A count effect in Warlpiri vowel harmony

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1. Overview

Majority rules vowel harmony: a hypothetical pattern whereby the grammar assesses the number of majority and minority vowels in a word, and harmonizes the minority vowels.

- Previously advanced as a pathological pattern predicted by Optimality Theory to exist under certain assumptions.
- Prior investigators have yet to identify a case of majority rules harmony.

We present data on variable vowel harmony in Warlpiri suggesting it as a potential example.

- We identify a count effect whereby the grammar assimilates the vowel occurring the least number of times in the word, regardless of direction.
- The data are consistent with many-to-one harmony or majority rules harmony.

The data lend support to a system in which directionless assimilatory constraint dominates count-based, symmetric IDENT.

2. Background on count effects in harmony patterns


- E.g., (i) if A\text{AGREE} \gg IDENT(lar) \gg *LAR, A\text{AGREE} \text{FUDGE}(lar) ... then we get /p\text{ig}/ \rightarrow [p\text{kig}]; but /p\text{ig}/ \rightarrow [p\text{gkdz}], /p\text{kidz} \rightarrow [p\text{gkdz}], etc.

Lombardi (1999), Bakovi (2000), for example: add other constraints, potentially with some universal ranking, to rule out pattern (binary faith and constraint conjunction respectively).


- Helps explain rarity/so-far-unattestedness, but should it be ruled out completely?

3. Background on Warlpiri

Warlpiri: Pama-Nyungan language spoken in Australia by around 3,000 people.

- Has three vowels: [a u ɾ]
- The high vowels were previously shown to trigger progressive and regressive cross-boundary rounding harmony; [a] is not subject to harmony, and can block it (Nash 1986, Harvey & Baker 2004).

4. Introduction to the data

Data drawn from text corpus called the Warlpiri Dictionary Project (WDP).

- WDP data collected by a number of linguists (primarily Ken Hale and Mary Laughter) in central Australia in the 1970s and 1980s.
- Disharmonic nouns were identified in the WDP, and their frequencies were calculated from Warlpiri sentences.

Warlpiri disharmonic nominals appear to be in a stage of regularizing to harmonic forms. Our interest is in how harmony behaves in this stage.

- Of the 355 disharmonic noun roots identified, 95 vary with a harmonic form.

5. Variable vowel harmony with equal numbers of disharmonic vowels

54 nouns have equal numbers of /u’s and /i’s.

- No dominant-recessive harmony: roughly harmonic matching to [a].
- They vary overwhelmingly lexically as to whether harmonic form displays progressive or regressive harmony: roughly 50% harmonizing regressively.

(2a) Progressive

mjipu = mjippa ‘ceremonial fat’
juṯuŋkuṯuŋ ‘python’
muŋpuŋu = muŋpuŋa ‘marsupial’

(2b) Regressive

marrku = marri ‘claypan’
majalŋuŋa ‘nail’

Suggests harmony agnostic to vowel direction in the aggregate—conditions we would expect to obtain in a system harmonizing to majority when disharmonic vowels are unequal.

6. Variable vowel harmony with unequal numbers of disharmonic vowels

The 41 nouns with unequal numbers of /u’s and /i’s display a count effect: 35 harmonize to majority vowel (3a), 4 harmonize to minority (3b), and 2 vary.

(3a) Count-based harmony

kulukuru = kulukuru ‘middle’
puhuki = puhuku ‘calf’
purtuŋŋuŋa – purtuŋŋuŋa ‘beetle’

(3b) The four exceptions

ŋuŋkuŋkuŋa – ŋuŋkuŋkuŋa ‘child’
kmajalŋuŋa – kmajalŋuŋa ‘echidna’
kuŋkuŋkuŋa – kuŋkuŋkuŋa ‘crab’

- All but two forms with unequal vowels have a single minority vowel—hence data are largely consistent with many-to-one harmony.

- The two forms with two minority vowels follow majority rules: e.g., ɲuŋkuŋkuŋ – ɲuŋkuŋkuŋ ‘decongestant plant’, kmajalŋuŋa – kmajalŋuŋa ‘fairy martin’

- Various cases of transparent [ɑ] in variable forms.

7. Implications for phonological theory

The data lend support to:

- a directionless assimilatory constraint along the lines of Lombardi (1999);
- a system in which such constraint dominates a count-based, symmetric IDENT, with IDENT dominating directional constraints;
- no interference from count-avoiding constraints (Lombardi’s and Bakovič’s approaches, for example).

We provide below tableaux of a Harmonic Grammar analysis of these forms (Legendre, Miyata & Smolensky 1990).

| /juŋkuŋ/ H | AGREE(rd) | IDENT(rd) |
| /uŋkuŋ/ | w = 1 | w = 1 |
| 1 | * | * |

8. Future directions: a wug test with long words

Does the count effect scale up to multiple minority vowels? Need lots of long words:

- For example, if we have two vowels ɭ and three vowels ɭ, do speakers tend to harmonize in favor of ɭ? What about three vowels ɭ and four vowels ɭ?

Future directions: present native Warlpiri speakers with a long disharmonic nonce form, and ask them which optional variant they prefer.

“This is a [mirukunj]... also called a...”
A. [mirukunj] A. [kurunguŋuŋa]
B. [mirukunj]

If the count effect were to scale up to higher numbers of minority vowels, then that would suggest majority rules unambiguously. Some implications for present discussion:

- Semanticity raises issues for serial phonological frameworks such as SPE and HS, at least traditionally posed (Chomsky & Halle 1968, McCarthy 2000).

9. Conclusion

Count effect in Warlpiri vowel harmony: seems at least to be a many-to-one pattern, possibly even majority-rules pattern.

- Supports constraints/ranking laid out by Lombardi to predict the count effect.
- Might be best to find other explanations for rarity other than expanding CON—e.g., a simplicity bias in learning (Moreton & Pater 2012, McCollum et al. 2019).
- Adds to cases in which a pattern predicted to be pathological turns out to exist (Hayes 2018).

10. Acknowledgments

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References