phrasing

From the perspective of *production*:

- **Swabian pronominal variation**: lexical determination of the form with reference to information structure, postlexical rephrasing of clitic clusters
- **Degema en(do)clisis**: lexical and postlexical tones, issues concerning lexical integrity
- **Pashto second position en(do)clisis**: mismatch of syntactic and prosodic linear order and demonstration of the p-structure autonomy

→ Part of the Swabian variation as an example

Swabian first person singular nominative pronoun (1SgNom)

Swabian distinguishes between three realisations of the 1SgNom pronoun:
full form [i:], enclitic form [ə] and pronoun drop [∅]

Full form [i:] and enclitic form [ə] roughly distinguished by focus/framesetting:

- (1) jetzt koch [ə] ebbes wo bloß [i:] kenn
Now cook 1sg.nom something of.which just 1sg.nom know
'Now I will cook something of which just I know.'

Here: focus on the clitic version

The 1SgNom enclitic [ə]

(2) weisch du wo ((n-) ə) sə nõ han
know.2sg.prs 2sg.nom where(=(n-)1sg.nom) =3sg.f.acc there have.1sg.prs
'Do you know where I put her?'

Three possible surface variations of the clitic cluster:

- ... wo =ə =sə ... unmarked version
- ... wo =n-ə =sə ... with *n*-insertion to avoid vowel hiatus,
only cluster initially (**wo =ə =n-əm*),
indicates nested p-word structure: ((wo)_ω=n-ə =sə)_ω
- ... wo = ∅ =sə ... deletion only possible within clitic cluster

Analysis within LFG

General architecture in LFG (Bresnan and Kaplan 1982)

- **Modular** – ‘structures’ represent different levels of linguistic information, where
‘Each aspect of linguistic structure is organized according to its own cohesive set of rules and principles’ (Dalrymple (2001, 85))
 - Each structure is related to other structures via **projection functions**
 - **Rich lexicon** – strong lexicalist hypothesis
- ... Strong in syntax and semantics, not much on prosody or phonology (‘p-structure’)

In order to analyse phenomena like the Swabian 1SgNom pronoun:

1. extend the lexicon to include (lexical) phonological information
2. create a representation for p-structure that can account for a wide range of data
3. formalise the exchange at the interface between syntax and prosody

1. The multidimensional lexicon

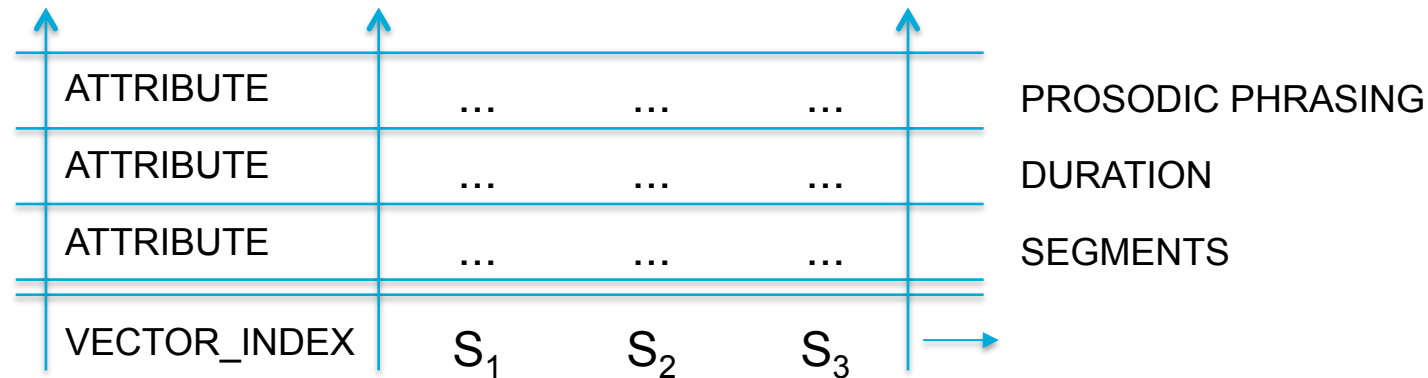
(Roughly following Levelt et al. (1999))

Concept	S(yntactic)-Form	P(honological)-Form
ICH	PRON	(focus)
	PRED	SEGMENTS / i /
	NUM	METRICAL FRAME $(\sigma)_\omega$
	CASE	-----
	sg	(¬ focus)
	nom	SEGMENTS / ə /
		METRICAL FRAME = σ

- **Modular:** strict separation of module-related information
 - Each lexical dimension can only be accessed by the related module
 - Translation function: Once a dimension is triggered, the related dimensions can be accessed as well and the information can be instantiated to the related modules
- **Transfer of vocabulary** (at the syntax-prosody interface)

2. The P-diagram

The representation of p-structure



- Compact model imitating the linear nature of the speech signal over time
- **Structured syllable-wise:** Each syllable receives a feature vector. Each vector consists of a number of values referring to a number of attributes:
 - Concrete values from the speech signal (**Duration**, F_0 , ...)
 - Information from the lexical p-form (**Segments**, **lexical stress**, ...)
 - Abstract interpretations of the above (**Prosodic phrasing**, **ToBI**, ...)
- Easily accessible (from a computational perspective)

Transfer of Vocabulary

s-string
... wo i sie n̄õ han

ρ

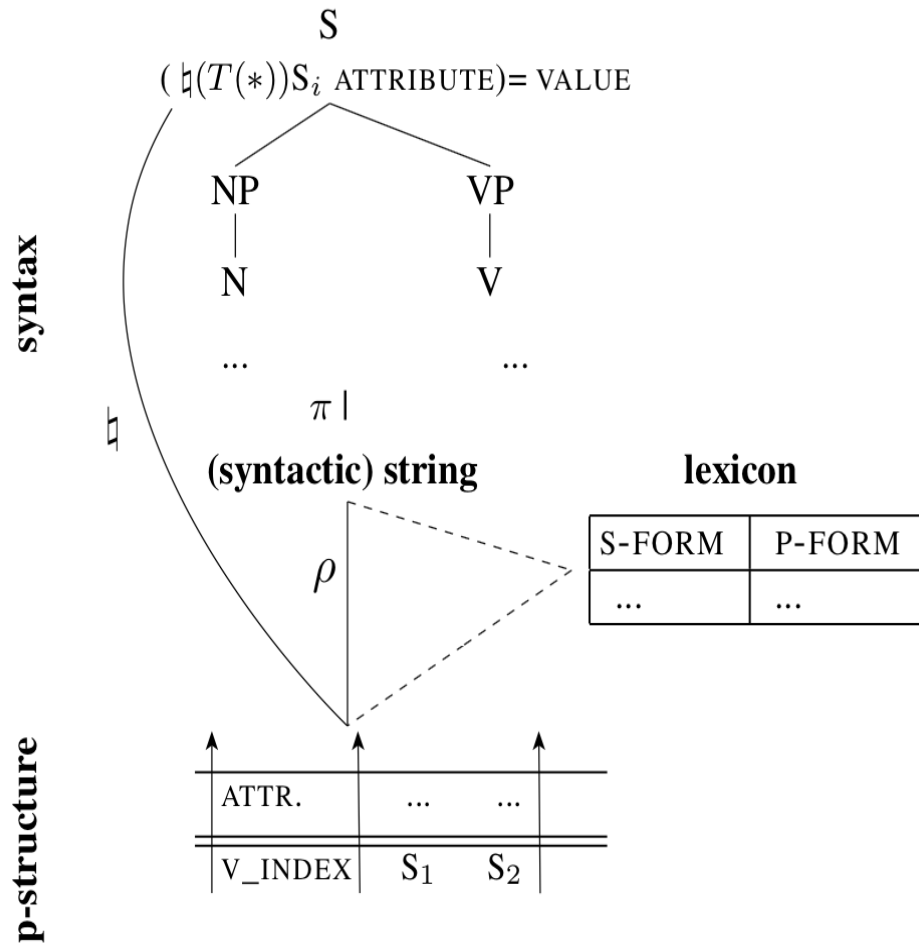
p-structure

Lexicon

S-FORM	P-FORM	SEGMENTS	MET. FRAME
wo	[vo:]	/v o:/	('σ) _ω
i ... ¬(FOCUS ↑ _i)	[ə]	/ə/	=σ
sie	[sə]	/s ə/	=σ
n̄õ	[nõ:]	/n õ:/	('σ) _ω

PHRASING	(σ) _ω	=σ	=σ	(σ) _ω	(σ) _ω
...
LEX. STRESS	prim	-	-	prim	prim
SEGMENTS	/vo:/	/ə/	/sə/	/nõ:/	/han/
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3. Transfer processes at the interface



1. Transfer of vocabulary: ρ

Morphosyntactic/phonological information on lexical elements is exchanged via the multidimensional lexicon

2. Transfer of structure: $\mathfrak{h}(\rho(\pi^{-1}))$

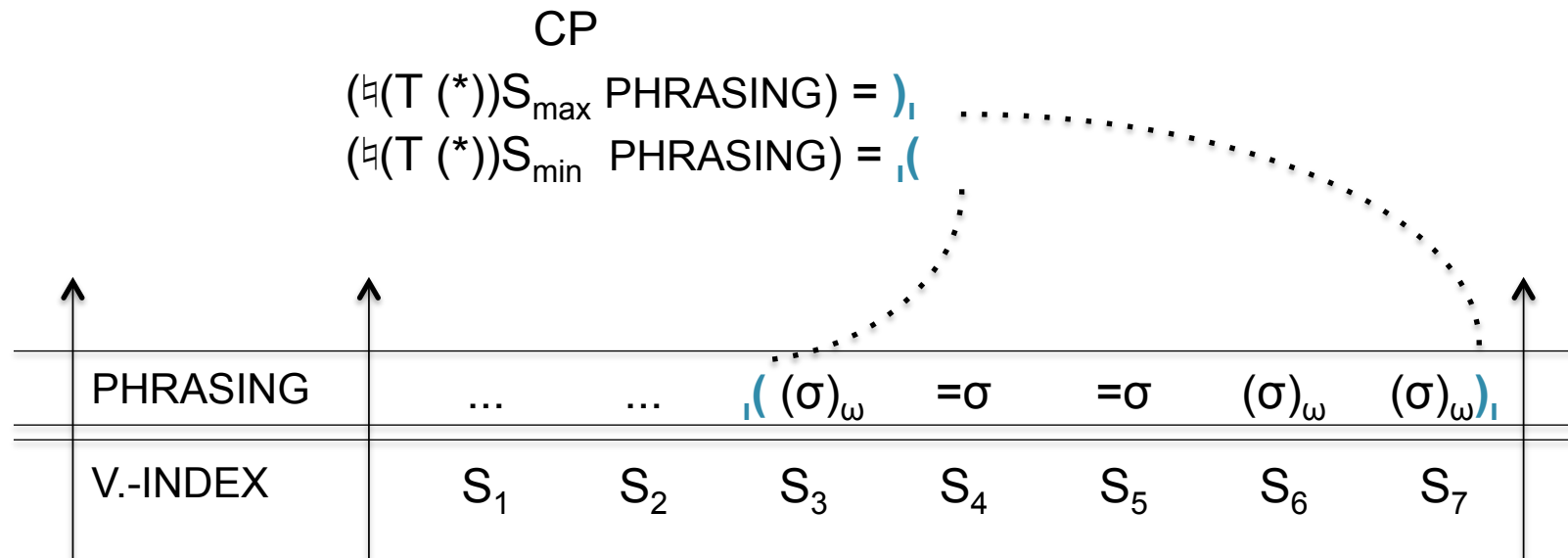
Information on syntactic and prosodic grouping is exchanged: higher constituents of the prosodic hierarchy
(Cf. Selkirk (2011)'s *match theory*)

Transfer of Structure

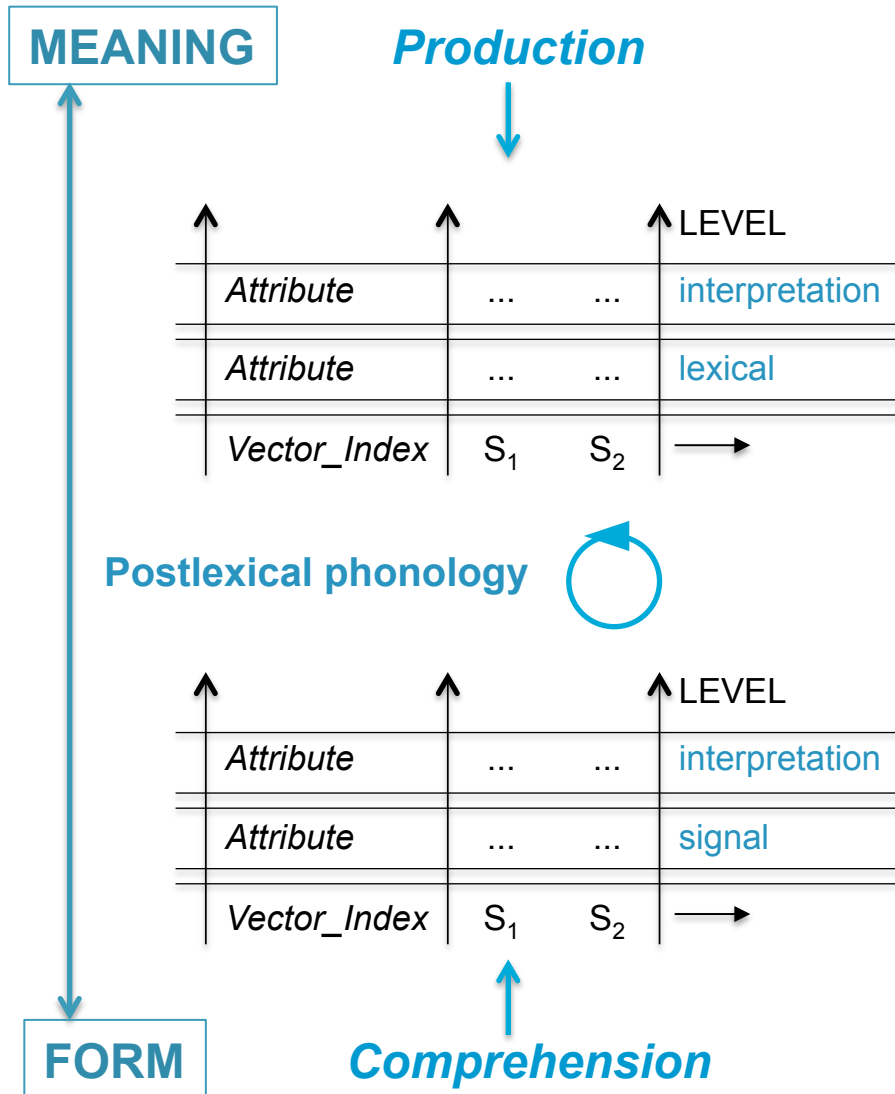
Syntactic bracketing: *weisch du [wo(=(n-) ə)=sə nǒ han]_{CP}*

Assumption: Every CP matches an Intonational Phrase (I)

CP-annotation:



4. Postlexical Phonology in P-structure

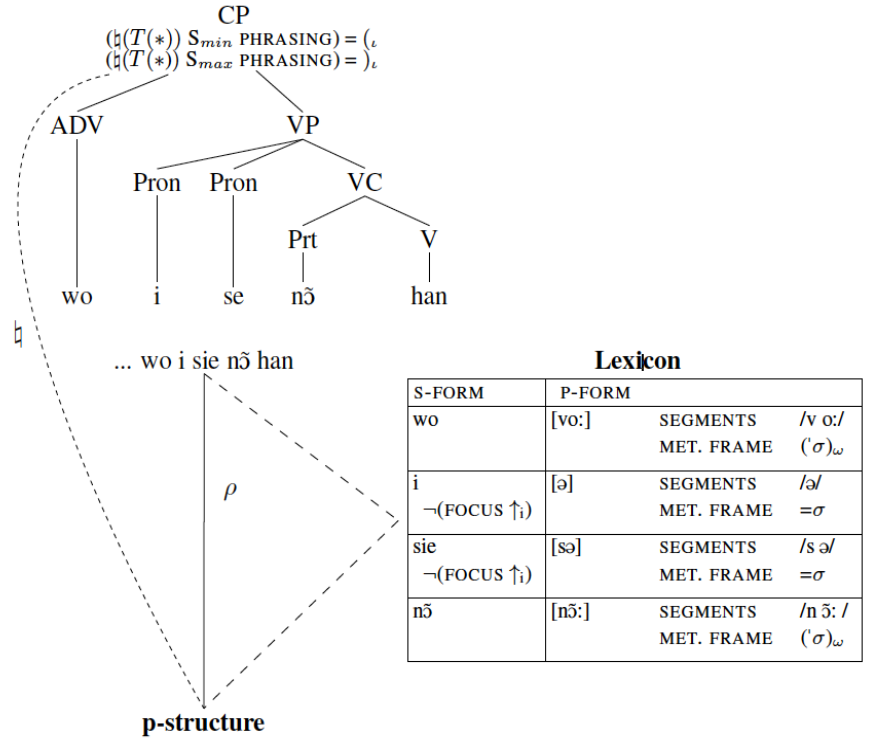


- Always **input** and **output**:
Can be homogeneous - but might also be completely different!
- A set of **postlexical phonological rules** determines the output.

Accounts for clitic cluster variation

- **wo e se** (unmarked)
- **wo ne se** (*n*-insertion)
- **wo se** (pronoun drop)

Summary



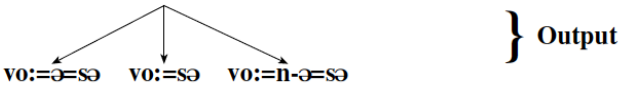
Lexicon

S-FORM	P-FORM	SEGMENTS	MET. FRAME
wo	[vo:]	/v o:/	(σ) $_{\omega}$
i	[ə]	/ə/	= σ
sie	[sə]	/s ə/	= σ
n5	[n5:]	/n 5:/	(σ) $_{\omega}$

p-structure

PHRASING	($_{\iota}(\sigma)_{\omega}$)	= σ	= σ	(σ) $_{\omega}$	(σ) $_{\omega}$) $_{\iota}$
SEGMENTS	/vo:/	/ə/	/sə/	/n5:/	/han/
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- 1: $\omega_i = (?+)_\alpha^n \rightarrow ({}_{\omega} \omega_i (?+)_\alpha^n)_{\omega}$
- 2: $(\emptyset \rightarrow \emptyset) /)_{\omega}(\sigma -)_{\sigma} \sigma +)_{\omega}$ } **postlexical phonology**
- 3: $(\emptyset \rightarrow [n]) / ({}_{\omega}({}_{\omega} ?* V)_{\omega} (\sigma - V \dots)_{\omega}$



Future work

- **Detailed analysis of how p-structure relates to semantics and information structure** (work on questions and focus patterns)
- **Clitics and other particles in the verbal complex of Iranian languages**

Thank you!