

## VARIABLE NEUTRALIZATION OF THE INTERVOCALIC RHOTIC CONTRAST IN NORTHERN BELIZEAN SPANISH\*

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**ABSTRACT.** While it has been contended that the intervocalic tap/trill contrast has been lost in many Spanish varieties, maintenance of this phonemic contrast has been attested via segmental duration rather than the number of lingual contacts. The present paper investigates the neutralization of the intervocalic rhotic contrast in emerging, bi-dialectal speakers of Northern Belizean Spanish, an understudied variety of contact Spanish with innovative patterns of rhotic distribution. Acoustic analysis of data from 10 adolescent speakers from Orange Walk, Belize showed that in the elicited, oral production data, speakers were able to more consistently maintain their native Spanish variety's intervocalic tap/retroflex approximant phonemic contrast. However, in an effort to phonetically switch to a more standard variety of Spanish in the read-aloud task, speakers' overgeneralization of the tap led to neutralization of the tap/trill contrast and partial loss of their native Spanish variety's intervocalic phonemic contrast.

**Keywords.** rhotics, Northern Belizean Spanish, neutralization, bilingual phonology, bidialectalism

**RESUMEN.** Mientras que se ha constatado que el contraste intervocálico entre las dos róticas del español, la vibrante simple y la vibrante múltiple, se ha perdido en muchas variedades del español, el mantenimiento de su producción normativa se ha confirmado por medio de duración segmental en vez del número de vibraciones del ápice de la lengua contra los alvéolos. La presente investigación estudia la neutralización del contraste de la rótica intervocálica en hablantes bidialectales emergentes del español del norte de Belice, una variedad que está poco estudiada dentro de las variedades del español en contacto y que presenta patrones innovadores en la distribución de las róticas. Un análisis acústico de los datos de 10 adolescentes de la región de Orange Walk (Belice) demostró que en la tarea de producción oral los hablantes fueron capaces de mantener el contraste fonémico de la vibrante simple/retroflexa aproximante de su variedad nativa de español. Sin embargo, en un esfuerzo de cambiar a una variedad más estándar de español, en la tarea de lectura, encontramos que los hablantes generalizan el uso de la vibrante simple dando lugar a la neutralización del contraste entre la vibrante simple/múltiple y a la pérdida parcial del contraste fonémico intervocálico de su variedad nativa.

**Palabras clave.** róticas, el español del norte de Belice, neutralización, fonología bilingüe, bidialectalismo

### 1. Introduction

Whereas extensive research has been carried out on Spanish voiced and/or voiceless stops in the last three decades, (Benkí 2005; Flege 1991; Flege & Eefting 1987; Magloire & Green 1999; Zampini 1994, 1998, *inter alia*), less experimental research has been conducted on the production of rhotics in Spanish varieties. To date,

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most of the extant literature on the production of Spanish rhotics focuses on dialectal variation in the realization of rhotics (Colantoni 2006; Díaz-Campos 2008; Henriksen & Willis 2010; Lewis 2004; Sanchez Corrales 1986; Vásquez Carranza 2007; Willis 2006, 2007; Umaña Aguilar 1981, among others) or the L2 acquisition of the tap and/or the trill (Face 2006; Hurtado & Estrada 2010; Rose 2010; Olsen 2012; Reeder 1998).

Of particular interest in the literature has also been the maintenance of the intervocalic tap/trill phonemic contrast. Evidenced in fewer than 30 minimal pairs (Bradley & Willis 2012) such as *pero* ‘but’ and *perro* ‘dog’, and *caro* ‘expensive’ and *carro* ‘car’, this contrast is one of the most distinctive features of normative<sup>1</sup> Spanish varieties. Whereas Hammond (1999) contends that in many Spanish varieties, the tap/trill intervocalic contrast has been lost, it has been shown that this phonemic distinction is maintained via segmental duration of trill variants rather than the number of lingual contacts associated with the canonical apico-alveolar trill (for Veracruz Mexican Spanish: Bradley & Willis 2012; for Dominican Spanish: Willis & Bradley 2008).

Rhotic production in Spanish varieties with divergent patterns of rhotic distribution, however, remains understudied. Little acoustic research has been carried out on rhotic production in these contexts, which are often characterized by the intricate interplay of two or more phonological systems as a result of regional bidialectalism and intensive language contact. An innovative feature that individualizes these varieties is the existence of an assibilated rhotic (for Central Valley Costa Rican Spanish: Adams 2002; Vásquez Carranza 2006; for Highland Ecuadorian Spanish: Bradley 1999, 2004) or a retroflex approximant (for Afro-Costa Rican Spanish: Zimmer 2011; for Los Angeles Spanish: Lastra de Suárez 1975; for Northern Belizean Spanish: Hagerty 1979), pervasively used in place of the canonical apico-alveolar trill. Thus, in these Spanish varieties, the trill seems either non-existent and/or in a diachronic process of phonemic merger with the alveolar tap.<sup>2</sup>

Thus far, in the descriptive and variationist literature, the use of the retroflex approximant has also been attested in New Mexican Spanish (Cassano 1977), Texas Spanish (Sánchez 1973), Yucatan Spanish (Lope Blanch 1975) and Lorain Puerto Rican Spanish (Ramos-Pellicia 2007). More pertinent to the current study, however, neutralization of the intervocalic rhotic contrast has been reported for Judeo-Spanish dialects in the Balkan Peninsula (Bradley & Willis 2012; Quintana 2006: 84), in certain sociolects of Paraguayan Spanish (Granda 1980), Equatorial Guinean Spanish (Granda 1984) and in the Spanish variety spoken by Limonese Creole/Spanish sequential bilinguals in Limón, Costa Rica (Zimmer 2011).

From a diachronic perspective, these varieties stand out because they have evolved in such a way that their phonological systems have undergone a systematic restructuring in the normative patterns of Spanish rhotic distribution. Although these innovative patterns have been documented in some studies (e.g. Bradley 1999; Vásquez Carranza 2007), it is not well understood what the phonetic outcomes are vis-à-vis the intervocalic rhotic contrast in these varieties. Hence, the case of rhotics in these Spanish varieties merits further study.

<sup>1</sup> Following Bradley & Willis (2012), the patterns of rhotic distribution in normative Spanish are those which conform to Hualde’s (2005: 183) description.

<sup>2</sup> For a similar case of phonetic weakening and diachronic non-usage of the intervocalic trill in Polish, see Jaworski & Gillian (2011).

In view of this fact, the current study examines novel acoustic data on rhotics from Northern Belizean Spanish (NBS), an understudied Spanish variety which has been reported to show significant cross-linguistic influence from English (Hagerty 1996). No previous study has specifically investigated Hispanic Belizean speakers' production of rhotics and/or the neutralization of the intervocalic rhotic contrast in NBS. Thus, explored in this paper is rhotic production in NBS. More specifically, the primary focus of this study was to examine the distribution and realization of rhotics in NBS elicited oral production versus rhotic production in a monolingual, reading mode in order to determine whether the intervocalic rhotic contrast has neutralized as Hagerty (1979) previously suggested.

This paper is structured as follows: in section 2, previous studies on rhotic production and the intervocalic rhotic contrast in Spanish are summarized. Section 3 provides a brief background on NBS. Section 4 presents the research questions that guided this study and an overview of the methodology used. Section 5 outlines the results of the study. Finally, section 6 provides a discussion of the study's findings, and section 7 offers some conclusions.

## 2. Literature Review

Acoustic studies on Spanish rhotics have primarily focused on the dialectal variants of the tap and/or the trill. In particular, the trill, which presents difficulty to both native speakers and second language learners of Spanish (Blecua 2001; Face 2006; Jaworski & Gillian 2011; Lewis 2004; Olsen 2012; Widdison 1998) has been widely studied and noted for its cross-dialectal allophonic variation. While the tap involves the production of only one closure with an average duration of 20ms (Quilis 1993), the trill involves a series of lingual contacts, typically more than two, which can only be produced under specific aerodynamic conditions (Bradley & Willis 2012; Face 2006; Ladefoged & Maddieson 1996; Solé 2002; Willis 2007). The apico-alveolar trill can only be produced when an airstream passes through an aperture produced by high air pressure, and the pressure behind each closure dips dramatically, consequently triggering the apex of the tongue to produce another occlusion (Jaworski & Gillian 2011).

Trill variation and the maintenance of the tap/trill contrast in Spanish have been well studied by Colantoni (2001, 2005, 2006). In her study on the Argentine dialects of Corrientes and San Juan, Colantoni's (2006) acoustic study revealed that in these Spanish varieties, trill variants range from fricatives to approximants. Colantoni examined elicited oral production from 8 male speakers, and her findings showed that in terms of degree of periodicity, approximant variants of the trill appear acoustically and perceptually very similar to the standard trill. In other words, Colantoni argues that the increase of periodicity in a fricative trill may actually be an alternative to the production of a seemingly-auditory trill, and which compensates for articulatory constraints and helps to maintain the tap/trill contrast via non-assibilation.

Willis & Bradley (2008) also studied the intervocalic tap/trill contrast. They found that in Dominican Spanish (DS), the tap/trill contrast has not been neutralized. They compared the production of 154 taps with previously recorded data on trills extracted from a recorded narrative (Willis 2006, 2007), and the study revealed that both the tap and the trill appear in a continuum of variants (e.g. the trill appears as [r], [ɦr], [ɦr̥] and [ɦ]), consistent with the findings of other researchers. Most importantly, their findings revealed that the rhotic contrast is maintained in DS. Even though they seem auditorily similar, duration differentiates them. In terms of duration, the mean trill duration is at least three times as long as the mean tap duration (e.g. for Cibao

speakers, 89ms versus 20ms); furthermore, Willis & Bradley suggest that consonant reduction and elision in taps, and pre-breathy voicing in DS trills occur in order to help maintain the tap/trill contrast.

Bradley & Willis (2012) found further evidence in their study on Veracruz Mexican Spanish (VMS), where the intervocalic tap/trill contrast is also maintained via segmental duration rather than the number of lingual contacts of the trill. Their study was based on data collected in 2005 from ten university students who are native speakers of VMS. In the guided, semi-spontaneous speech task, speakers narrated a story using Mayer's (1969) *Frog Where are You?* picture story. Their spectrographic analysis showed that taps were typically lenited or elided, whereas trills typically had voiced and voiceless fricative and approximant variants; and post-approximantized allophones [rɪ], which had continuous formant structure after lingual contacts, typically less than two. Their acoustic analysis of 216 phonemic taps and 339 phonemic trills also showed that there was no overlap in the segmental duration of normative taps and trills in intervocalic position. Trills were significantly longer than taps (i.e. 36ms versus +60ms for nine out of ten speakers).

In comparison to the previous research on the normative intervocalic tap/trill contrast, scant acoustic research has specifically examined the intervocalic rhotic contrast in Latin American Spanish varieties with divergent patterns of rhotic distribution. Noteworthy is the social context in which these varieties are found. Typically, these non-standard varieties with divergent patterns of rhotic distribution co-exist with a standard variety of Spanish, often the country's official language of instruction. Thus, an important aspect of these contexts is Spanish bidialectalism. Following Yiakoumetti & Esch (2010: 294), bidialectalism is a situation where "two varieties of the same language are used alongside each other". Speakers' native language is the non-standard variety whereas the standard variety is the second dialect students learn in the classroom context. Hence, a crucial phonological consequence of this linguistic situation is that speakers are exposed to both normative and divergent patterns of Spanish rhotic distribution.

Examples of these linguistic situations have been documented in Ecuador and Costa Rica. In the case of highland Ecuadorian Spanish, Bradley (1999) reported that the assibilated [r̃] shares the phonetic distribution of the voiced, alveolar trill in syllable-initial contexts. Thus, the assibilated [r̃] can occur in word-initial position, in post-consonantal position, and in contrastive distribution with the tap in intervocalic position. Unlike the tap and/or the trill, however, the assibilated rhotic can occur in complex syllable onsets after non-continuant coronals such as [t] and [d] as in *tres* 'three' and *vendrá* 'will come'; word-internal coda-position where a coronal follows the rhotic, as in *persona* 'person', and in word-final position, before a vowel or consonant, and before a phrase boundary.

In a subsequent study, Bradley (2004) recorded five speakers of highland Ecuadorian Spanish. Analysis of /rC/ tokens in this study, however, showed that before homorganic coronal consonants (i.e. /t, d, s, n, l/), assibilated rhotic occurred variably. Both the tap and the assibilated rhotic occurred in free variation in this context. Bradley, however, proposed that these findings might have been affected by the nature of the reading task he used, which heightened participants' self-awareness of pronunciation in laboratory settings.

Studies on Costa Rican Spanish have also shown similar phenomena, where rhotic variants appear in several phonetic contexts, replacing either the tap or the trill (Sánchez Corrales 1986; Umaña Aguilar 1981). Vásquez Carranza's (2007) descriptive study explores the realization and distribution of rhotics in the Central

Valley Costa Rican Spanish dialect. Following the work of previous researchers who reported the assibilation of rhotics in Costa Rican Spanish (Sánchez Corrales 1986; Umaña Aguilar 1981), Carranza provides specific contexts where rhotics are assibilated in the variety of Spanish spoken in the Costa Rican Central Valley region. Six participants who were natives from the Central Valley region were audio-recorded reading a list of words and sentences which contained rhotics in different phonetic contexts.

Impressionistic analysis of the data collected showed that participants consistently substituted the trill with a retroflex assibilated [ʀ], both word-initially and intervocalically, thus confirming a similarity between Ecuadorian Spanish and Costa Rican Spanish as reported by Bradley (1999). Furthermore, the voiced alveolar tap was observed in intervocalic position when it contrasted with the trill (i.e. orthographically) and in post-consonantal position excluding *l*, *n* and *s*, pre-consonantal position, and word finally. In /tr/ clusters, as had been pointed out by Sanchez Corrales (1986) and also in line with the Ecuadorian Spanish data, both word-initially and word-medially, devoicing and assibilation occurred as a result of gestural overlap, and this yielded an alveolar [tʃ] affricate sound as in *tree*.

Moreover, in word-medial complex /dr/ onset clusters that are preceded by the voiced sonorant coronals *l* and *n*, the tap is realized as an assibilated [ʀ] as a result of coarticulation. In reference to the tap, elision of the rhotic was reported to occur only in /rC/ clusters at the morpheme boundary when the rhotic was followed by a consonant-initial clitic (i.e. *ponerle*). Carranza argues that in the case of this dialect of Costa Rican Spanish, natural cross-linguistic processes and limitations more aptly account for this phonetic phenomenon. Note that in these studies, the crucial interplay between normative and divergent patterns of rhotic distribution is not addressed.

Although the intervocalic rhotic contrast has not been previously investigated in NBS, Hagerty's (1979) phonological analysis of Belizean Spanish provides valuable insights into rhotic production in Northern Belize. Hagerty collected his data through a picture identification task and semi-structured interviews, where participants spoke about Belizean legends and folk tales of supernatural beings. The final 38 interviews that were analyzed were each approximately 30 minutes in length. In his study, Hagerty focused on the intervocalic voiced dental stop /d/ in Belizean Spanish, but he nonetheless provides an overview of rhotic variants in Belizean Spanish. In particular, for the variety spoken in Northern Belize, Hagerty reported the pervasive use of the voiced retroflex approximant [ɹ] allophone and very minimal use of the trill.

In reference to the intervocalic phonemic contrast, Hagerty (1979: 81) noted that there was "an ongoing process of phonemic merger, resulting in a complete lack of opposition," particularly among younger Belizeans, who were unable to produce the contrast in minimal pairs such as ['karo] 'car' and ['karo] 'expensive', suggesting, therefore, a neutralization of the intervocalic rhotic contrast in NBS. He further commented that in the case of Northern Belize, the merger was in the direction of the retroflex approximant. More than thirty years have passed since Hagerty made these observations. Whether the intervocalic rhotic contrast has neutralized in NBS or not is one of the main questions this study seeks to answer.

Carranza's (2007: 302) article was undoubtedly insightful. However, her statement that "in other Latin American countries where there is a significant influence of the English language, no instances of retroflexion of rhotics have been reported" highlights how crucial it is for varieties such as NBS to be studied. If there is one Latin American variety which can serve as the quintessential case of historical Spanish/English language contact, it is NBS, which as Hagerty (2006: 138) contends,

is “a regional dialect rich in unique features, many of which have evolved as a result of contact with English.” Furthermore, since neutralization of the intervocalic rhotic contrast has been attested in Afro-Costa Rican Spanish (Zimmer 2011), the case of Northern Belize merits further study as a Creole is involved in both contact situations. To date, little is known about bilingual/multilingual outcomes in contact situations where Spanish is in contact with a Creole.

The current acoustic study, therefore, contributes to the much-needed understanding of the distribution and realization of rhotics in a linguistic situation where two varieties of Spanish are in contact with English and an English-based Creole. Specifically, it sheds light on rhotic production in NBS elicited, oral production versus reading in a Spanish monolingual mode. Impressionistic and acoustic analyses were carried out to provide an insight into patterns of divergent rhotic distribution and to examine the intervocalic rhotic neutralization in NBS.

### 3. Northern Belizean Spanish

Hagerty (1979: 2) emphasized that “the meager documentation available regarding Belizean Spanish amply demonstrates a void in Hispanic dialectology which must be filled.” The paucity of linguistic knowledge on Belizean Spanish is demonstrably evidenced even today, where the case of Spanish in Belize is only mentioned in passing (e.g. Lipski 2007, 2010) or not mentioned at all in descriptive accounts of Spanish in contact with English or other languages (e.g. Hualde et al. 2010; Montrul 2012). Thus far, Hagerty’s (1979) groundbreaking phonological analysis of Belizean Spanish is the only study which specifically examines phonetic variation in the two main Spanish varieties spoken in Belize. In the literature, it is mostly through sociolinguistic work that we gain insights into NBS (Brockmann 1979; Koenig 1975, 1980).<sup>3</sup>

Although the existence of Spanish in Belize dates back to as early as the 1600s (Hagerty 1979: 20), its presence did not become noticeable in Belize until the nineteenth century, when Mexican refugees settled in Northern Belize (i.e. Orange Walk and Corozal) during the Caste War in Yucatan in the late 1840s. Prior to this era, Belize was predominantly populated by speakers of British English and an English-based Creole (Gabbert 2007). Hence, it was not until after this first major wave of immigration that Spanish really became noticeable in the linguistic landscape of Belize.

Note that some of the original settlers of Northern Belize were speakers of Yucatan Spanish, a variety that had already been in contact with Yucatec Maya. Thus, it is the contact of this Spanish variety with English and Belizean Kriol (BK)<sup>4</sup> in Northern Belize that led to the emergence of present day NBS. It is also noteworthy to mention that whereas Spanish is also spoken in other parts of Belize, especially the Central region, there is “a sharp contrast in features” between NBS and the variety

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<sup>3</sup> Brockmann’s (1979) descriptive study examined language choice and language use in Orange Walk Town, whereas Koenig (1975, 1980) investigated code-switching and language vis-à-vis language maintenance and language shift in the Corozal district.

<sup>4</sup> In the literature, Belizean Kriol is typically spelled as Belizean Creole. In this paper, the adapted term “Belizean Kriol” is adopted as “Bileez Kriol” is the spelling used by the National Kriol Council in Belize. While *Bileez Kriol* refers to the language, *Creole* refers to the people of mixed European and African ancestry.

spoken in Central Belize,<sup>5</sup> especially as it relates to the use of rhotics (Hagerty 1979: 80). Precisely for this reason, the present study focuses on NBS, which is the Spanish variety where there is innovation in the production of rhotics.

In the present study, NBS adolescent speakers are described as ‘emerging’ bi-dialectal speakers of Spanish because in contrast to other Latin American countries, Belize’s official language is English. Hence, speakers start developing proficiency in their second variety of Spanish primarily in the high school classroom context. In general, children in Northern Belize acquire NBS as their home language. At the age of four, some start attending kindergartens, and thereafter, for a significant part of their daily lives, English becomes the newly found focus of their academic world. In upper primary school levels (Grades 7-9) and during the freshman high school year, most students from rural areas start acquiring BK for social purposes. For many rural students, it is not until high school that they start to take formal instruction in standard Spanish. In Belizean high schools, Spanish is a compulsory core subject that is taken for a minimum of three or four contact hours per week.

#### 4. The Current study

##### 4.1. Research Questions

In order to gain a better understanding of rhotic production and the intervocalic rhotic contrast in NBS, the present study was guided by the following research questions:

- i. What are the general patterns of rhotic distribution in Northern Belizean Spanish?
- ii. What does segmental duration of intervocalic rhotics reveal about the intervocalic rhotic contrast in Northern Belizean Spanish elicited oral production versus reading?

##### 4.2. Participants

10 adolescent speakers from Orange Walk, Belize were recruited to participate in the current study.<sup>6</sup> Participants were divided into two groups: the freshman high school group (4 males, 1 female) and the senior high school group (1 male, 4 females).<sup>7</sup> Adolescent speakers were specifically chosen as they represent the social group that receives the most Spanish instruction in the Belizean school system. Furthermore, Hagerty (1979: 81) identified the phonemic merger in rhotics particularly in the youngest generation. He observed that in some of his younger consultants, “the merger ha[d] reached its final stage.” Thus, academic level was used to determine whether there was a significant difference in rhotic realization between

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<sup>5</sup> This Spanish variety was the result of the second main wave of immigration of Spanish speakers, primarily Salvadorans, Guatemalans and Hondurans, who fled from civil wars in their countries and settled in different parts of Central and Southern Belize during the 1980s (Shoman 2010).

<sup>6</sup> Informed consent involving minors was sought and obtained in accordance with University of Florida Institutional Review Board 02 (Protocol #2011-U-1260).

<sup>7</sup> In the current study, gender was not a factor that was examined. However, a larger sample could allow in-group and across-groups’ examination of gender effects in relation to rhotic production, especially since gender has been attested as a crucial factor in phonological production (e.g. Labov 1990). As highlighted by one reviewer, a more balanced group of participants could have allowed a clearer picture of NBS rhotic production vis-à-vis gender and sociophonetic attitudes.

the freshman and senior group. It was expected that since the senior group has been receiving more years of instruction in Spanish, they would have more successfully maintained a normative intervocalic rhotic contrast. Information on speakers' linguistic background and language use were obtained via a language background questionnaire and the widely-used DELE Spanish proficiency test.

*Table 1. Participant information on self-rated proficiencies and language use*

Speaker/ Gender	DELE	Self-rated Proficiencies			Language Use	
		SP	BK	EN	% per day w/ closest friends	% per day w/ family members
<b>F1/m</b>	Low	3.5	5.9	5.7	90BK/10S	80BK/20S
<b>F2/f</b>	Low	5.6	3.6	5.7	80S/20K	90S/10BK
<b>F3/m</b>	Low	6.2	-	5.9	80S/20E	100S
<b>F4/m</b>	Low	6.2	4.6	5.9	70S/30BK	80S/20BK
<b>F5/m</b>	Inter	6.3	-	6.1	90S/10E	100S
<b>S1/m</b>	Inter	5.2	5.0	4.8	60S/40BK	70S/30BK
<b>S2/f</b>	Inter	5.8	3.5	5.6	70S/30K	90S/10BK
<b>S3/f</b>	Low	3.6	6.5	6.3	80K/20S	70BK/30S
<b>S4/f</b>	Inter	5.9	4.1	5.8	50S/40BK/10E	80S/20BK
<b>S5/f</b>	Inter	5.7	3.6	5.5	70S/30BK	90S/10BK

\*SP = Spanish, BK = Belizean Kriol, EN = English, inter = intermediate

The self-reported data showed that most speakers rated both their Spanish and English proficiencies similarly (see Table 1). Speakers F2, F4, S2, S4 and S5 reported being less proficient in BK than in Spanish or English, whereas speakers F1 and S3 rated their Spanish proficiency as markedly lower than both their BK and English proficiencies. Thus, the latter two participants were Kriol dominant Spanish speakers, a fact which was confirmed by the DELE results. Noteworthy, however, is that the DELE results were consistent with speakers' self-rated proficiencies only in some cases (e.g. speakers F1 and S3, but see F4). These discrepancies, however, are not surprising given the fact that the DELE is not the most adequate test to assess the proficiency of NBS speakers. Dialectal differences should be taken into consideration, especially since the language in the test largely reflects Peninsular Spanish rather than Latin American varieties of Spanish.

In terms of language use, with the exception of speakers F1 and S3, all speakers reported using SP more frequently than EN or BK both with their peers and family members. Note also that speakers F3 and F5 reported not being proficient in BK. Thus, in line with Brockmann's (1979) previous observation, the self-reported data suggests that although the use of BK is increasing in rural areas, Spanish is still the language that is used more frequently in Orange Walk villages.

#### 4.3. Tasks

A total of four tasks were used. Elicited oral production data were obtained via two picture description tasks, where participants used six-quadrant picture stories from Timms' & Eccott's (1972) textbook to narrate the sequence of events in the story (e.g. Figure 1 below). In order to encourage the use of vernacular speech, participants were asked by a native of the community to narrate the story in Spanish as it is spoken in Orange Walk, Belize.

Figure 1. Picture Story 'The Flood' (Timm & Eccott 1972: 64)



Oral production data was also obtained via a translation task of “The Pink Crocodile,” a story specifically written to elicit rhotic production in different phonetic contexts. Since participants focused more on the task of translation, less conscious awareness was given to their pronunciation and production of Spanish rhotics in different contexts. Additionally, reading data was obtained via a Spanish reading task (see Appendix 1), which was the Spanish translation of the English story “The Pink Crocodile”. Stories and passages from other studies were initially contemplated for use, but they were not employed because Spanish dialectal differences in writing style and particularly vocabulary could have confounded the results in the read-aloud task. Thus, the English version and the Spanish translation of the story were written by the researcher, a native speaker of NBS.

#### 4.4. Procedure

With their parents’ consent, speakers were audio-recorded in their homes, where they felt more at ease and comfortable. Care was taken to ensure that there was silence in the room as the interview was being conducted. Each speaker was engaged in a preliminary, short informal interview in NBS, where they spoke about their school life and briefly narrated the story of *Los Tres Cerditos* ‘The Three Little Pigs’. Participants then completed the two picture description tasks, followed by a ten-minute interval between these tasks and the translation task. For the translation task, participants were asked to translate the story “The Pink Crocodile” to Spanish. They were simply asked to translate it to the best of their ability. Participants were given an average of 15 minutes before they began translating. Finally, for the read-aloud task, which was a Spanish translation of the story “The Pink Crocodile”, participants were asked to read the passage aloud.

After the recordings, the researcher helped some participants to complete the Spanish linguistic background questionnaire. Since students typically fill out forms and applications in English, the researcher clarified any doubts or queries students had regarding items in the questionnaire. Lastly, participants completed the DELE 50-item Spanish proficiency test.

Recordings were done in Orange Walk, Belize, using an external PNY SD card, a Marantz PDM 620 and a Shure SM 10-A head-mounted microphone with a sampling rate of 44.1kHz. Recordings were transcribed by the author and tokens were identified and analyzed to determine rhotic distribution and realization in the following contexts:

- i. word initial position [ \_\_ V];
- ii. tap intervocalic position [ V \_\_ V];

- iii. trill/retroflex approximant intervocalic position [ V \_\_ V];
- iv. complex syllable onsets [ C \_\_ ];
- v. word-internal coda position [ \_\_ C]; and
- vi. word-final position [V \_\_ ].

For phonetic contexts (ii.) and (iii.), the reading text contained a total of sixteen intervocalic taps and nine intervocalic trills.<sup>8</sup> Eight taps occurred in the onset of a stressed syllable, as in *amarillo* ‘yellow’ and *orilla* ‘edge’; two taps occurred in the onset of an unstressed syllable that was followed by a stressed syllable (e.g. *corazón* ‘heart’ and *caracol* ‘seashell’) and six occurred in the onset of an unstressed syllable preceded by a stressed one, as in *pero* ‘but’. Intervocalic taps in monosyllabic words and the word *para* ‘to’ were excluded from the analysis as they showed a strong propensity to lenite (i.e. *para* lenited to *pa*).

While all Spanish and English r-words were extracted from the elicitation tasks and the read-aloud task, results from this study are based primarily on the acoustic analysis of rhotics in intervocalic contexts. A total of 137 retroflex approximants and 193 taps from the elicited oral production data were acoustically analyzed to examine the maintenance of the NBS divergent intervocalic rhotic contrast. Furthermore, 160 taps and 90 rhotics in medial trill position from the read-aloud data were acoustically analyzed to determine whether there was neutralization of the normative rhotic contrast. Analysis of the extracted tokens was carried out using the acoustic software program *Praat* (Boersma & Weenink 2008). Taps were considered when there was a full or partial occlusion indicated in the spectrogram as a break between vocalic sounds. An ‘overgeneralized tap’ was counted as a tap that was produced in an intervocalic trill/retroflex approximant context.<sup>9</sup> In line with Blecua (1999), Bradley & Willis (2012), Face (2006), Hualde (2005), Solé (2002) and Willis (2007), trills were only counted when two or more closures were visible in the spectrogram. Lastly, following Zhou et al. (2008) and Olsen (2012), approximants with a bunched or retroflex manner of articulation were distinguished by measuring the average F4 and F5 distance. This was obtained by averaging the F4 and F5 frequencies at three or four even intervals, depending on the segment length, and then subtracting the F4 average from the F5 average. An average F4 and F5 distance of 700 Hz indicated a bunched approximant, whereas a distance of 1400 Hz or more indicated a retroflex approximant. In all cases, caution was taken to ensure that only the intended rhotic segment was measured.

## 5. Results

### 5.1. General patterns of rhotic distribution and realization in NBS

The first research question in this study aimed at determining the general patterns of rhotic distribution and realization in NBS. A total of 130 rhotics in word-initial position; 150 rhotics in complex syllable onset position; 50 rhotics in word internal coda position; and 80 rhotics in word-final position from the read-aloud data were impressionistically analyzed to determine the general trends in NBS rhotic production.

<sup>8</sup> The preceding and following vowel were not controlled for, as previous work has shown that this variable does not have an effect on the realization of rhotics (for further discussion, see Blecua 2001). Solé (2002) found, however, that the vowel which follows a rhotic does have an effect on trill production.

<sup>9</sup> In the literature, the overgeneralized tap is sometimes referred as a ‘flap’ when it is realized as a target trill (see, for example, Hammond 1999).

Based on the impressionistic analysis of these tokens and the acoustic analysis of tokens in intervocalic contexts, the data showed that rhotic patterns in NBS strongly resemble divergent patterns which have been previously reported by Bradley (1999, 2004) and Vásquez Carranza (2007).

The data revealed that in NBS, the intervocalic rhotic contrast is maintained through the systematic use of the tap and a retroflex approximant /ɻ/, thus confirming Bullock & Gerfen's (2004) contention that when bilingual phonologies undergo restructuring, phonemic contrast is not lost. Figure 2 is an adapted version of Hualde's (2005) description of rhotic distribution in normative Spanish.

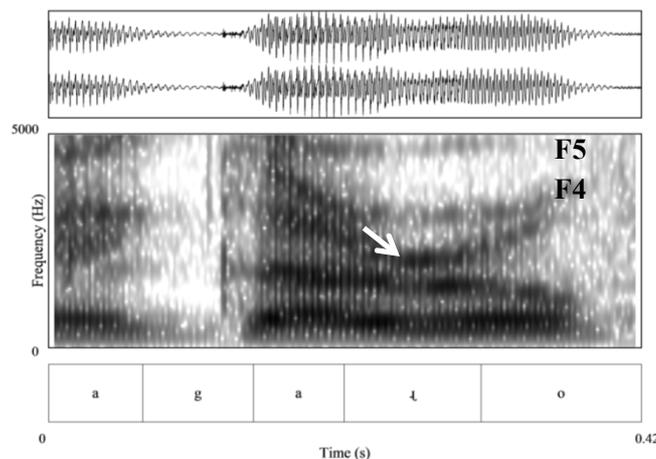
Figure 2. Divergent rhotic distribution in NBS

retroflex approximant /ɻ/	<p>i) #__ word-initial /ɻoka/ 'rock'</p> <p>ii) C__ after heterosyllabic consonants /l, n, s/ /alɻededor/ 'around' /enɻedo/ 'mess' /isɻaelita/ 'Israeli'</p> <p>iii) __C homorganic alveolar consonants /t, d, l, n, s/ /impoɻtante/ 'important' /veɻde/ 'green' /caɻɻos/ 'Carlos' /caɻne/ 'meat' /peɻsona/ 'person'</p> <p>iv) V__V intervocalic /peɻo/ 'dog'</p>
tap /r/	<p>i) V__V intervocalic /pero/ 'but'</p> <p>ii) C__ tautosyllabic consonant (onset cluster) /tres/ 'three' /broma/ 'joke' /griego/ 'Greek'</p> <p>iii) V__#C/## /esta(r) feliz/ 'to be happy'</p>

The NBS tap appears in intervocalic position and in the second position in tautosyllabic onset clusters. It also variably occurs in word final position, before a consonant or a pause. In contrast to normative Spanish, however, the retroflex approximant appears in canonical trill contexts (i, ii & iv) and in a canonical tap context (iii). Undoubtedly, the most salient phonological feature of NBS is the retroflex approximant /ɻ/, which may be the phoneme that contributes to this Spanish variety's "apparent English accent" (Hagerty 1996: 137). Important to realize is that since NBS speakers routinely engage in ubiquitous code-mixing (Balam 2013; Brockmann 1979: 175), the retroflex approximant easily lends itself to either English or NBS phonology in bilingual discourse.

Figure 3 exemplifies the NBS intervocalic rhotic, which clearly appears as a vowel-like segment. English-like rhoticization is acoustically evidenced in the lowering of the third formant. In the acoustic literature, this drop in the third formant is what distinguishes bunched and retroflex approximants produced by speakers of American English (Bullock & Gerfen 2004; Hagiwara 1995; Ladefoged & Maddieson 1996; Stevens & Blumstein 1975; Olsen 2012; Zhou et al. 2008). Thus, in contrast to other varieties of Spanish where other variants such as the assibilated rhotic (e.g. Bradley 1999; Vásquez Carranza 2007) or the fricative trill (Colantoni 2006) appear in the intervocalic trill position, NBS employs a retroflex approximant. In the case of *agarró* ‘caught’ below, the average F4 and F5 distance was 1,601 Hz, thus indicating a strong retroflex manner of articulation.

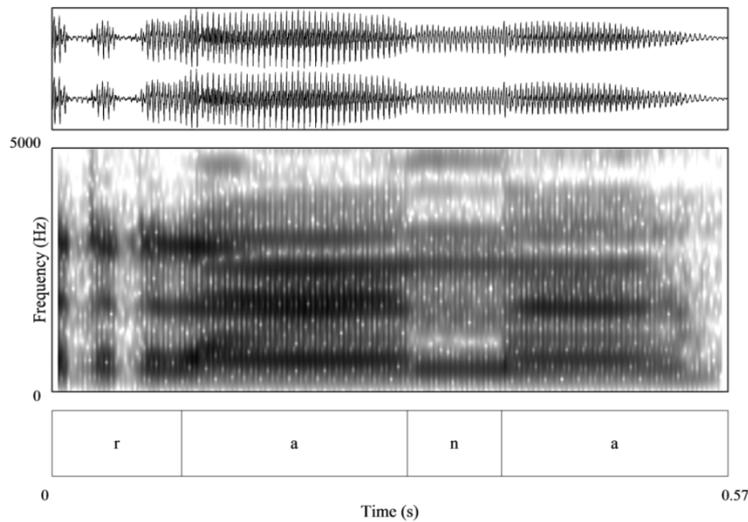
Figure 3. Retroflex rhotic in *agarró* ‘caught’ produced by speaker F2



Impressionistic analysis of the elicited oral production data revealed that the retroflex approximant is used more consistently in word initial and intervocalic trill position than in word final position, where lenition of the rhotic was very pervasive, particularly in infinitive verbs.<sup>10</sup> Thus, in NBS, the substitution of the trill for the retroflex approximant was most salient in word initial and intervocalic trill positions. Overall, trill production was very low. In elicited oral production, no trill was attested, and in the read aloud data, only three trills were produced, in each case by a different speaker in the senior high school group. In intervocalic tap position, a non-canonical, two-closure trill was produced in the word *morada* ‘purple’. The other two normative trills were produced in word-initial position, for the word *rana* ‘frog’ by S1, the speaker who code-switched the most, and by speaker S2 (see Figure 4).

<sup>10</sup> Impressionistic analysis of 251 infinitive verb tokens from the elicited oral production data showed that deletion of the word-final rhotic occurred 59% of the time. This null rhotic allophone is less common in Spanish varieties, though a similar phenomenon has been attested in Afro-Hispanic varieties of Spanish (Hualde et al. 2010).

Figure 4. Two-closure trill in rana 'frog' produced by speaker S2



Acoustic analysis of the read-aloud data confirmed that the phonetic context where the NBS system seems most vulnerable is the intervocalic trill position where speakers produced a retroflex or a voiced tap to the same degree, a fact which is further discussed in the following section. Also salient in the data was the free variation observed in participants' speech regarding rhotic-final words which were followed by an affix clitic morpheme or a homorganic alveolar consonant in word-initial position, as in (1).

- (1) *cumplir diez años*                      i. [kum.'pli.d̪ie.sa.'ɲos]  
 'turn ten years old'                      ii. [kum.'pli̠.d̪ie.sa.'ɲos]

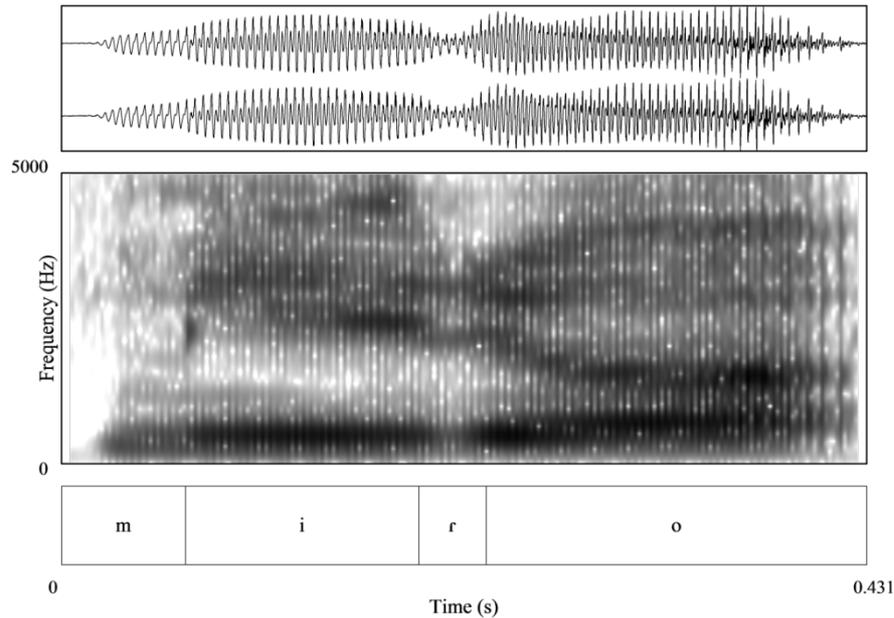
The data showed that in word-final contexts, if the rhotic was followed by a homorganic alveolar consonant as in 1) above, the tap was either realized as an elided allophone (i) or as a retroflex approximant (ii). This pattern was especially salient in the elicited, oral production data. In the read-aloud task, however, which triggered more careful speech, speakers showed a tendency to produce the normative tap in this position. Overall, these are the most salient patterns identified in the rhotic production of the speakers. The present description, however, is only a preliminary outline of rhotic distributional patterns in NBS, which certainly merits further quantitative and acoustic research.

### 5.2 Neutralization of the NBS intervocalic rhotic contrast

The main research question addressed in this study is whether there is neutralization of the intervocalic rhotic contrast among younger speakers of NBS, as Hagerty (1979) observed. Acoustic analysis of 193 taps and 137 retroflex approximants showed that in elicited oral production, speakers successfully maintained their native variety's divergent tap/retroflex approximant contrast. In the intervocalic tap context, speakers consistently produced the tap with a complete or partial closure. In fast speech, however, taps were sometimes produced as lenited taps. As Figure 5 illustrates, a lenited tap is a continuant rhotic realization (Rose 2012), also described in the literature as a perceptual tap (Willis & Bradley 2008; Bradley & Willis 2012), which lacks a visual closure. In these cases, the reduction of intensity was useful in isolating the tap in order to measure its duration. Care was taken to

ensure that surrounding vowels were excluded. The analysis revealed that the mean duration for the NBS tap across speakers was 26.7 ms.

*Figure 5. Lenited tap in miró 'saw' produced by speaker F1*



The retroflex approximant was also consistently produced in elicited production, although some variation was attested (see Table 2). In contrast to Calvo Shadid and Portilla Chaves (1998), who reported that retroflex allophones accounted for 54% of the total occurrences in intervocalic trill position, retroflex approximants accounted for 94% of the intervocalic trill tokens in the present sample. The ‘overgeneralized tap’ was attested in 9 out of 146 target retroflex approximants. Worth mentioning also is that in contrast to Costa Rican Spanish, where an incidence of 2-3% of trill production has been reported (Umaña Aguilar 1981), none of the ten speakers in the current study produced a canonical trill in elicited oral production, thus confirming that in NBS, the trill is not used, especially in more spontaneous speech.

Table 2. Rhotic production in elicited oral production

Speaker	Tokens with NBS tap	Tap duration in ms	Tokens with overgeneralized tap	Tap duration in ms	Tokens with retroflex approximant	F4-F5 distance in Hz
F1	25	25.6	0	0	18	1048
F2	14	28.7	2	24.0	9	1497
F3	15	23.5	0	0	14	1529
F4	13	24.9	0	0	5	1262
F5	30	27.6	0	0	27	1583
S1	15	25.4	1	32.0	13	974
S2	28	27.0	2	24.0	11	1072
S3	16	28.4	4	28.7	9	1258
S4	13	27.3	0	0	14	992
S5	24	27.9	0	0	17	1270
<b>Total</b>	<b>193</b>	<b>26.7</b>	<b>9</b>	<b>27.1</b>	<b>137</b>	<b>1248</b>

In terms of mean duration across speakers, little variation was found. Speakers generally produced mean durations that are longer than the mean of 20ms reported by Quilis (1993). In the case of speakers F2, S1, S2 and S3, although there was more variation in speakers' individual average durations, the mean durations for the NBS tap and the overgeneralized tap across speakers were very similar (i.e. 26.7 and 27.1 ms respectively). Note that speakers which produced overgeneralized taps include both speakers who reported a higher proficiency in BK than SP (i.e. F2 and S3) and speakers who reported being more proficient in SP (i.e. S1 and S2). It may be that this overgeneralization occurred as a result of the experimental nature of the tasks. Ideally, sociolinguistic interviews could have been carried out to further overcome the "Observer's Paradox," which remains a challenge for researchers who investigate vernacular speech, especially in communities where varieties have been or are stigmatized<sup>11</sup> (Wardhaugh, 2006: 19).

Crucial to point out in relation to the retroflex approximants is that there does not seem to be a correlation between BK and degree of retroflexion. Although speakers F3 and F5 were not proficient in BK, they nonetheless produced the approximants with the highest degree of retroflexion. Thus, we cannot attribute the degree of retroflexion to BK. In this regard, results from this study are contrary to Zimmer's findings (2011: 203), where a higher degree of retroflexion was reported for Afro-Costa Rican, Limonese Creole/Spanish bilinguals than for Hispanic Costa Rican Spanish speakers.<sup>12</sup> The mean F4 and F5 distance for the current group of speakers was 1248 Hz, which is considerably greater than the distance of 1057 Hz reported by Olsen (2012), for native English speakers learning L2 Spanish. Noteworthy also,

<sup>11</sup> The retroflex approximant is a stigmatized variant, often associated in the literature with speakers that have low levels of formal education (Adams 2002; Vásquez Carranza 2006). In Brazilian Portuguese, where the retroflex approximant has been attested, this variant is also stigmatized (for further discussion, see Rennicke 2011).

<sup>12</sup> Zimmer's contention, however, is mostly based on impressionistic analyses. It is not clear how she determined degree of retroflexion in her data.

however, is that not all speakers produced approximants with a strong retroflex manner of articulation. For example, speakers F1 and S2 produced approximants that were more intermediate in manner of articulation, with a mean F4 and F5 distance of 1048 Hz and 1072 Hz respectively. Also consider the case of speaker S1 who had a mean distance of 947 Hz. Although speaker S1 made pervasive use of lexical borrowings and intra-sentential code-switching, he produced more bunched-like approximants.

In summary, the elicited oral production data showed that contra Hagerty (1979), the participants maintained their native variety's tap/retroflex approximant intervocalic contrast, and overgeneralization of the retroflex approximant in target tap contexts was very minimal. Only speaker S4 produced the retroflex approximant in the word *empezaron* 'started' twice and in the word *llamaron* 'called.' Tap overgeneralization was also minimal, accounting for 4% of the target intervocalic retroflex approximants. Based on the mean durations of the NBS tap and the overgeneralized tap produced by speakers F2, S1, S2 and S3, however, the data revealed that speakers did not acoustically differentiate these two variants. Thus, neutralization was attested but in a very small percentage of the elicited oral production data set.

In the read-aloud data, however, there was a marked increase in tap overgeneralization. A 6 (intervocalic realization: in trill context as trill, tap, fricative, retroflex, in tap context as tap, or retroflex) x 2 (speaker type: freshmen vs seniors) repeated measures ANOVA revealed a main effect for intervocalic realization,  $F(1.1, 9.0) = 75.576, p = .000$ , no main effect for speaker type,  $F(1, 8) = .000, p = 1$ , and no intervocalic realization by speaker type interaction,  $F(26.9, 9.0) = 1.360, p = .28$ . In particular, within the normative trill context, the tap was produced significantly more than any other realization ( $p < .05$ ). The analysis of 160 taps and 90 rhotics in medial trill/retroflex approximant position revealed that speakers did not maintain the normative intervocalic contrast.

Results from the item analysis that was carried out showed that the NBS intervocalic tap was produced 95% of the time in the read-aloud task (see Table 3). The other variants included fricative variants and overgeneralized retroflex approximants in the words *caracol* 'seashell' and *orilla* 'edge'. Noteworthy is that for *caracol* 'seashell' and *amarillo* 'yellow,' the mean duration of the NBS tap was substantially longer than for the words *corazón* 'heart' and *pero* 'but'. Only the latter tokens had mean durations which were similar to Blecua's (2001) reported average duration of 23 ms for the normative tap in Peninsular Spanish. Overall, however, the tap mean duration across tokens was 27.7 ms. Similar to the pattern observed in the elicited oral production data, speakers consistently produced the tap with minimal overgeneralization.

Table 3. *Phonetic distribution of the voiced tap in intervocalic position*

Tokens	Total	NBS Tap /r/	Other Variants	Tap mean duration/ms
pero (4)	40	37	3	25
amarillo (2)	20	20	0	32
caracol (1)	10	8	2	31
morada (1)	10	8	2	28
miro (2)	20	20	0	29
quiero (2)	20	20	0	25
pajarito (2)	20	20	0	27
corazon (1)	10	10	0	24
orilla (1)	10	9	1	28
<b>Total</b>	<b>160</b>	<b>152</b>	<b>8</b>	<b>27.7</b>

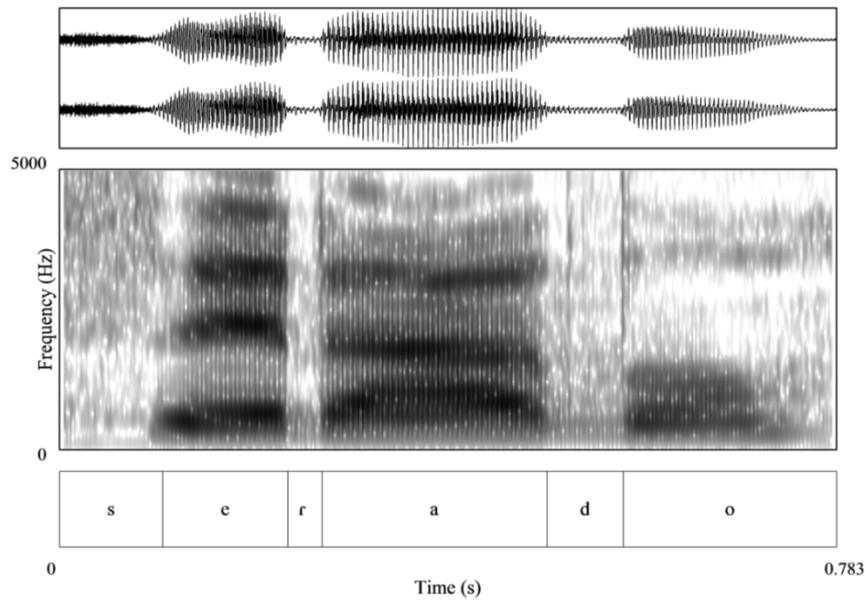
On the other hand, phonetic instability was clearly evident in the intervocalic trill/retroflex approximant context, where overgeneralization of the tap was attested (see Table 4). A post hoc test revealed that in the read-aloud data, the retroflex approximant and the voiced tap in word medial position were used equally ( $p = 1.000$ ), thus strongly suggesting that the intervocalic rhotic contrast was compromised. Acoustic analysis of the read-aloud data confirmed that the intervocalic NBS tap was used to a similar degree as the intervocalic retroflex approximant.

Table 4. *Phonetic distribution of the retroflex rhotic in intervocalic position*

Intervocalic retroflex approximant/trill	Tokens	Retroflex approximant	F4-F5 Distance in Hz	Overgeneralized tap	Mean Duration In ms
perro	50	24	1272	26	26
corrió	10	3	1182	7	29
arriba	10	3	1405	7	32
arroz	10	5	1630	5	32
cerrado	10	2	1600	8	26
<b>TOTAL</b>	<b>90</b>	<b>37</b>	<b>1418</b>	<b>53</b>	<b>29.0</b>

In 41% of the tokens, the intervocalic rhotic was produced as a NBS retroflex approximant, whereas in the remaining 59%, the intervocalic retroflex approximant was realized as an overgeneralized tap, as in *cerrado* ‘closed’ (see Figure 6), with a clear visual closure, followed by no frication, post-approximantization and/or r-coloring. In previous work (Kouznetsov & Pamies 2008: 674), it has been shown that a Spanish trill is sometimes produced with one closure followed by “a vocalic component before the next vowel” such as r-coloring (Henriksen & Willis 2010). However, as illustrated by Figure 6, there is no such vocalic component before the open, central vowel /a/; thus, the alveolar tap and the overgeneralized tap in NBS are strikingly similar not only auditorily but acoustically as well.

Figure 6. Overgeneralized tap in cerrado ‘closed’ produced by speaker S2



Overgeneralized taps have been documented in the trill production of intermediate and advanced L1 speakers of American English learning L2 Spanish (Face 2006; Rose 2010). They have also been reported for some speakers of Afro-Costa Rican Spanish (Zimmer 2011). In the case of the current study’s participants, note that despite the differences in years of Spanish instruction, speakers did not differ in their ability to maintain the normative tap/trill phonemic contrast. Contrary to what was predicted, both groups demonstrated a similar degree of difficulty in the maintenance of the normative intervocalic tap/trill contrast. There was a tendency, however, for the senior group to produce overgeneralized taps more frequently. The senior group accounted for 60% of the overgeneralized taps.

Thus, data from the read-aloud task showed a two-fold effect. First, there was a substantial decrease in the use of the retroflex approximant, from 94% to 41%. There was also a corresponding increase of more than 150 Hz in the overall mean degree of retroflexion, possibly as a result of more careful speech. Most importantly, evidenced in the data was an increase in tap overgeneralization, which contributed to the attested partial neutralization. Analysis of individual speaker data also revealed that as a phonetic cue, segmental duration did not differentiate between the NBS tap and the overgeneralized tap. Table 5 summarizes speakers’ tap durations across the two tasks. The elicited oral production data shows that six out of ten participants successfully maintained the NBS tap/retroflex approximant intervocalic contrast, whereas only two did so in the read-aloud task.

A 4 (condition: elicited production tap, elicited production overgeneralized tap, read-aloud tap, read-aloud overgeneralized tap) x 2 (speaker type: freshmen vs seniors) repeated measures ANOVA revealed a main effect for condition,  $F(1.9, 15.4) = 8.474, p = .004$ , no main effect for speaker type,  $F(1,8) = .507, p = .497$ , and no condition by speaker type interaction,  $F(1.9, 15.4) = 1.436, p = .267$ . Regarding the difference between the tap and the overgeneralized tap, a Bonferroni post-hoc analysis revealed that they were significantly different from each other in the elicited production task ( $p = .033$ ) but not in the read-aloud task ( $p > .05$ ), thus confirming that it is particularly in the reading task that tap overgeneralization led to neutralization of

the normative tap/trill contrast and partial loss of the speakers' native variety's intervocalic rhotic contrast.

Since there were only four participants in elicited oral production and eight in the read-aloud task that produced overgeneralized taps, a paired-samples t-test was subsequently carried out to determine if there were significant differences between the means of the taps that were produced by these speakers. The paired-samples t-test revealed that the durations of the NBS taps and overgeneralized taps produced by F2, S1, S2 and S3 in elicited oral production were not significant,  $t(3) = .080, p = .941$ ; and no statistical difference was found between the means for the taps produced by speakers F2, F3, F4, F5, S1, S2, S3 and S4 in the read-aloud task,  $t(7) = -1.414, p = .200$ . Furthermore, no statistical difference was found between freshmen and senior speakers in their production of the NBS taps and the overgeneralized taps,  $p > .05$ .

Table 5. Mean durations of taps across tasks

SPEAKER	ELICITED ORAL PRODUCTION				READ ALOUD			
	NBS /r/		overgeneralized /r/		NBS /r/		overgeneralized /r/	
	Duration in ms	SD	Duration in ms	SD	Duration in ms	SD	Duration in ms	SD
F1	25.6	4.5	0	0	33.5	12.4	0	0
F2	28.7	5.0	24.0	1.4	29.2	6.8	32.8	5.8
F3	23.5	4.4	0	0	24.9	5.3	28.6	9.4
F4	24.9	4.0	0	0	27.3	4.6	25.3	4.6
F5	27.6	6.0	0	0	27.0	7.8	27.0	8.4
S1	25.4	3.3	32.0	5.9	25.1	3.9	26.9	5.1
S2	27.0	6.0	24.0	0	30.2	8.7	32.7	7.8
S3	28.4	7.3	28.7	0	31.4	4.3	30.2	2.3
S4	27.3	6.1	0	0	23.1	5.3	23.3	3.8
S5	27.9	5.7	0	0	23.3	2.9	0	0

Thus, in the read-aloud data, insofar as the intervocalic tap/trill contrast is concerned, eight out of ten speakers were unable to consistently maintain either their native Spanish variety's contrast or the normative intervocalic rhotic contrast. There was evidence of neutralization in the production of the NBS tap and the overgeneralized tap, whose mean durations across speakers were 27.5 ms and 28.4 ms respectively. Figure 7 below shows the tap durations in the minimal pair *pero/perro* 'but/dog,' which are 22 ms and 18 ms respectively. In Figure 8, the non-continuant taps in *cerrado* 'closed' and *caracol* 'seashell' lasted 23 ms and 25 ms respectively. Note that tap duration differences are very minimal and there is no intervening vocalic component between the rhotic and the following vowels.

Figure 7. Speaker S2's neutralized production of *pero* 'but' and *perro* 'dog'

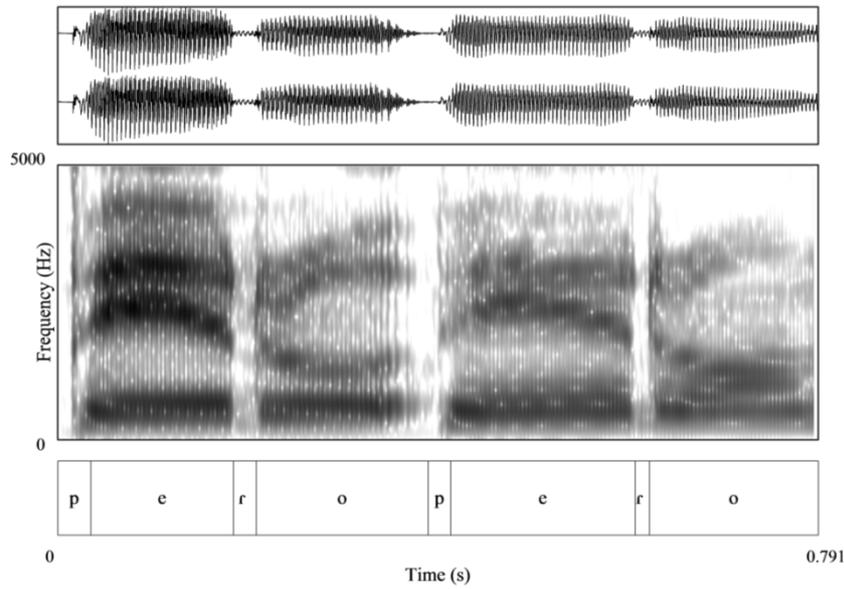
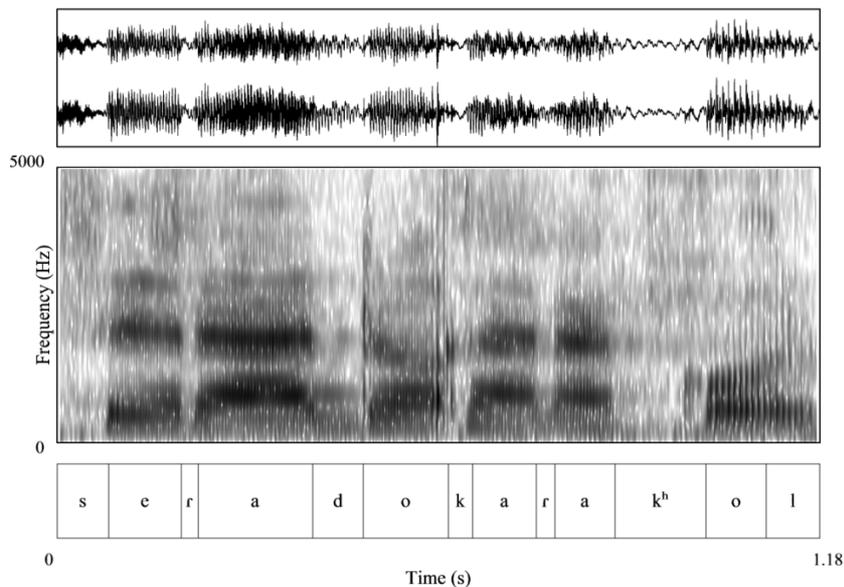


Figure 8. Speaker S3's production of *cerrado* 'closed' and *caracol* 'seashell'



Overall, the data showed that there were marked differences between intervocalic rhotic realizations in elicited oral production versus reading-aloud. While in elicited oral production, the tap/retroflex approximant phonemic contrast was more consistently maintained, in the read-aloud task, there was a decrease in the use of the retroflex approximant and an increase in the use of the overgeneralized tap, which resulted in partial loss of the intervocalic phonemic contrast. In reference to the study's hypothesis, participant groups did not significantly differ in their phonetic realizations. Freshman participants did not exhibit more phonetic variation and greater difficulty in maintaining the intervocalic rhotic contrast as it had been hypothesized. Speakers from both groups overgeneralized the tap in the intervocalic retroflex approximant context. In the read-aloud data, the mean segmental durations for the NBS tap and the overgeneralized tap (i.e. 27.5ms vs. 29.4ms) showed that there was a

striking similarity between the two intervocalic taps. Thus, neutralization of the normative tap/trill contrast led to the partial loss of the NBS divergent rhotic contrast. As to why this may have occurred is further elaborated in the following section.

## 6. Discussion

The current study set out to provide a general overview of rhotics in NBS and to primarily determine whether there is evidence of neutralization of the intervocalic rhotic contrast in NBS. Acoustic analysis of data collected from ten adolescent native speakers of NBS showed that in elicited oral production, speakers maintained their native variety's divergent intervocalic tap/retroflex approximant contrast to a significantly higher degree than in oral reading. Thus, contra Hagerty's (1979) claim that in NBS, the phonemic merger of the rhotics was in the direction of the retroflex approximant, results revealed that the NBS rhotic contrast is maintained in more naturalistic speech. Overgeneralization of the retroflex phoneme accounted for less than 1% of the entire data set. In the read-aloud data, however, speakers overgeneralized the tap, and this contributed to variable neutralization (i.e. neutralization of the normative tap/trill contrast and partial loss of their variety's divergent intervocalic rhotic contrast).

These results could simply be dismissed as another case of "near-neutralization" (for further discussion, see Silverman 2012: 69), where variability in the maintenance of a phonemic contrast sometimes occurs as a way to salvage the listener from semantic ambiguity. However, given the marked differences between the elicited, oral production data versus the read-aloud data, there is no doubt that NBS speakers' rhotic production warrants careful consideration of relevant social and phonological factors.

For one, the nature of multilingualism in Northern Belize must be considered as an important factor which contributes to speakers' language proficiencies, and thus, their phonetic capabilities. Typically, divergent patterns of rhotic distribution in Latin American dialects have been examined in more or less stable language contexts where Spanish is the official language, as is the case of Costa Rica and Ecuador. In the case of Belize, however, English is the official language. Thus, native NBS speakers receive limited formal instruction in standard Spanish. This definitely has an effect on the development of speakers' proficiency in standard Spanish. In contrast to speakers from Costa Rica's Central Valley, who may have the capacity to phonetically switch from a non-standard Spanish variety to a more standard one, adolescent speakers of NBS do not seem to be able to make this phonetic switch. This is a fact, however, which must be analyzed through several angles.

One possible explanation that can account for the variable neutralization of the intervocalic rhotic contrast in the read-aloud data is that speakers' phonetic production may have been affected by their heightened awareness of pronunciation. From the works of Labov (1966), and researchers such as Tarone (1983) and Elliott (2003), we know that when a bilingual speaker is aware that he/she is being observed, he/she employs a more conservative speech style. In previous work, it has been shown that the nature of a task does have an effect on phonetic production.

For example, in her study on rhotic production in coda position, Ramos-Pellicia (2007: 55) found that Lorain Puerto Rican Spanish speakers used the normative rhotic variant in "their most monitored form of speech." In more informal conversation, however, speakers employed the less prestigious variant, the lateral rhotic [l], which is a distinguishing feature of Puerto Rican Spanish. Similar observations were made in the current study. In elicited oral production, which is less monitored than reading-aloud, speakers used the retroflex approximant to maintain their variety's intervocalic

rhotic contrast. However, the more formal nature of the read-aloud task triggered more conservative speech, which was evidenced in the speakers' attempt to switch to more normative patterns of rhotic distribution. The fact that some speakers produced the overgeneralized tap even in elicited oral production may be attributed to the fact that even elicited oral production may have been perceived as semi-formal; consequently, speakers did not categorically employ their native variety's intervocalic rhotic contrast.

The puzzling question, however, is whether NBS speakers are able to produce the apico-alveolar trill or not. It may be that the production of the overgeneralized tap in the trill context occurred as a result of articulatory undershoot, which has been contended to occur when a speaker intends to produce a phoneme but fails to reach the intended articulatory target (Jaworski & Gillian 2011; Liljencrants & Lindblom 1972). This would be supported by the fact that it is particularly when speakers engage in more monitored speech that their phonetic performance changes, indicating that they do in fact try to switch to a more standard variety of Spanish. However, since adolescent participants are emerging bidialectal speakers of Spanish, they cannot yet successfully maintain the normative tap/trill intervocalic contrast. Thus, speakers may have tried to produce the trill, and in an effort to produce the normative tap/trill contrast in the reading task, speakers produced an overgeneralized tap more than 50% of the time instead, which in terms of segmental duration, did not differ from the NBS tap.

In contact acquisition studies, it has been shown that children successfully acquire phonological contrasts and they have an impressive control over their ability to not only switch between languages but between language varieties. Khattab (2009), for example, showed how Maguy, Mazen, and Mohamed, three Arabic-English bilingual children living in England, accommodated their phonetic patterns to their mother's Arabic-accented English by making detailed phonetic adjustments to their utterances. There is compelling evidence, however, which proves that as children mature, it becomes increasingly more challenging for them to acquire phonological features and rules not present in their first language (Trudgill 1981; Chambers 1992).

Hence, in view of phonetic accommodation, the results from this study suggest that adolescent speakers of NBS, insofar as the intervocalic phonemic contrast is concerned, seem to be unable to switch from non-standard phonology to standard Spanish phonology, which requires the tap/trill phonemic contrast instead of the tap/retroflex approximant contrast. Thus, the fact that adolescent NBS speakers are emerging bi-dialectal speakers may be the primary reason why they are seemingly unable to maintain their rhotic intervocalic contrast, specifically when they try to accommodate to a more standard monolingual Spanish mode. In view of the fact that only two normative trills were produced in the reading-aloud task, it may be that only at higher proficiency levels do NBS speakers acquire or learn the distinctive tap/trill phonological contrast found in most Central American dialects.

What is nonetheless surprising is that even though NBS speakers are constantly exposed to standard Spanish aural input, via interpersonal communication and the Mexican mass media, where the trill is used, they do not seem to be able to easily produce the trill. Interestingly, their minimal use of the 'standard' trill is comparative to trill production by intermediate L1 American English learners of Spanish as a second language (Face 2006). In his study on the acquisition of the voiced alveolar tap and the voiced alveolar trill in intervocalic position by intermediate and advanced native speakers of American English (AE) in a non-naturalistic setting, Face (2006) shows that his participants' accuracy in the production of the trill was starkly low, in

comparison to the native group. Of relevance to the results obtained in this study is the fact that the trill was produced by only 6 of the 20 intermediate-level, fourth semester Spanish learners, and four of these speakers produced the trill only once. In this study, only three out of the ten speakers each produced a single trill.

Furthermore, advanced learners in Face's study did not have much difficulty articulating the tap; however, they overgeneralized the tap, producing it in contexts where the trill should be produced. Face points out that the overgeneralization of the tap by the advanced learners can be seen as a developmental error, which coincides with Major's (1987, 2001) Ontogeny Model which predicts that over time, transfer errors in the interlanguage of second language learners should decrease while developmental errors should increase and then subsequently decrease. While both Face's study and this study were not designed to test Major's model, it is worth noting that even though they are in completely different sociolinguistic contexts, the speakers in this study share similarities with L1 AE speakers' production of rhotics.

Another factor that could have had an effect on speakers' phonetic production is the interlocutor's shared linguistic and ethnic background. In Communication Accommodation Theory (CAT), Giles and colleagues (1973, 1991) posit that speakers often unconsciously use strategies to negotiate the ideal social distance they want to have with interlocutors, and thus, their changes in accent and speech patterns are driven by motivations such as the desire for social acceptance, maintenance of linguistic identity, etc. Trudgill (1986) argues that dialect accommodation especially takes place when a sound is a salient marker of identity, and speakers are acutely aware of these linguistic markers. In Spanish-English bilingual phonetic inventories, the ability to articulate the normative trill is typically associated with 'standard' Spanish. While variants such as the retroflex approximant and the assibilated rhotic are stigmatized, as Vásquez Carranza (2007) and Adams (2002) contend for Central Valley Costa Rican Spanish, it nonetheless persists because it is a marker of identity.

Hence, the phonetic patterns for rhotic production observed in the reading task may have occurred as a direct result of two accommodation strategies in conflict. In CAT, the *divergence* strategy is used to reinforce linguistic differences; in this case, the nature of the reading task would have inevitably caused students to modify their phonetic patterns so that they seem more 'standard' and 'formal'. However, since the study's participants and the interlocutor share the same ethnic and linguistic identity, *divergence* would have been in direct conflict with *convergence* and *maintenance* strategies. This analysis would be supported by Brockmann's (1979) observation that among Spanish speakers from Orange Walk, language choice was determined by the perceived ethnicity of the speaker. The symbolic importance of ethnic identity among speakers in Northern Belize was also emphasized by Koenig (1975, 1980).

Thus, it can be argued that in an effort to maintain this shared linguistic and cultural identity and not feel an undesired sense of 'otherness,' adolescent NBS speakers may have tried to reduce the social distance between themselves and the interlocutor by keeping some of the rhotic distributions of their home dialect. Thus, they unconsciously struggled to not have a foreign-accented Spanish, while also trying to sound as 'standard' as possible. In the case of speakers F1 and S5, who nonetheless maintained their native variety's tap/retroflex approximant contrast, it may be that their NBS linguistic identity and a desire to avoid a foreign-accented Spanish may have taken precedence over adjusting to a standard variety of Spanish.

There is no doubt that social-indexical factors could have played a role. It has been shown in previous sociophonetic work that sometimes bilinguals can choose to develop or realize a category or not, and this occurs as a means of indicating ethnic

affiliation (Hirson and Sohail 2007) or as a way of distancing oneself from a certain type of variant or accent (Simonet 2010). For example, Ramos-Pellicia (2007) explains that since the rhotic variant [l] is negatively perceived in Island Puerto Rican Spanish (IPRS), first generation Lorain Puerto Rican Spanish speakers in her study use the retroflex approximant instead of the lateral rhotic variant in order to distance themselves from the stigmatized lateral variant.

In the current study, it may be that the speakers wished to distance themselves from standard Spanish because of their negative attitudes to standard Spanish (see Balam 2013 for further discussion on NBS speakers' attitudes toward their Spanish varieties). If the trill is associated with standard Spanish, to which they are negatively predisposed, then more than likely, they will be more adamant about producing it, especially if the speaker and the interlocutor are from the same speech community, and are thus, equally aware of the community's established linguistic norms.

Furthermore, negative attitudes towards standard varieties have been attested in Creole contact situations. Craig (1983), who conducted extensive research on Jamaican Creole/English speakers, emphasized that part of the problem in teaching the standard variety to non-standard speakers of English is that they have negative attitudes toward Standard English, particularly its phonology. Thus, there is no doubt that if NBS speakers have negative attitudes toward the phonological patterns of standard Spanish, then more than likely, they will not produce normative patterns of rhotic distribution. Whether such social-indexical factors had anything to do with trill production certainly falls outside the purview of this paper. Thus, in-depth investigation must be carried out to better understand speakers' attitudes to the apico-alveolar trill and other suprasegmental aspects of standard Spanish.

In this paper, I have provided some sociolinguistic motivations that may help to explain the patterns of rhotic distribution and realization observed in the current study. It is my proposal that rarely do NBS speakers manage to acquire or learn the tap/trill contrast in a way that mirrors speakers of Spanish dialects that do have the normative contrast; however, this outcome is due to a complex combination of both cognitive and social-indexical factors that merit further study. This hypothesis is one which can be tested in a future cross-sectional study where attitudes to trill production and phonological patterns of normative Spanish can be thoroughly examined. This kind of sociophonetic research on rhotic production in NBS is necessary to more lucidly understand how language attitudes and sociolinguistic factors contribute to NBS speakers' phonetic accommodation to different languages or dialects depending on context, interlocutor, language identity, self-perception, etc. The possibility exists that if the interlocutor had been a native speaker of another variety such as Peninsular Spanish, the study could have yielded different results or maybe not.

Future studies also need to examine other age-groups of speakers and further investigate the role of Belizean Kriol on NBS. Note that Kriol dominant Spanish speakers F2 and S3 overgeneralized the tap in both contexts. Thus, there is the possibility that this was an avoidance strategy that can be attributed to their low proficiency in both standard Spanish and NBS. Hence, further research must be carried out to determine whether Kriol dominant Spanish speakers in Northern Belize have greater difficulty in maintaining an intervocalic rhotic contrast in comparison to Spanish dominant speakers. In reference to neutralization in NBS and other Spanish varieties, as Bradley & Willis (2012) contend, more research needs to determine whether segmental duration is a cue that listeners can perceive, as this may be even more relevant to the foregoing discussion. This could be revealing, especially since previous research shows that listeners do not seem to be sensitive to perceptual

differences between certain rhotic variants (for discussion on the perceived perceptual difference between bunched and retroflex approximants, see Twist et al. 2007). Last but not least, as aptly pointed by one reviewer, studies on rhotic neutralization can also explore whether a phonological contrast between rhotics is maintained via lengthening of the preceding vowel, especially when the pre-rhotic syllable is stressed. It could even be a possibility that aspiration in preceding voiceless stops, along with vowel lengthening, may be used as contrastive cues in NBS (e.g. [pero] ‘but’ versus [p<sup>h</sup>e:ro] ‘dog’).

Studying the case of rhotic distribution and realization in Belize holds important insights into Spanish bidialectal phonologies in multilingual communities. Important to highlight is that when Hagerty (1979) conducted his study, Spanish education was not part of Belize’s curriculum; thus, incipient bidialectalism as a result of classroom instruction was not a factor that he had to consider. However, language education in Belize has evolved since then. The Ministry of Education in Belize made Spanish a compulsory subject in high schools in 1998. In 2001, Spanish instruction was integrated in the primary school curriculum (Ministry of Education 2004), and it was not until 2010 that a Spanish education program was launched in the national university to train Spanish teachers for this endeavor. Thus, certain measures have been established to bolster Belizeans’ Spanish/English bilingual competence. To date, however, Belize does not have a Spanish education language policy.

As Belize strives to better integrate itself into Spanish-speaking Latin America, where its linguistic situation has gone largely unnoticed, greater importance will have to be given to Spanish education and the development of students’ bilingual and Spanish bidialectal competence. Hispanic Belizeans pursuing higher education in Spanish-speaking countries like Mexico, Guatemala and Cuba could greatly benefit from such initiatives as it would better prepare them with the phonological and lexical skills they need to transition from an English system of education to one where Spanish is the official language of instruction. Guion (2003) reminds us that in the long run, such changes in the patterns of schooling can have lasting effects on speakers’ phonological system and realization of phonemes. In light of these facts, and given the patterns of Central American migration to Belize, it remains to be seen what will happen to the rhotic intervocalic phonemic contrast and the phonetic realization of the normative trill in NBS.

## 7. Conclusion

Studies on rhotic production in Latin American Spanish varieties have primarily focused on stable linguistic contexts, but this study sought to provide an insight into rhotic production in a more complex situation where phenomena such as rhotic neutralization evidently seems to be vulnerable to both cognitive and social factors. Results from this study showed that in oral elicitation, participants were able to more consistently maintain their Spanish variety’s divergent tap/retroflex approximant intervocalic phonemic contrast; however, in the read-aloud task, there was partial neutralization of the intervocalic rhotic contrast. This occurred as a consequence of unsuccessful phonetic accommodation. Thus, the data from NBS partially support Hammond’s (1999) claim that in Spanish dialects, there is neutralization of the intervocalic rhotic contrast. The findings particularly show that variable neutralization is a possibility, especially in contexts where speakers are still in the process of becoming bi-dialectal speakers of Spanish and are unable to phonetically switch from one dialect to the other under certain social circumstances. In the case of Northern Belize, it may be that only after years of formal instruction in a Spanish-speaking

country and/or continuous naturalistic exposure to varieties such as Mexican Spanish that NBS speakers develop the necessary phonological competence in standard Spanish, which consequently allows them to more successfully switch between Spanish dialects. Future investigation could examine whether in cases such as these, NBS speakers indeed develop both the normative and divergent intervocalic rhotic contrasts and are able to successfully maintain them both in reading and more naturalistic discourse. This could greatly contribute to our current understanding of phonetic outcomes among native Spanish speakers who acquire/learn normative patterns of rhotic distribution and realization in post-adolescence.

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## Appendix

### El Cocodrilo Rosado

Había una vez que vivía un cocodrilo rosado muy callado. Decía pocas palabras y era muy grande, y todos los habitantes del bosque le tenían miedo. Cuando iba a cumplir diez años, decidió que iba a organizar una fiesta para todos los animales de la selva. Pero no tenía amigos así que decidió salir del río para ir a invitar a los animales personalmente. Al salir del río, se encontró con una rana morada que estaba sentada en un caracol. El cocodrilo rosado abrió su gran hocico para hablar, pero al ver sus grandes dientes filosos, la pobre rana se espantó y se desmayó. El cocodrilo quedó confundido. Luego siguió su camino y se encontró con un ratoncito. El cocodrilo una vez más intentó hablarle, pero el ratoncito sin pensarlo dos veces, se escabulló como una flecha y se escondió arriba de un árbol. El cocodrilo se quedó triste. Pero siguió. Y entonces miró un perro negro. Y el cocodrilo se asombró porque el perro no corrió cuando intentó hablarle. Dijo el perro: "sí, dime amigo". Y respondió el cocodrilo rosado: "Voy a tener una gran fiesta para mi cumpleaños. Habrá jamón, pavo, arroz, mucho que beber y mucho que comer. Quiero que vengas a celebrar conmigo." Entonces se empezó a reír el perro como loco. "No, no nací ayer. Quiero seguir vivo": le respondió el perro. Y el cocodrilo se sintió muy triste porque se preguntaba que era una fiesta sin invitados. Y decidió regresar al río. Cuando ya llegaba cerca de la orilla del río, miró a un pajarito amarillo muy bonito en una rama. Tristemente, le contó lo que había sucedido. Y el sabio pajarito amarillo le dijo: "el corazón es como un libro. Si no lo hubieses cerrado hace tantos años, no te tendrían tanto miedo."