How To Optimise Your Grammar in Three Levels

An Introduction to Stratal Optimality Theory

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Outline

Who is giving this workshop?

- 4th semester M.A. Linguistics, Leipzig University
- worked as research assistant on Stratal OT analyses & database

Why care about Stratal Optimality Theory?

- paradoxical or opaque data
- proposing contradictory rules and grammars for one language
- "solution": grammar is structurally hierachical
- consists of different levels with different rules
- similiar to syntactical phases, borders etc.

Why care about Stratal Optimality Theory?

Process	**Stratum**	**Ranking**
Deletion	Root/Derivation	Onset » Dep-IO » Max-IO
Epenthesis	Stem/Inflection	Onset » Max-IO » Dep-IO
Hiatus	Phrase/Compound	[Dep-IO, Max-IO] » Onset

Table: Victor Zimmermann's Stratal OT Michif Analysis

Why care about Stratal Optimality Theory?

Process	Stratum	Ranking
H-Deletion	Macrostem	Align-L » Ident-IO » Align-R
Downstep	Inflection	Align-L » Ident-IO » Align-R
No Vowel Harmony	Clitics	Align-R » Ident-IO » Align-L

Table: Kit Grigoleit's Stratal OT Moro Analysis

Disclaimer

Constraints

- constraints are different from phonological rules as they are rather formulated as prohibitions
- for the scope of this workshop I formulated them closer to rules but in an actual analysis you'd need to formulated them like constraints

Stratal Re-Ordering

- The two stratal analyses chosen for this workshop do not have re-ranking of constraints for each stratum
- while these analyses show the possible "tricks" of a stratal analysis
- there are many analyses where different constraints have different priorities on different levels really showcasing the stratal structure of a grammar

1. Optimality Theory

Optimality Theory (OT)
morphophonological framework by Prince & Smolensky (1993), McCarthy & Prince (1993)

- Input: Phonological representation from morphology & lexicon
  - Lexicon & morphology: DOG + PLURAL
  - Phonology: /dɒg/ + /s/
- Constraints: phonological rules (universal, violable)
  - [-*voiced*] → [+ voiced] / [+ voiced] ___.
- Output: phonologically modified morphosyntactic form
  - Output: /dɒgz/

1. OT Tableau Default

Input:/phonological representation/	CONSTRAINT 1	CONSTRAINT 2
a. candidate a	*	
☞ b. candidate b		*

1. Example A: English

(1) AGREE [*Voice*]
Obstruents in a cluster must agree in voicing. (Beckmann 1998)

Input:/ dɒg + s/	AGREE [*Voice*]
a. dɒgs	*
☞ b. dɒgz	

1. Example B: Rules & Constraints

Language XYZ

- Data: y + x
- Language: wants letters organised in alphabetic order.
- Constraint: ALPHABET Letters must be in alphabetical order.
- Input: y + x $\rightarrow$ Output: x-y

1. Example B: OT Tableau

(2) ALPHABET
Letters must be in alphabetical order.

(3) IDENT-IO
Everything in the input must be represented in the output.

Input: /y + x/	ALPHABET	IDENT-IO
a. y - x	*	
☞ b. x - y		*

Exercise 1: Puzzle

English

- Data: eng. *bed* /bɜd/
- Language: Does not allow voiced obstruents in coda of a syllable.
- Input: /bɜd/ $\rightarrow$ Output: /bɜt/

1. Write a phonological rule (formal or informal)
2. Give it a cool constraint name.
3. Model it in an OT table.

Exercise 1: Solution

Rule: [+ voice] → [-*voice*]/__.
Constraint: **VoicedCoda* Obstruents must not be voiced in coda position.
Constraint: IDENT-IO(VOICE) The voice feature in the input remain the same in the output.

Input: //b3d//	*VOICEDCODA	IDENT-IO(VOICE)
a. /b3d/	*	
☞ b. /b3t/		*

2. Stratal Optimality Theory

Stratal Optimality Theory (Stratal OT)
morphophonological framework by Bermudez-Otero (1999) & Kiparsky (2000)

- **Stratification**: The phonological and morphology of grammar is organised into levels.
- **Level-ordering**: Each domain has a certain morphosyntactic and phonological properties.
- **Constraint ranking**: The constraints can *(not)* be re-ordered in different strata.
- **Affixes**: Affixes are specified whether what stratum they enter.

2. Stratal Optimality Theory: 1st Stratum

Language XYZ prefers for concatenation y+x constraint ALPHABET:

Input: /y - x/$_{1stStratum}$	ALPHABET	IDENT-IO
a. y - x	*	
☞ b. x - y		*

2. Stratal Optimality Theory: 2nd Stratum

Language XYZ prefers for derivations with the constituent [y-z] the constraintIDENT-IO:

Input: /[z- [x - y]]/$_{2ndStratum}$	IDENT-IO	ALPHABET
a. [[x - y] - z]	*	
☞ b. [z - [x - y]]		*

2. Stratal Optimality Theory: Default Strata

The three strata traditionally assumed are:

Stratum N°	**Stratum**
1	Stem Stratum
2	Word Stratum
3	Postlexical Stratum

Table: Classical Stratal Analysis

2. Stratal Optimality Theory: Exemplatory Stratal OT Analyses

Exemplatory Stratal OT Analyses

Language	**Number of Strata**	**Author(s)**	**Stratifying Process**
Nuuchahnulth	2 Strata	Stonham (2007)	Glottalisation
Albanian	3 Strata	Trommer (2013)	Stress
Tetsótiné	6 Strata	Jaker & Kiparsky (2020)	Affixal Morphology

Table: Overview: Stratal OT Analyses

2. Stratal OT: Nuuchahnulth (Stonham 2007)

Nuuchahnulth (Wakashan, Canada)

- Data: (double) CV-reduplication
  - maa-maaɬ-yimɬ-ap but *maa-maa-maaɬ-yimɬ-ap
  - ya-yaq-hi **and** ya-ya-yaq-hi
- Language:
  - SUF.RED: requires CV-reduplication of the verb root
  - PL: requires CV-reduplication of the verb root
  - If SUF.RED & PL co-occur, CV of the verb root gets reduplicated **twice**.
- Input: SUF.RED-PL-long-at.the.limbs
- Output: ya-ya-yaq-hi 'the long-limbed ones'

2. Stratal OT: Nuuchahnulth (Stonham 2007)

Nuuchahnulth

(4) *RedRed
No double reduplication.

(5) Ident-IO (FaithIO Stonham 2007)
The input corresponds to the output.

Stratum N°	**Constraints**	
Stratum 1	*RedRed	Ident-IO
Stratum 2	*RedRed	Ident-IO

Table: Stratal Analysis Nuuchahnulth (Stonham 2017)

2. Stratal OT: Nuuchahnulth (Stonham 2007)

Nuuchahnulth: 1st Stratum

Input: /ɾɛð-yaq-hi/$_{1stStratum}$	*RedRed	Ident-IO
a. ya-ya-yaq-hi	*	
☞ b. ya-yaq-hi		

Nuuchanulth: 2nd Stratum

Input: /ɾɛð-[ya-yaq-hi]$_{2ndStratum}$/	*RedRed	Ident-IO
a. ya-yaq-hi		*
☞ b. ya-ya-yaq-hi		

Exercise 2: Arabic

Arabic (Kiparsky 2000)

- Language Processes:
  - /i/-Deletion: Delete /i/ in open unstressed syllable
  - Stress: Put stress on penultimate closed syllable
  - 1PL.SBJ: -/na/ gets added at some point
- Data: /fíhim/ 'to understand' + /na/ = /fhím-na/

1. In what order do the 3 processes have to apply to get from /fíhim/ to /fhím-na/ 'we understood'?
2. Try to model the process ranking in an OT table.

Exercise 2: Arabic

Arabic (Kiparsky 2000)

Process	**Form**
	fíhim
	fíhim+na
Stress Shift	fihím+na
/i/-Deletion	fhím+na

Table: Process Ordering /fhímna/ 'we understood'

Exercise 2: Arabic /fhím+na/ OT table

(6) Stress (HeadMax-BA Kiparsky 2000)
Stress is on the penultimate syllable.

(7) No [ɪ]
Delete /i/ in open, unstressed syllables.

(8) Ident-IO (**Max-IO** Kiparsky 2000: 7)
The input corresponds to the output.

Exercise 2: Arabic /fhím+na/ OT table

Arabic: 1st Stratum

Input: /fí.him + na/$_1$*st*	Stress	No [ɪ]	Ident-IO
a. fhím.na	*		*
☞ b. fi.hím.na		*	

Arabic: 2nd Stratum

Input: /fi.hím.na/$_2$*nd*	Stress	No [ɪ]	Ident-IO
a. fi.hím.na		*	
☞ b. fhím.na			*

Reflection: Stonham (2007)

Stonham (2007): Nuuchanulth

- The constraint ranking remains the same over the two strata
- Reduplicating affixes get added incrementally (1st in 1st stratum, 2nd in 2nd stratum)
- The constraint *RedRed is always violated if two reduplicating affixes are attached in the first stratum and non-violated in the 2nd stratum.
- The "power" of this stratal analysis is therefore in the constraint *RedRed

Reflection: Kiparsky (2000)

Kiparsky (2000): Arabic

- The constraint ranking remains the same over the two strata
- The affix -/na/ is attached at the very beginning.
- Going through the 1st strata the output undergoes the stress shift.
- This form is then put through the 2nd stratum where stress is no longer violated and no the constraint No [ɪ] deletes the /i/.
- Problem: Technically /fhímna/ in the first stress is neither violating the Stress nor No [ɪ] constraint.

Summary

Thoughts?
Problems?
Ideas?

Thank you for your time and participating :)

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