Learning Sour Grapes Harmony in an artificial language learning experiment

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1. Introduction

- In this study, results show humans being sensitive to *Sour Grapes Harmony*, an unattested phonological pattern.
- My results also suggest a novel account for *why* Sour Grapes harmony is unattested.

2. Sour Grapes

- Standard, attested harmony patterns spread a **feature's value** from one edge of a phonological domain to the other, with the spreading sometimes being stopped by a **blocker** segment (Rose and Walker 2011).

/pitukutʃu/ → [pitikitʃi] /pitukatʃu/ → [pitikatʃu]

- However, some constraint-based theories of assimilation predict Sour Grapes Harmony when blockers are present (Bakovic 2000, Wilson 2003).
- In this pattern, blocker segments don't just stop a feature from spreading past them—they can also block any spreading from occurring at all.

/pitukutʃu/ → [pitikitʃi] /pitukatʃu/ → [pitukatʃu]

- Sour Grapes is unattested and past attempts to explain this took two routes:
  - Limiting theories so they can only represent myopic patterns (e.g., Wilson 2006)...
  - ...Or limiting phonological learning based on Formal Language Theory (e.g., Heinz and Lai 2011).

3. Background

- Work in artificial language learning has helped shed light on whether other typological trends are due to biases that make some patterns hard or impossible to learn (e.g., Moreton 2008).
- However, past experiments that tested Sour Grapes struggled to find an explanation for why it's unattested:
  - Finley (2008) found that any harmony that involved blockers (attested or otherwise) was unlearnable.
  - Lin and Myers (2010) found a marginal preference *for* Sour Grapes in their participant's learning.

4. Design and Methods

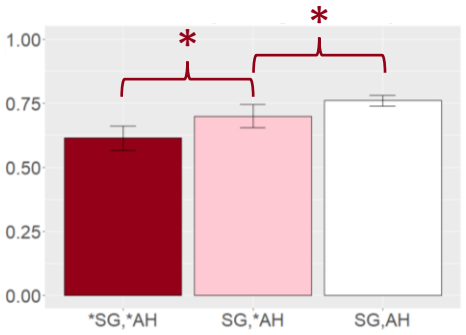
- Participants were trained on surface forms that were grammatical in both **Sour Grapes (SG)** and **attested harmony (AH)** and were never given information about underlying forms.
- The language had:
  - A vowel inventory of [i], [u], and [a]
  - Left-to-right backness harmony
  - The vowel [a] acting as a blocker
- In testing, participants listened to three kinds of stimuli and said whether they belonged to the language from training:

	Description	Example
***SG, *AH**	Ungrammatical in both patterns	[tipukutʃu]
SG, *AH	Ungrammatical only in A.H.	[tipukatʃu]
SG, AH	Grammatical in both	[tipikitʃi]

- If Sour Grapes is unlearnable, words in the SG,*AH and *SG,*AH should both be judged as not belonging to the language.

5. Results

- The proportion of "Yes" responses from testing are below:
  - Participants preferred words that were allowed in both patterns (SG,AH) to those only allowed in Sour Grapes (SG,*AH).
  - They were also preferred the latter to words that weren't grammatical in either pattern (*SG,*AH).
- This suggests they were sensitive to both patterns, since they could distinguish all three stimulus groups in testing.



6. Conclusions

- These results suggest that Sour Grapes might be learnable, since participants were sensitive to the pattern.
- But they also suggests a novel explanation for its absence:
  - Words that were only grammatical in SG were less preferred by participants.
  - Sour Grapes could be learnable but diachronically unstable (see Stanton 2016, Hughto 2018 for similar reasoning with different phenomena).