

# The Emergence of the Frequency Code in Sound Symbolism of Gender in Cantonese Names

Yoonjung Kang & Kristen Wing Yan Wong

Centre for French and Linguistics University of Toronto Scarborough

## Introduction & Literature review

**Arbitrariness** (Not symbolic where form or sound of word does not resemble its meaning) <sup>[1]</sup>

- A major feature that sets human language apart from animal communication

**Insights from previous Research:**

- Growing research suggested that sound symbolism is more pervasive than previously thought, certain sounds in human language bias towards certain meaning and concept <sup>[2,3]</sup>

**The Frequency code:** <sup>[4]</sup>

- **High or rising frequency sounds tend to signal the concept of smaller size, femininity**
- **Low or falling frequency sounds are linked to larger size, masculinity, and dominance**
- An example of sound-meaning associations that recurs cross-linguistically
- Hypothesized to be iconic and universal due to articulatory grounding

## Research Questions

1. Does sound pattern reflecting the frequency code exist in male and female Cantonese first names?
2. Do Cantonese speakers and Native English speakers without any knowledge of tonal language actively use the frequency code similarly in making judgement on the gender of novel Cantonese names?

## Corpus Analysis: Frequency Code in natural language

### Methods

**Corpus:**

- Top 144 disyllabic female & 144 disyllabic male names collected from a 2006 survey of 3,000 Hong Kong residences and annotated; neutral names excluded

**Features studied and prediction:**

Factor	Prediction according to the Frequency Code	
	Favor Male	Favor Female
(1) Tone Height	Low	High
(2) Tone Contour	Falling	Not Falling
(3) F0 Contour across syllables Level (high-high or low-low); Rising (low-high); Falling (high-low)	Falling	Not Falling

Table 1. Tonal features and predictions involved in the corpus analysis

### Analysis

- Examined gender distribution of Cantonese names by 3 tonal feature and syllable position
- Examined the effect of tone characteristics in predicting gender preference

### Results

**Pattern of distribution:**

- Most conditions that is predicted to prefer female names indeed have a higher proportion of female name (Fig.1)

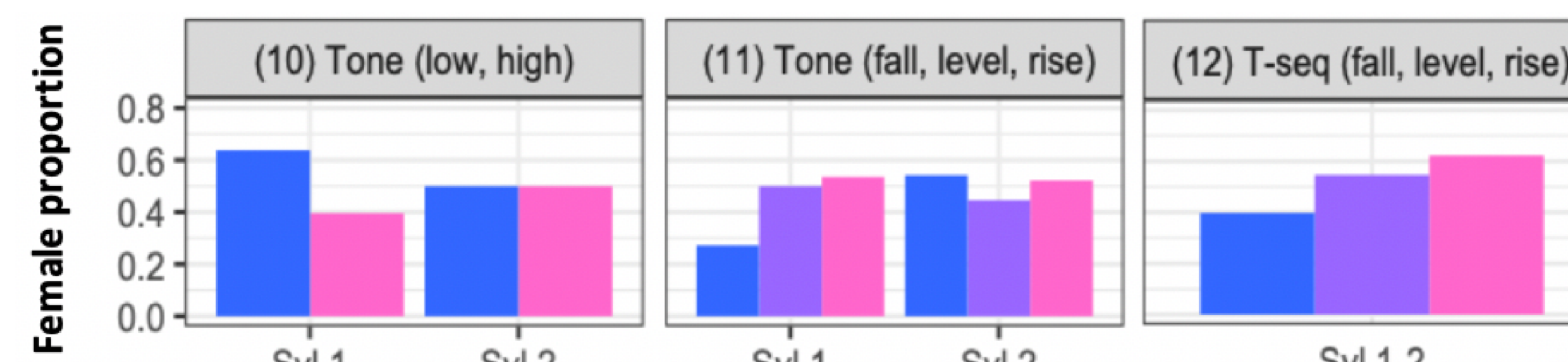


Figure 1. Gender Distribution of Cantonese names by tonal characteristics

**Effect of pitch contour in predicting gender preference:**

- Rising contour significantly prefers female over male names
- Statistical significance of effect is inconsistent depending on the tests used

**Discussion:** Tones may play a subordinate role when other segmental features are involved

### Reference

- [1] de Saussure, F. 1916. *Course in General Linguistics*. 1916. New York, NY: McGraw-Hill  
[3] Svantesson, Jan-Olof. 2017. Sound symbolism: the role of word sound in meaning. *Wiley Interdisciplinary Reviews: Cognitive Science* 8(5): e1441.  
[5] Lakoff, Robin. 2004. *Language and Woman's Place: Text and Commentaries*. OUP.

## Experiment: Insights from name gendering experiment

### Methods

**Participants:**

- 22 Cantonese & 24 English speakers (no knowledge of tone language)

**Stimuli:**

- 20 made-up two-syllable Cantonese names that obey the rules of Cantonese phonology and balanced for segmental and syllable properties
- The same names were pronounced in four different tone patterns (Table 2)
- Each syllable was recorded in different tones and spliced together to create two-syllable name stimuli

**Task:**

- Participants listened to each name and rated the names on a 6-point scale from "certainly female" (=0) to "certainly male" (=5) (Fig.2)

**Results** (Fig.3)

- Used a linear mixed-effects logistic regression model
- A consistent effect was observed across both language groups

**Effects of level tones:**

- Tones systematically affected gender judgements:
    1. High level tones induced most female leaning ratings
    2. low level tones induced most male response
- **Direction of effects aligns with frequency code!**

**Effects of contour tone:**

- Effect of falling and rising tones does not statistically differ from each other

## Discussion & Conclusion

**The frequency code as a universal sound symbolic bias**

- supported by the observation that both speaker groups showed preference aligning with the frequency code

**The effect for Cantonese speakers is unlikely to be a learned pattern**

- An opposite tendency where low tones are more prominent in female names is attested in the corpus analysis

**Lack of significant effect in tone contours is unexpected**

- Given that Cantonese names have a tendency in line with the frequency code (falling pitch prefer male names) and the rising intonation contour is utilized in English, often associated with female speech <sup>[5]</sup>
- The two-syllable name stimuli may not be perceived as a disyllabic word with a single tonal contour since the stimulus were created by concatenating two monosyllables with a short pause between the syllables

**Conclusion:**

- The frequency code as a universal bias may be overridden in real names but persistent in its influence

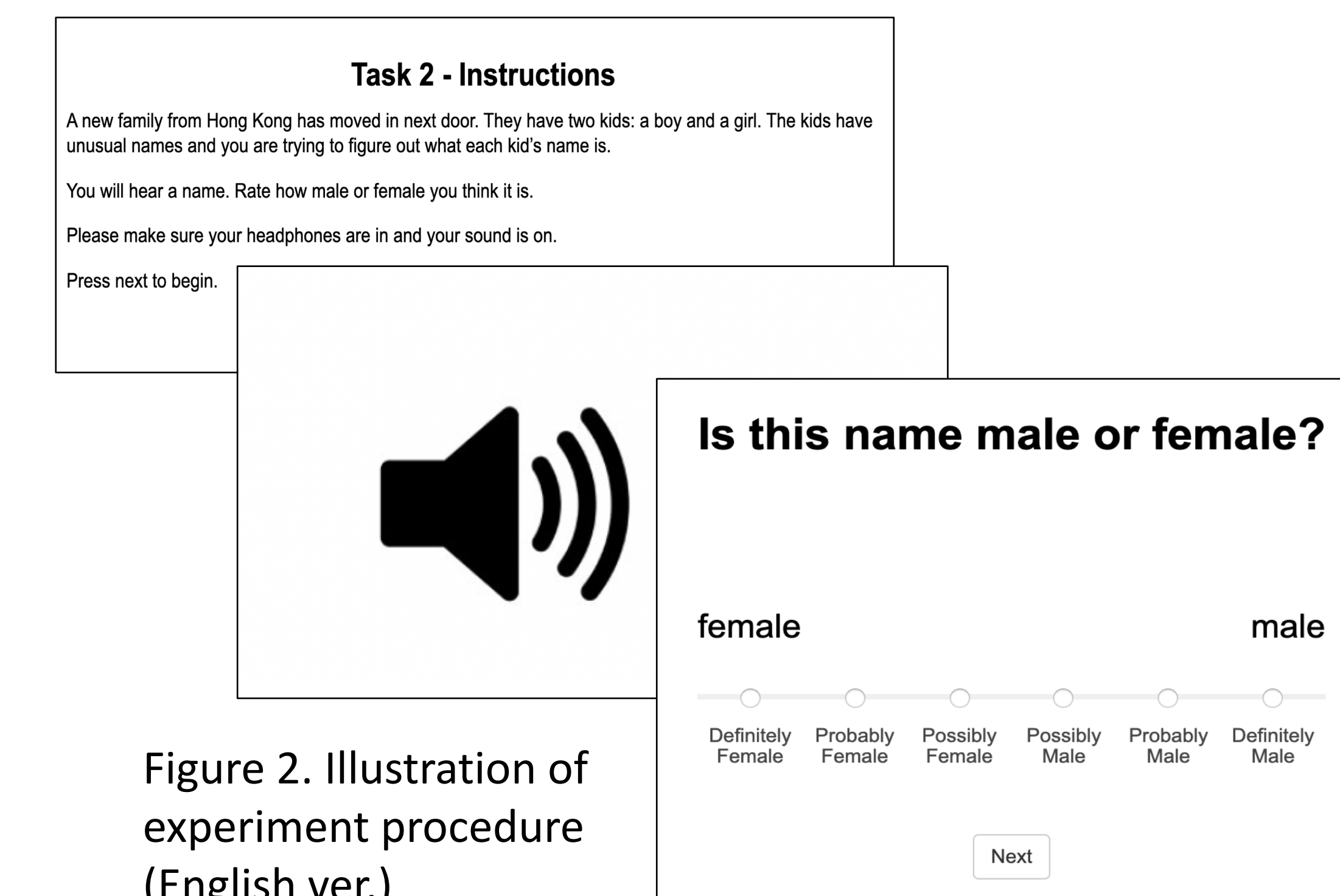


Figure 2. Illustration of experiment procedure (English ver.)

Syllable 1	Syllable 2	Tone condition
High tone (T1)	High tone (T1)	H-H : High level
High tone (T1)	Low tone (T6)	H-L : Falling
Low tone (T6)	Low tone (T6)	L-L: Low level
Low tone (T1)	High tone (T6)	L-H: Rising

Table 2. Breakdown of four-way tonal contrasts within each name

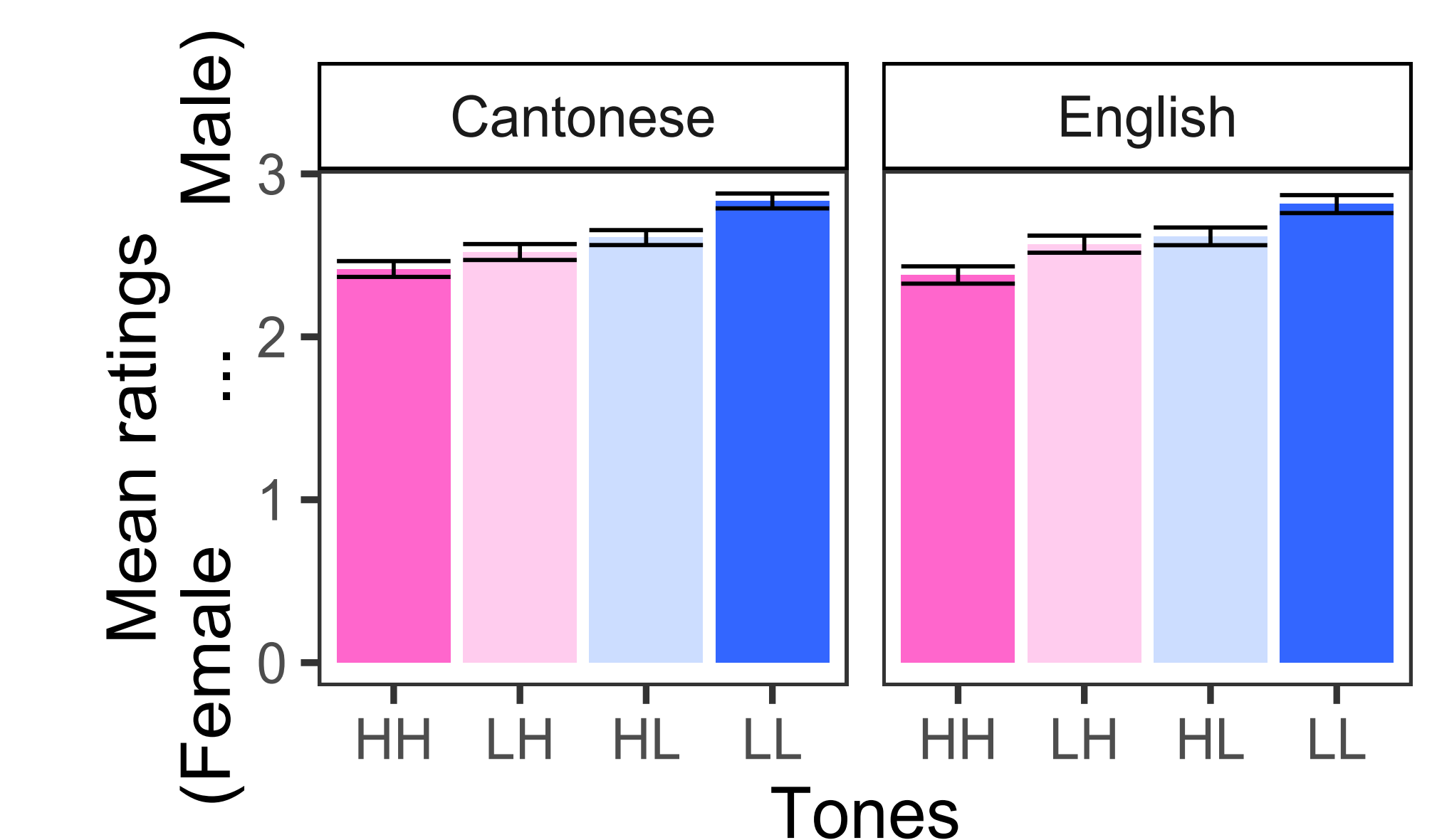


Figure 3. Results showing effect of tone on gender judgement. In the bar graphs, pink and blue bars represent female and male favoring conditions, respectively. Darker shade indicates a significant effect and the lighter shade indicates a nonsignificant effect.

[2] Alderete, John, and Alexei Kochetov. 2017. Integrating sound symbolism with core grammar: The case of expressive palatalization. *Language* 93(4): 731-766.

[4] Ohala, John J. 1995. The frequency code underlies the sound-symbolic use of voice pitch. In *Sound Symbolism*, ed. J. Nichols, J.J. Ohala & L. Hinton, 325-347. Cambridge: Cambridge University Press.