Pashto second position en(do)clisis and the syntax-prosody interface in LFG

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This talk

→ New approach to the syntax-prosody interface in LFG

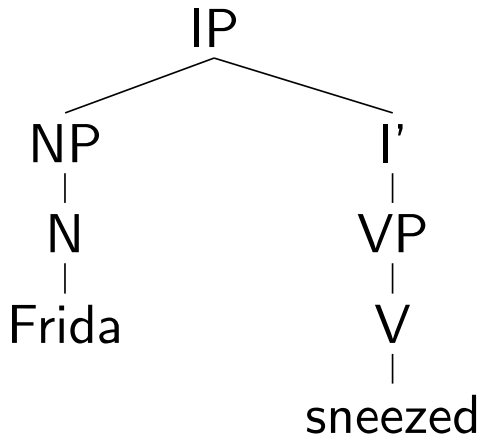
→ Sample application to Pashto second position en(do)clitics

TOC:

LFG – a brief introduction

- developed in the 1970s/1980s by Joan Bresnan and Ronald M. Kaplan
- generative, non-transformational grammar theory
- original account of LFG assumed two different ways of representing syntactic structure: c(onstituent)-structure and f(unctional)-structure.

C- and f-structure: *Frida sneezed*



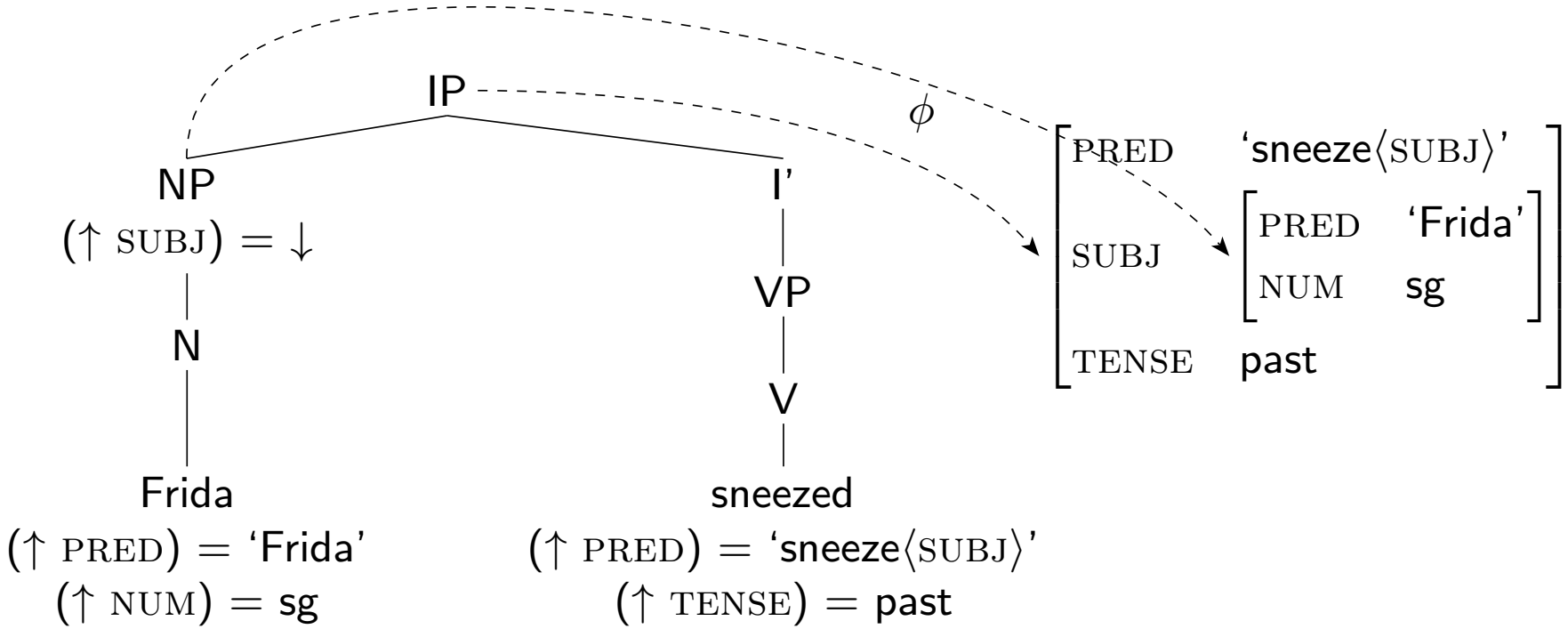
- syntactic tree-format
- linear and hierarchical organization of words

$$\begin{bmatrix} \text{PRED} & \text{'sneeze}\langle\text{SUBJ}\rangle\text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Frida'} \\ \text{NUM} & \text{sg} \end{bmatrix} \\ \text{TENSE} & \text{past} \end{bmatrix}$$

- AVM format: [ATTR value]
- functional representations, predicate-argument structure
- no linear order per se

Communication via correspondence functions

⇒ relate specific parts of one structure to specific parts of another structure



- $*$ refers to the *current node*, $\hat{*}$ to the *mother node* in the c-structure tree.
- $\phi(*)$: *f-structure associated with the current node* ($\downarrow$).
- $\phi(\hat{*})$: *f-structure associated with the current node's mother node* ($\uparrow$).

Lexicon

- rich and complex structure
- output consists of morphologically complete words
- understood as dynamic component: words are constructed according to internal morphophonological processes (Dalrymple 2015)

$\Rightarrow$ lexical entries as they are represented here are surface representations of lexicon-internal complex processes

$\Rightarrow$ strong lexicalist hypothesis

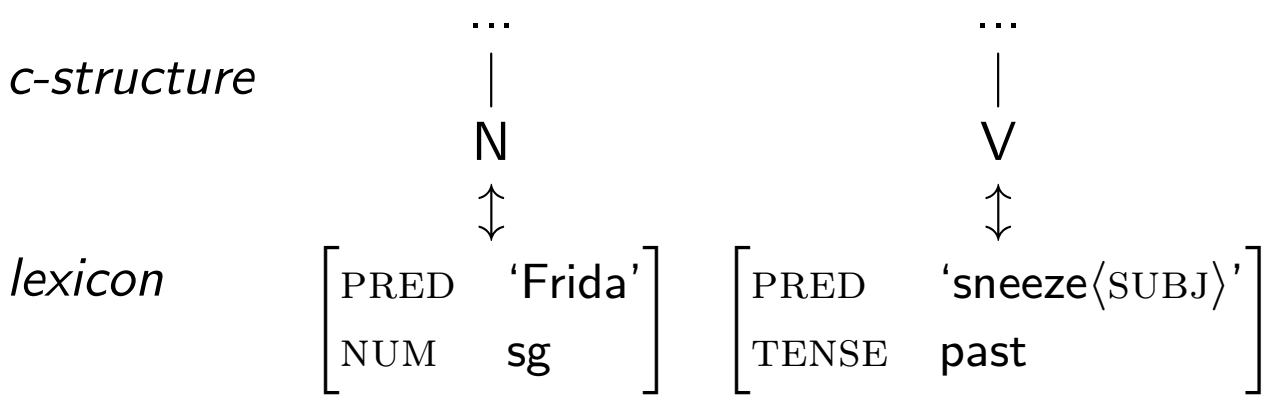
> *principle of lexical integrity:*
>
> Morphologically complete words are leaves of the c-structure tree and each leaf corresponds to one and only one c-structure node.
>
> (Bresnan 2001, 92)

Insertion of lexical information into the syntactic module

The lexical entry:

sneezed	V	$(\uparrow \textsc{pred}) =$ 'sneeze$\langle \textsc{subj} \rangle$' $(\uparrow \textsc{tense}) =$ past
Frida	N	$(\uparrow \textsc{pred}) =$ 'Frida' $(\uparrow \textsc{num}) =$ sg

Individual lexical items are associated to the respective c-structure terminal nodes



Modularity

- separation of linguistic information and representation in line with general notion of modularity:

  > "Each aspect of linguistic structure is organized according to its own cohesive set of rules and principles" (Dalrymple 2001, 85)

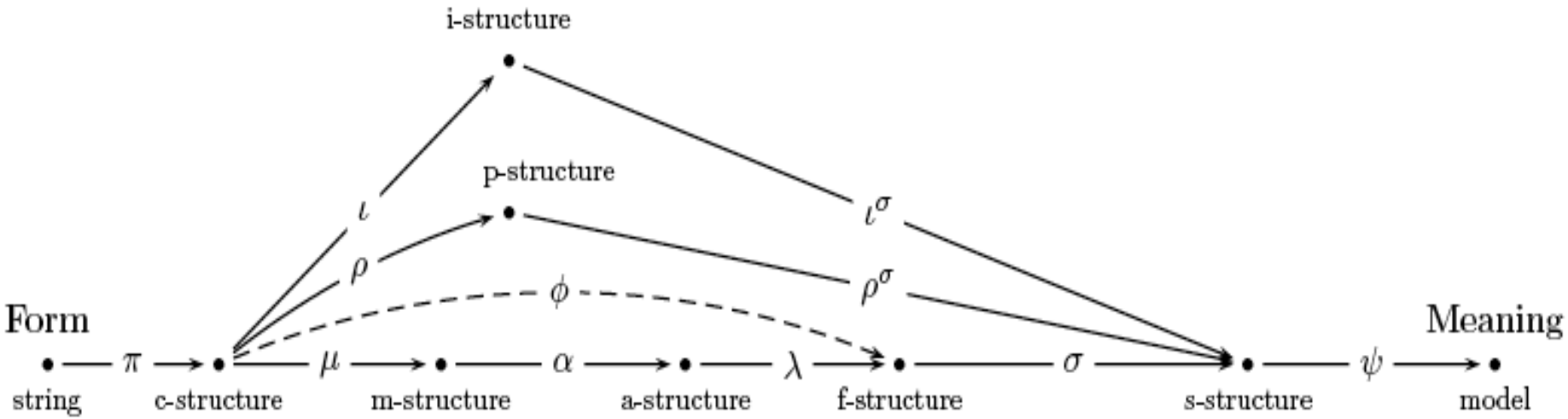
→ different aspects of linguistic information are not required to be of the same formal type

→ representation should be determined by the properties of the linguistic information

- different representations build up "in parallel" ($\neq$ 'separate')

Overall architecture

In the last decades, several linguistic components have been added:



(Asudeh 2006, 373)

- located between two vanishing points FORM and MEANING (or phrased differently: *comprehension* and *production*)

Intermediate summary

Concluding, the following statements can be made about LFG:

1. LFG is a modular framework; its 'structures' represent different types of linguistic information.
2. LFG does not assume encapsulated modularity; structures are built up in parallel (overlapping).
3. The different types of linguistic information are related via projection functions.
4. LFG supports the strong lexicalist hypothesis, the 'principle of lexical integrity', which assumes that only fully-formed words enter the syntactic tree.

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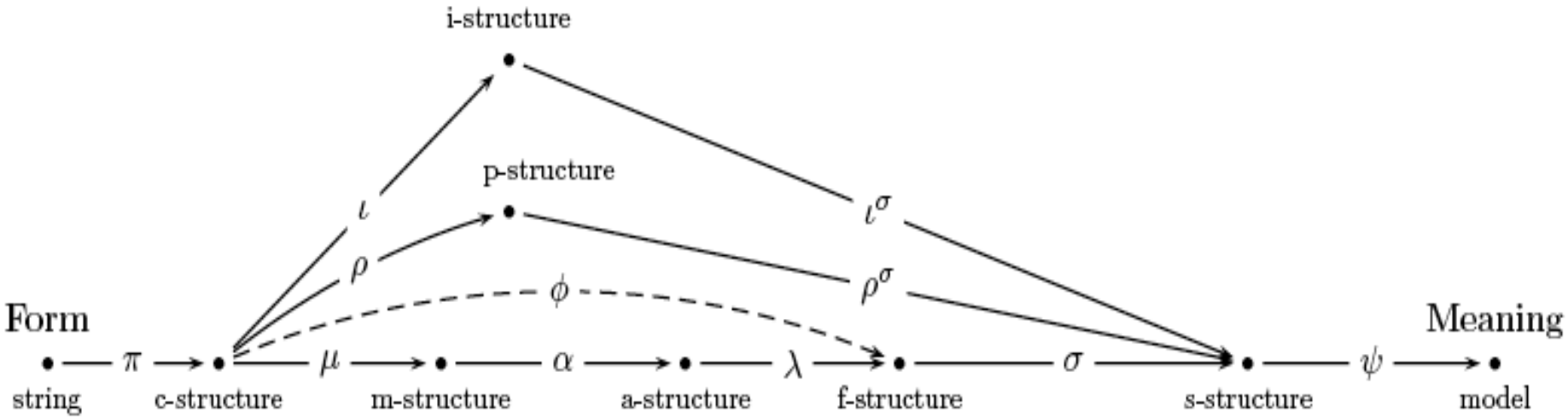
Grammar with focus on p-structure



(Asudeh 2006)

- ('Phonological') string is placed with FORM

→ String instantiates information from each (lexical) item to terminal nodes of c-structure via relation π

- P-structure projected off c-structure via ρ ($\Rightarrow$ syntax determines prosody)

Problems with this interface position

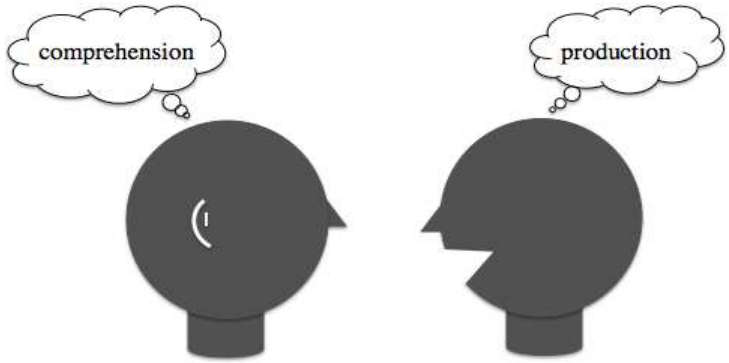
1. Problematic with Modularity: How does the phonological information ‘keep’ until p-structure is reached; how does prosodic phrasing ‘keep’ until the sentence is uttered?
2. How are differences in linear order accounted for? How can a clitic be syntactically analysed, if it is ‘hidden’ within another item?
3. Where are the postlexical phonological rules?
4. Where does the lexicon come in?
5. How are lexicon and postlexical phonological rules positioned in relation to p- and c-structure?

Underlying assumptions for a new proposal

- Language is modular: semantics, syntax, postlexical phonology ...
  - Each module subject to individual constraints and individual vocabulary
  - Question: how do they communicate and to what extent do they overlap
- Any act of language is a process between two poles:

$$\text{MEANING} \longleftrightarrow \ldots \longleftrightarrow \text{FORM}$$

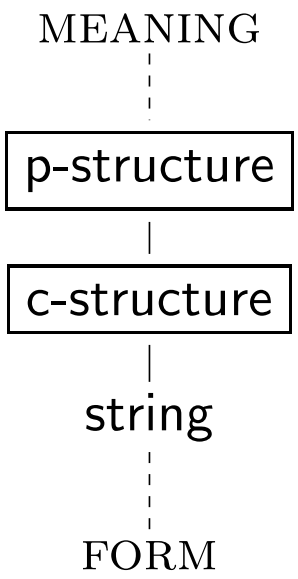
- The 'direction' is important (especially at the interface between modules)



- Always with a view to developing a possible computational application
- Allow for many different types of information to be processed

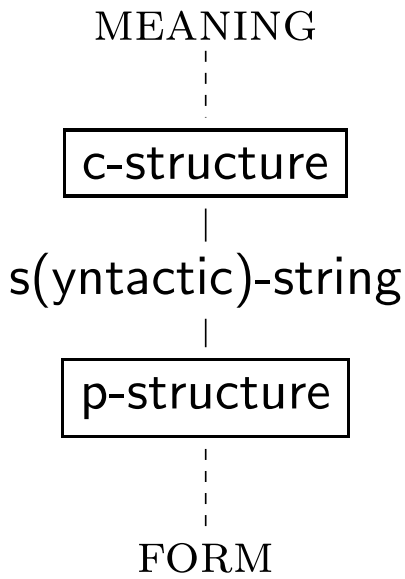
New proposal

'Old' architecture



$\Rightarrow$

New Proposal



$\rightarrow$ Allows for a modular architecture: c- and p-structure can be 'interfaced' through string and lexical look-up

$\rightarrow$ Much closer to models of speech production

The integration of p-structure into LFG: requirements

Integration of phonological/prosodic information into LFG requires:

1. Extension of the lexicon to include lexical phonological information: **the multidimensional lexicon**
2. New representation of p-structure: **the p-diagram**
3. Formalization of the syntax–prosody interface:
   - **transfer of structure**
   - **transfer of vocabulary**

$\Rightarrow$ The resulting interface was applied to a number of challenging phenomena: German case ambiguities (comprehension), Swabian clitics/n-insertion, Degema en(do)clisis, *Pashto second position en(do)clisis* (production)

1. Multidimensional lexicon

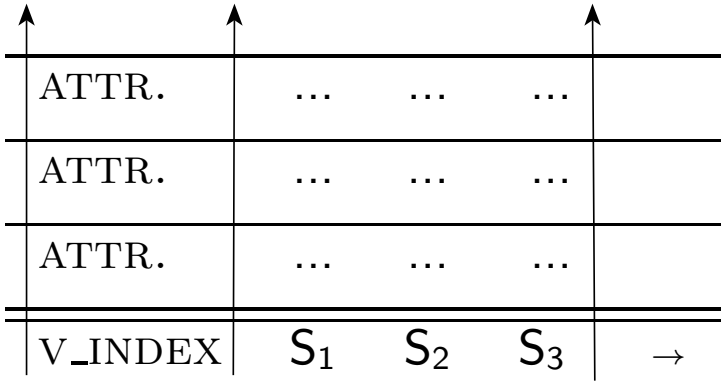
concept	s(yntactic)-form			p(honological)-form	
SNEEZE	sneezed	V	(↑ PRED) = 'sneeze⟨SUBJ⟩' (↑ TENSE) = past	P-FORM SEGMENTS METRICAL FRAME	[sni:zd] / s n i: z d/ $('\sigma)_\omega$

- Modular: strict separation of module-related information

→ each lexical dimension can only be accessed by the related module of language

- 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
- Surface representation: fully fledged forms, but dynamic generation is assumed

2. The P-diagram



- Structured syllable-wise
- Each syllable receives a feature vector which includes several dimensions

→ Associated with a number of values referring to a number of attributes

- Compact model imitating the linear nature of the speech signal over time
- Easily accessed (from a computational perspective)

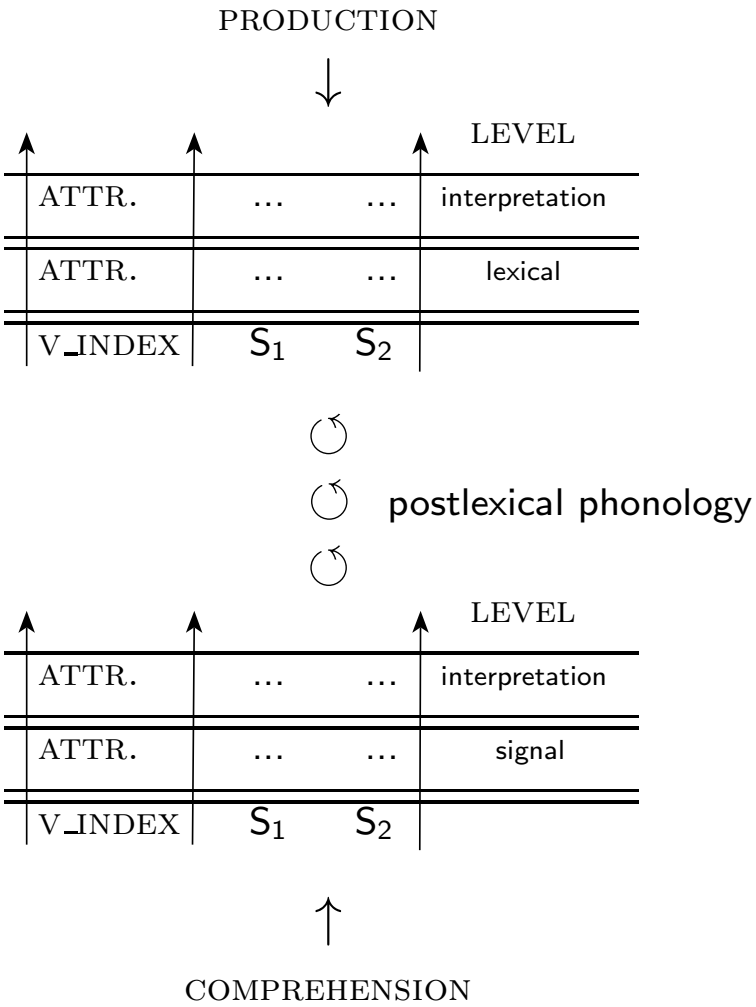
Three levels:

1. *lexical:* Information gathered from the lexical entry
2. *signal:* Information directly found in the signal
3. *interpretation:* Interpretation on the basis of lexical, signal, and/or interpretation information

2. The P-diagram - levels and possible attributes

					LEVEL
PHRASING	$\omega($	...	...	$)_\omega$	INTERPRETATION
SEMIT._DIFF	2	-3	-4	2	↓
ToBI	...	...	L*	...	
BREAK_IND.	...	...	...	1	
F0	192	170	158	166	SIGNAL
DURATION	0.19	0.15	0.25	0.2	↓
LEX_STRESS			prim		LEXICAL
LEX_TONE	H	!H	L	H	↓
VALUE	/ə n/	/ɪ g/	/z a m/	/p l/	
V_INDEX	S_1	S_2	S_3	S_4	→

The P-diagram in P-structure



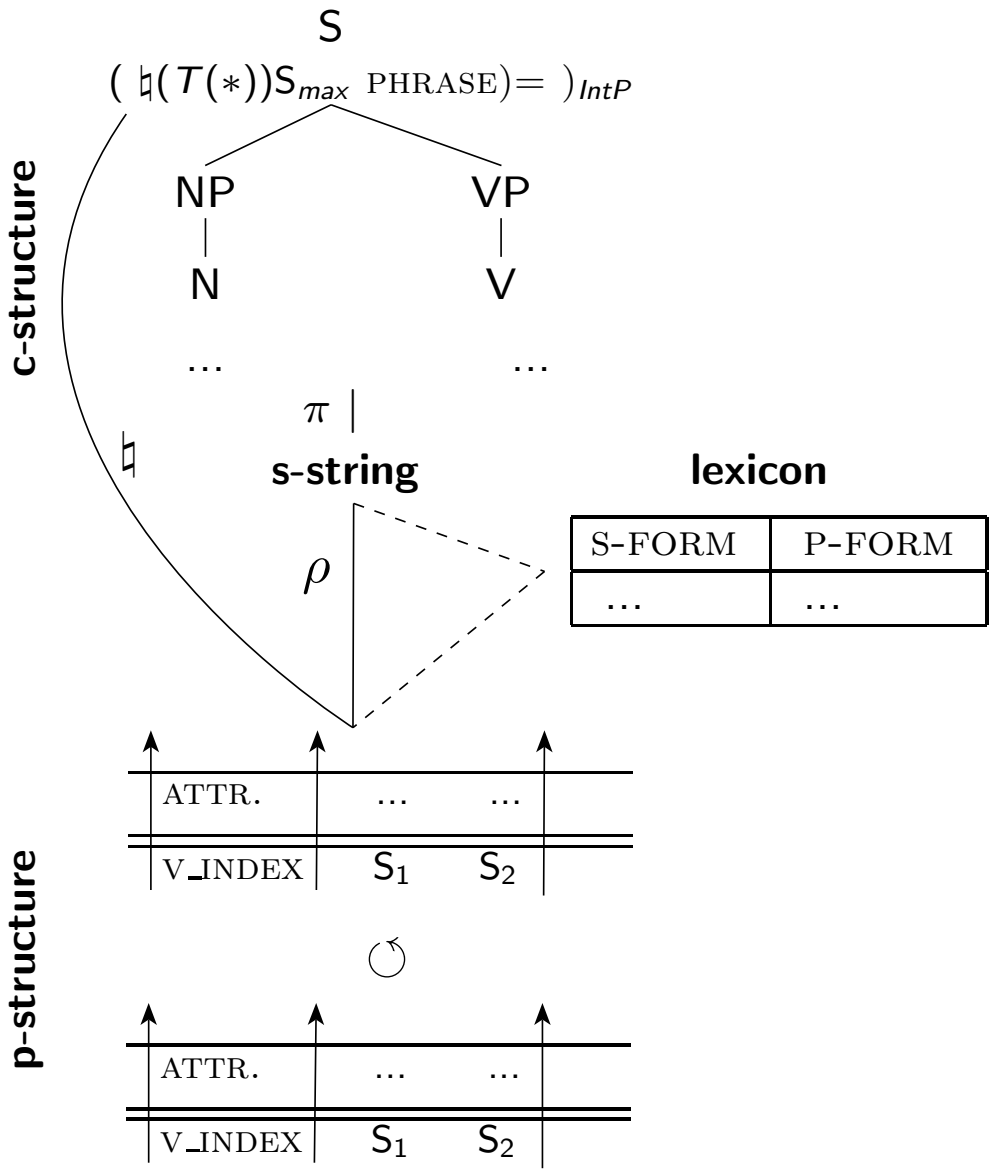
- P-structure always has an input and an output

→ input and output can be homogeneous - but might also be completely different

- A set of postlexical phonological rules determine the output
- SIGNAL level is already part of the phonology–phonetics interface
- Output of p-structure in production: syntactic, lexical, and postlexical phonology

→ many other influencing factors can be assumed!! (i-structure, frequency, size, ...)

3. Transfer of information at the syntax–prosody interface



1. *Transfer of vocabulary*: ρ
   Morphosyntactic/phonological information on lexical elements is exchanged via the multi-dimensional lexicon
2. *Transfer of structure*: $\natural(\equiv \rho(\pi^{-1}))$
   Information on syntactic and prosodic grouping is exchanged (higher constituents of the prosodic hierarchy).
3. Exemplary c-structure annotation:
   $\natural(T(*))S_{max}$ PHRASE)= $)_{IntP}$
4. Underlying prosodic theory roughly following Selkirk (2011)'s *match* theory

Intermediate summary

- Compact representation of p-structure via the p-diagram

→ combination with postlexical phonological rules allows representation of a great variety of processes

- Transfer at the interface is two-fold:
  1. *transfer of vocabulary* (through the multidimensional lexicon)
  2. *transfer of structure*
- Applicable for models of production as well as comprehension

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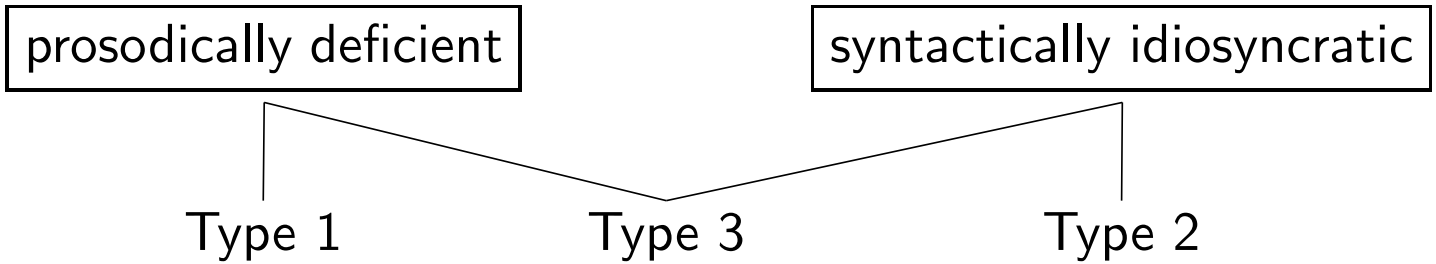
Some general notions on clitics

Anderson (2005)'s three-way distinction:



In LFG (and elsewhere) clitics are:

- ordinary lexical items, form independent terminal nodes in the syntactic tree
- prosodically deficient (in most cases), have to be attached to a host

Brief differentiation of meso- and endoclisis, second position clitics, and infixation:

- *infixation*: corresponding adfixes, lexical process
- *mesoclisis*: clitic positioned between stem and adfix, postlexical process
- *endoclisis*: clitic is positioned within the stem of the host, postlexical process; a challenge for the concept of lexical integrity!
- *second position clitics (2P)*: 'second' mostly refers to position after first word or the first syntactic XP constituent, for prosodic or syntactic reasons.

Untangling 'Pashto second position en(do)clisis'

Pashto:

→ Eastern Iranian language, ca. 50 Million speakers in Afghanistan/Pakistan

→ Data presented here mainly from Tegey (1977) and native speaker N. Rehman

Weak Pronoun	Num.&Pers.	**Modal**	Translation	**Adverbial**	Translation
me	1. Sg	ba	will, should	xo	really
de	2. Sg	de	should, let	no	then
ye	3. Sg				
am / mo	1. Pl				
am / mo	2. Pl				
ye	3. Pl				

Expected to have functional scope over the whole sentence (daughters of S).

If more than two enclitics cooccur, they are placed in a fixed template.

(1)	1	2	3	4	5	6	7	8
	xo	ba	am	am/mo	me	de	ye	no

Syntactic constraints

(2) [angur]$_{NP}$ =**ye** rɑwṛə
grapes he brought
'He brought grapes.'

(3) [xušɑl aw patang]$_{NP}$ =**ba** =**ye** dər ta rɑwṛi
Koshal and Patang will it you to bring
'Koshal and Patang will bring it to you.'

*xušɑl =**ba** =**ye** aw patang dər ta rɑwṛi

(4) [laylɑ na]$_{PP}$ =**de** ɑxistə (*laylɑ =**de** na ɑxistə)
Layla from you buy
'You were buying it from Layla.'

(5) [ağa šəl kaləna xɑysta peğla aw loy təgay alək]$_{NP}$ =**me** nən byɑ wəlida
that 20- year pretty girl and big thirsty boy I today again saw
'I saw that pretty 20-year old girl and the big thirsty boy again today.'

Syntactic constraints

(6) [tor =**me** wəlidə] magar [spin =**me** wə nə lidə]
Tor I saw but Spin I PERF not saw
'I saw Tor, but I didn't see Spin.'

It can be concluded:

- Pashto 2P enclitics are clause-bound
- Always placed after the first syntactic constituent
- The size of that constituent does not matter

→ Already difficult to find a common prosodic host

Prosodic constraints

(7) rα ta pe gὰndə́ =**de**
me for by_him sew you
'You were having him sew it for me.'

→ 2P clitics cannot be reduced to syntactic constraints

→ can only occur after stressed elements

⇒ This can also result in en(**do**)clisis

Endoclisis

- Pashto is an argument-dropping language

→ sentences can consist of only a verb and a 2P clitic

- Endoclisis in the context of an aspect-determined stress alternation

(8a) **imperfective:**
ṭakwαhə́ =**me**
shake I
'I was shaking it.'

(8b) **perfective:**
ṭák =**me** wαhə
shake$_1$ I shake$_2$
'I shook it.'

→ The 2P enclitic does not only change its linear position, but 'moves' *into* the stem of the host ⇒ *endoclitic*

⇒ With respect to the verbal hosts, three classes can be distinguished:

Class I: 'Monomorphemic' verbs

(9a) **imperfective**

təxnawála =**me**

tickle I

'I was tickling (her).'

(9b) **perfective**

wá =**me** təxnawəla (*wátəxnawəla =**me**)

PERF I tickle

'I tickled (her).'

Perfective aspect formed with perfective prefix *wə*

→ Receives main stress

⇒ The clitic is placed after the stressed prefix

Class I: The *a*-initial verbs

- form perfective with *wə*-prefix
- can have alternating stress in the imperfective

(10a) **imperfective:**
ağustá =**me**
wear I
'I was wearing it.'

(10b) **imperfective:**
á =**me** ğustə
wear$_1$ I wear$_2$
'I was wearing it.'

- /a/ as separate clitic/prefix from a diachronic perspective(?)

→ Not true for all *a*-initials

→ No longer from a synchronic perspective

Class II: 'Bimorphemic' verbs

Majority of verbs in this class consist of a derivational prefix and a root.

(11a) **imperfective**

ṭelwαhá	=**me**	
push	I	

'I pushed (it).'

(11b) **perfective**

ṭél	=**me**	wαhə
PREF	I	push

'I was pushing (it).'

- Perfective formed via stress shift to the prefix
- Clitic in perfective placed after the stressed prefix

However:

Also a group of verbs which do not contain an identifiable prefix/root

(12a) **imperfective**

bαylódə	=**me**	
lose	I	

'I was losing (it).'

(12b) **perfective**

bάy	=**me**	lodə
$lose_1$	I	$lose_2$

'I lost (it).'

Class III: Complex predicates

Complex predicates: combination of adjectives/adverbs/nouns and light verbs

→ if stress on the light verb: clitic follows the complex predicate

→ if stress on first part: clitic positioned preceding the light verb

Intermediate summary

1. Clitics seem to follow first syntactic constituent.

→ size does not matter, cannot be interrupted

2. If that syntactic constituent is destressed, clitics are placed after the next constituent carrying stress.
3. In the cases in (2.) and in verb-initial sentences, the clitic is placed according to an aspect-caused stress shift

→ after the verb in the imperfective (**en**clitic)

→ within the verb in the perfective (**endo**clitic)

Resulting prosodic range: from several phonological phrases to stressed syllables.

essentially:
size does not matter,
but stress does,
and while verbs can be interrupted,
other syntactic constituents cannot?

Proposed solution

1. Pashto 2P clitics are first and foremost placed according to syntactic constraints.

→ In the position after the first syntactic constituent

2. If syntactically (and prosodically) stranded in clause-initial position

→ postlexical phonological rephrasing (prosodic inversion) ensures that the 2P enclitic has a host.

⇒ Closer look at the syntactic and prosodic requirements

Pashto syntax - some relevant notions

- SOV (Verbal complex (VC) is always final)
- Argument-dropping
- Scrambling of constituents *before* VC
- Assume a flat syntactic structure (all XPs as immediate daughters of S)

Preverbal clitics

A close look at the 'stressed preceding syntactic constituent'.

(14) rα ta pe gαnḍə́ =**de**
me for by_him sew you
'You were having him sew it for me.'

Inital 'unstressed' elements are part of a second group of clitics

Corresponding strong form:

→ construction with a **strong** oblique pronoun: *mα*

(15a) tor [*mα sara*] ḍer ẋə pezani
Tor me with very well acquainted
'Tor is very well acquainted with me.'

→ construction with a **weak** oblique pronoun: *rα*

(15b) tor ḍer ẋə [*rα sara*] pezani
Tor very well me with acquainted
'Tor is very well acquainted with me.'

→ Moved to the position in front of the verb for no apparent prosodic reason!

Syntactic analysis (LFG)

⇒ **Conclusion**: *Syntactic* clitic, syntactically attaching to the constituent which ensures sentential scope: the VC.

- **Consequence**: There will never be a completely unstressed constituent preceding the verbal complex.
- (Simplified) syntactic analysis very straightforward:
  S ⟶ [{XP 2P XP* | 2P} VC] (where XP = {NP | PP | AP | AdjP})

Two possible constructions:

1. XP 2P XP* VC

→ no further rearrangements necessary

2. 2P VC

→ **En**litics in clause-inital position require repositioning (via prosodic inversion)

Prosodic inversion

Main question: What is the 'landing place' of the 2P clitic?

⇒ Answer to that with evidence from several phonological processes:

1. vowel coalescence
2. vowel harmony
3. initial /k/-deletion

Vowel coalescence

(16) **VC-external clitic:**
tə =**ye** wɑxla (*wə axla)
you it PERF.buy
'You buy it.'

(17) **VC-internal clitic:**
wɑ =**ye** xla
PERF.buy$_1$ it buy$_2$
'Buy it.'

(18) **Across word boundaries:**
kor špɑnə axli (*špɑnɑxli)
house shepherd buys
'The shepherds are buying the house.'

→ vowel coalescence within the prosodic word

→ postlexical process – also occurs with negative marker which is a separate syntactic item

Vowel harmony

Regressive vowel harmony: /i/ and /u/ raise mid-vowels /o/ and /e/ to high.

(19) **applies to 2P clitics:**
wə =**di** guri (*de)
PERF should see
'He should see him.'

(20) **applies to preverbal clitics:**
wər bɑ̃ndi (*bɑ̃nde) xiʒu
it on step
'We are stepping on it.'

(21) **Does not apply to VC-external 2P clitics:**
patang =**me** [wini]$_{VC}$ (*mi)
Patang me sees
'Patang sees me.'

(22) **does not apply between two prosodic words:**
x̣e wux̣e (*x̣i wux̣e)
good camels
'Good female camels'

Vowel harmony II

1. VH applies to all word categories if the phonological context is given.
2. Within the verbal complex, VH spreads to both groups of clitics.
3. VH cannot cross the boundary between two lexically stressed words (two individual prosodic words); i.e., vowel harmony is not restricted by the phonological phrase.
4. VH cannot spread to a 2P clitic that is outside of the verbal complex, even if it is directly preceding it.

Conclusion: can be assumed that the verbal complex itself forms one prosodic word, including the main verb and both types of clitics.

Initial /k/ deletion

Class III complex predicates: light verbs starting with /k/:

In the imperfective: (stress on light verb)

(23) **first component ends in a vowel:**
asad ğanəm wobə-**k**awi
Asad wheat water do
'Asad was watering the wheat.'

(24) **First component ends in a consonant:**
asad ğanəm tit-∅awi (*tit-kawi)
Asad wheat spread do
'Asad was spreading the wheat.'

In the perfective: (stress on initial component)

(25) **deletion never occurs:**
dzhobəl **k**-em
injured do
'I injure...'

Assumption: Some boundary prevents the deletion

Prosodic inversion – the landing place

What is the boundary?

- Can't be a 'real' prosodic word boundary $)_\omega(_\omega$, if analysis is to be true for all other verb classes as well
- Can't be foot
- **Solution:** nested prosodic word $((\text{x})_\omega\ \text{x})_\omega$

$\rightarrow$ strong enough to restrict /k/-deletion

$\rightarrow$ weak enough to let processes like vowel harmony pass

A note on domain assignment

If assuming that VC as a whole receives prosodic word status:

1. Each stressed item receives prosodic word status: $(\text{x x } (\acute{\text{x}})_\omega \text{ x x})_\omega$
   $\rightarrow$ problematic if class three light verb receives prosodic word status – k-deletion would again be blocked, but this is not the case
2. Each stressed item forms a prosodic word boundary to its right: $((\text{x x } \acute{\text{x}})_\omega \text{ x x})_\omega$

	construction	**example**
1	$((\text{wə́})_\omega$=**di** guri$)_\omega$	after perfective prefix (VH)
1	$((\text{w}\alpha)_\omega$ =**ye** xla$)_\omega$	after perfective prefix (VC)
2	$((\text{ṭél})_\omega$ =**me** wαhə$)_\omega$	after stressed part of verb
3	$((\text{r}\alpha$ ta pe gαnḍə́$)_\omega$=**de**$)_\omega$	after verb and preverbal clitics
4	$((\text{r}\alpha$ ta pe wə́$)_\omega$=**de** gαnḍə$)_\omega$	after perfective prefix and preverbal clitic

Prosodic Inversion: Within the verbal complex in Pashto, a 2P clitic is placed *after the first prosodic word*.

Summing up

1. Pashto 2P clitics are subject to both, syntactic and prosodic constraints.

2. If there is a preceding syntactic constituent, the (syntactic) placement is always sufficient:

→ *There are no unstressed syntactic constituents preceding the 2P clitics*

3. If syntactically and prosodically stranded in a phrase-inital position, postlexical prosodic inversion ensures correct prosodic placement

→ The 2P clitic is placed at the position after the first prosodic word

4. As for the analysis: straightforward implementation at the syntax-prosody interface in LFG

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LFG analysis at the syntax →prosody interface

(26) wα =**ye** xla
PERF.buy$_1$ it buy$_2$
'(You) buy it.'

→ verb-inital perfective construction

1. part of the *prosodic* placement of 2P clitics
2. a-initial verb *axla* marks the perfective aspect with the prefix *wə-* (class I)
3. two postlexical phonological processes: vowel coalescence and prosodic inversion

Corresponding syntactic rule:

$$S \longrightarrow \ldots [\ \{XP\ CCL\ XP^* \mid \mathbf{CCL}\}\ \mathbf{VC}\ ]$$

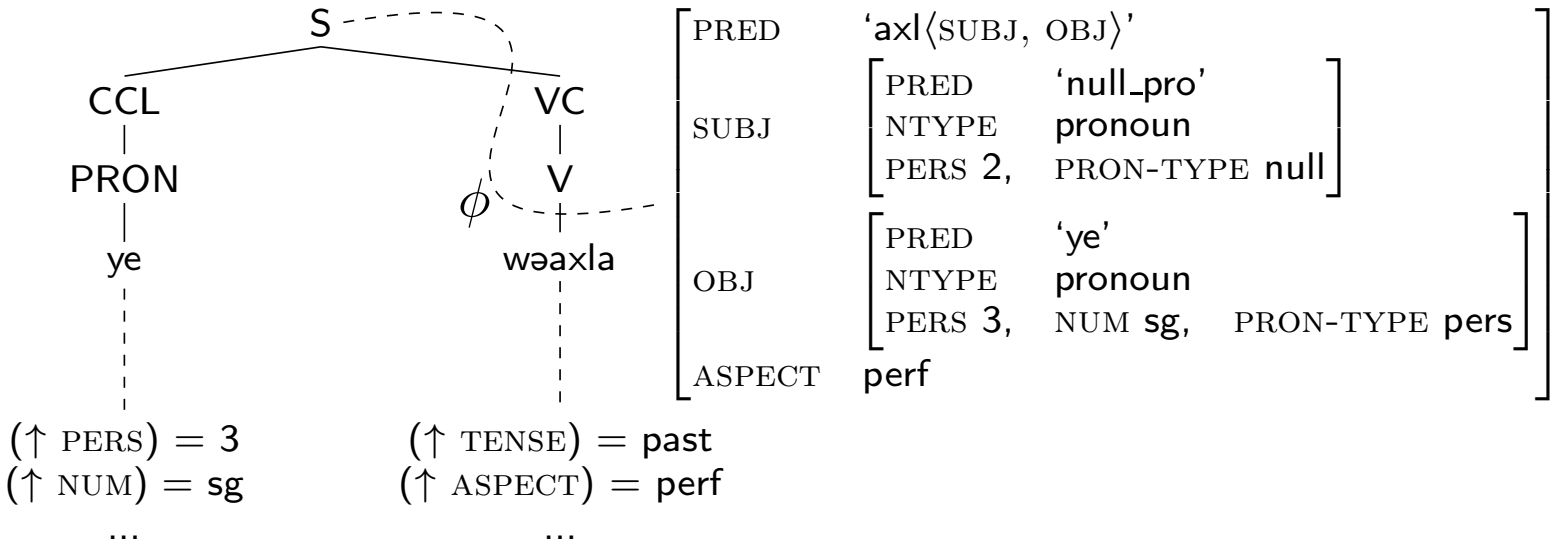
... where CCL stands for 'clitic cluster'

1. Lexical entries

s-form				p-form	
wə-axla	V	(↑ PRED)	= 'axl⟨SUBJ, OBJ⟩'	P-FORM	[wə́axla]
		(↑ TENSE)	= past	SEGMENTS	/w ə a x l a/
		(↑ ASPECT)	= perf	METR. FRAME	$'\sigma)_{\omega}\sigma\sigma$
		...			
ye	PRON	(↑ PRED)	= 'ye'	P-FORM	[ye]
		(↑ PERS)	= 3	SEGMENTS	/y e/
		(↑ NUM)	= sg	METR. FRAME	$=\sigma$
		(↑ CL-TYPE)	= 2P		
		...			

c- and f-structure

C- and f-structure representation of *wα ye xla* 'Buy it':

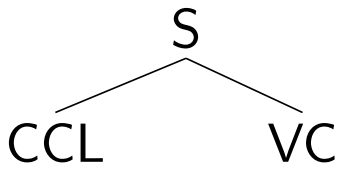


- f-structure representation shows the dropped subject argument ('null_pro')
- c-structure: only includes CCL and VC as immediate daughters of S

→ CCL node containing the 2P clitic *ye* stranded clause-initially

⇒ condition for prosodic 2P clitic placement is created

2. Transfer of structure



S: projects an intonational phrase

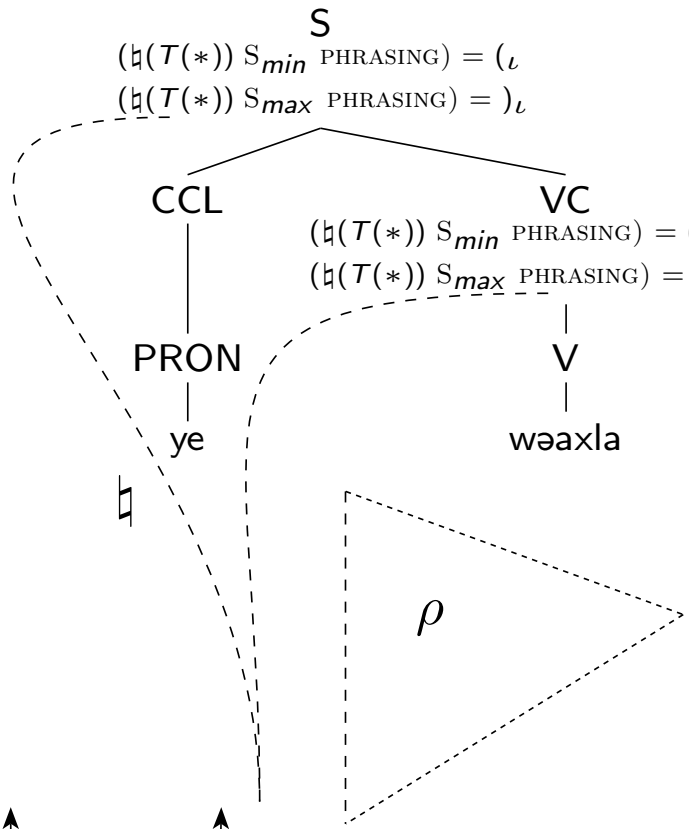
$$\begin{array}{c} \text{S} \\ (\natural(T(*))\ \text{S}_{min}\ \text{PHRASING}) = (_{\iota} \\ (\natural(T(*))\ \text{S}_{max}\ \text{PHRASING}) =)_{\iota} \end{array}$$

VC: projects a prosodic word

$$\begin{array}{c} \text{VC} \\ (\natural(T(*))\ \text{S}_{min}\ \text{PHRASING}) = (_{\varphi}(_{\omega} \\ (\natural(T(*))\ \text{S}_{max}\ \text{PHRASING}) =)_{\omega})_{\varphi} \end{array}$$

CCL: does not project structural information to p-structure

Transfer of structure and vocabulary: *ye wəaxle*

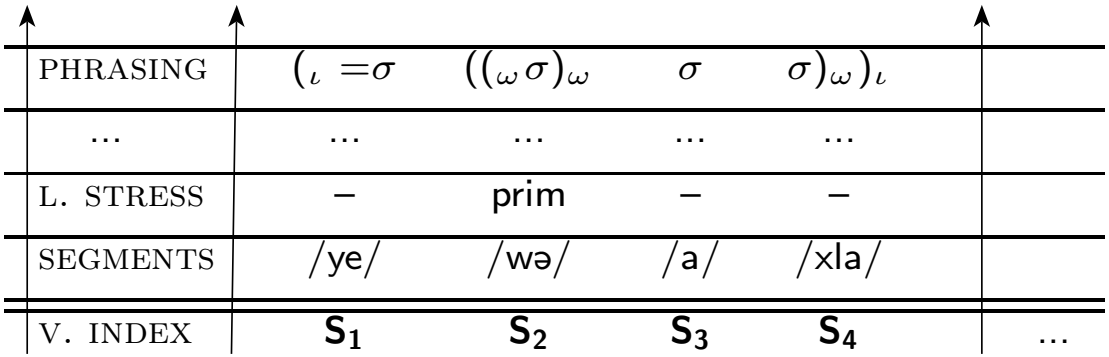


s-form	p-form	
wə-axla V	P-FORM	[wə́axla]
	SEGMENTS	/w ə a x l a/
	METR. FRAME	$'\sigma)_\omega \sigma\sigma$
ye PRON	P-FORM	[ye]
	SEGMENTS	/y e/
	METR. FRAME	$=\sigma$

PHRASING	$(_\iota =\sigma$	$((_\omega \sigma)_\omega$	σ	$\sigma)_\omega)_\iota$	
...	...	...	...	...	
L. STRESS	–	prim	–	–	
SEGMENTS	/ye/	/wə/	/a/	/xla/	
V. INDEX	S_1	S_2	S_3	S_4	...

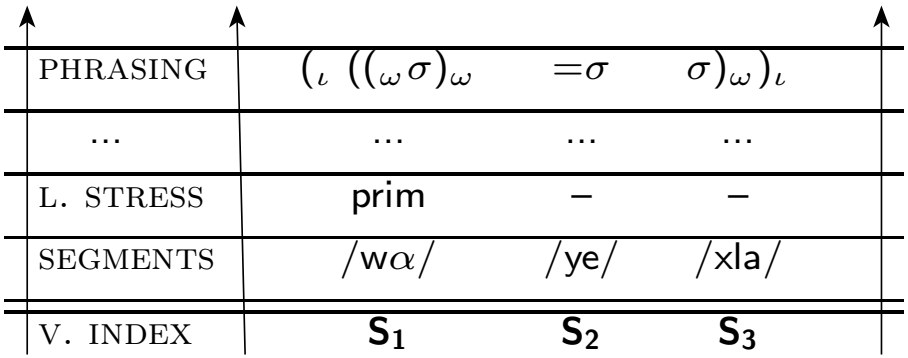
Postlexical phonological rules

input p-structure



PHRASING	$(_\iota$ $=\sigma$	$((_\omega\sigma)_\omega$	σ	$\sigma)_\omega)_\iota$	
...	...	...	...	...	
L. STRESS	–	prim	–	–	
SEGMENTS	/ye/	/wə/	/a/	/xla/	
V. INDEX	**S$_1$**	**S$_2$**	**S$_3$**	**S$_4$**	...

- vowel coalescence: ə a $\longrightarrow \alpha$ / $(\omega$?* _ ?* $)\omega$
- prosodic inversion: $(_\iota$ $=\sigma+$ $(\sigma=)^*$ $\omega \longrightarrow (_\iota$ $(\sigma=)^*$ ω $=\sigma+$



PHRASING	$(_\iota$ $((_\omega\sigma)_\omega$	$=\sigma$	$\sigma)_\omega)_\iota$	
...	...	...	...	
L. STRESS	prim	–	–	
SEGMENTS	/wα/	/ye/	/xla/	
V. INDEX	**S$_1$**	**S$_2$**	**S$_3$**	

output p-structure: $\Rightarrow$ *wα ye xla*

The output of p-structure

- Combination of syntactic structure, lexical information, and postlexical phonological rules from the perspective of production
- Linear order of p-structure output does not have to be congruent to the syntactic linear order!! (Prosody has the 'last word')
- Further information from the interfaces to information structure, phonetics, frequency ...
- Note on comprehension: The processes described in this section from the perspective of production are completely reversible!

Summary

Main goal: Provide a 'road map' which allows the integration of lexical and postlexical phonology and prosody into LFG

- new representation of p-structure: the p-diagram
- extension of the lexicon to include phonological information
- transfer of information between c- and p-structure on two levels:
  - *transfer of vocabulary*
  - *transfer of structure*
- modular: each module with separate processes and vocabulary, no extra formal power is needed
- reversible: applicable to production and comprehension
- can be implemented computationally

$\Rightarrow$ analysis of challenging phenomena like Pashto 2P en(do)clisis now possible at the syntax– prosody interface