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Abstract

Key words: L2 Spanish phonetic development, Spanish Rhotics, Teaching Spanish L2 pronunciation

Rhotics training is suitable for any L2 Spanish course (Reeder, 1998; Johnson, 2008). Drawing attention to perceptual cues and articulatory techniques, L2 learners may acquire the necessary tools to produce rhotics (Schmeiser, 2019). Computer Assisted Language Learning (CALL) provides technological and pedagogical materials from a variety of contexts that individualize instruction (Derwing and Munro, 2005) and Computer Assisted Pronunciation Teaching (CAPT), a subset of CALL, allows students to imitate voice samples and receive training on oral production, supporting L2 pronunciation instruction (Moedjito, 2016; Lord, 2019). However, the development of CAPT tools is limited, and rarely accompanied by empirical studies that examine their impact.

This study explores perceptual and articulatory techniques addressing the pronunciation of Spanish rhotics by means of a week-long computerized training in CANVAS that has been designed for college students enrolled in L2 Spanish classes at a large Midwestern university. The effects of training on the phonetic development of taps [ɾ] and trills [r] is examined. The pedagogical design of the training facilitates the conscious perception of the phonetic features of rhotics and then provides explicit articulatory techniques to produce both sounds. The study incorporates a useful and easily accessible computer tool adaptable to a variety of L2 Spanish courses and beneficial to many Spanish teachers and learners.

This study empirically tests the utility of the online training. College learners registered in beginning, intermediate and advanced L2 Spanish courses (N=13) completed two production tasks before and after the training: a sentence reading task containing target tap/trill tokens, a paragraph reading task, and a spontaneous elicitation task (picture description). Voice recordings were made of their participation. In addition, at the end of the training participants completed a survey to assess the utility of the computerized tool according to their perspectives. The acoustic analysis in *Praat* (Boersma & Weenink, 2022), assesses participants' target tokens pre- and post- training by measuring the duration of each segment and following Henriksen's (2015) classification scheme: taps are classified as *true*, *approximant*, or *perceptual*; and a 0-3 scale is employed for trills based on number of occlusions (p. 297).

The first part of the training encourages L2 Spanish learners to notice the differences and similarities of the Spanish tap [ɾ] in relation to American English. First, learners compare the retroflex sound [ɻ] of English (e.g., 'caɻ') and the English flap (e.g., 'buɾter' ['bʌ.ɾə]). Subsequently, they attempt to transfer the English flap towards the articulation of the Spanish tap [ɾ] (e.g., *flor* ['flor] or *pero* ['pe.ro]). Hualde (2005) states that English speakers who lack knowledge of Spanish can associate the tap [ɾ] with the tap/flap in English that is present in the phonemes /t/ or /d/ in intervocalic context after a tonic vowel and before an unstressed one, whereby neutralization of the two consonants yields a sound considerably similar to the Spanish tap [ɾ] (Hualde, 2005, p. 150). Once the similarity is perceived, Spanish L2 learners perform

mechanical and communicative pronunciation exercises to condition their articulation of the Spanish tap [r].

The second part offers explicit articulatory techniques aimed to facilitate the production of the Spanish trill. The technique requires maintaining slight pressure with the apex of the tongue between the hard palate and the alveolar ridge, thus regulating air flow so that it exits with momentum and speed, which triggers an involuntary series of vibrations caused by lingual contacts, or the trill [r]. This phenomenon occurs due to the relationship between speed and pressure, also known as the Bernoulli effect (Martínez Celdrán, 1997). By focusing learners' attention towards the articulatory features of trills, they are provided with a basic technique to produce [r] in syllable onset position. This presentation will present a report on the overall impact of the computerized training on the pronunciation of Spanish rhotics between tasks both individually and collectively according to participants' level of Spanish course in a quasi-experimental design approach.

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Annex: Summary of Pronunciation Training of Spanish Rhotics

PART ONE: SOFT sound [r] as in 'por, para'.		
Lesson 1	Module A	SOFT sound in the middle or at the end of a word.
Lesson 2	Module B	SOFT double sound in the same word
PART TWO: Strong sound [r] as in 'carro, rojo'		
Lesson 3	Module C	STRONG sound at the beginning or in the middle of a word.
Lesson 4	Module D	STRONG sound + SOFT sound in the same word
REVIEW		
Lesson 5	Modules A-D	Final Review

Lesson 1. Module A: SOFT sound in the middle or at the end of a word (objectives).

LESSON 1

In this lesson, you will study the pronunciation of the **soft r** sound in Spanish or "**sonido suave**" at the beginning of a syllable as in 'per**r**o' and at the end of a syllable as in 'col**r**o'.

You will work on making a conscious effort to notice a sound in English that is very similar to the **soft r** sound in Spanish.

OBJECTIVES:

- Perceive the **tap**, a sound in English that is similar to the **soft r** sound in Spanish as in 'por' or 'para'.
- Produce the tap in Spanish by copying the sound of the tap in English, a sound similar to the **soft r** sound in Spanish as in 'por' or 'para'.

Lesson 2. Module B: SOFT DOUBLE sound in the same word (objectives).

LESSON 2

In this lesson, first, you will review lesson 1 and how the **tap** found in words like 'tomato' is similar to the **soft r** sound in Spanish. You will do a quick practice when this **soft r** sound or '**sonido suave**' appears at the beginning or at the end of a syllable.

After that, you will practice the **tap** when it duplicates in the same syllable as in 'para**r**', and when it appears more than once in different parts of the same word as in 'ca**r**icatu**r**a' or 'col**r**ear'.

Lesson 3. Module C: STRONG sound at the beginning or in the middle word (objectives).

LESSON 3

In this lesson, first, you will do a quick review of **tap** sounds in words like 'pero', 'parar', 'caricatura' or 'colorear'. Remember that the **soft r** sound in Spanish never appears at the beginning of a word.

Then, you will work on mastering the technique required to produce the **STRONG R** sound or '**sonido FUERTE**'. This sound **only occurs** at the beginning of a syllable and it is written with one '**R**' at the beginning of a word as in 'rápido', 'reloj', 'ratón', and two '**RR**' in the middle of a word as in 'carro', 'cerro', 'tarro'.

Lesson 4. Module D: STRONG sound combined with a soft r sound in the same word (objectives).

LESSON 4

In this lesson, first, you will do a quick review of how the **tap** sounds in words like 'pero' or 'parar', and the technique required to produce the **STRONG r** sound as in 'perro', 'rico', or 'sonrisa'.

Now, you will work on combining both the **STRONG R** and the **soft r** sounds in the same word as in 'correr' or 'reir'.

REVIEW (Modules A-D): Spanish R sounds (objectives)

LESSON 5

In this lesson, first, you will **REVIEW** the pronunciation of **r sounds** in Spanish (Modules A-D). The lesson covers both **tap/soft r** sounds in words like 'pero', 'parar'; etc., and the production of the **STRONG r** sound as in 'perro', 'rico', 'sonrisa'; etc. The lesson also reviews the combination of both the **strong R** and the **soft r** sounds in the same word as in 'correr' or 'reir'. Then you will complete a few Perception and Production tasks. Finally, you will get access to a survey to provide your comments about the training.