

## Syllable count judgments and temporal organization of articulatory gestures

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The present study is a replication and an extension of [4,6,7] on the relationship between rime duration and syllable count judgments (SCJ) in English words with tense vowel/diphthong nuclei + liquid coda (*1syll < feel, fire < 2syll*). This particular class of words termed *sesquisyllables* [4] exhibits variation in speakers' SCJ. [7] have shown that rime durations differ between words associated with one-syllable vs. more-than-one syllable SCJ. Their results indicate that a common representation is used for both motor planning and metalinguistic judgments. This study aims to provide further evidence for this hypothesis by considering results reported by [5] on gestural coordination patterns of liquids in complex codas: English coda liquids show a gestural coordination pattern reserved for onsets. They are coordinated in-phase with the vowel, whereas coda stops and nasals are coordinated out-of-phase with the vowel. In coda clusters, the in-phase coordination pattern translates into a significant shortening of the acoustic duration of the vowel preceding a liquid+C complex coda. Based on [7], if rime duration affects a speaker's SCJ, we predict that forms with complex codas will differ in their SCJ from singleton coda liquids: adding a second coda C should lengthen the rime, shifting the SCJ closer to 2 syllables. However, considering the results of [5], the singleton coda liquid and complex coda forms should not differ in SCJ, because adding a second coda C triggers acoustic vowel shortening, thus keeping rime durations comparable. Alternatively, if the vowel shortening isn't significant, the SCJs for the two forms will differ. We tested the hypotheses in a production and judgment task.

**Participants** were 18 native speakers of American English, all students living in the US.

**Test stimuli** consisted of triplets with a tense V/diphthong in an open syllable (CV: *fee, bee*), followed by a coda liquid (CVC: *feel, beer*), and followed by a liquid+C2 coda (CVCC: *field, beard*). Controls consisted of a lax vowel + liquid/nasal (*gull-gulp, bin-bins*), tense vowel/diphthong + nasal (*stay-stain-stained*), and unambiguous disyllabic words (*public*).

**Task:** Speakers completed the same production task as in [7], followed by a modified SCJ task: speakers were asked to choose between three SCJ values 1, 1.5, or 2 syllables. Because for liquid coda tokens acoustic boundaries weren't always clear, vowel duration + C1 and full rime duration were measured.

**Preliminary results** (from 12 subjects so far) based on a linear mixed model [1] with *Rime\_duration* as a fixed factor and *Speaker, Token, Word\_frequency* [3] as random factors, reveal an overall effect of *Rime\_duration* on SCJ ( $p=.002$ ). For the pooled data, tokens judged as 1 syllable (including CV, CVC, CVCC) have the shortest rime duration. Tokens judged as 1.5 syllables (including CVC, CVCC) have longer rime duration. For CVC tokens, 1.5 syllable judgments were given exclusively to liquid codas. For CVCC tokens there is a high degree of inter-speaker variation. Overall, we find that V+liquid sequences are acoustically shorter in CVCC than CVC tokens ( $p=.03$ ), confirming [5]. At a Speaker level, however, SCJs are variable. Two strategies can be observed, corresponding to both hypotheses, respectively. Some speakers give the same SCJ to CVC and CVCC tokens, while others increase the SCJ between CVC (1 syllable) and CVCC (1.5). The difference between the two groups is in the amount of VC1 shortening: when the SCJ is the same, there is more VC1 shortening and when the SCJ increases there is less VC1 shortening. This shows that there is no universal strategy for SCJ but within each strategy the predictions are borne out. The results support the hypothesis that a common representation is used for both motor planning and metalinguistic judgments, but suggest that this common representation differs between speakers.

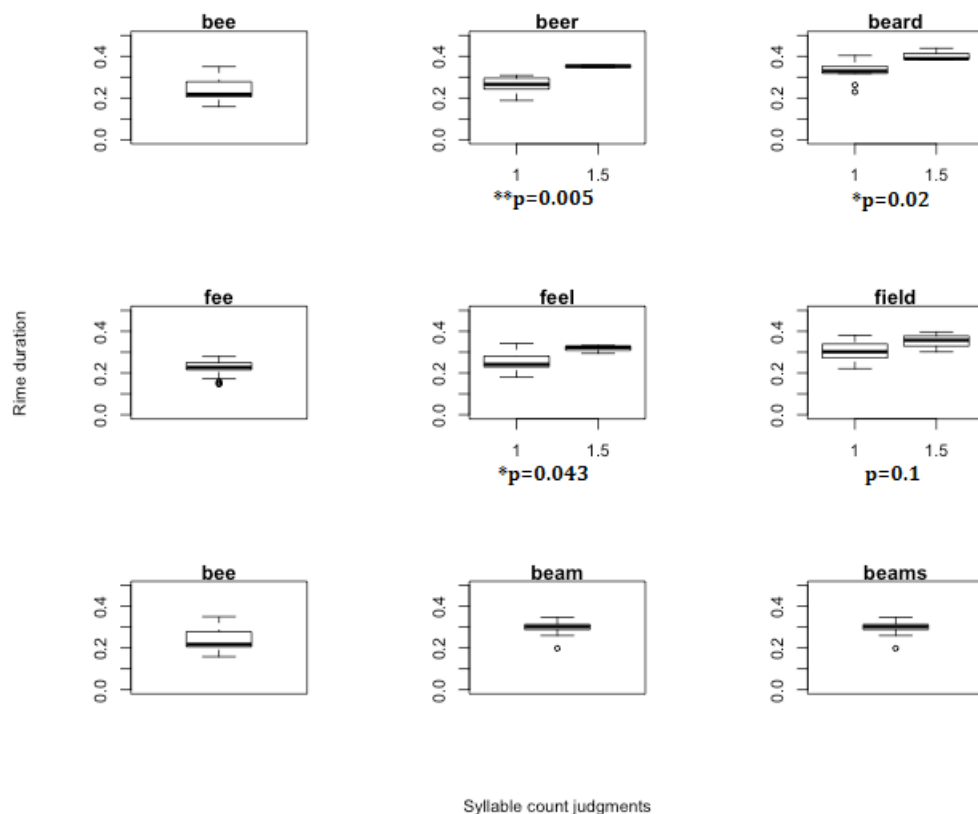


Figure 1: Rime duration as a function of SCJ for different Coda types

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