Evidence for base-driven alternation in Tgdaya Seediq

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1 Overview

UR discovery: Two approaches

- **"Cobbled" URs (Kenstowicz and Kisseberth, 1977):** URs are maximally informative.
  - → Determine which slots in paradigm reveal underlying contrast(s), **'cobble'** these together to set up UR.
  - → UR discovery is harder, but resulting grammar is simple.
- **Surface bases (Albright, 2002, et seq.):** Learners base UR on a **single** surface form.
  - → Pick a slot in the paradigm to be the base, and project other slots using this base.
  - → UR discovery is easier, but resulting grammar is more complex, requires exceptions.

Current study: Tgdaya Seediq

- Seediq (iso:trv) is an Austronesian language spoken in Taiwan.
- Extensive alternations in verb paradigms make it a good test case for comparing theories of morphophonology.
- **Finding:** Asymmetries in Seediq lexicon support the Albrightian surface base approach.

3 Two solutions

Given a paradigm of this sort...

STEM	SUFFIXED	
'haŋuts	'huŋedan	'to cook'

Cobbled URs (Yang, 1976)

UR — /haŋed/

SR — ['haŋuts] [hu'ŋedan]

Albrightian surface base

Base — ['haŋuts] or [hu'ŋedan]

SR — [hu'ŋedan] ['haŋuts]

References

https://tinyurl.com/t5w75s4

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2 Sources of alternation in Seediq

Neutralization from vowel reduction:

- Stress is always penultimate; suffixation shifts stress rightwards.
- Pretonically:

STEM	SUFFIXED	DESCRIPTION
'atik,'utik,'etik...	'tikan	Onsetless vowels delete
'pahik, 'puhik,'pehik...	pi'hikan	Assimilate if separated by /h,ʔ/
'patik, 'petik, 'putik...	pu'tikan	Else, reduce to [u]

→ Result: Neutralization of contrast in **suffixed forms.**

- Post-tonically:

STEM	SUFFIXED	DESCRIPTION
'patuk	pu'tekan,pu'tokan,pu'tukan	/e,o,u/ → [u] in closed syl.

→ Result: neutralization of contrast in **isolation stems**

Final consonant neutralization:

- Many processes of word-final consonant neutralization, some examples listed:

STEM	SUFFIXED	DESCRIPTION
'patik	pu'tikan,pu'tipan	/p/, /b/, /k/ → [k]
'patic	pu'titan, pu'tidan, pu'tican	/t/, /d/, /t͡s/ → [t͡s]
'patiŋ	pu'tiŋan,pu'timan	/m/, /ŋ/ → [ŋ]

→ Result: neutralization of contrast of **isolation stems**

Overall: All forms of a paradigm to suffer from neutralization

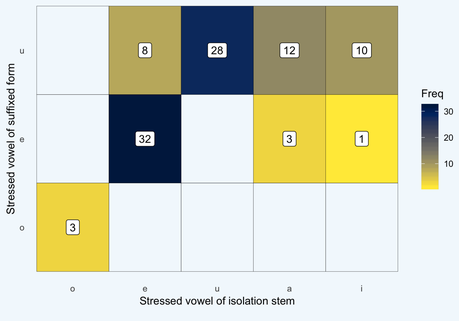
4 Predictability from stem

Despite apparent ambiguity, patterns in lexicon make it so that **suffixed forms are highly predictable from stem (non-suffixed) forms**

Predicting vowel alternations

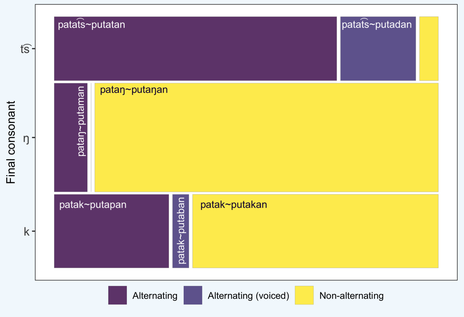
- Due to post-tonic vowel reduction...
  CVCuC∼{CuCeCan, CuCoCan, CuCuCan}
- But, identity of vowel in suffixed form is predictable via **"vowel matching":**

if		*then*	
	potus		putosan
	petus		putesan
	p{u,a,i}tus		putusan



Predicting consonant alternations

- Most final alternations either:
  - almost always occur (c∼t)
  - almost never occur (ŋ∼m)
- Result: a speaker can predict with almost perfect accuracy whether or not a final consonant will alternate.



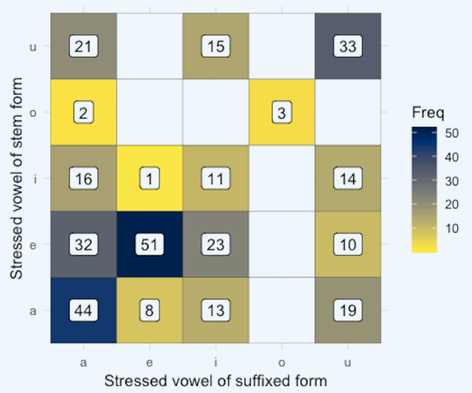
6 Conclusion

- Seediq suffixed forms are highly predictable from their stems.
- Asymmetries in Seediq lexicon suggest **reanalysis from a stem base**.
  - Unexpected under the cobbled UR approach.
  - Natural result of Albrightian approach, assuming that speakers have designated the stem form as base.
- Ongoing: wug-testing

5 Predictability from suffixed forms

Notably, **stem forms are not as predictable from suffixed forms** (i.e. suffixed forms are **less informative**

- In the suffixed forms of a verb, the **penultimate vowel of the stem** is always neutralized due to **pretonic VR.**



- Patterns of predictability for 'undoing' pretonic VR are relatively weak.
  - e.g. [pu'tasan] most likely has the stem ['patas]. However, this is correct only 38% of the time (44/115)
  - Overall, picking the 'most likely' option correctly predicts **181/316 forms (49%)**.
- pretonic VR also **affects more forms** than the neutralizing processes which affected the stem.

6 More evidence from modeling

Rule-based models confirm **stem-suffix asymmetry**, which can be better explained under the surface-base approach.

Implementation: a model for surface-base learning

- Rule-based model (cf. Minimal Generalization Learner, Albright and Hayes, 2003)
- Takes a surface form as base, derive other forms of the paradigm with a series of **rules**.

Model Evaluation

- **Rules** evaluated using adjusted confidence:
  - **Confidence:** % of forms where rule application results in correct output (≈ accuracy)
  - **Adjusted confidence** (Mikheev, 1997): penalizes rules that have less evidence
- **Lexical items** are given a **'score'** (≈ well-formedness) based on the adjusted confidence of the rules applied to them.
- **"Better"** model assigns **higher scores** to the lexical data.

Data

Compared **two models**: Stem-base vs. Suffix-base
Tested **two "lexicons"**:

- REAL: 342 existing Seediq paradigms
- SIMULATED: 700 paradigms, where rates of alternation are determined by baseline frequencies of sounds in Seediq lexicon.

Model Results

- **Comparing models:** 'Stem to Suffixed' model (where **stem** is the base) performs much better than the 'Suffixed to Stem' model.
- **Comparing "lexicons":** The 'Stem to Suffixed' model does much worse on the SIMULATED set.

⇒ Asymmetry suggests that Seediq speakers have reanalyzed verb paradigms to be **predictable from stem**.