Illusory epenthesis and recoverability-conditioned sensitivity to phonetic detail.

James Whang, Department of Linguistics, New York University, james.whang@nyu.edu

Illusory vowel epenthesis?

Japanese listeners tend to perceive [u] between consonant clusters even in the absence of vocalic cues (Dupoux et al. 1999).

- $[C_1C_2] \rightarrow /C_1uC_2/$ is repair mechanism of phonotactic violation.
- Phonetically minimal vowel epenthesized.

High vowels devoice/delete between voiceless obstruents in Japanese.

- /kita/ → [k̥ita] 'north'
- /suki/ → [ski] 'like'

Devoicing vs. deletion depends on phonotactic predictability (Whang 2014).

		i	u
High predictability	ɸ	-	✓
	s	-	✓
	ç	✓	-
Low predictability	p	✓	✓
	k	✓	✓
	ʃ	✓	✓

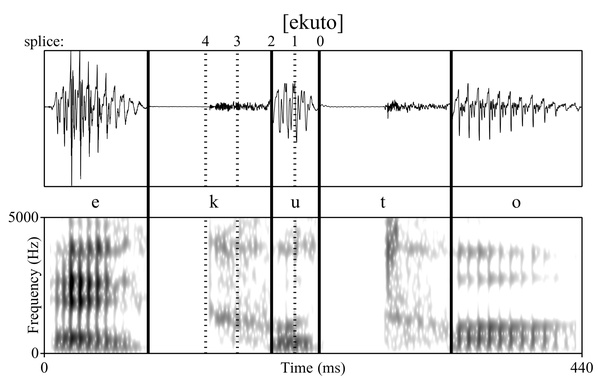
Question: How "illusory" is illusory epenthesis really?

- Sensitivity to high vowel-like cues?
- Sensitivity modulated by predictability?

Methodology

- **Participants:** 29 (16 female) Tokyo natives aged 19-22.
- **Task:** Force-choice identification task.
- **Materials:** Naturally vowel-less vs. spliced vowel-less tokens (splice 2).
  - Target vowel = [Ø, i, u, a]

NoReduce	eb__ko	ez__po	eg__to	ob__ke	oz__pe	og__te
LoPred	ep__ko	eʃ__po	ek__to	op__ke	oʃ__pe	ok__te
HiPred	eɸ__ko	es__po	eç__to	oɸ__ke	os__pe	oç__te



Results

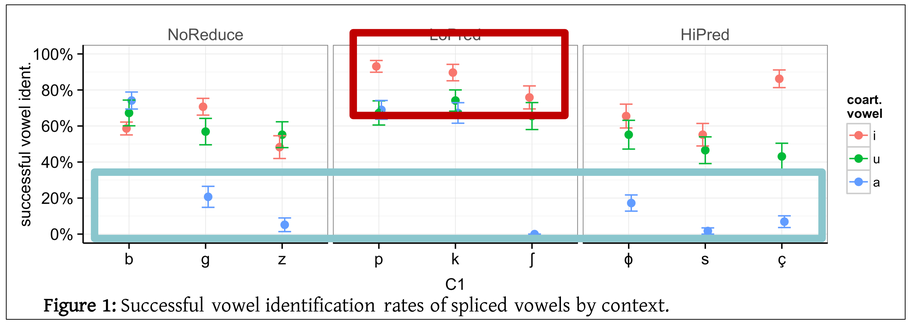


Figure 1: Successful vowel identification rates of spliced vowels by context.

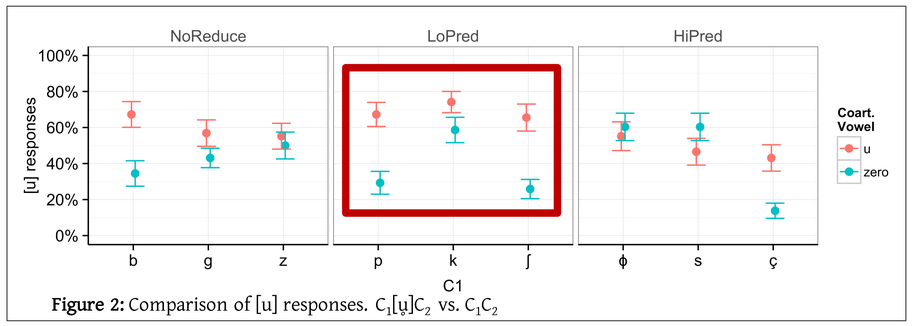


Figure 2: Comparison of [u] responses. $C_1[u̥]C_2$ vs. C_1C_2

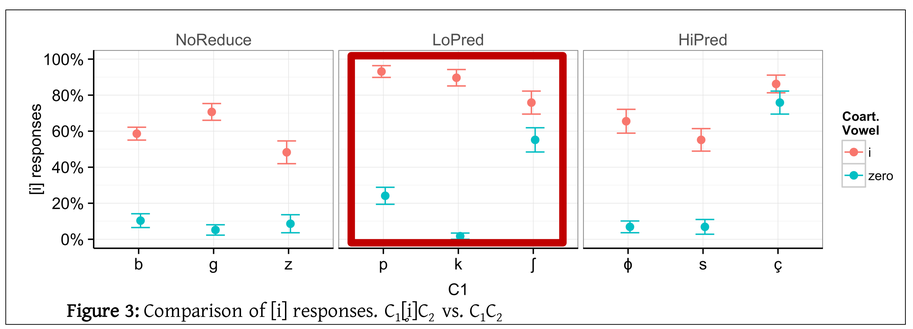


Figure 3: Comparison of [i] responses. $C_1[i̥]C_2$ vs. C_1C_2

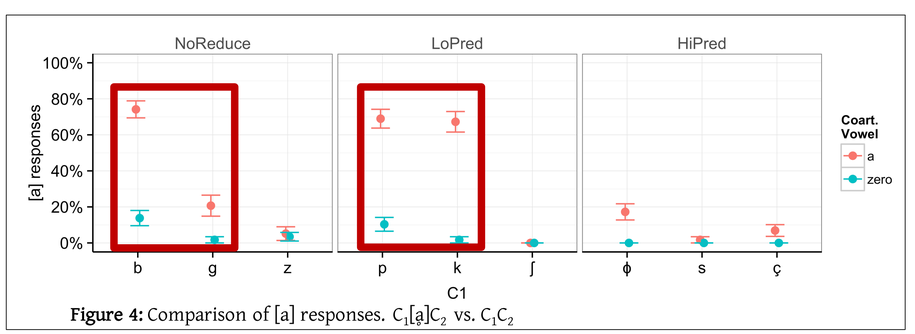


Figure 4: Comparison of [a] responses. $C_1[ḁ]C_2$ vs. C_1C_2

	NoReduce			LoPredict			HiPredict		
	ebko	egto	ezpo	epko	ekto	eʃpo	eɸko	espo	eçto
a	0.14	0.02	0.03	0.10	0.02	0.00	0.00	0.00	0.00
i	0.10	0.05	0.09	0.24	0.02	0.55	0.07	0.07	0.76
u	0.34	0.43	0.50	0.29	0.59	0.26	0.60	0.60	0.14
Ø	0.41	0.50	0.38	0.36	0.38	0.19	0.33	0.33	0.10

Table 1: Response rates by vowel and context for naturally vowel-less tokens.

- Vowel identification rates in spliced tokens (Figure 1).
  - High for [i, u] but not [a].
  - Highest in low-predictability contexts.
- Rate of vowel responses in $C_1ØC_2$ tokens (Table 1).
  - Highest in high predictability contexts.
  - Lowest in non-reducing contexts.
  - High [i] responses for [ʃ, ç], [u] elsewhere.
- Comparison of responses (Figures 2-4).
  - Coarticulation in spliced tokens drive up responses of coarticulated vowel compared to vowel-less baseline.
  - Most noticeable in LoPred for all vowels.
  - [a] responses also higher but only for stops.

Discussion & Conclusion

- Difference in identification rates between [i, u] and [a] suggests sensitivity to high vowels cues, stemming from high vowel reduction experience.
- Difference in identification rates between LoPred and HiPred contexts suggests recoverability-conditioned sensitivity to vowel cues.

- Phonotactic violation is not the sole factor driving perceptual epenthesis (contra. Dupoux et al. 1999).
- While there is bias towards hearing a vowel, the choice of epenthetic segment is result of phonetic cues in the signal.
- The same cues can be less perceptible depending on predictability from context

Acknowledgements: This material is based upon work supported by the National Science Foundation Graduate Research Fellowship Program under Grant No. BCS-1524133.