Learning to resyllabify across words: a training study

Daniel Scarpace and Mariam Mirza, Department of Linguistics and SIP, University of Illinois, Urbana-Champaign
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Background
Previous phonetic training studies in Spanish have been only segmental (Arteaga 2000, Lord 2005), such as VOT, intervocalic lenition, etc. However, no improvement in production through explicit learning in a computer study (Kissling 2013)

Little attention paid to external sandhi processes by L2 speakers, despite its importance to producing and understanding fluent, connected speech. Rasminson & Zampini (2005) measured the awareness of synaloepha (e.g. [la’miya] for la amiga ) and found that L2 speakers transcribed less than 1% of these occurrences correctly.

A similar problematic process in Spanish is consonantal resyllabification across word boundaries (Huade 2005): las#la.sas → la.s#fa.sas ‘the wings’ (homophonous with las#salas ‘you salt it’)

Additionally, <r> is resyllabified across word boundaries before vowels, but only as a tap (variable before consonants). Word initial <r> is always a trill: ve rocas [r] ‘she sees rocks’ ver ocas [r] ‘to see geese’

Tap and trill not orthographically distinguished, unlike word internally (pero / perro)

In English, resyllabification of this type is optional, but many speakers keep VC#V and V#CV sequences distinct by introducing a glottal stop or glottalization before a vowel-initial word. This tends to be speaker dependent, with rates of 25-100% by speaker (Umeda 1976, Scobbie & Pouplier 2010, Ladd et al 2003), but not well studied.

One previous study looked at resyllabification in Spanish by English speakers: Holt (2008) in a production experiment in which participants read sentences found that students who had phonetic training resyllabified word-final consonants in 62% of possible contexts, a 20% gain over their production performance prior to training and compared to the 80% rate of native Spanish speakers. However, these ratings were made impressionistically; no further analysis is provided with regard to consonant identity or presence or type of glottalization in the non-resyllabified tokens.

Research Questions
(1) How are V#CV and VC#V sequences realized by non-native speakers of Spanish? Are there differences in rates of glottalization when compared to native speakers?
(2) Are there differences in the realization depending on the consonant that straddles the word boundary, such as with /n/, /l/, and /r/?
(3) Can resyllabification be improved through explicit instruction?

Training
The L2 speakers took a semester long class on general Spanish Phonetics and Phonology (SPAN 303) at UIUC, following Terrell Morgan’s Sonidos en contexto textbook: Resyllabification was taught in two basis stages:

(1) to divide sentences into syllables (pp. 43-6), including production practice of phrases like dos iguanas (p44).

(2) later in the course, explicit mention of the difference between resyllabification of /r1/ and other consonants, as well as the pronunciation of word-initial <r> (pp. 343-4). This was reinforced with visual inspection of spectrograms of phrases like ver ocas vs. ve rocas.

Methodology
Native Speakers: recruited in Querétaro, Mexico.

Task: At both Time 1 and Time 2 participants read a series of meaningful sentences containing /V#CV/, /VC#V/ for /r/, /l/, and /n/.

[V#VCV] - e.g. ve ratas vs. [V#VCV] e.g. ver alas x 32 (16 C-initial)
[V#VCV] si notas vs. [V#VCV] sin otros x 24 (12 C-initial)
[V#VCV] la sardina vs. [V#VCV] las ardidas x 24 (12 C-initial)

80 tokens x 6 NS = 480 NS tokens
80 tokens x 6 L2 = 2 times 960 L2 tokens

Data Analysis:
The duration of the target segment was measured in PRAAT. For all vowel-initial tokens, the presence or absence of a glottal stop or glottalization of the following vowel was recorded. Glottalization was determined by visual inspection of the waveform and spectrogram, looking for irregular pitch periods (Dilley et al 1996).

Results & Discussion

• Native Speakers close to ceiling (95%)
• Learning is variable per speaker – some speakers still mark vowel-initial words with glottalization.
• Speakers are advanced: some already resyllabify often
• Production of <r> is variable: still many approximant (English) realizations (~40% accurate)
• See also Rose 2010 for L2 production of word-internal /r/ and /l/
• Difference between /n/ and /l/ -- why?
• Lexical encoding of vowel-initial words?

Future Work
• More raters to improve reliability
• What are these speakers’ English like?
• Duration/vowel quality of preceding vowel
• Comparison with non-trained group
• Use a more continuous measure of voice quality, e.g. H1-H2 VoiceSauce (Shue et al 2011, Garellek 2012)
• Non-reading task for more informal speech
• Does resyllabification improve the percept of fluency?

References


