



Onset Effects on a Tautosyllabic Vowel: Implications for Weight

USC

Miran Oh

Department of Linguistics, University of Southern California, USA, miranoh@usc.edu

INTRODUCTION

- It has been claimed that onsets, in addition to rimes, contribute to syllable weight [1, 2, 3].
 - Previous studies have examined the effects of onset size and/or voicing [2, 3].
 - Gordon [3] observed that syllables with **less sonorous (voiceless) onsets** are **heavier** than **more sonorous (voiced) ones** by calculating perceptual energy from changes in intensity over time.
- This study investigates the effect of onset sonority on acoustics of the tautosyllabic vowel, specifically pitch and duration.
- If vowels with less sonorous onsets have **higher pitch** and **longer duration**, this would imply that vowels with a **low sonority onset** may have **heavier weight** than those with a high sonority onset.
- Data from languages both with and without lexical stress systems—English and Korean—are examined to compare onset effect.

METHODS

Participants

14 native English speakers & 20 native Korean speakers (balanced for gender)

Materials

6 onsets for English and for Korean with different levels of **sonority**

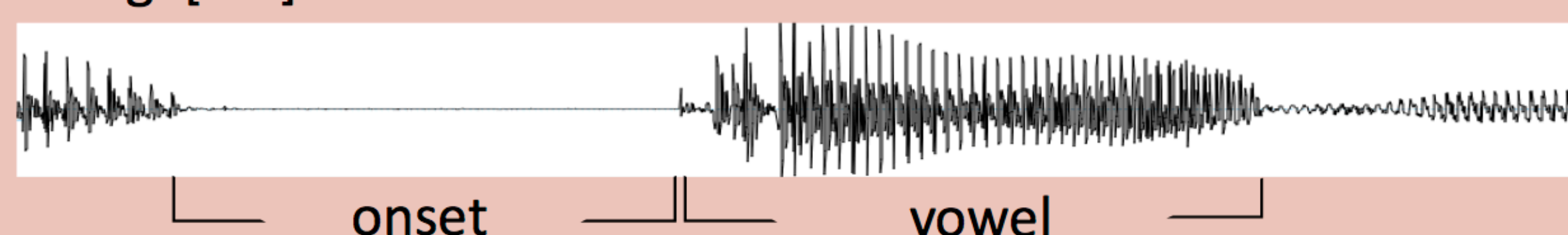
English: /t, s, d, v, n, l/ Korean: /t^h, t*, t, č, s, n/ (lowest to highest)

- Target English onsets are placed initially in a bi-syllabic word with initial stress. For Korean, target onsets initiate a tri-syllabic word.
- Onsets occur in an open syllable and in syllables closed with a nasal coda and a stop coda.
- 3 tokens of each onset were recorded.

Measurements

- Pitch:** Mean pitch value during the tautosyllabic vowel
- Vowel duration:**
 - For syllables with non-stop onsets, from the beginning of vocalic voicing to the end of vocalic voicing
 - For syllables with stop onsets, from the release of the stop closure to the end of vocalic voicing

e.g. [t*a]



RESULT I - PITCH

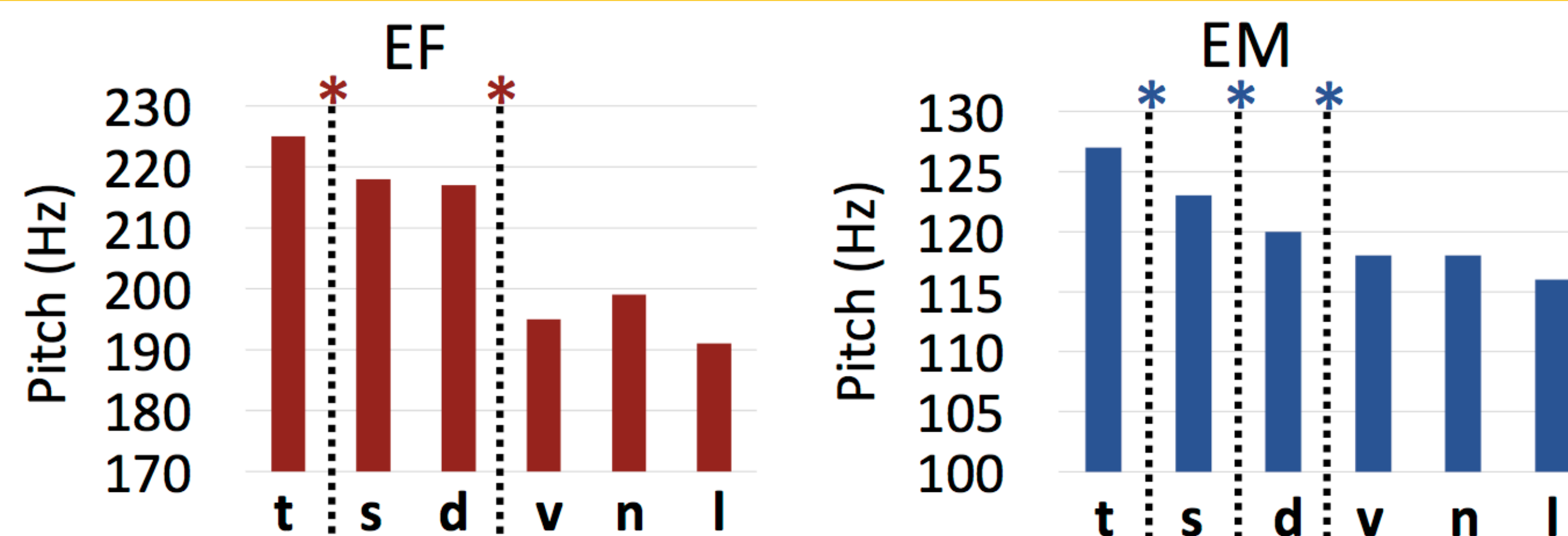


Figure 1. English female speakers (EF; left) and English male speakers' (EM; right) mean F0 from lowest to highest onset sonority

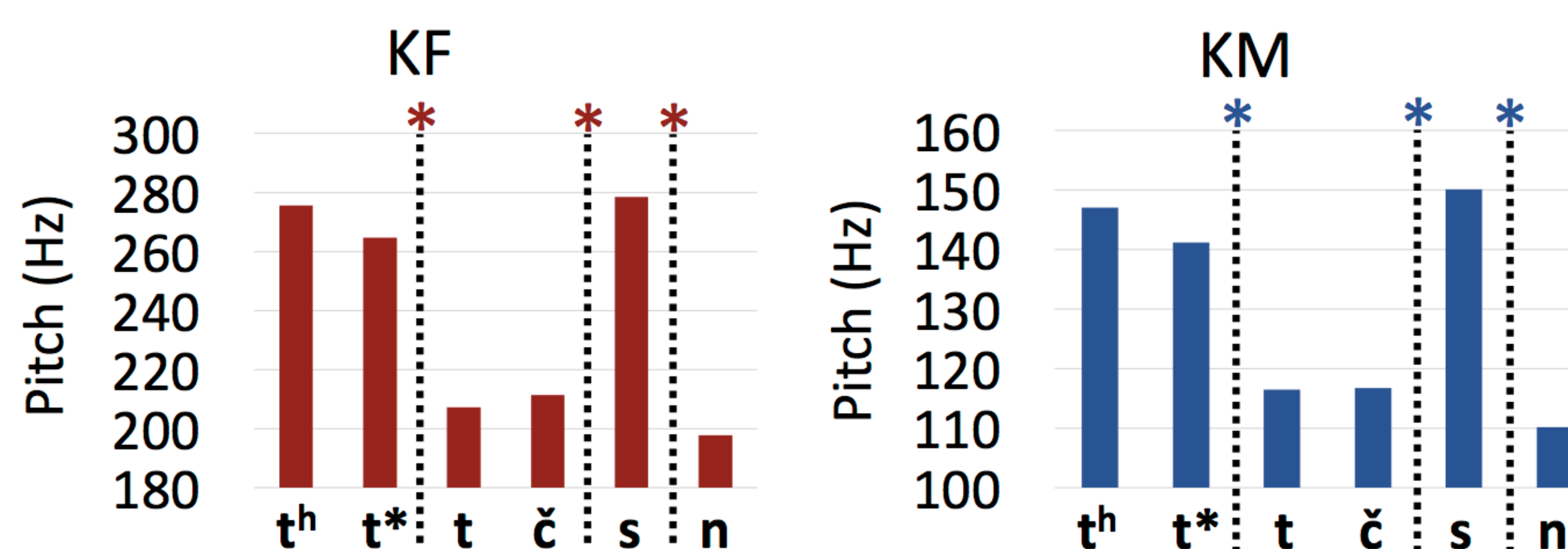


Figure 2. Korean female speakers (KF; left) and Korean male speakers' (KM; right) mean F0 in syllables with varying onset sonority

↑ Increasing sonority of the onset is accompanied by a decrease in mean pitch values

English: t > s > d > v, n, l; Korean: tense/aspirated (t^h, t*, s^(h)) > lenis (t, č, n)

RESULT II – VOWEL DURATION

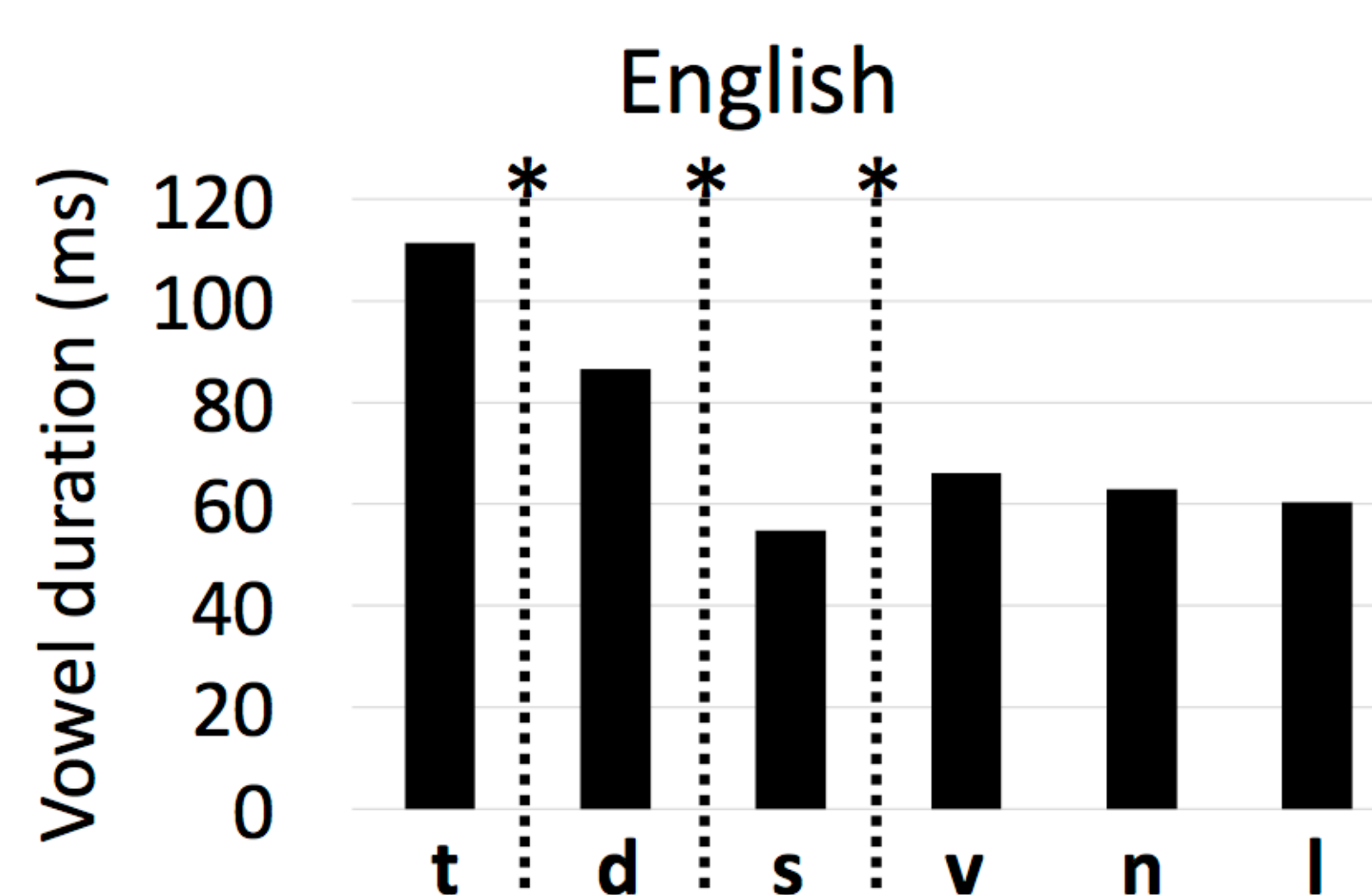


Figure 3. Mean vowel duration for English speakers

← Syllables with **less sonorous onsets** have **longer vowel duration** except for /s/

t > d > (v, n, l) > s

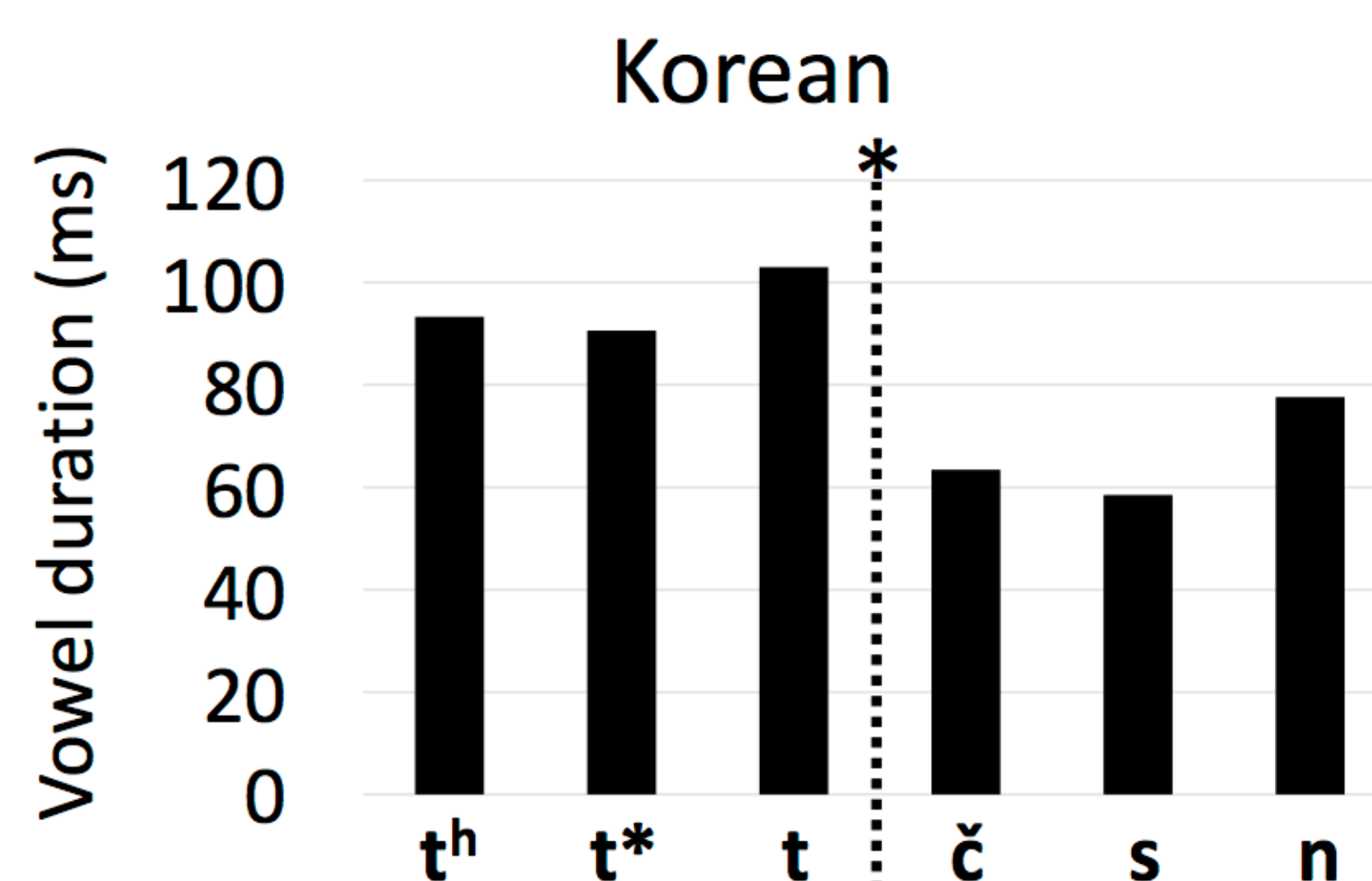


Figure 4. Mean vowel duration for Korean speakers

← Syllables with **stop onsets** have **longer vowel duration** than other onsets

(t^h, t*, t) > (č, s, n)

DISCUSSION

- As predicted, syllables with **less sonorous onsets** have **higher pitch** and **longer vowel duration** in general.
- English pitch (**high to low**): voiceless stop onsets > voiceless fricatives > voiced stops > voiced fricatives & sonorants
- Korean: **tense & aspirated onsets + /s/ (high pitch)** vs. **lenis (low pitch) stop onsets (long vowel duration)** vs. **non-stop onsets (short)**
- In English, onset /t/ had a **longest tautosyllabic vowel** followed by /d/, /v, n, l/, and /s/, respectively, in both open and closed syllables.
- Why does onset /s/ have an exceptionally short tautosyllabic vowel?

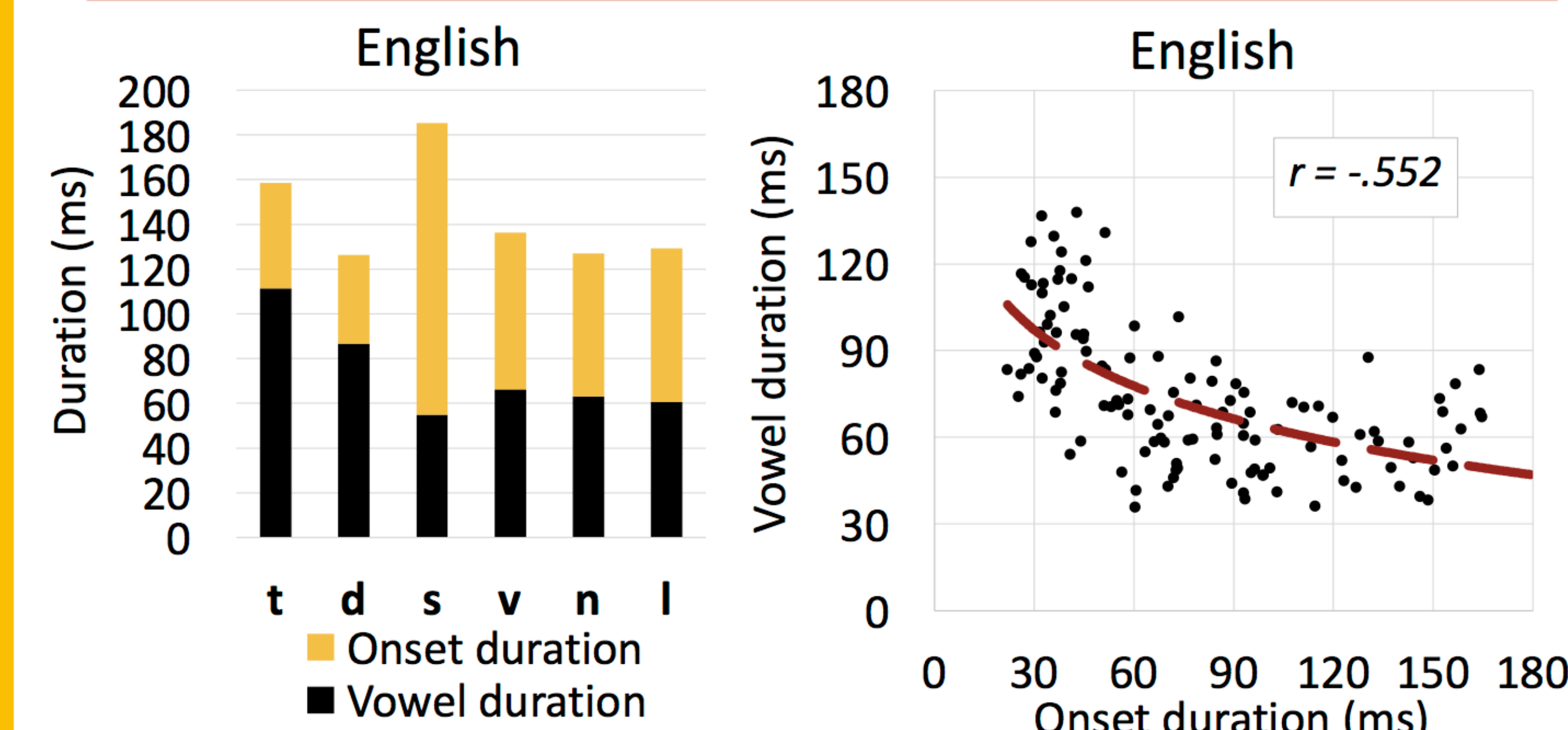


Figure 5. Mean onset duration and vowel duration in English

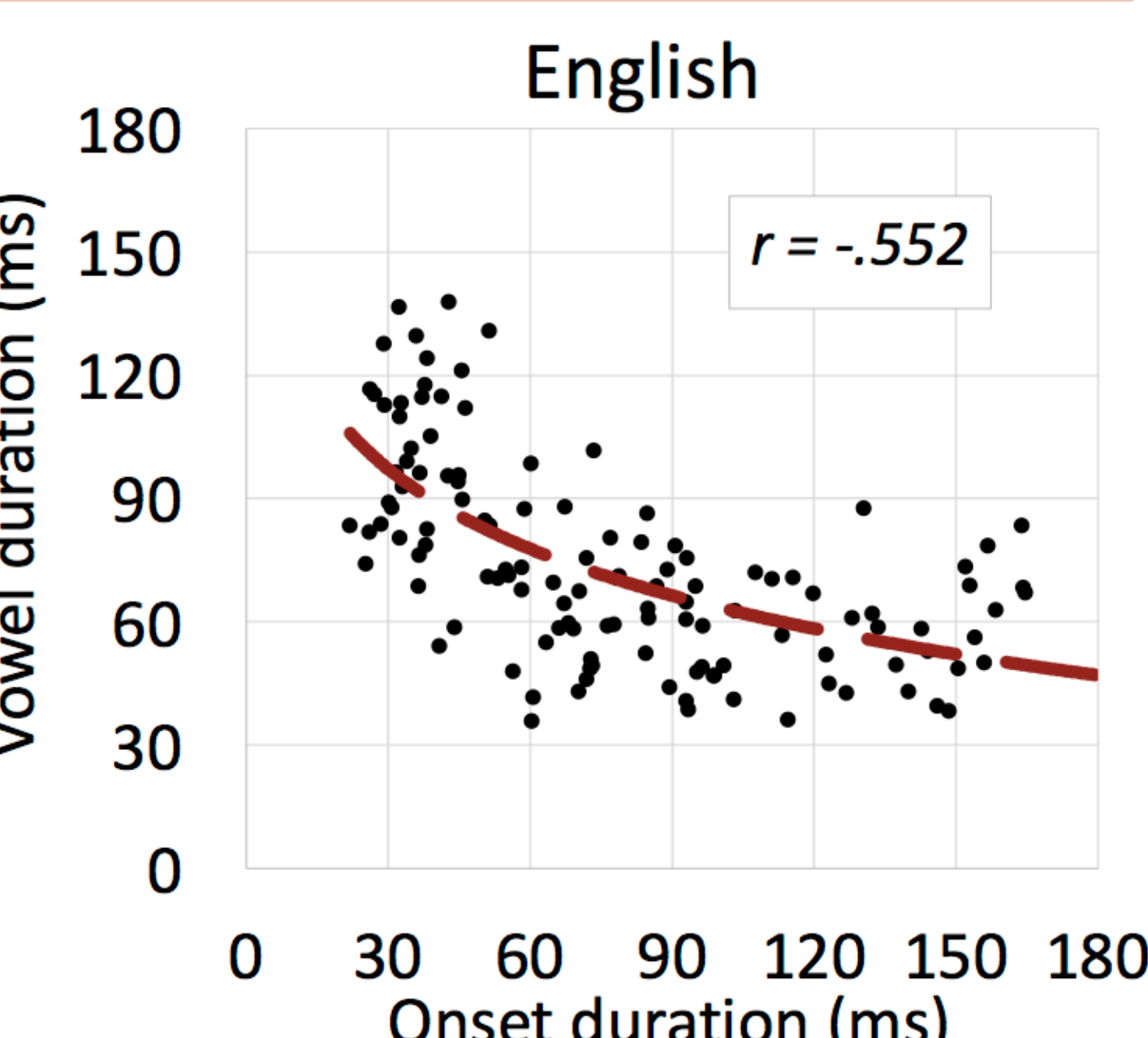


Figure 6. The correlation plot for onset duration and vowel duration

↑ **Shorter duration of the onset** is compensated by **longer duration of a tautosyllabic vowel**

CONCLUSION

- Onset duration and vowel duration stand in a **compensatory relationship**.
 - This can be further explored with articulatory measurements of timing and duration of onsets and vowels.
- Although the rimes are traditionally the most important contributors to syllable weight, the results show that onset sonority can affect the nuclear vowel's **pitch and duration** in a systematic way.
- The findings imply that phonological weight, and consequently processes sensitive to weight such as stress, may be influenced by the relation of onsets and their tautosyllabic vowels.

References

- [1] Davis, S. (1988). Syllable onsets as a factor in stress rules. *Phonology*, 5(1), 1-19.
- [2] Gordon, M. (2005). A perceptually-driven account of onset-sensitive stress. *Natural Language & Linguistic Theory*, 23(3), 595-653.
- [3] Ryan, Kevin M. 2014. Onsets contribute to syllable weight: Statistical evidence from stress and meter. *Language*, 90(2), 309-341.