

# An Analysis of Gender Differences in a Tongue Twister Task

Beckie Dugaillard (Lehman College)

[beckie.dugaillard@lc.cuny.edu](mailto:beckie.dugaillard@lc.cuny.edu)

## INTRODUCTION

Experimental studies show a number of bilingual **advantages** in **cognitive processing**, but the only potentially underlying mechanism thoroughly investigated to date is executive function (with a focus on attention/inhibition mechanisms (Bialystok et al. 2012)).

Recently: **phonetic skill** (i.e. ability to distinguish/learn novel sounds) was shown to be enhanced in bilinguals (Spinu et al. 2018, Kaushanskaya & Marian, 2009, Antoniou et al. 2015).

Since learning new patterns of pronunciation involves audition, perception, and articulatory control, the question arises to what extent these are enhanced in people with superior performance on phonetic learning tasks, such as bilinguals. Dugaillard & Spinu (2019) found that late (sequential) L2 bilinguals outperformed monolinguals and other bilinguals on a tongue-twister task (following Goldrick & Blumstein, 2006, McMillan & Corley, 2010)), suggesting an advantage in articulatory skill.

Following up on these findings, in this study I address the question **whether gender has an effect on articulatory skill**.

## WHY GENDER?

**Reiterer et al. 2011:** late bilingual M outperformed F in an audio-vocal speech imitation task.

**Possible explanations:** M advantage in motor skill learning (Dorfberger et al. 2009), evolutionary Darwinian theory of sexual selection (Fitch 2010), and/or giftedness (Preckel et al. 2008): M more represented in extremes of the normal distribution curve, while F in main representation toward the mean with respect to many abilities, e.g. disorders of the voice and tone-deafness more prevalent in M)

## EXPERIMENT

**Hypothesis:** males exhibit superior articulatory skill compared to females.

**Participants:** 40 CUNY undergraduates

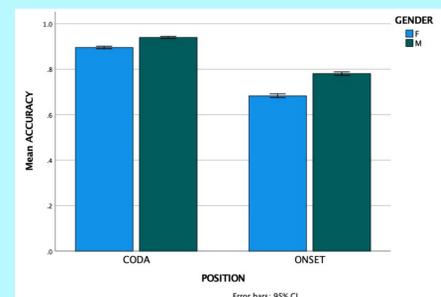
- 19 monolinguals
- 21 multilinguals (mixed backgrounds)

**Task:** read artificially constructed tongue-twisters three times each in quick succession, matching a 150 beats-per-minute metronome rhythm

**Stimuli:** 64 randomly presented nonce items  
e.g. **kef gef gef kef**

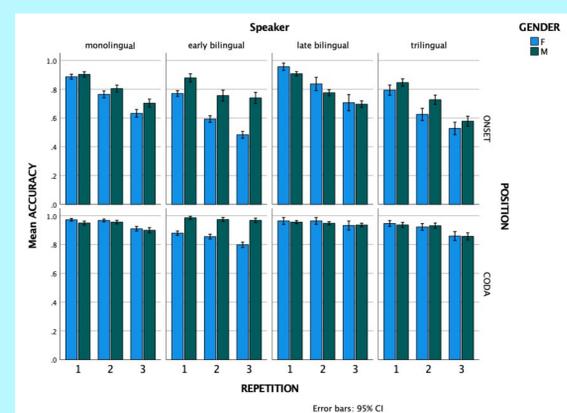
**Manual analysis to measure ACCURACY:** listen to each repetition to determine if onset (**kef**) and coda (**kef**) consonants were produced correctly.

## RESULTS



Significant gender effects (M > F) in both Coda and Onset position.

➔ Hypothesis supported



Breakdown by group, position, and repetition.

Gender effect most evident in early bilinguals, and partially in trilinguals (only in Onset position, which was more difficult overall).

## SUMMARY & DISCUSSION

Dugaillard & Spinu (2019) found a **late (sequential) bilingual advantage** in articulatory skill.

In this follow-up study, it was found that, while no gender effects are apparent in the late bilingual group, males outperform females in the early bilingual group (not tested by Reiterer et al. 2011) and partially in the trilingual group (only in Onset position, which was the more vulnerable position across the board).

Hypothesis supported but more research needed to understand why these results depart from Reiterer et al. (2011) in not having found a late bilingual advantage in articulatory skill. Potential explanations: *sample size* (too small in present study) and/or a *proficiency confound*.

## Selected References

- [1] Bialystok, E., Fergus I. M. C. & Luk, G. (2012). Bilingualism: Consequences for Mind and Brain. *Trends in Cog Sci* 16(4)
- [2] Goldrick, M. & Blumstein, S.E. (2006). Cascading activation from phonological planning to articulatory processes: Evidence from tongue twisters. *Language and Cognitive Processes* 21:649–683.
- [3] Krizman, J., Marian, V., Shook, A., Skoe, E. & Kraus, N. (2012). Subcortical encoding of sound is enhanced in bilinguals and relates to executive function advantages. *PNAS* 109 (20) 7877–7881.
- [4] Luk, G., de Sa, E. & Bialystok, E. (2011). Is there a relation between onset age of bilingualism and enhancement of cognitive control? *Bilingualism: Language and Cognition* 14, 588–595.
- [5] McMillan, C. T. & Corley, M. (2010). Cascading influences on the production of speech: Evidence from articulation. *Cognition* 117(3), 243–260.
- [6] Spinu, L., Hwang, J. & Lohmann, R. (2018). Is there a bilingual advantage in phonetic and phonological acquisition? The initial learning of word-final coronal stop realization in a novel accent of English. *Intern J of Bilingualism* 22(3), 350–370
- [7] Reiterer, S. M., Hu, X., Erb, M., Rota, G., Nardo, D., Grodd, W., Winkler, S., & Ackermann, H. (2011). Individual differences in audio-vocal speech imitation aptitude in late bilinguals: Functional neuro-imaging and brain morphology. *Frontiers in Psychology*, 2, Article 271. <https://doi.org/10.3389/fpsyg.2011.00271>
- [8] Michael, E. B. & Gollan, T. H. (2005). Being and becoming bilingual: Individual differences and consequences for language production. In J. F. Kroll & A. M. B. de Groot (Eds.), *Handbook of bilingualism: Psycholinguistic approaches* (pp. 389–407). New York: Oxford University Press.
- [9] Kaushanskaya, M. & Marian, V. (2009) The bilingual advantage in novel word learning. *Psychonomic Bulletin and Review* 16(4), 705–710.