The mora-counting alternation of /g/ nasalization in Japanese compounds is NOT internalized

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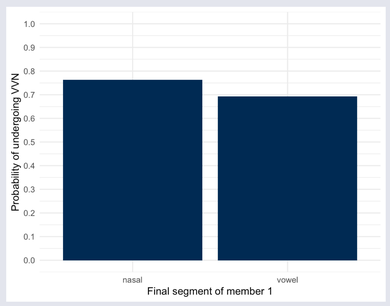
1 Background - Counting

- Traditional view: Phonology cannot count (past 2).
- Re-analysis of counting past 3: e.g., Kager (2012).
- Paster (2019): There are some patterns cannot be re-analyzed as counting within 2.
  E.g., ternary H tone spreading in Zezuru.
- Carr (2006): UG cannot count while phonological generalizations can.

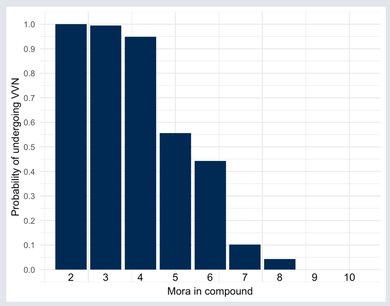
- No found pattern counts past 4.
- Counting patterns never involve segmental features.

2 Motivation - Japanese /g/ nasalization

- Voiced Velar Nasalization (Itô and Mester, 1996):
  /g/ → [g] / $_{\text{PrWd}}$[⎓
  /g/ → [ŋ] / elsewhere
- In a /X-gY/ compound where /gY/ is a free stem:
  /g/ → [ŋ] (optional).
- Prob of nasalization predicted by: (Breiss et al., 2022)



(a) local nasality



(b) mora length

REAL-LEXICON STATISTICS

This mora-counting pattern is UNNATURAL because:

- It involves counting (to 7!) (2nd-order phonotactics).
- It involves segmental features when counting.

RESEARCH QUESTION

Is the UNNATURAL pattern of mora-counting alternation really internalized by native speakers?

3 Method

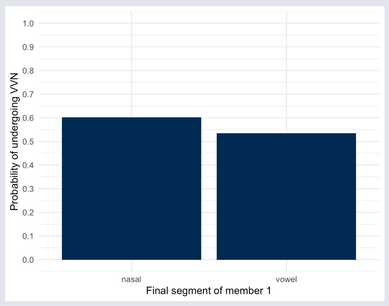
- 15 native Japanese speakers were recruited.
- A wug-test of word naturalness judgement on Prolific.
- 45 pairs of free words were given in sentences in orthography and audios, e.g., [temi] & [gemo].
- Rated the relative naturalness between two potential forms of each nonce compound word in audios:

[temigemo]	1	2	3	4	5	6	7	[temiŋemo]

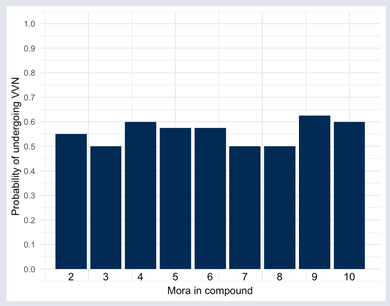
- All the nonce words were created by manipulating the two factors, (a) local nasality; (b) mora length.
- An ABX test of distinguishing between [g] and [ŋ].

4 Results

- (a) local nasality: one thing was learned - nasals give rise to slightly more nasalizations than vowels. ($p = 0.219$)
  (This is consistent with the statistics in real lexicon.)
- (b) mora length: prob of undergoing /g/ nasalizations is not far away from the chance level. (sig different from 50%, $p = 0.03$, 99% CI: [0.49, 0.63]) (not internalized)



(a) local nasality



(b) mora length

WUG-LEXICON STATISTICS

5 Discussion

- The NATURAL pattern of local nasality is partially internalized, although greatly distorted towards the chance level.
- The UNNATURAL pattern of mora count is almost not internalized at all.
- 'THE SURFEIT OF STIMULUS' effect as in Becker et al. (2011), Becker et al. (2012), which is explained by a learning bias against counting in phonology.
- A possibility is that such an UNNATURAL pattern is under-learned due to insufficient amount of input, as in White (2014).

6 My future research

- To model this pattern in formalized grammar.
- To examine the learnability of this pattern in an artificial language learning (ALL) test.

References

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