Representing variation

The view from phonological theory

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Where is syntactic variation?

- In syntactic theory, there has been a lively debate about the locus of variation
- Roughly two positions:
  - Variation is in the computational system ('parameters')
  - The computational system is universal; variation is in the representations, specifically in the choice of features in functional categories (the 'Chomsky-Borer' hypothesis)
- The second hypothesis is attractive; it leaves computation universal, so that it does not have to be learned. the only thing that needs to be learned is the lexicon (and that is necessary anyway).

Where is phonological variation?

- Phonologists have always been empirically interested in variation (possibly more so than syntacticians)
- Yet they do not seem to participate much in the discussion on the locus of variation in syntactic theory.
- There are roughly three positions, but all of them put variation in the computational component:
  - Different systems correspond to different rule systems (*SPE*, variation in individual rules, their ordering; etc.) plus the relevant representations.
  - Parameter theory (e.g. Hayes' work in the 1980s on stress; Government Phonology)
  - Constraint ranking (OT, Harmonic Grammar)

Learning phonology: an exercise

- One thing a child definitely has to learn while acquiring phonology is: which phonetic properties are contrastive?
- In other words, she has to learn what the phonological primitives are (features, elements)
- What if we assume that this is the *only* thing the child learns: the set of features and possibly some properties of those features?
- In syntax, the primitives are functional items, i.e. morphosyntactic feature bundles (I think); in phonology it would be elements or features.
- That would lead to something similar to the Borer-Chomsky Conjecture in phonology.

The set-up of the grammar

- The idea is that computation is universal.
- I assume this means that there is a set of operations such as autosegmental linking and delinking, projection of prosodic structure, etc.
- These apply “whenever their conditions are met” (a cross-linguistic generalization of Kaye’s Minimalist Hypothesis, that is usually supposed to be true *within a given language*)

Two case studies

- Vowel harmony
- Final devoicing

Turkic vowels

ɨ	∅	i	{FRONT}
a	{LOW}	e	{FRONT, LOW}
u	{ROUND}	y	{FRONT, ROUND}
o	{LOW, ROUND}	ø	{FRONT, LOW, ROUND}

(work with Kathrin Linke)

Building Block 1: Licensing Constraints

- Charette and Göksel (1996) observe that the patterns of Vowel Harmony follow the same 'licensing constraints' as the underlying inventory in Turkic.
- However, their background assumption is that there is a universal generator which takes all the available elements and combines them freely, and then there is a set of language-specific constraints which rules out certain combinations both syntagmatically and paradigmatically
- Furthermore, presumably the way in which the paradigmatic relations are established is probably also language-specific.
- Variation is still mostly in the computation; the elements stay the same.

Building Block 2: Needy Vowels

- Nevins (2010) argues that Vowel Harmony is triggered by the target vowel, which is 'needy', i.e. it does not have a value for a (binary) feature, and it is specified as needing one.
- This creates the possibility that VH is a universal process, which however only applies if a vowel is needy. Some languages just do not have needy vowels.
- Since Nevins works in a binary feature framework, there is no specific prediction as to which features can be needy.

Building Block 3: Emptyness as a condition on Vowel Harmony

- Pöchtrager (2010) shows that disharmonic roots in Turkish obey certain restrictions, which mostly have to do with emptyness: I elements only spread to empty-headed positions, U only to empty expressions (a famous paper by Clements and Sezer 1982 makes similar observations)
- Pöchtrager notes that a problem of ordering arises (if I spreading applies first, this evacuates U spreading), but he assumes that spreading is just a matter of (simultaneous interpretation): the target stays empty
- This makes (phonetic?) interpretation of phonological into something that is variable / the object of parametric variation.

Building Block 4: Strength of individual segments

- Inkelas (ms) proposes that learners give an individual 'strength' index to segments on a word-by-word basis. The strength corresponds to the confidence that a learner has about the identity of such a segment.
- Typically, the strength will be higher for segments within morphemes than at edges; that explains (certain) DEE
- Inkelas proposes a ranking $\textsc{Faith}_{strong} \gg \textsc{M} \gg \textsc{Faith}_{weak}$ for such situations
- Notice that this ranking could be universal: learners of a language in which M is completely irrelevant learn that all segments are strong, learners of a language in which M always apply, make all segments weak

Putting the blocks together

- We accept that a language consists of unary elements that can be freely combined into segments
- We accept that VH is a matter of 'needy vowels'
- We propose that emptiness leads to neediness (a completely full vowel is never needy)
- The issue is: what is neediness?

(There are some similarities also with Van der Hulst 2012; which may hopefully be discussed during the discussion period.)

Feature Cooccurrence Requirements

We have to assume that features can have the following properties

- F$\supset$G: the feature F 'needs' the feature G
- *{F,G}: the feature F 'repels' the feature G

Note that this means that features have properties (just like 'uninterpretable' etc. features in classical minimalism). This is something which needs to be formalized. I assume that actually only features can have such properties, not segments.
(I will from now on talk about features, just because that is more in line with syntactic parlance.)

Vowel harmony

nom.sg.	*gloss*	*gen.sg.*	*nom.pl.*
kɨz	‘girl’	kɨz-ɨn	kɨz-lar
ip	‘rope’	ip-in	ip-ler
sap	‘stalk’	sap-ɨn	sap-lar
el	‘hand’	el-in	el-ler
pul	‘stamp’	pul-un	pul-lar
jyz	‘face’	jyz-yn	jyz-ler
son	‘end’	son-un	son-lar
køj	‘village’	køj-yn	køj-ler

Spreading properties

We have to assume that Turkish features have the following properties

- V⊃FRONT
- V⊃ROUND
- FRONT and ROUND need lexical support (cannot be just inserted to satisfy the needs of V)

Spreading of features would be a universal process, but subject to the properties of the vowels in question.
The third property might be a universal (the Non-Arbitrariness Condition of Government Phonology)
The result is that empty vowels will start attracting FRONT and ROUND whenever they can; but they will stay needy on the surface if those features are not available.

Final Devoicing

- Catalan:
  - *gris* ‘grey (M)’ - *grizə* ‘grey (F)’
  - *gos* ‘dog (M)’ - *gosə* ‘dog (F)’
- Dutch:
  - *kwaa[t]* ‘angry (PRED.)’ - *kwadə* ‘angry (ATT)’
  - *laat* ‘late (PRED.)’ - *latə* ‘late (ATT)’
- German:
  - *Rad* ‘wheel (NOM. SG.)’ - *Rades* ‘wheel (GEN.SG.)’
  - *Rat* ‘council (NOM.SG.)’ - *Rates* ‘council (GEN.SG.)’

(work with Björn Köhnlein)

Two Romance dialects

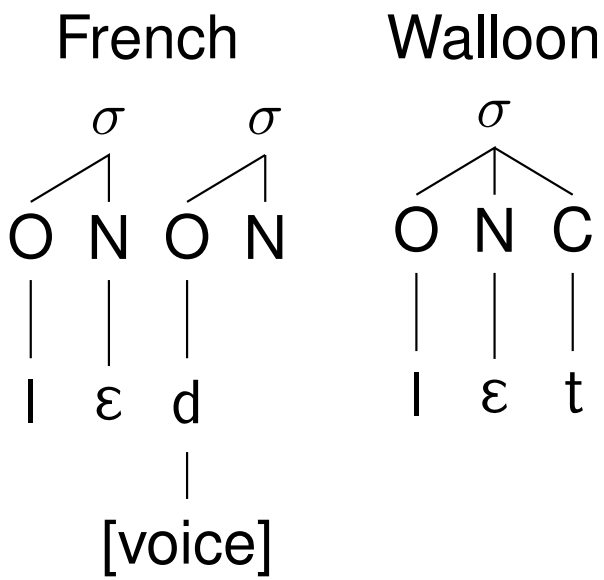
- Standard French has obligatory devoicing (only) before voiceless obstruents: distin[kt]tif (distin[g]uer), su[pt]ropical (su[b]alpin), pro[ʃt]er (pro[ʒ]et), a[ps]or[ps]ion (absor[b]er), la[ts]us (par[de]sus), but [regɑrd] ‘look’
- Walloon: *wåde-lu* ‘keep it’ [wɔːtly] vs. *wåd’-ler* ‘to support mine walls with billets’ [wɔdle] (Liège)

(Van Oostendorp, to appear)

Final Devoicing as a property of [Voice]

- FINDEV: [Voice] needs to be in an onset.

laide



Independent evidence

- The most important argument in favour of the assumption that word final consonants are onsets in French, is that they can form clusters
- However, these clusters have been simplified in Walloon
- This gives strong support to the assumption that they are syllabified differently, i.e. in codas

underlying form	isolation	prevocalic
/trist/	[tris] ‘sad’	[tristɛs] ‘sadness’
/mɛspl/	[mɛs] ‘meddlar’	[mɛspliː] ‘meddlar-tree’

What's the difference?

- Are (final) empty nuclei allowed? (the Piggott parameter)
- This again can be formalized as a property of a feature (e.g. V⊃F)

Four West Germanic languages

- Dutch: /rad/ $\rightarrow$ [rat] (voicing distinction, FD)
- German: /rat/ $\rightarrow$ [rat^h] (spread glottis distinction, FD)
- Yiddish: /rɔd/ $\rightarrow$ [rɔd] (voicing distinction, no FD)
- English: /bæt/ $\rightarrow$ [bæt] (spread glottis distinction, no FD)

Four West Germanic languages: Voicing assimilation

- Dutch: /frœyt/+/boːm/ → [frœydboːm] (VA)
- German: /opst/+/paum/ → [opst^{h}paum] (no VA)
- Yiddish: /bɑk/+/bein/ → [bagbein] (VA)
- English: /bæk/+/bon/ → [bækbone] (no VA)

Analysis

- Dutch and German have a syllable structure like Walloon
- English and Yiddish have a syllable structure like French
- Dutch and Yiddish have a feature VOICE
- English and German have a feature SPREAD
- Coda consonants are needy for any laryngeal feature
- VOICE is needy for onsets
- SPREAD can be provided by the end of the word

Projection

- We encounter a specific type of neediness, i.e. neediness of a feature for a certain position.
- This has been formalized in Van Oostendorp (1995, 2000) as ‘projection’: certain features project to certain prosodic positions and vice versa. In that work, however, projection is a (violable) constraint of the grammar
- We need to reconceptualize it as a property of the feature

Conclusion

- I have presented an exercise in finding a more precise locus of variation in phonology
- The idea is that the only thing which is language-specific is the set of features and their properties; everything else follows from them
- Under this model, the acquisition task would be restricted to learning the set of phonological features and their properties (in particular, neediness and repulsion)
- An issue: we have to stipulate 'properties of features', of two types: relations to other features, and projection to prosodic structure.
- It is not immediately clear what this means, and to what extent this can be extended to other domains (e.g. stress should be seen entirely as projection of features).