

# Stability of Nahuatl and Spanish Intonation Systems of Bilingual Nahuatl Speakers from the Mexican Veracruz Huasteca Region

*Eduardo Patricio Velázquez Patiño*<sup>1</sup>

<sup>1</sup>Facultad de Lenguas y Letras, Universidad Autónoma de Querétaro, Mexico  
utka@yahoo.com

## Abstract

In Veracruz Huasteca Nahuatl interrogatives, we found that there is a higher preference for L\*+H (late rise) ascending prenuclear and nuclear tones. Initial and final boundary tones, as well as the first prenuclear tone, are highly variable, though they seem to conform to general voice production mechanisms, which are common to most languages. The aim of this paper is to show that there are no identical intonation patterns between similar sentences in Nahuatl and in the Spanish dialect spoken by bilingual Nahuatl speakers. However, their patterns are very similar to those of Spanish speakers from the same region. The native Nahuatl speakers who took part in this study are university students and have been bilingual since childhood. Thus, apparently, they do not seem to incorporate prosodic characteristics from Nahuatl into Spanish, rather they clearly differentiate both systems. The obvious differences regarding Central Mexican Spanish are easily explainable as sociolectal or geolectal differences because the Nahuatl speakers are in contact with speakers of a rural Spanish dialect of the Veracruz Huasteca Region. Nevertheless, they also seem to be affected by pragmatic and attitudinal factors due to the nature and conditions of the applied Communicative Situations Questionnaire.

**Index Terms:** Nahuatl, Spanish, intonation, comparative analysis, bilingualism, communicative situations questionnaire

## 1. Introduction

Nowadays, there are at least ten dialects of Nahuatl, an indigenous Uto-Aztecan language spoken in vast regions of Mexico (see Figure 1) and Central America, even though the number of monolingual speakers is rapidly decreasing due to the continuous contact with Spanish [1, 2].

The level of mutual intelligibility between speakers of different dialects varies across regions. For example, even speakers of close dialects like Western and Eastern Huasteca Nahuatl (spoken in the States of Veracruz, Puebla and Hidalgo) have a mutual intelligibility of 85% [3]. Veracruz Huasteca Nahuatl is a variant of the latter dialect. The municipality of Chicontepec has the second largest population of Nahuatl speakers in Mexico (39,908 in 2000 [4]), whereas Ixhuatlán de Madero occupies the eighth position (22,236 speakers in 2000 [4]). The Community of Mesa de Tzonámatl (marked with '3' in Fig. 1) belongs to Chicontepec, and El Guayabo (marked with '2' in Fig. 1) belongs to the municipality of Ixhuatlán de Madero (whose main town is marked with '3' in Fig. 1), where Nahuatl coexists with Spanish and other indigenous languages such as Otomi, Totonac and Tepehua, and is mainly restricted to family, community and some academic contexts. Despite this large

number of speakers, there are still few linguistic studies that have been done, especially those devoted to its phonological structure.

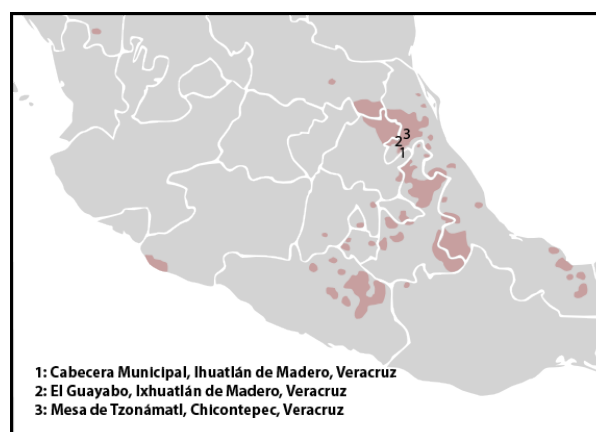


Figure 1: Nahuatl-speaking regions in Mexico.

This study consists of preliminary results obtained from Nahuatl and Spanish interrogative utterances produced by bilingual speakers from the Veracruz Huasteca Region, and Spanish sentences produced by monolingual speakers from the same region, for comparison purposes. That will lead to a deeper analysis of Nahuatl intonation of the different sentence types but also across dialects and regions, taking into account its own phonological characteristics, but without forgetting that Nahuatl and Spanish have been in close contact for five centuries and they have influenced each other at all levels.

## 2. Previous studies

Spanish philologists have long debated [5, among others] whether or not Nahuatl has exerted an important influence on Mexican Spanish, at least where Nahuatl was originally spoken. This phenomenon would presumably have reached far beyond the lexical level, reaching also the phonological level, and even the intonation system. Lope Blanch [6, 7] was always opposed to those theses, but he recognized that it was still necessary to study Mexican Spanish intonation and modern Nahuatl intonation in detail.

### 2.1. Phonological inventories of Nahuatl and Spanish

Bilingual speakers and native speakers of Nahuatl who learned Spanish during childhood are constantly in contact with both phonological systems. Even if this paper is devoted to the study of intonation, it is well known that not only Mexican Spanish borrowed hundreds of words from Nahuatl, but also

the various Nahuatl dialects have gradually been borrowing and adapting Spanish words, discourse and pragmatic markers, which are also used by bilingual and monolingual speakers.

In order to understand the phonological adaptations in both languages, in Table 1 we present both the Veracruz Huasteca Nahuatl and the Mexican Spanish phonological inventories, where the black symbols on the left of each column represent Nahuatl phonemes and the grey ones represent the Spanish ones. Symbols between parentheses correspond to allophones implying place assimilation [ɱ, ɲ]; aspiration or voicelessness in syllable coda position [p<sup>h</sup>, t<sup>h</sup>, k<sup>h</sup>, t̪<sup>h</sup>, or ɬ, ɱ, ɲ, j, w], in onset position [x<sup>w</sup>, ɱ, ɲ, j, w], or before a phonological /h/ or their voiced counterparts, as well as spirantization or approximation of voiced stops between vowels [β, ð, γ, or β, ð, γ] or in syllable onset position [j]. Moreover, Nahuatl has four vowels [i, e, a, o], which may be short or long. Sound [ʔ] only appears after vowels in utterance-final position [8].

Table 1. *Phonemes and allophones of Veracruz Huasteca Náhuatl (black) and Mexican Spanish (grey).*

	CONSONANTS									
	labial	lab.-dent.	dental	alveolar	(alv.-)palat.	velar	velar-labial	glottal		
Stops	p p	b	t t	d		k k	g g	k <sup>w</sup>	(ʔ)	
Aspirated stops	(p <sup>h</sup> )		(t <sup>h</sup> )			(k <sup>h</sup> )				
Affricates			t͡s	t͡ʃ	t͡ʃ t͡ʃ					
Asp. affricates			(t͡s <sup>h</sup> )		(t͡ʃ <sup>h</sup> )					
Fricatives	(β)	f	s s	(ð) (θ)	ʃ	(j)	x	(γ) (x <sup>w</sup> )	(h)	
Nasals	(ɱ) m m	(ɱ)	(ɲ) n n			j	(ɲ)(ŋ)			
Trills				r						
Taps/Flaps				ɾ						
Lateral				l l						
Approximants					(j)	j j	(w)	w w		
	VOWELS									
High					i: i i	u				
Mid					e: e e	o o		o:		
Low					a a	a:				

## 2.2. Intonation

Beyond the segmental level, we could be tempted to state that the intonation systems of both languages have influenced each other. In a previous study [9], we presented a proposal of a combinatorial intonation model made up of isolated tones (see Figure 2), called NawaToBI, which also takes into account the trochaic binary rhythm of Nahuatl, and its automatic generation of secondary stress inside rhythmic structures according to phrasal (clause) structures. The main goal behind that project is to develop an autosegmental-metrical model following pioneer works on intonation [10, 11, 12, 13, and 14], which could be used for all or most of the Nahuatl dialects spoken nowadays and even for Spanish [cfr. 15, 16], just for comparative reasons. So far, in Veracruz Huasteca Nahuatl and Spanish we have identified slightly different intonation contours for each of the main pragmatically neutral sentence types, where neutrality is mainly expressed by means of simpler, less salient tones like \* (non-perceivable tonal movement on stressed syllable of less than 1.5 semitones), L\* (isolated fall between -1.5 and -3.00 st), or H\* (isolated rise between +1.5 and +3.00 st) [17]. L+H\* is a rise, preceeded by a valley, which reaches its maximum during the stressed syllable, whereas L\*+H reaches its maximum after the limits of the stressed syllable. H+L\* is a fall preceeded by a rise which reaches its minimum during the stressed syllable. Falls or rises exceeding the ±3.0 semitones are signalled by means of ‘!’ for downstepped or ‘j’ for upstepped contours. Initial, intermediary and final boundary tones can just be high or low.

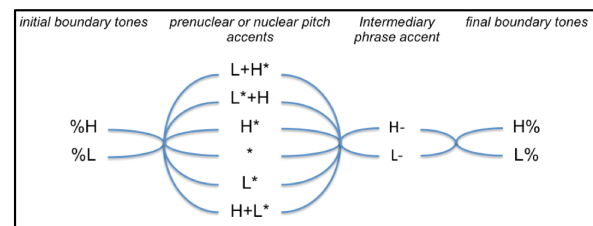


Figure 2: *Combinatory model of Nahuatl intonation.*

## 2.3. Communicative situations questionnaire

A questionnaire of communicative situations assures an acceptable level of spontaneity [18]. The researcher provides all informants with the same previous information and communicative intentions by reading aloud 75 common situations to the native speaker, corresponding to different types of sentences: declarative, interrogative (absolute, partial, and reiterated), imperative or vocative sentences, asking him or her to ‘act’ or interact in a ‘close-to-natural’ way according to the given situation. The basic questionnaire was initially adapted from the long questionnaire proposed for the *Atlas Interactivo de la Entonación del Español*, ATLES [19], translated into Morelos Nahuatl, but also culturally and thematically adapted in order to create topics and characters, which would appear familiar to the native speakers. The Morelos version was unintelligible in Veracruz Huasteca Nahuatl, so our Spanish version was used and adapted in accordance to exigencies of the situation.

Through this questionnaire, we were able to elicit these types of sentences, which are further subdivided according to the intended semantical and pragmatical meanings: A. Declaratives (neutral vs. non-neutral), B. Absolute interrogatives (neutral vs. non-neutral), C. Partial interrogatives (neutral vs. non-neutral), D. Reiterated interrogatives (neutral vs. non-neutral), E. Imperatives (commands vs. pleas), and F. Vocatives. In this paper we will only present the results for the interrogatives, i.e. B, C and D.

## 3. Methodology

For the present study, we selected two female native speakers of Veracruz Huasteca Nahuatl, one of them from Mesa de Tzonámatl, Chicontepec, and the other one from El Guayabo, Ixhuatlán de Madero (see Figure 1), who are bilingual university students at the Universidad Veracruzana Intercultural (UVI) in Ixhuatlán de Madero. We also selected two native speakers of Spanish who were born and raised in Ixhuatlán de Madero, who had no Nahuatl-speaking parents and who were also university students about the same age.

The recording sessions were held in quiet spaces at the UVI and in downtown Ixhuatlán de Madero. The first session, recorded with an Olympus LS-11, was devoted to Nahuatl and, in order to avoid a prompting effect, the second session was held some months later and was devoted to record the sentences and interviews in Spanish, which were captured with a Tascam DR-100MKII.

By using the previously mentioned Communicative Situations Questionnaire, we recorded 944 sentences, 303 in Nahuatl and 641 in Spanish (both bilingual and monolingual), plus some mistakes, which were excluded from this study. The recording sessions were later cleaned, prepared and edited in Audacity, and then transcribed and analyzed in Praat [20].

0	0.62	0.12		-2.26	0.96		-1.47	2.77	0.19		
ke	ni	*ka	tʰa.	ti	toh	*ka	tʰis.	ne.	mo	*ko	neh.

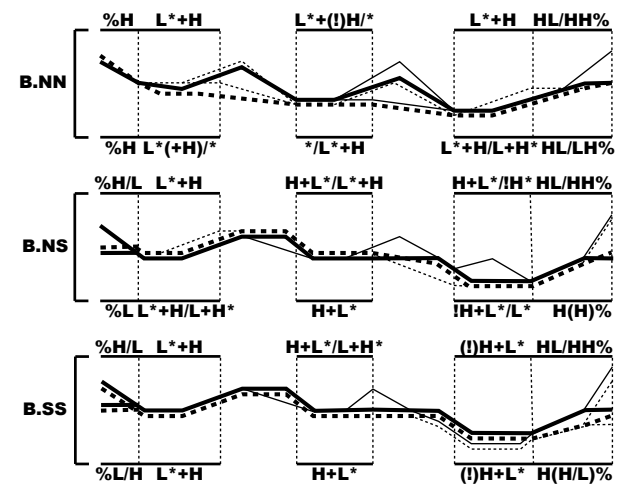
¿Kenikatsa titohkatis ne mokoneh? (¿Cómo vas a nombrar a tu hijo?/What will you name your child?)

## 4. Results

For that reason, data in the condensed images represent the various degrees of preference for individual pitch accents. Thus, the thickest lines show the sequence of the most preferred initial boundary tone, first prenuclear pitch accent, last prenuclear pitch accent, nuclear pitch accent, intermediary phrase accent and final boundary tone. Since it was impossible to ignore the second (or third) best choices (at least 25% of the observations), we depict these options by using one or two alternative contours. Solid lines always represent the tone sequence of neutral sentences written above the curves, while the dashed lines depict the tone sequence of non-neutral sentences written below the curves. Parentheses or slashes in the sequence of tone indicate the multiple alternatives.

The different datasets will be referred to by naming the sentence type and the speaker type, for example, B.NS means ‘absolute interrogatives spoken in Spanish by a native Nahuatl speaker’, whereas a C.NN corresponds to a ‘partial or pronominal interrogative spoken in Nahuatl’, just like the neutral sentence depicted in Figure 3, which should be compared with the solid lines of the C.NN stripe shown in Figure 5.

The B.NN dataset (see Fig. 4) has a clear difference between the preferred neutral and non-neutral contours in initial and final prenuclear pitch accents, where neutral absolute interrogatives in Nahuatl are produced with L\*+H tones and non-neutral ones with L\* and \*, respectively. Initial, nuclear and final tones are the same (%H ... L+H HL%), but not compared to B.NS and B.SS, because they show almost no difference between the internal pitch accents in neutral and non-neutral sentences and between both groups: L\*+H H+L\* H+L\* (late rising, descending, descending), while the boundary tones are more variable. B.NN contrasts with them.



## 4.2. Partial interrogatives

1150

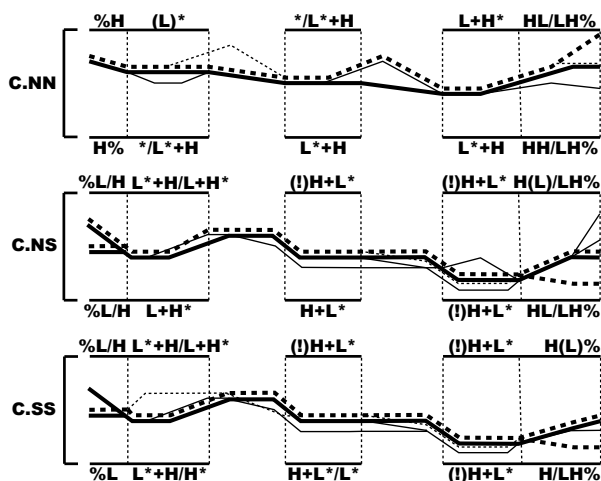


Figure 5: *Neutral vs. non-neutral partial interrogatives.*

### 4.3. Reiterated interrogatives

Finally, the contours of the preferred tones in neutral and non-neutral reiterated interrogatives (see Figure 6) show the same kind of pattern seen in absolute interrogatives, where non-neutral structures have a flatter shape in the prenuclear region ( $L^* *$ ) than their neutral counterparts ( $L+H$   $L^*+H$ ), while the rest is the same. Partial interrogatives (see Fig. 5) seem to behave in a different way, because the neutral sentences are flatter than the non-neutral ones. Datasets D.NS and D.SS have almost identical shapes among groups and between neutral and non-neutral sentences: %L  $L+H^*$   $H+L^*$   $H+L^*$  HL%. The main differences lie on the second or third best choices and showing the difference between neutrality and non-neutrality by means of deeper slopes on descending tones.

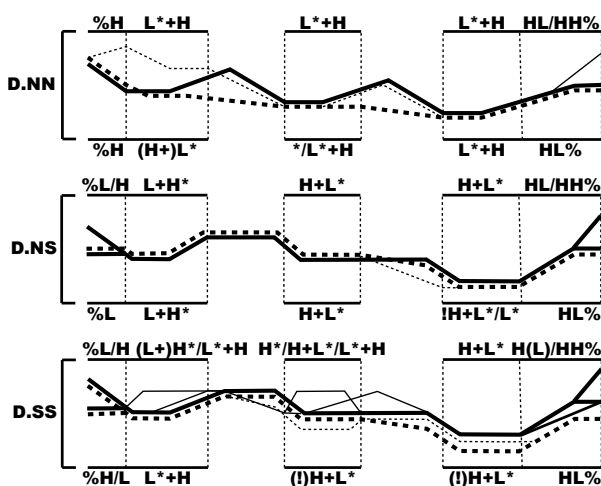


Figure 6: *Neutral vs. non-neutral reiterated interrogatives.*

## 5. Conclusions

In general terms, taking not just the isolated sets of pitch accents, but the intonation contours into account, we can conclude that, surprisingly, there is no interrogative intonation contour, which is exactly the same for Veracruz Huasteca Nahuatl and Mexican Spanish spoken by speakers from the same region. The most interesting fact is that, when speaking

Spanish, Nahuatl native speakers use the same intonation patterns (at least the initial, prenuclear and nuclear pitch accents) as their native Spanish speaker counterparts without incorporating characteristics from their mother tongue.

The obvious differences with regard to, say, Central Mexican Spanish are mostly due to sociolinguistic, dialectal or stylistic differences, which still have not affected the prosodic structure of Nahuatl.

In Veracruz Huasteca Nahuatl interrogatives there is a higher preference for prenuclear  $L^*+H$  (post-tonic ascending or late rising) accents, whereas Spanish speakers prefer (!)H+L\* (pre-tonic falling or steep falling) pitch accents. The same is also true for the nuclear tones. Initial or final boundary tones, as well as the first prenuclear tone, do not show significant differences and seem to conform to general airstream mechanisms which are common to most languages.

## 6. Discussion and Future Work

First of all, this space was not large enough to show the whole comparative analysis of declaratives, interrogatives and vocatives. This will be presented on future works. Here we wanted to present the groups showing the larger differences between both languages. As a brief preview, declaratives and vocatives are very similar among the three datasets.

These studies, where researchers try to work with close-to-natural utterances are unfortunately not fully natural. Even non-speakers of Nahuatl or Spanish would quickly notice that some of the utterances were ‘over-acted’ or ‘under-acted’, because they follow characteristic patterns, which could be used in other languages. Some other productions, especially the first of two repetitions were undoubtedly pronounced with an enumerative list intonation pattern. This affected slightly the obtained results. In future analyses, it will be necessary to work with the data obtained from map tasks, storytelling, read-aloud texts, interviews and conversations, which could convey more evidence for and against the naturalness and authenticity of the data analyzed so far for this and other dialects.

A further topic has been the high degree of bilingualism of both Nahuatl speakers. We should try to replicate the study with older people having a lower proficiency level in Spanish. We predict that the differences would not be so clear, because they would be basing their production more on their Nahuatl prosodic structures. The results might not present anything new at all, but at least it would be scientifically attested through a controlled study.

## 7. Acknowledgements

The author would like to thank Cecilia de la Cruz Hernández and Rosa Imelda Lagos Santiago, as well as their families, because of their participation in this project as representatives of their language and culture, as attendants to the course on Language Documentation at the UVI, and as transcribers.

Of course, this project would impossibly have been materialized without the financial help of Fondo para el Fortalecimiento de la Investigación 2012, granted by the Universidad Autónoma de Querétaro.

On a personal level, a special acknowledgement goes to the members of the Seminario de Prosodia organized at El Colegio de México by Pedro Martín Butragueño and other colleagues and research assistants who collaborated with us, listened to previous versions of this study, and enriched it with their comments. However, all mistakes remain my own.

## 8. References

- [1] U. Canger, “Nahuatl”, in K. Brown and S. Ogilvie [Eds], *Concise Encyclopedia of Languages of the World*, Elsevier, 745, 2006.
- [2] INALI (Instituto Nacional de Lenguas Indígenas). *Catálogo de las Lenguas Indígenas Nacionales. Variantes Lingüísticas de México con sus autodenominaciones y referencias geoestadísticas*. Mexico City: INALI, 2009.
- [3] M. P. Lewis, G. F. Simons, and Ch. D. Fenning [Eds], *Ethnologue: Languages of the World, Eighteenth edition*. Dallas: SIL International, 2015.
- [4] INEGI (Instituto Nacional de Estadística, Geografía e Informática). *Perfil Sociodemográfico de la población hablante de náhuatl*. Mexico City: INEGI, 2005.
- [5] Á. Rosenblat, “Contactos interlingüísticos en el mundo hispánico: el español y las lenguas indígenas de América”, in Polussen, Norbert and Sánchez Romeralo, Jaime (coords.): *Actas del II Congreso Internacional de Hispanistas*. Nijmegen: Instituto Español, 1967, pp. 109-154.
- [6] J. M. Lope Blanch, *El español de América (Aula Magna, 10)*. Madrid: Alcalá, 1968.
- [7] J. M. Lope Blanch, La originalidad del español americano y las lenguas amerindias. In *Actas del II Congreso Internacional de Historia de la Lengua Española. Tomo I*. Madrid: Pabellón de España, 1992, 73-110.
- [8] R. Beller, and P. Beller, “Huasteca Nahuatl” in Langacker R. W., *Studies in Uto-Aztecan Grammar. Modern Aztec Grammatical Sketches, vol. 2*. Dallas: Summer Institute of Linguistics/University of Texas at Arlington, 1979, pp. 199-306.
- [9] E. P. Velázquez Patiño, “Intonation Patterns of Morelos Nahuatl”, in Campbell, Nick; Gibbon, Dafydd y Hirst, Daniel [eds.]. *Proceedings of the 7th international conference on Speech Prosody*. Science Foundation Ireland: Dublin, 2014, pp. 487-491.
- [10] J. Pierrehumbert, “The phonetics and phonology of English intonation”, PhD dissertation, MIT, 1980 [IULC edition, 1987].
- [11] J. Pierrehumbert, and M. Beckman, *Japanese Tone Structure*, MIT, 1988.
- [12] M. E. Beckman, and E. G. Ayers, “Guidelines for ToBI Labelling. Version 3 (1997)”. Online: [http://ling.ohio-state.edu/~tobi/Guidelines for ToBI Labelling.htm](http://ling.ohio-state.edu/~tobi/Guidelines%20for%20ToBI%20Labelling.htm), accessed on 29 Nov 2015.
- [13] M. E. Beckman, M. Díaz-Campos, J. Tevis McGory, and T. A. Morgan, “Intonation across Spanish, in the Tones and Break Indices framework”, in *Probus*, 14: 9-36, 2002.
- [14] M. E. Beckman, J. Hirschberg, and S. Shattuck-Hufnagel, “The original ToBI system and the evolution of the ToBI framework”. In Jun, S.-A. (ed.) *Prosodic Typology -- The Phonology of Intonation and Phrasing*. Oxford: OUP, 2005.
- [15] C. De la Mota, P. Martín Butragueño, and P. Prieto, “Mexican Spanish Intonation”, in P. Prieto and P. Roseano [Eds], *Transcription of Intonation of the Spanish Language*, Munich: Lincom Europa, 319-350, 2010.
- [16] C. De la Mota, P. Martín Butragueño, and P. Prieto, *Mexican Spanish Intonation*. In Prieto, Prieto y Roseano, Paolo (eds.). *Transcription of Intonation of the Spanish Language*. Munich: Lincom Europa, 2010, 17-48.
- [17] A. Pamies, A. M. Fernández Planas, E. Martínez Celdrán, A. Ortega Escandell, and M. C. Amorós, “Umbrals tonals en espanyol peninsular”, in Díaz García, J. (ed.) *II Congreso Nacional de Fonética Experimental*. Sevilla: Universidad, 2002, pp. 272-278.
- [18] M. A. Y. Pradilla, and P. Prieto, “Entonación dialectal catalana: la interrogación absoluta neutra en catalán central y en tortosino”, in: *Actas del II Congreso de Fonética Experimental (2001)*. Sevilla: Universidad de Sevilla, 2002, pp. 291-295.
- [19] P. Prieto, and P. Roseano, [Coords], “Atlas interactivo de la entonación del español, 2009-2010”. Online: <http://prosodia.upf.edu/atlasentonacion/>, accessed on 29 Nov 2015.
- [20] P. Boersma, and D. Weenink, 2012. “Praat: doing phonetics by computer (Computer program, Version 5.3.85)”. Online: <http://www.praat.org/>, accessed on 29 Nov 2015.