Tier-Based Strict Locality in Phonology and Morphology

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Our goal

	Phonology	**Morphology**
Received view	regular Kaplan&Kay (1994)	regular Beesley&Karttunen (2003)
Recent research	subregular Heinz (2015)	**?**

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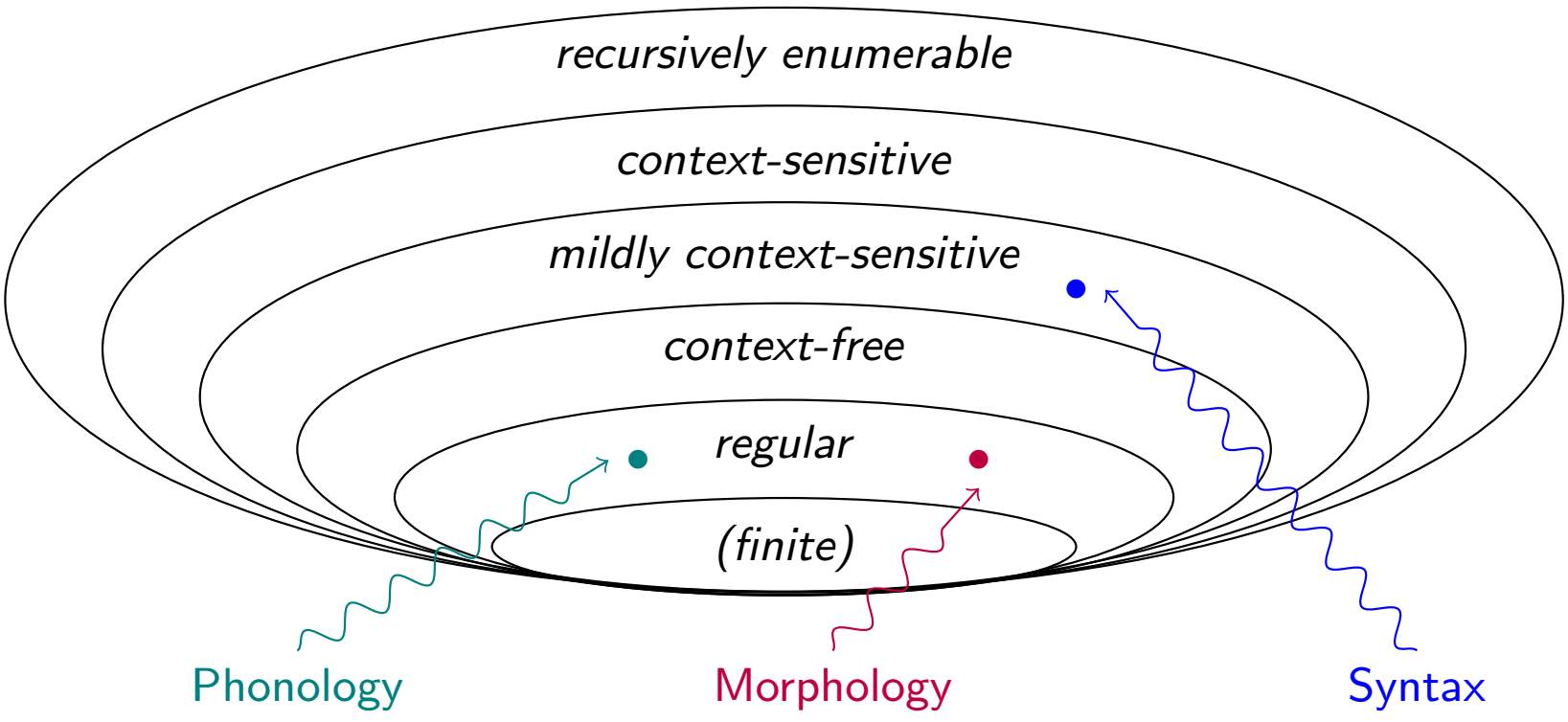
- Show that **morphotactics is also subregular**
- More precisely: **Tier-Based Strictly Local**
- **Consequences**
  - parallels to phonology
  - no over-predictions
  - explain typological gaps

Outline

The Chomsky Hierarchy of String Languages



Phonology and morphology as regular languages

Morphology and phonology are regular

Kaplan&Kay (1994), Beesley&Karttunen (2003)

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Regular predictions:

- Harmony applies if there is no blocker in a word
- First-last harmony
- Amount of prefixes depends on the amount of suffixes

Subregular Phonology and Morphology

Subregular phonology

Subregular morphotactics

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not full power of finite-state machinery is being exploited ⇒ **subregular hierarchy**

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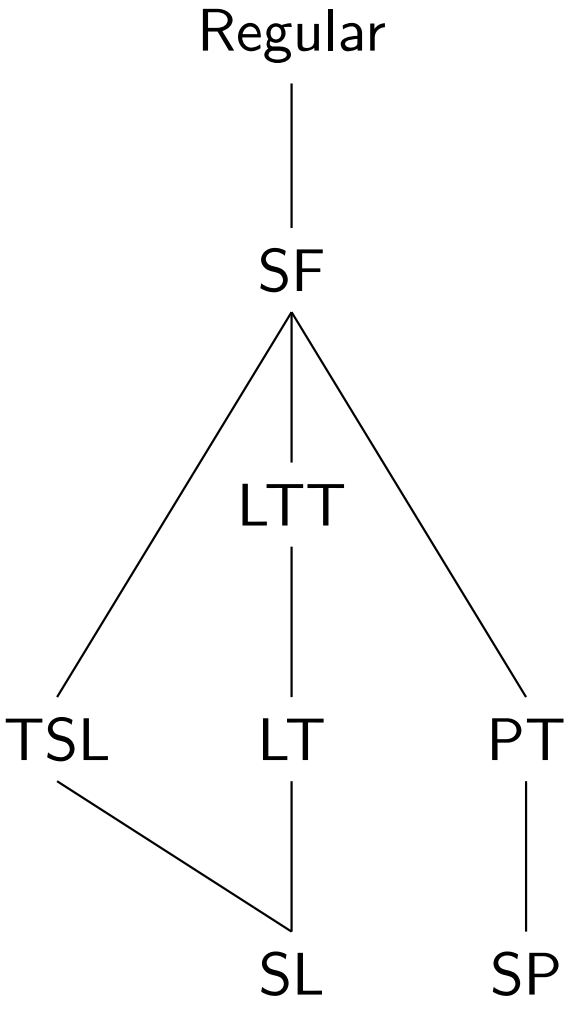

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All **phonological dependencies** are

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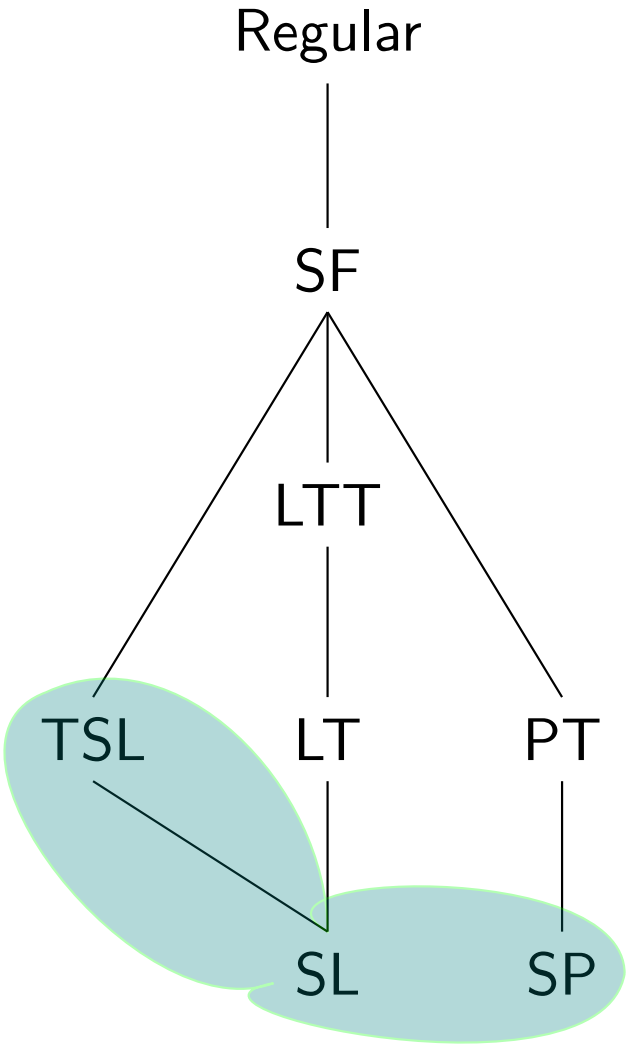
Subregular hierarchy



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- **Strictly Local grammar** captures local dependencies.

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- Anticipatory obstruent assimilation:
  *$C_{+voi}C_{-voi}$: vsë ‘*all*’ → [fs]ë
  *$C_{-voi}C_{+voi}$: pros^{j}ba ‘*request*’ → pro[z^{j}b]a
- Obstruent word final devoicing:
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- This prediction is correct:
  vperëd 'forwards' → [fp]erë[t]
  mozg 'brain' → mo[sk]

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- *lö[s]en, *rei[s]en, *gru[s]eln, ...
- ^{ok}lö[z]en, ^{ok}rei[z]en, ^{ok}wa[ss]er...

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Example (Vowel harmony in Lakaa, Niger-Congo)

- Non-high vowels harmonize in ATR (Akinlabi 2009)

  [+ATR]: èsìsòn '*smoke*', lèjìmə̀ '*matriclan*'

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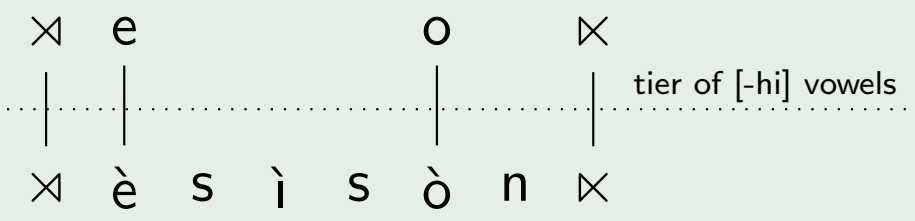

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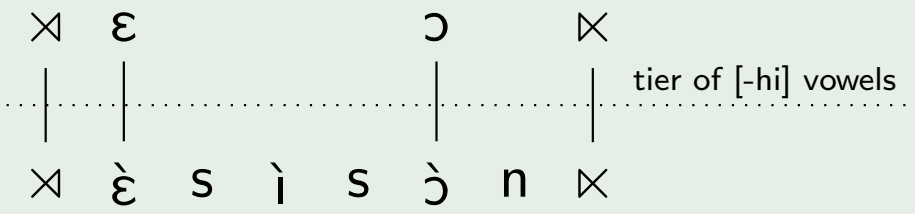

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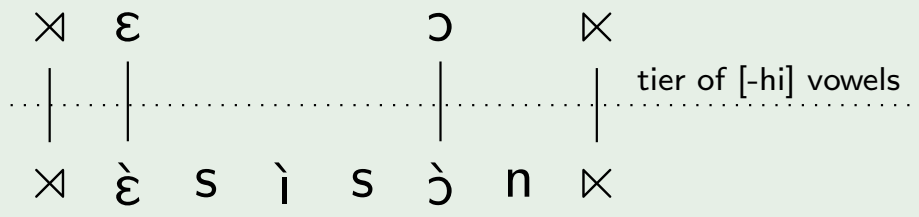

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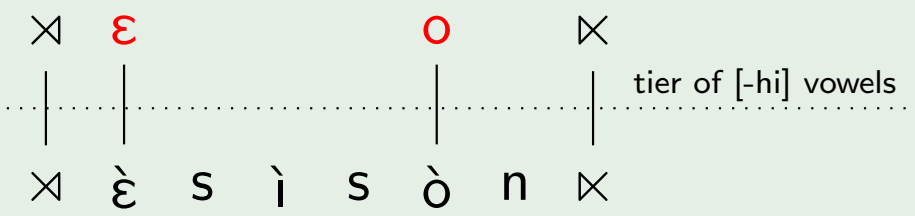

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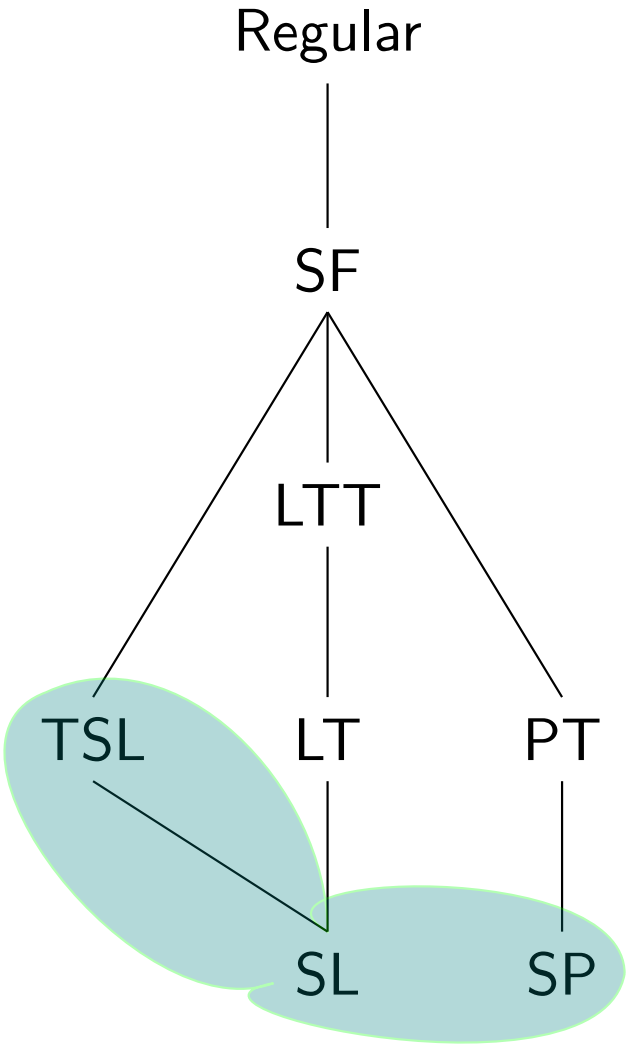

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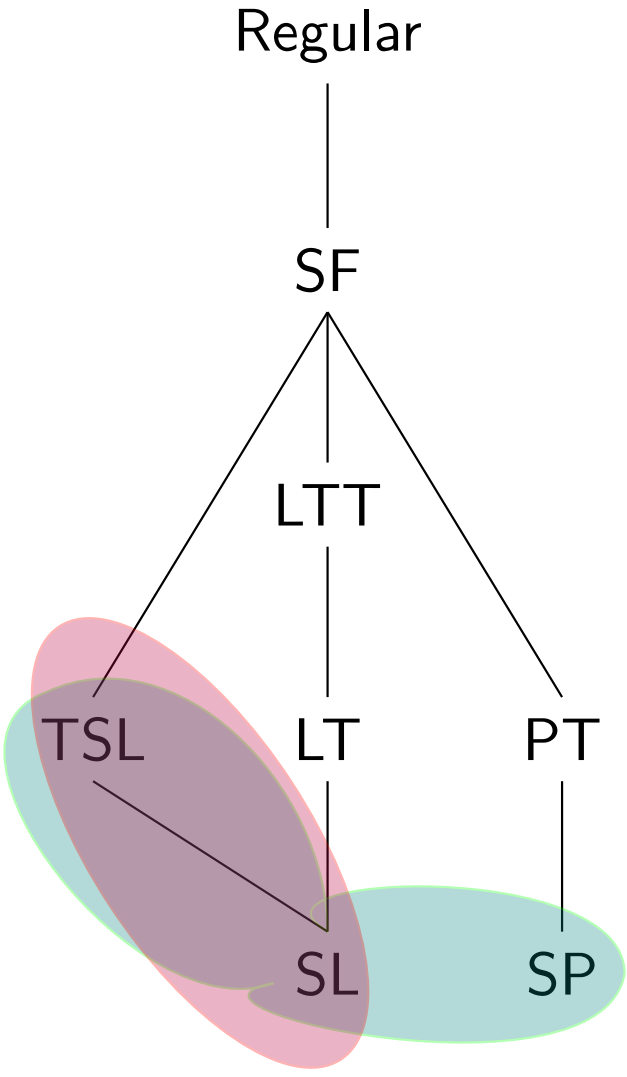

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- Indeed, it is correct:
  undoable, unlockable

Non-SL morphology: circumfixation

- English un-...-able are prefix and suffix that can co-occur
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- This pattern is not SL.

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- This pattern is TSL
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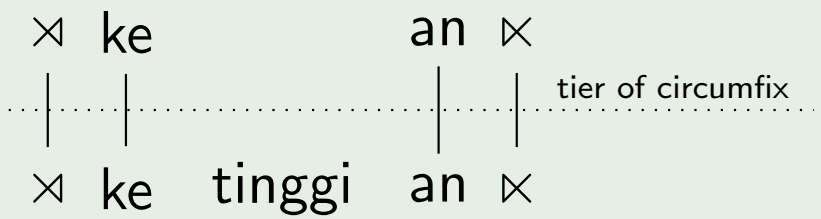

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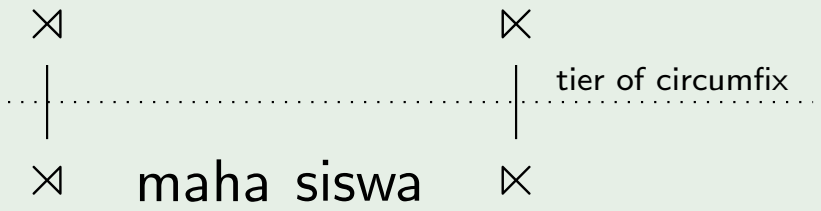

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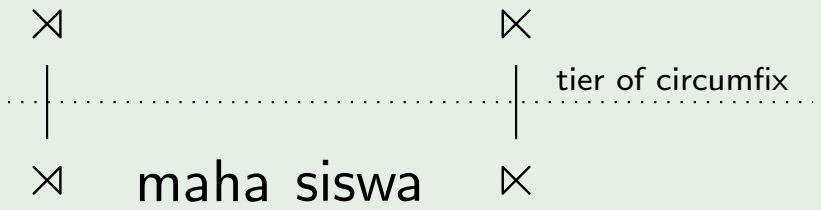

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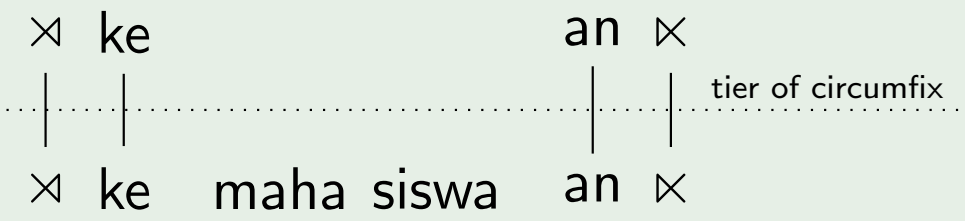

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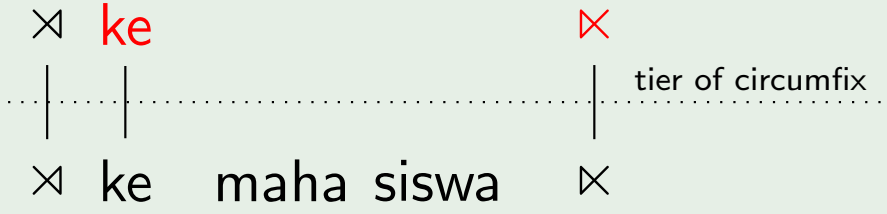

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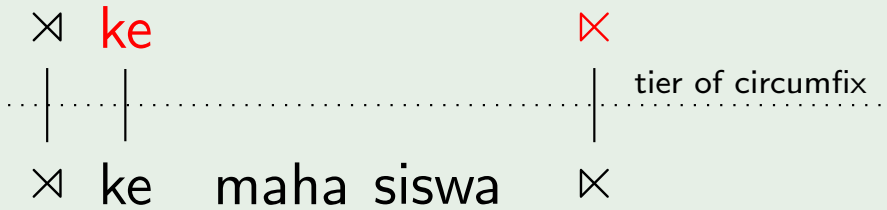

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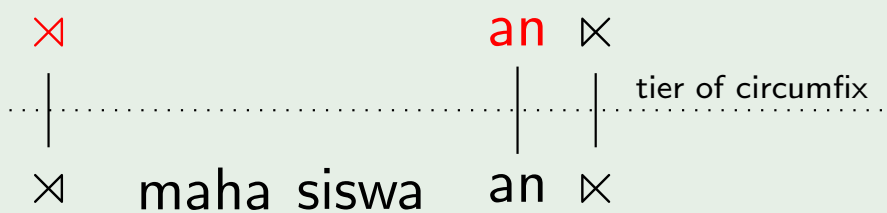

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- vyo is *prefix* if the negation si is present
- vyo is *suffix* in other cases
- This language is not SL: stem is unbounded in length.
- It is TSL with vyo, si and stem boundaries (#, #) on the tier.

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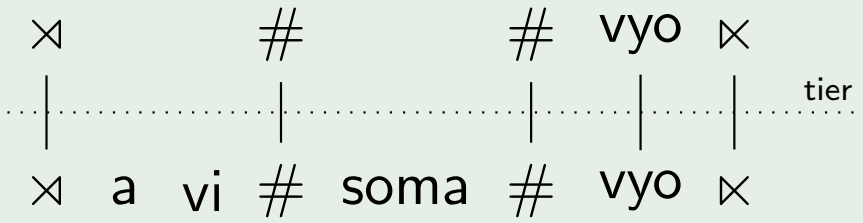

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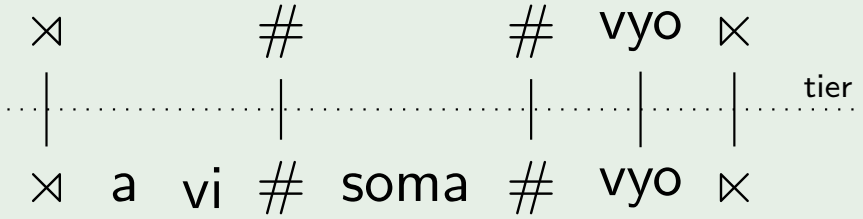
a-vi-soma-vyo:



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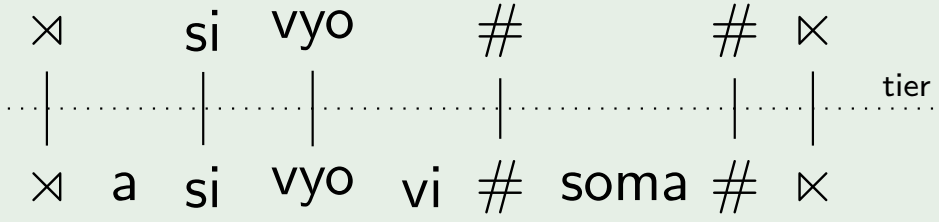

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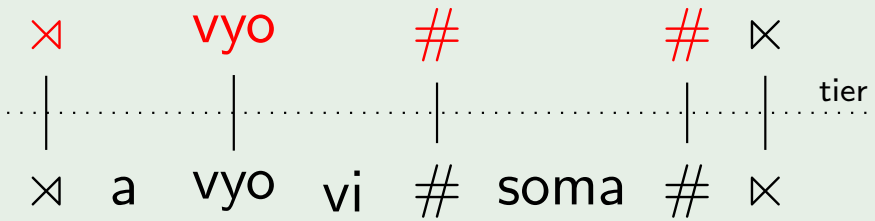

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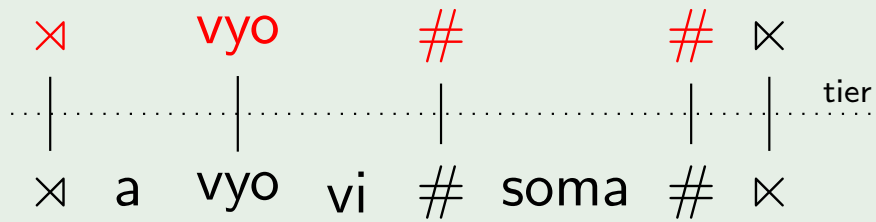

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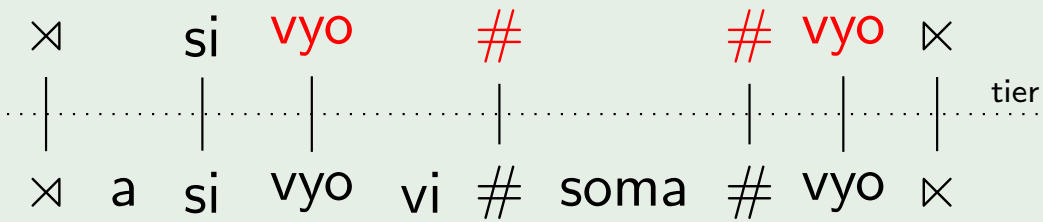

Interim Summary

- SL enforces local dependencies
- TSL analyzes non-local dependencies as local over *tiers*
- Both phonology and morphotactics are mostly SL
- Some of phonological and morphotactic dependencies are TSL
- Can we predict any typological gaps?

Typological gaps

Basic Logic of Argument

If combination of two attested TSL patterns is not regular, we get a typological gap.

Some predicted gaps:

- No embedded circumfixation;
- No cases when amount of prefixes depends on the amount of suffixes;
- In general, no $a^n b^n$ pattern and its derivatives.

Typological gap I: Impossible compounding

Example (Compounding patterns)

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- Russian + Turkish pattern: **stem-(stem^{n}-marker^{n})**
  amount of compounding affixes = amount of added stems
- This pattern is not regular and appears to be non-existent

Typological gap II: Recurrent affixation

Example (multiple affix application)

- In German, prefix über- '*after*' can be iterated: **über*-stem**
  morgen '*tomorrow*'
  über-morgen '*the day after tomorrow*'
  über-über-morgen '*the day after the day after tomorrow*'

Typological gap II: Recurrent affixation

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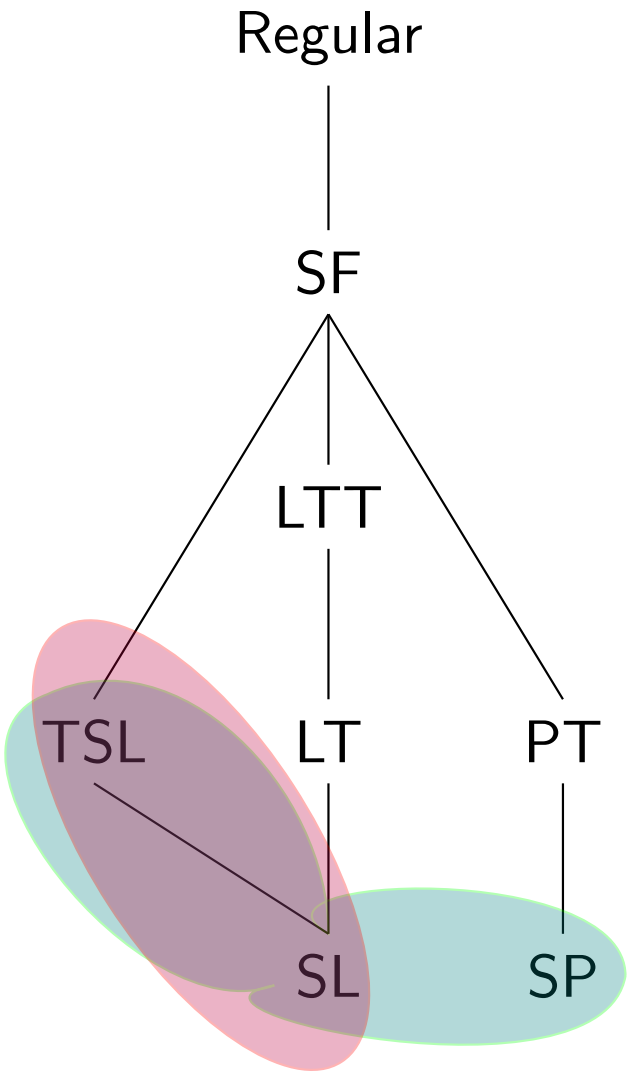
- The resulting pattern of iteration of the circumfix would be **crc^n-stem-mfx^n**
- This pattern is not regular, therefore it does not exist

Conclusion



- Morphotactics is at most Tier-Based Strictly Local
- Set of typological gaps can be explained due to the subregular nature of morphology
- Same formal tools can be used for **morphology** and **phonology**

Future work

- Try to find SP patterns in morphotactics
- Look at more typologically diverse languages
- Extend to mappings from underlying to surface forms
- Work with representations of internal structure
- The elephant in the room: reduplication

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