Productivity, Universality, and Cumulativity in Sound Symbolism: A Pokémonastics Study of Georgian and English

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Background

- Pokémonastics experiments use Pokémon names to study sound symbolism in and across languages ([1] et seq.)
- Georgian (Kartvelian) exhibits sound symbolism patterns in "manner-of-speaking" verbs ([2]):

(1) *loud crying*

[**dʒʁ**avis]	loudest, lowest pitch
[**tʃχ**avis]	intermediate pitch
[**tʃ'q'**avis]	highest pitch, piercing

(2) *angry complaining*

[dʒ**u**dʒʁ**u**nebs]	lower pitch, softer
[dʒ**i**dʒʁ**i**nebs]	higher pitch, louder
[dʒ**a**dʒʁ**a**nebs]	loudest, angriest

➢ Stop series associations: *lowest pitch* Voiced < Voiceless < Ejective *highest pitch*

➢ Vowel associations: /i/ higher and louder while /u/ lower and softer; /a/ louder than /i/ and /u/

- **Research question**: Are patterns productive for Georgian speakers? Do they hold for English speakers?

Method

- Present subjects with novel Pokémon names and ask them whether each name more suitable for a pre-evolution or post-evolution Pokémon

ˈp'ak'ame

Pre-evolution

Post-evolution

Artwork by *toto-mame*

- Stimuli: 36 Georgian nonce words of shape ˈCVCVCe
- Two fully-crossed dimensions: *Stop Type* and *Vowel*
- Places of articulation limited to those used in English
- Stimuli recorded by a native Georgian speaker
- First Pokémonastics experiment with auditory stimuli

Sample Stimuli

	/a/	/i/	/u/
Ejective	ˈp'ak'ame	ˈt'ip'ire	ˈp'utʃ'une
Voiceless	ˈtʃakane	ˈpitire	ˈkupume
Voiced	ˈdagale	ˈgibime	ˈgudʒune

Predictions and Analysis

- Pitch and volume associations expected to translate straightforwardly to Pokémon evolution status (size/strength)
- **Predictions for Georgian speakers** (> means *elicits more post-evolution responses than*):
  - ➢ For stop series: Voiced > Voiceless > Ejective (based on pitch associations)
  - ➢ For vowels:
    - /a/ > /i u/ (based on volume associations)
    - For /i/ and /u/, two possibilities: /i/ > /u/ (based on volume associations) or /u/ > /i/ (based on pitch associations)
- **Predictions for English speakers**:
  - ➢ Goal to test whether English speakers would reproduce Georgian patterns → same predictions as above
  - ➢ Alternative predictions for ejectives:
    - Phonetically salient → more strongly associated with post-evolution Pokémon
    - Absent in English and [–voice] → same behavior as voiceless stops
  - ➢ Previous Pokémonastics experiments on English ([3], [4]) have found:
    - Voiced > Voiceless
    - /a/ > /i/ and /u/ > /i/
- Only analyzed results of participants who could not articulate what experiment was about
- For each experiment, mixed-effects logistic regression with fixed effects Stop Type, Vowel, and their interaction + post-hoc pairwise comparisons among three stop types and three vowels

Acknowledgments

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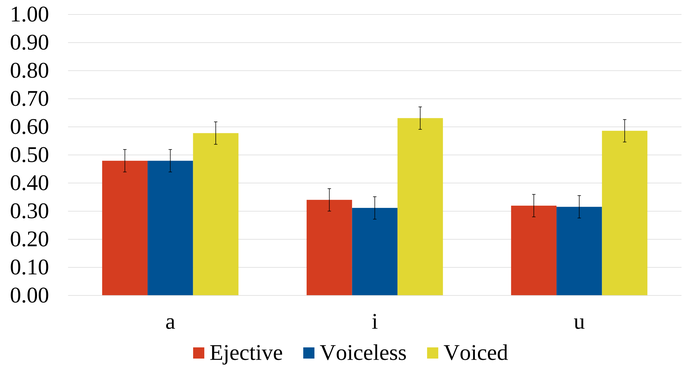
Works Cited

[1] Kawahara & Kumagai 2019
[2] Holisky & Kakhadze 1988
[3] Kawahara & Breiss 2021
[4] Kawahara & Moore 2021
[5] Godoy et al. 2020
[6] Kumagai & Kawahara 2022

Handout

Experiment 1: Georgian

Rates of Post-evolution Response by Stop Type and Vowel (N = 61)

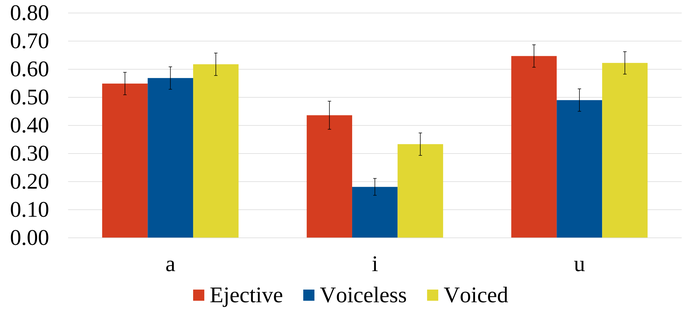


Results

- Voiced > Voiceless (***) and Voiced > Ejective (***)
  - ➢ Three-step Voiced – Voiceless – Ejective scale not fully productive
- /a/ > /u/ (*) and /a/ > /i/ (p = 0.067)
  - ➢ Consistent with volume associations of /a/ vs. /i u/ in Georgian
- Interaction: extent to which Voiced more strongly associated with post-evolution Pokémon reduced when vowel is /a/ (*)
  - ➢ Sub-linear cumulativity of distinct sound symbolism effects

Experiment 2: English

Rates of Post-evolution Response by Stop Type and Vowel (N = 51)



Results

- Voiced > Voiceless (**) and Ejective > Voiceless (***)
  - ➢ Voiced > Voiceless replicates previous finding for English
- /a/ > /i/ (***) and /u/ > /i/ (***)
  - ➢ Replicates previous findings for English
- Interactions: extent to which Ejective (***) and Voiced (p = 0.097) more strongly associated with post-evolution Pokémon reduced when vowel is /a/
  - ➢ Sub-linear cumulativity

Discussion

- **Sound symbolism patterns** in Georgian lexicon **not fully productive**
- **Some effects** found here for Georgian and English **may be universal**
  - ➢ Voiced → ↑ post-evolution Pokémon previously found in English ([3]), Japanese ([1]), Portuguese ([5]), Russian ([6])
  - ➢ /a/ > /i/ previously found in English ([3], [4]), Portuguese ([5]), Russian ([6])
- Despite Georgian lexical pattern, neither language group associated ejectives most with pre-evolution Pokémon
  - ➢ English speakers showed Ejective > Voiceless → ejectives phonetically salient or perhaps perceived as voiced
- Differing treatment of /u/: Georgian /a/ > /i **u**/ vs. English /a **u**/ > /i/ → **language-specific sound symbolism?**
  - ➢ In Georgian lexicon, /u/ associated with soft volume → "smaller" than /a/ and on par with /i/?
- Evidence for **sub-linear (less-than-additive) cumulativity** of distinct sound symbolism effects in both languages
  - ➢ Contrasts with previous finding of linear cumulativity of distinct sound symbolism effects in English ([3])
  - ➢ Difference may be due to our use of auditory (vs. orthographic) stimuli
- Effect sizes suggest **between-language differences in strength of different sound symbolism effects**
  - ➢ Georgian: voicing has bigger effect than vowel quality vs. English: vowel quality has bigger effect than voicing
  - ➢ English pattern echoes previous findings within English ([3], [4])
  - ➢ Past work also suggests voicing has smaller sound symbolic effect in English than in Japanese ([1])
  - ➢ Even if some sound symbolism patterns universal, relative magnitudes may vary cross-linguistically