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LING 151

Alveolar flap duration perceptions in English- and dual English-Spanish speakers

Introduction

In this phonetics experiment, we seek to test the perception of both “non-dual” English speakers and multilingual English-Spanish speakers—both groups plentiful in Northern California. This perception test is particularly concerned with the processing of Spanish and English [ɾ]. Both sounds occur in English but maintain different distributions in each language. In English, [ɾ] occurs intervocalically as an allophone of /d/ and /t/. This can be seen in words like *butter*, pronounced [bʌɾɚ], and *pudding*, pronounced [pʊɾɪŋ] in some dialects. This is in contrast to the Spanish [ɾ], where it occurs only as a rhotic, occurring in words like *pero* [peɾo]—itself being contrastive with a trilled rhotic, as seen in *perro* [pero].

Notice that, in both *pero* and *butter*, the alveolar tap occurs intervocalically; because of the nature of [ɾ] in both of these languages, the perception of this segment may be skewed when heard in this environment. I hypothesize that this sound will experience alternations for non-dual English speakers and dual English-Spanish speakers, with both languages having unique perceptions of either sound that are quite different. If these sounds are distributed in the same way and in such a way that is valid for both languages, then perhaps a listener will have different perceptions of the segment involved. In addition to this, I hypothesize that the length of the consonant is a particularly telling trait of how the segment is perceived.

I predict that non-dual English speakers will hear all or most instances as /d/, and that dual English-Spanish speakers will hear shorter instances of [ɾ] as either /ɾ/ or /d/, with /d/ being heard more frequently as the length progresses.

Methods

Participants in the study were pulled from each conductor's circle of friends and acquaintances. Many were college-aged people who attended UCSC themselves, like the conductors. Dual English-Spanish speakers were Latino Californians (and are likely to speak the particular variety of Spanish spoken in California), and the non-dual speaking group were from various backgrounds.

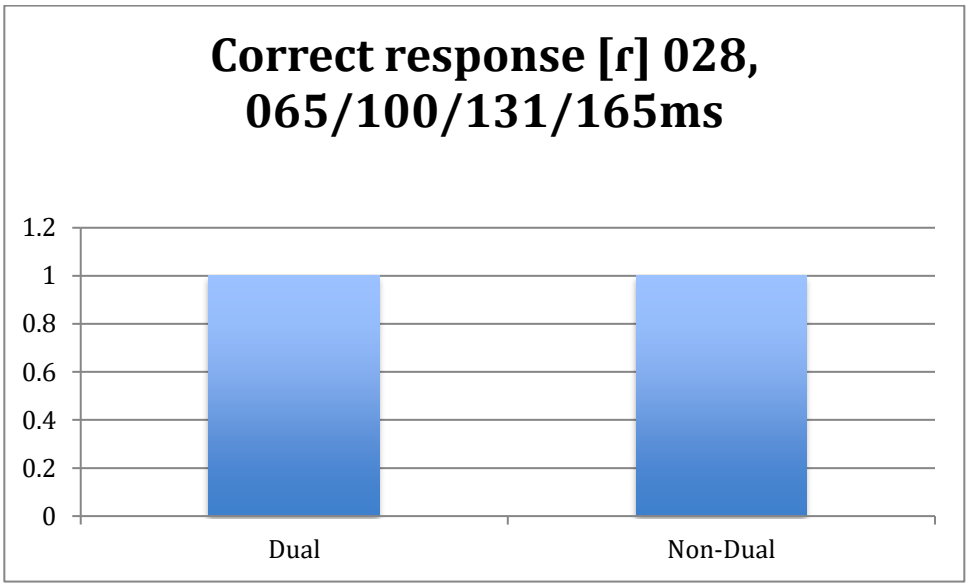
Each participant was prompted that this experiment would be brief and involves a simple lexical decision task. Participants were told that they would be hearing words from either English or Spanish and that all they would be required to identify consonants in a Google form provided to them. The participants played a clip from YouTube containing each sound and were then asked to provide a consonant in each of the ten slots below that corresponded to the consonant heard in the sound clip. All consonants were flanked by [i] on either side. Participants were given this skeletal structure with "i_i" being written above each text box; each participant was expected to merely input letters that corresponded to each sound heard between each [i] segment. These 10 responses were populated into a Google Sheet for analysis.

Each of the words played in the following order:

[itʃi] [iɾi] [ili] [iɾi] [imi] [iɾi] [isi] [iɾi] [itʃi] [iɾi]

Words occurred between each instance of [ɾ] to act as a "palate cleanser" before the participant was to attend to the following instance of [ɾ]. The first and shortest instance of [iɾi] was 0.028 milliseconds with each subsequent word stepping to 0.065, 100, 131, and 165 milliseconds respectively.

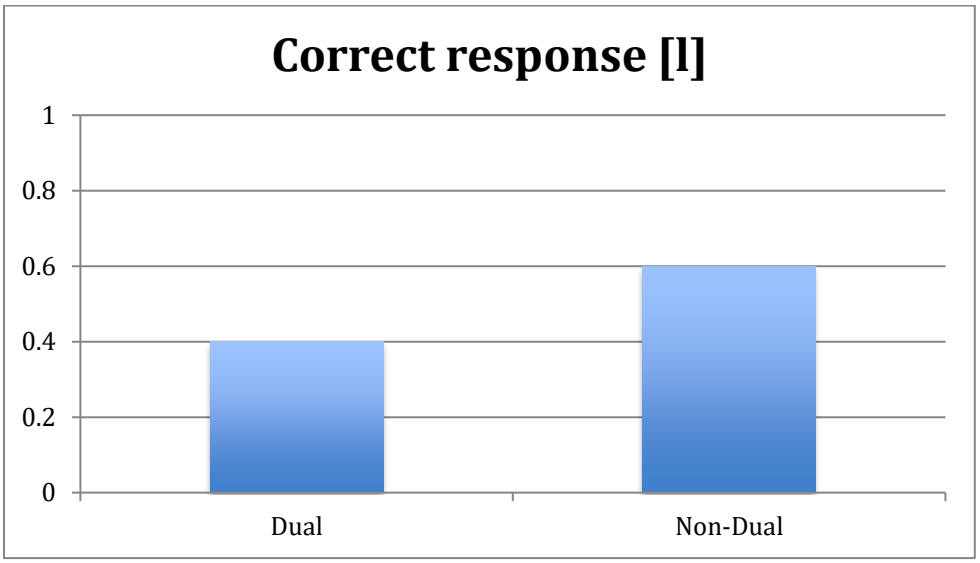
Results



Non-Dual English speakers identifying correctly at an average of 100%; dual English-Spanish speakers showing identical results

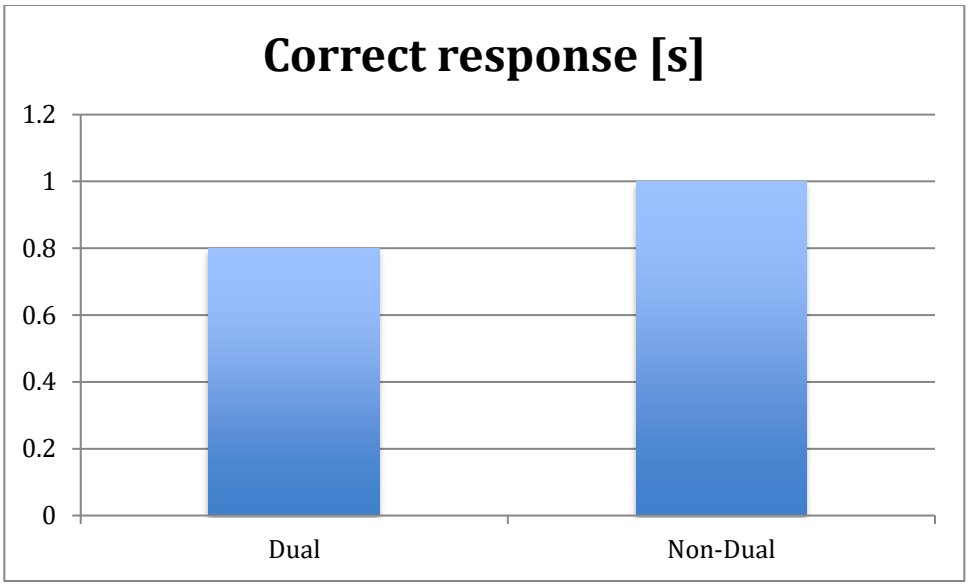
The results are unremarkable. At each interval—65ms, 100ms, 131ms, and 165ms—every participant provided identical results, with each person correctly identifying the [ɾ] segment between each [i] vowel.

Strangely, some of the “palate cleansing” words were often misheard as other consonants:



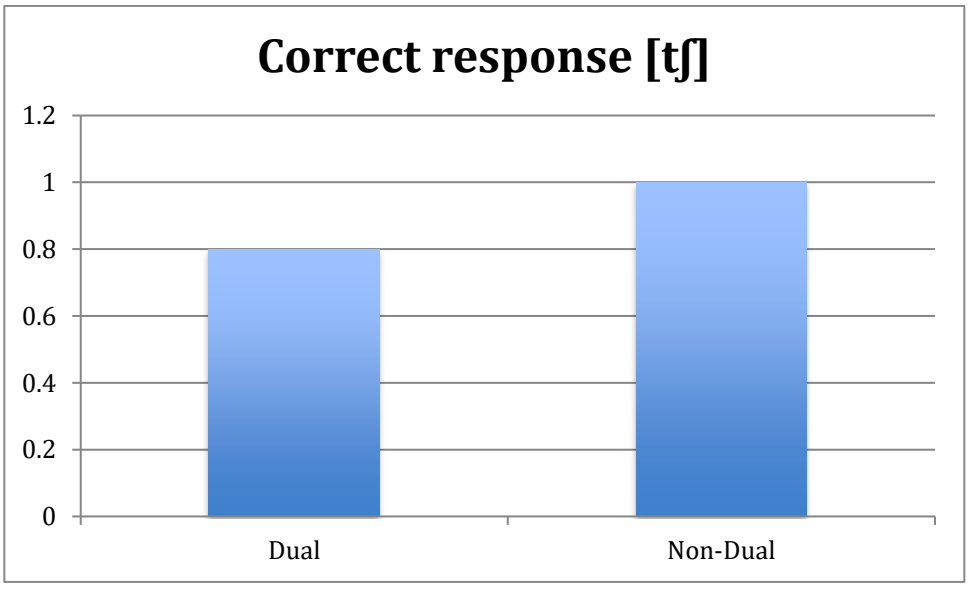
Non-Dual English speakers identifying correctly at an average of 60%; dual English-Spanish speakers 40%

Where the dual speakers had issue identifying the consonant [l], with the non-dual speakers being able to identify this consonant correctly more than the Spanish-English speakers.



Non-Dual English speakers identifying correctly at an average of 100%; dual English-Spanish speakers 80%

Where the dual speakers had minor hiccup identifying the consonant [s] (one reporting of /z/), while the non-dual speakers had no issue identifying this segment correctly



Non-Dual English speakers identifying correctly at an average of 100%; dual English-Spanish speakers 80%

Similar to the perception of [s], dual speakers had minor issue identifying the consonant [s] (one reporting of /ks/), while the non-dual speakers had no issue identifying this segment correctly.

Based the above results, no conclusion can be drawn that leads to determining that increasing the length of the segment [ɾ] contributes to its perception as a /d/ or /ɾ/ across linguistic lines.

However, it can be seen, unintentionally, that perhaps *other* consonants are more difficult to perceive by dual speakers and non-dual speakers, albeit maybe only slightly. Dual speakers seem to perform worse all-around, although particularly with [l] sounds (which non-dual speakers also had quite a bit of issue with). The palate-cleansing portions seem to have provided more information than the actually test itself.

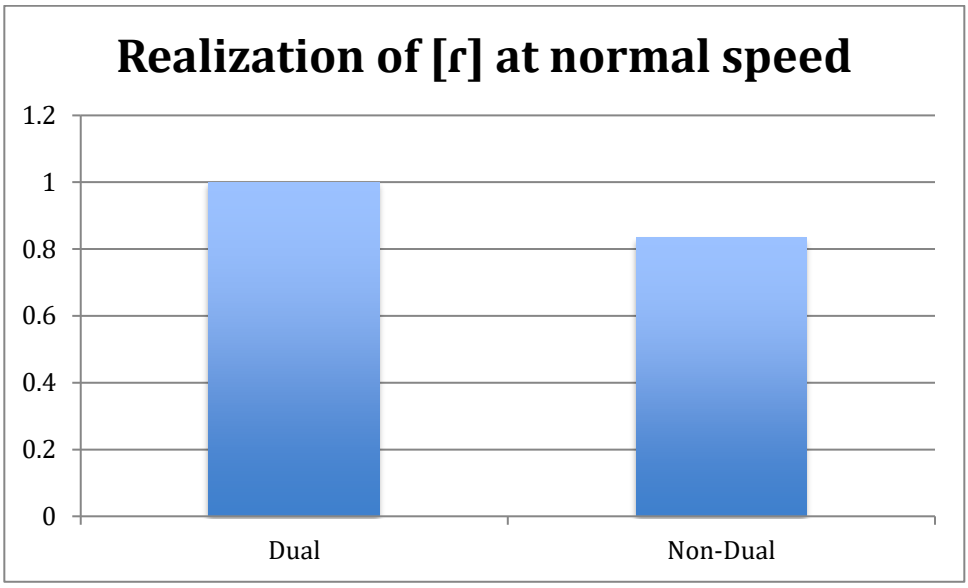
Future Work

Future work with this should involve more carefully chosen palate-cleansing words, if any at all. While participants were prompted that the sounds were from either English or Spanish; while both constituents like <ichi> and <imi> are both possible in English and Spanish, it could be that they are more strongly associated with one or the other (the same could be true for <idi> and <iri>). Difficult occurred when actually picking palate-cleansing words as there is little leeway between the English and Spanish sound inventory, especially as it intersects with their vocabulary inventory.

Elongating the actual segment was difficult and in some aspects sounded particularly like a trill (which was noted in some responses to each instance of [ɾ]-sounds).

Non-dual Spanish-English participants were able to have background in other languages that were not Spanish, perhaps complicating the results, especially if the other languages themselves had trilled or flapped rhotics.

Note that an additional point of data was added after the completion of this paper. This non-dual speaker reported the first instance of [iɾi] as /d/, the only listener to have done so. Here is an updated chart accounting for new data:



Where, at the lowest length of [ɾ], a single indivual non-dual speaker reported hearing /d/. This speaker correctly identified all other segments except [s], which was reported as /ʃ/.