

Reassessing constraints on complex rhymes in English: The phonetic and phonological status of the coronal obstruents

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The phonotactics of English impose an upper limit of three segments in the syllable rhyme. In general, the Sonority Sequencing Principle (SSP) strictly governs the sequences of permissible segments to fill these three positions. Exceptions to these assumptions involve exclusively the coronal obstruents [t, d, θ, s, z] which violate these restrictions in two ways: 1) by combining with a preceding stop or fricative in violation of the SSP: *depth* [epθ], *lapse* [æps], *fact* [ækt], or 2) by violating the length restriction as the fourth segment in the syllable rhyme: *child* [ajld], *faint* [ejnt], *clowns* [awnz], *tenths* [eŋθs]. In an effort to account for these exceptions it has been proposed that the coronal obstruents receive a special structural status allowing them to be joined to the otherwise well-formed syllable as an appendix (Halle & Vergnaud, 1980) or to a higher-order constituent such as the prosodic word (Booij & Rubach, 1984). Other approaches disassociate the coronals from the preceding syllable altogether simply licensing them at the edge of the word (Ito, 1986) or assigning them as onsets to syllables with an empty nucleus (Kaye, 1990b) or null vowel (Burzio, 1988). None of these theoretical accounts has led to consensus among phonologists as to the proper treatment of these exceptional rhymes in English.

This paper reports on a pair of acoustical studies demonstrating that the production of four-segment rhymes in naturally spoken English is exceedingly rare. In the first study, productions of rhymes appearing to be in violation of the three-segment restriction were extracted from digitized recordings of the conversational speech of ten monolingual English speakers and submitted to acoustic analysis using Praat signal analysis software. Subjects were lead through a guided conversation resulting in multiple spontaneous productions of the target words in a wide variety of phonetic contexts. Spectrographic analysis revealed that coronal obstruents in apparent violation of the three-segment length restriction on the English rhyme failed to surface in pre-consonantal position, unless the resulting sequence of consonants (across the boundary of the following word) was characterized by a rise in sonority, often (but not always) taking the shape of permissible English onsets. In the second study, English speaking subjects were recorded producing near minimal pairs of monosyllabic words in isolation contrasting stop-final words in apparent violation of the three-segment rhyme restriction with their nearly identical counterparts, which differed only in their lack of an underlying fourth rhyme segment (i.e. *paint* vs. *pain*, *wild* vs. *while*). Acoustic and auditory inspection showed that phonetic suppression of the rhyme-final stop rendered pairs to be virtually homophonous, except for a weak tendency toward slightly longer rhyme durations in words lacking a final stop. Cases in which final [t] or [d] surfaced were characterized by audible release bursts often followed by significant aspiration in the case of [t] and weak formant structure in the case of [d] suggesting that their syllabic affiliation was not as coda consonants but rather as onsets to some form of subsequent syllabic nuclei. The results of the studies are discussed in terms of contrasting articulatory (phonetic) syllables with psychological (phonological) intuitions of the syllable. The “mismatch” between psychological and physical representations of the syllable is accounted for within the theoretical conception of “Frame then Content” (MacNeilage & Davis, 1990a) in which the phonetic output of syllables is constrained by the rhythmic open-close alternation of the mandible independent of phonological representation.

References

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