The Timing of Violations in Serial Derivations

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Persian Hiatus Resolution

- Hiatus at morpheme boundaries is optionally resolved via epenthesis or deletion of the suffix-initial V (Ariyaee & Jurgec 2020):

(1) /baba-emun/ → [babaemun ∼ babamun ∼ babaʔemun] 'our dad'
/baba-eʃ/ → [babaeʃ ∼ babaʃ ∼ babaʔeʃ] 'his/her dad'
/baba-æm/ → [babaæm ∼ babam ∼ babaʔæm] 'my dad'

- Deletion is strongly disfavored if it would eradicate the suffix (REALIZEMORPHEME (RM; Kurisu 2001)):

(2) /baba-e/ → [babae ∼ ???/*baba ∼ babaʔe] 'the dad'

- In the absence of hiatus, Root + Suffix emerges unchanged:

(3) /dæftær-emun/ → [dæftæremun] 'our office'

- McCarthy (2008): Deletion must occur over several steps: e → V → ∅

My Argument

- A serial Noisy Harmonic Grammar analysis is possible only with modifications to both NOHIATUS and RM.
- NOHIATUS must be satisfied by less than complete deletion of a vowel.
- RM must assign violations before a morpheme is fully eradicated.
- **The importance of timing:** In a gradual framework, the point at which a constraint is satisfied/violated has ramifications for the success of the derivation.

Noisy HG & NOHIATUS

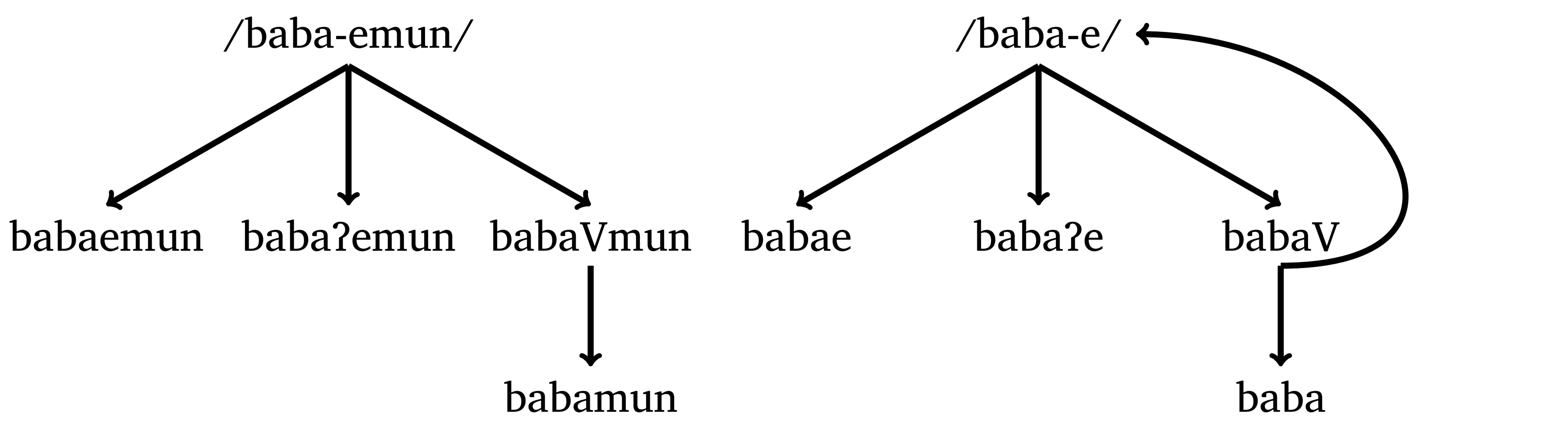
- Noisy HG (NHG; Boersma & Pater 2016): constraint weights are perturbed before each evaluation, creating variation in the output.
- Gradual deletion requires Serial NHG (SNHG): weights are perturbed at each step.
- Constraints:
  - NOHIATUS drives deletion/epenthesis.
  - REALIZEMORPHEME discourages deletion in /baba-e/.
  - HAVEPLACEV penalizes placeless vowels, motivating V → ∅.
  - HAVEPLACEC penalizes [ʔ], hence penalizes epenthesis.
  - Faithfulness: MAXV, DEPV, MAXC, DEPC, MAXVPLACE, DEPVPLACE
    - ⋆ Not used here: DEPCPLACE (dominates everything)

Modified NOHIATUS

- In /babaemun/ → babaVmun → [babamun], NOHIATUS is satisfied only by the final step, so it can't motivate the first step.
- Refinement: NOHIATUS penalizes consecutive *fully specified* vowels. Now no violation is incurred by [babaVmun].

Traditional REALIZEMORPH

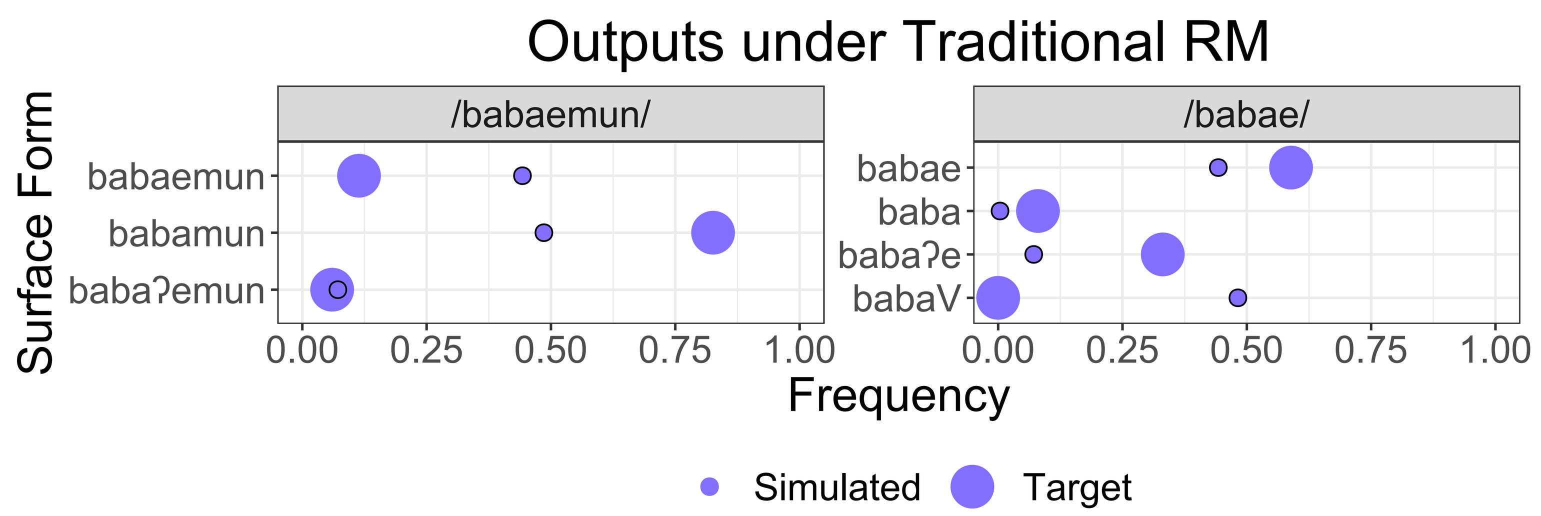
- Derivational paths:



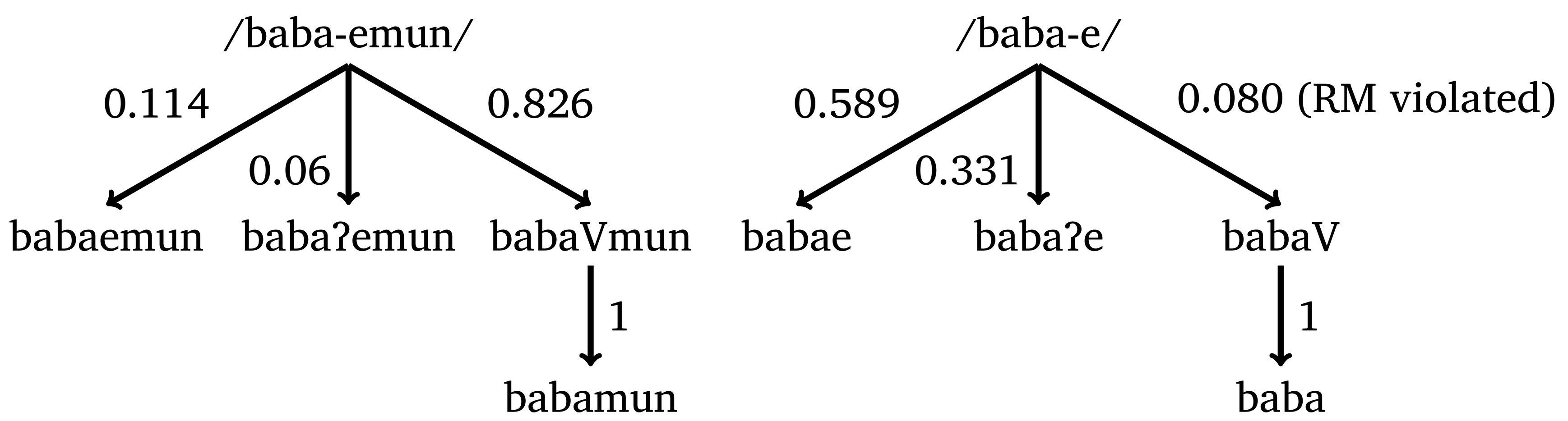
- Output frequencies inferred from graphs in Ariyaee & Jurgec (2020) using WebPlotDigitizer (Rohatgi 2020):

	Surface Form	Target		Surface Form	Target
/baba-e/	babae	0.589	/baba-emun/	babaemun	0.114
	baba	0.080		babamun	0.826
	babaʔe	0.331		babaʔemun	0.060

- RM is responsible for the lower rate of deletion in /baba-e/, but in standard formulations (e.g. Kurisu 2001), RM is not violated until the last vestige of a morpheme is gone.
- RM penalizes only the last step toward deletion: V → ∅. Once the derivation reaches [babaV], RM must encourage reinsertion of V's features instead of deletion.
- SNHG Monte Carlo simulations were run in R (R Core Team 2020) using weights from OTSoft (Hayes et al. 2013).
- Best results found:



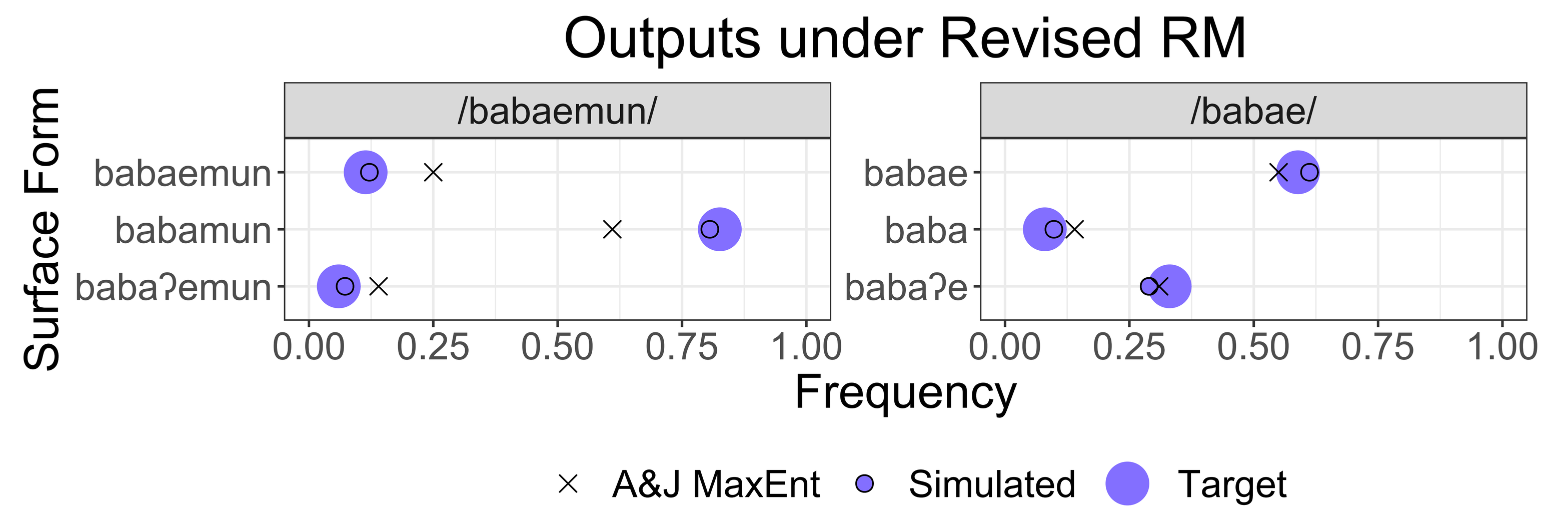
- Inaccurate frequencies; ill-formed *[babaV] is the most common output.
- The problem: RM's anti-deletion pressure kicks in too late.
- RM must discourage deletion from the beginning:



A New Version of REALIZEMORPHEME

(4) REALIZEMORPHEME: assign −1 for each morpheme that does not have a fully specified phonological exponent.

- Now SNHG simulations are more accurate and compare favorably to Ariyaee & Jurgec's parallel MaxEnt analysis:



Conclusions

- In a serial framework, it can matter when violations are incurred/resolved:
  - Deletion is impossible if NOHIATUS requires complete eradication of a vowel.
  - Accurate frequencies are possible only if RM penalizes the first step toward deletion.
- SNHG is a viable model of optionality.
  - A potential pitfall avoided here: converging part of the way toward deletion (*[babaVmun]) because perturbed weights favor deletion on one step but disfavor it on the next.
  - The key: constraints favoring non-initial steps in a multi-step process must have high enough weights that they're nearly certain to dominate even after perturbation.
  - Here, w(HAVEPLACEV) = 6.74, w(MAXV) = 0: V → ∅ will always occur if a previous step yields /e/ → V.
- Remaining issue: what does "fully specified" mean in (4)? Must accommodate tonal/featural affixes in other languages.

References

• Ariyaee, K. & P. Jurgec. 2020. Variable Hiatus in Persian is Affected by Suffix Length, Paper presented at AMP 2020, Santa Cruz, CA, September 19. • Boersma, P. & J. Pater. 2016. Convergence Properties of a Gradual Learning Algorithm for Harmonic Grammar, *Harmonic Grammar and Harmonic Serialism*, edited by J. J. McCarthy & J. Pater, 389–434, Bristol, CT: Equinox. • Hayes, B., B. Tesar, & K. Zuraw. 2013. OTSoft 2.5, software package, http://www.linguistics.ucla.edu/people/hayes/otsoft/. • Kurisu, K. 2001. *The Phonology of Morpheme Realization*, Ph.D. thesis, University of California, Santa Cruz. • McCarthy, J. J. 2008. The Gradual Path to Cluster Simplification, *Phonology* 25:271–319. • R Core Team. 2020. *R: A Language and Environment for Statistical Computing*, R Foundation for Statistical Computing, Vienna, Austria, URL https://www.R-project.org/. • Rohatgi, A. 2020. Webplotdigitizer: Version 4.4, URL https://automeris.io/WebPlotDigitizer.