

# Determining the functions of second-person pronoun forms *cê/ocê/você* in Brazilian Portuguese through acoustic analysis

Lúcia de Almeida Ferrari, Bárbara Helohá Falcão Teixeira  
Universidade Federal de Minas Gerais

This paper presents a research on Brazilian Portuguese second-person pronoun forms *cê/ocê/você*. Our aim is to propose a new methodology for studying the functional properties of these forms based on the acoustic analysis of spontaneous speech data from the C-ORAL-BRASIL corpus (Raso & Mello 2012). We propose that the possible cliticization and the functional properties of these forms must be assessed through prosodic and distributional, rather than syntactic, criteria.

**Keywords:** second-person pronoun, Brazilian Portuguese, acoustic analysis, clitics, spontaneous speech.

## 1. Introduction

Brazilian Portuguese (BP) second-person singular pronoun is realized in three forms: the so-called standard one, *você*, and the reduced forms *ocê* and *cê*.

These three forms and their functions have been largely discussed in the literature, but only now, with the publication of the C-ORAL-BRASIL spontaneous speech corpus (Raso & Mello 2012), is it possible to verify their actual usage.

Previous studies maintain that the reduced forms must be considered as products of grammaticalization and, particularly regarding the form *cê*, that it must be considered as a cliticization of *você* (Vital 1996; Ramos 1997; Vital & Ramos 2006, 2008). In those studies, the atonicity of *cê* is determined through morphosyntactic criteria and it is assumed that *cê* is always realized as subject.

There are few corpus-based studies, none of them analyzing spontaneous speech data.

This paper proposes a new approach to the study of those forms that utilizes spontaneous speech data retrieved from the C-ORAL-BRASIL corpus. Our goal is (a) to determine the tonicity or atonicity of the forms *cê/ocê/você* based on prosodic criteria and (b) to establish the use, and hence the functions, of the three forms, with particular attention to the form *cê*.

We argue that tonicity must be examined in relation to prosody. Several studies indicate that the main correlate of lexical and phrasal stress in BP is duration (Massini 1991; Barbosa 2000, 2002; Fontes 2013). We therefore assume that there is a strong correlation between duration and tonicity. Thus, we consider that longer phonetic syllables [ˈse] in the forms *cê/ocê/você*, as compared to the mean durations of the phonetic syllables of their tone units, correspond to stressed syllables, while shorter phonetic syllables [se] in the same forms, as compared to the mean durations of the phonetic syllables of their tone units, equate to unstressed syllables. Our proposal is that the preverbal position, associated with subject function, is related to unstressed forms, while post-verbal positions, associated with object function, is related to stressed forms.

## 2. Literature review

The singular and plural forms of BP second-person pronouns have been extensively analyzed, as evidenced, e.g., by the aforementioned literature. Although different methodologies have been used, none of those studies had the opportunity to examine spoken data as it was done for the present study. Before presenting our own proposal, we will briefly review the state of art concerning previous studies on second-person pronouns in BP.

A series of syntactic studies argue that *cê* is a clitic, or at least a form at a certain stage of clitic/expletive formation (Vital 1996; Ramos 1997; Vital & Ramos 2006, 2008). These studies are mostly based on examples of unspecified source or transcribed interviews. The idea that they advance is that there would have been a process of grammaticalization that departed from the archaic honorific form *Vossa Mercê*, passed through *você* and *ocê*, and finally reached the form *cê*, which is therefore considered as a clitic or an expletive form. Some authors claim that *cê* cannot occupy the same positions as the forms *ocê* and *você*, nor can *cê* perform the same functions as the other two forms. That is to say, *cê* cannot be found (a) in post-verbal position, (b) after a preposition as an

indirect object, (c) in topicalization, or (d) in a focalized position. As we will soon show, our spoken data do not confirm most of those claims.

Following the tripartition proposed by Cardinaletti and Starke (1999), Petersen (2008) analyzes part of the data presented in previous studies from a different standpoint, concluding that *cê* corresponds to a weak form.

It is clear, therefore, that there is a deep concern within the field of syntax studies about the definition of the form *cê*.

Other researchers, however, prefer to observe the data rather than to define the forms.

A set of acoustic experiments on the reduced pronoun forms (Ciriaco, Vitral & Reis 2004) tested contextual phonetic variables in order to obtain data on the intensity and duration of such forms. According to the authors, results were neither normalized nor subjected to statistical analysis, for they were considered preliminary. Nevertheless, they confirm the cliticization process.

The phonological, morphological and syntactic tests proposed by Zwicky (1985) have been used in order to establish whether *cê* is a clitic or a full word (Barbosa 2005). The accentual groups observed in introspective data and transcribed interviews indicate that *cê* carries primary accent and is therefore a full word. Other tests, as morphological, syntactic and prosodic ones, indicate that *cê* does not show the behavior of a clitic; therefore, it should be considered as a tonic syllable.

From within a sociolinguistic perspective, Peres (2006), based on corpus data, analyzes the usage of *cê/ocê/você* both synchronically and diachronically. The corpora that the author used for comparisons consisted of transcribed interviews and were processed with the *Goldvarb 2001*<sup>1</sup> program (Robinson, Lawrence & Tagliamonte 2001) in order to determine relevant linguistic and extra-linguistic elements. The author finds that the form *cê* (1) shows an increase in usage over time and (2) occurs in contexts in which it cannot be considered as a clitic form, such as in post-verbal position and following prepositions.

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<sup>1</sup> According to Guy & Zilles (2007: 105), GoldVarb 2001 is a version for Windows of the VarbBrul (Variable Rules Analysis) package. It is a "set of multivariate analysis computer program specifically built for sociolinguistic variation data". The program was developed by Steve Harlow based on the previous Macintosh version GoldVarb 2.0 by Rand & Sankoff (1990). GoldVarb 2001 was developed at York University in a collaborative project between the Language and Linguistics and the Computer Science Departments (see Robinson, Lawrence & Tagliamonte 2001).

### 3. Methodology

In order to study the actual usage of the pronoun at issue, we extracted data from a corpus of Brazilian Portuguese spontaneous speech, the C-ORAL-BRASIL (Raso & Mello 2012). This corpus was chosen for three reasons:

- it is made up of 139 interactions recorded in natural context, showing great diaphasic variation (monologues, dialogues and conversations in a wide variety of situations, for a total of 208.130 words), which ensures, as much as possible, a faithful representation of the universe that the corpus intends to represent (Cresti & Moneglia 2005: 11);
- the transcriptions of the recordings are segmented into tone units and utterances, following the theoretical framework of the Language into Act Theory (henceforth, L-AcT; Cresti 1995, 2000), which comprises the empirical, inductive theory at the base of the C-ORAL-ROM comparable spoken corpora project (Cresti & Moneglia 2005);
- its high acoustic quality and the text-to-speech alignment through WinPitch (Martin 2004), a computer program for acoustic analysis and measurements that are crucial for our study.

The first step was to retrieve all tokens of the forms *cê/ocê/você* from the corpus. Transcriptions were used in order to locate the forms, but a verification of each occurrence by listening to the audio files and observing the spectrum through the *Praat* software<sup>2</sup> was made as well. This phase was important for screening the utterances that were good candidates for acoustic analysis, since we had to avoid audio portions with overlapping speech and/or too much background noise, factors that could interfere with a correct measurement of the durations.

The selected utterances containing the forms *cê/ocê/você* were acoustically analyzed in *Praat*. The utterances were segmented into phonetic syllables in order to allow for their durations to be properly obtained. The durations of the syllables of the form at issue was then compared to the durations of the other phonetic syllables in the same utterance and in the same tone unit.

According to L-AcT, the reference unit for spoken language is the utterance, defined as the smallest stretch of speech showing prosodic and pragmatic autonomy, i.e. performing a speech act. Utterance boundaries are signaled by terminal

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<sup>2</sup> Praat: doing phonetics by computer, version 5.3.51. <http://www.praat.org/> (accessed June 2, 2013).

prosodic breaks, while boundaries within utterances are signaled by non-terminal prosodic breaks. In principle, each tone unit corresponds to an information unit. Thus, information units are defined in terms of prosodic, pragmatic and distributional properties. According to L-AcT, the main domain of syntax is the information unit. In fact, different information functions – realized by different tone units – can be found in the same utterance, which can interfere with the prosodic analysis (Cresti 2000, 2014; Raso 2012b; Moneglia & Raso 2014).

To avoid the effects of intrinsic segmental durations, all durations were normalized in *Praat* using the *SGDetector* script (Barbosa 2006). In order to do so, the syllabic segmentation was done in broad transcription in ASCII, which is compatible with the *SGDetector*.

The normalized durations of the syllable [se] in the forms *cê/ocê/você* were then compared to the normalized durations of the other phonetic syllables within the same tone unit.

To verify the reliability of the research, results were subjected to statistical analysis with the Wilcoxon-Mann-Whitney test, in order to validate the difference among the syllable [se] of *cê/ocê/você* in preverbal and post-verbal positions and to verify whether they were statistically different or not.

### 3.1 Results

In the first search conducted on the corpus, a total of 2,026 tokens of *cê*, 262 tokens of *ocê* and 300 of *você* were collected. Then, they were organized in a spreadsheet in accordance to their occurrence as either preverbal or post-verbal elements, which is an indicator of their probable functions.

As previously mentioned, L-AcT assumes that pragmatic autonomy is signaled by prosody, so that even elements lacking a full syntactic/semantic structure can be autonomously realized as speech acts. This is an important point, given that syntactic criteria fail to serve as a reliable strategy for an adequate identification of reference units for speech. The pragmatic/prosodic criteria adopted within L-AcT for the identification of reference units, on the other hand, based on the perceptual detection of terminal and non-terminal prosodic breaks, has proven to be much more reliable, as a number of studies have pointed out. In order to justify our methodological choices, we will discuss in more detail some aspects of the L-AcT framework.

Speech flow is segmented into tone units. The tone unit that carries the illocution is, at the informational level, called Comment (COM), the only information unit that is necessary and sufficient for the performance of an utterance, since it is the COM that supplies the utterance with pragmatic autonomy. A sim-

ple utterance is constituted by the COM alone, while a compound one is constituted by the COM and one or more other information units. These other units also carry informational functions, and they are divided into textual and dialogic units. *Textual* units either build the text of the utterance, providing its semantic content, or refer to the text of the utterance, aiding in its interpretation<sup>3</sup>. *Dialogic* units, on the other hand, regulate the interaction<sup>4</sup>. Each unit of the information pattern is characterized by specific prosodic features.

The evaluation of informational functions compels us to treat differently the cases in which the pronoun itself (*cê/ocê/você*) forms part of a topic or scanned unit, or is pragmatically motivated, thus presenting specific prosodic features that do not allow us to compare its duration with something (the tone unit) to which the pronoun does not belong (since it makes up the entire locutive content of the tone unit).

Regarding the occurrences of the form *cê*, 1.974 of them are preverbal and 38 post-verbal. Of the post-verbal group, 36 are preceded by a preposition and 1 makes up the entire locutive content of the hosting utterance, thus carrying illocutionary value. Considering now the total number of occurrences of *cê*, we found 13 of them making up the entire locutive content of the hosting tone unit, of which 9 are preverbal forms in topic units – with or without a scanning unit (i.e. the subject is separately realized in a tone unit that has no informational value and is marked by a non-terminal prosodic break) –, and 4 are post-verbal and preceded by a preposition.

Regarding *ocê*, 177 the occurrences are preverbal and 75 post-verbal, 51 of which are prepositional. We also found 8 cases of *ocê* isolated within a tone unit, 2 of which preceded by a preposition.

Regarding *você*, 225 of the occurrences are preverbal and 62 post-verbal, 46 of which being preceded by a preposition. We found 6 cases in which *você* is isolated within an utterance – i.e. carrying illocutionary value – and 6 cases in which it is isolated within a non-illocutionary tone unit, 1 of which preceded by a preposition.

Table 1 provides a summary of the results presented above.

<sup>3</sup> According to L-AcT, the textual units are: the Comment (COM), which carries the illocutionary force; the Topic (TOP), which supplies the domain of application for the illocutionary force; the Appendixes of COM (APC) and of TOP (APT), the Parenthetic (PAR), and the Locutive Introducer (INT). For more detail about textual information units, see Cresti (1995, 2000), Raso (2012a), and Moneglia & Raso (2014).

<sup>4</sup> According to L-AcT, the dialogic units are: the Incipit (INP), the Phatic (PHA), the Expressive (EXP), the Allocutive (ALL), the Conative (CNT), and the Discourse Connector (DCT). For more detail, see Cresti (1995, 2000) and Raso (2012b, 2014).

**Table1.** Occurrences of *cê/ocê/você* in the C-ORAL-BRASIL corpus according to position

Position	<i>cê</i>	<i>ocê</i>	<i>você</i>
Preverbal	1974	177	225
	38 total	75 total	62 total
Post-verbal	36 prepositional	51 prepositional	46 prepositional
	2 without preposition	24 without preposition	16 without preposition
Isolated in utterance	1 (post-verbal)	0	6
Isolated in a tone unit	13 (4 post-verbal, 9 pre-verbal)	8	6
TOTAL	2012	260	299

The examples below, extracted from the C-ORAL-BRASIL corpus<sup>5</sup>, show the positions observed for the different forms:



- (1) \*LUZ: [95] se **ocê** passar em segundo lugar / **cê** tá muito bem / ué //  
(bfamdl03, 95)  
‘if **you** get second place / **you're** very well / huh //



- (2) \*CEL: [240] chamou **cê** não / sô // (bfamcv05, 240)  
‘(he) didn't call **you** / dude //



- (3) \*HER: [191] agora é **com você** // (bfamcv18, 191)  
‘now it's with **you** //



- (4) \*MUR: [7] **ocê** / Renata / e a Ana Luiza // (bpubdl04, 7)  
‘**you** / Renata / and Ana Luiza //



- (5) \*JAD: [283] jovem // [284] **você** // (bpubdl07, 284)  
‘guy // [284] **you** //

<sup>5</sup> The abbreviations used in the examples supply the following information: (a) the asterisk followed by a three-letter string and a colon identify the speaker; the number that follows in square brackets identify the rank of the utterance within its text. Texts are identified in parentheses as follows: *b* = Brazilian Portuguese, *fam* = familiar/private context, *pub* = public context, *mn* = monologue, *dl* = dialogue, *cv* = conversation; the subsequent number also indicates the rank of the utterance. Therefore, *bfamdl03\_95* informs that the example is Brazilian Portuguese (i.e. from the C-ORAL-BRASIL corpus), from the familiar/private context, 3<sup>rd</sup> dialogue, 95<sup>th</sup> utterance. The “/” symbol indicates non-terminal prosodic breaks, while “//” indicates terminal breaks, signaling utterance boundaries.

In (1) the forms *ocê* and *cê* are preverbal, in (2) there is a case of post-verbal *cê* without preposition. In (3) a prepositional post-verbal *você* is shown. Finally, (4) and (5) show, respectively, one example of *ocê* isolated in a tone unit and an example of *você* isolated within an utterance.

### 3.1.1 *Acoustic analysis*

We selected 133 utterances containing the forms *cê/ocê/você* from 62 different texts: 52 from familiar/private contexts (22 conversations, 17 dialogues and 12 monologues) and 9 from public contexts (3 conversations, 5 dialogues and 1 monologue). These forms are uttered by 74 different speakers, 36 men and 38 women representing all sociolinguistic groups in the corpus.

The utterances were selected based on the acoustic quality of the sound files and also the communicative situation, as it was necessary to ensure diaphasic variation within the sample.

We analyzed 16 utterances separately, as the pronouns carried specific illocutionary or pragmatic functions. In these cases, the duration of the pronouns could not be compared to the rest of the tone unit durations because, as already mentioned, they have properties of their own<sup>6</sup>.

Table 2 below shows how the other cases are distributed.

**Table 2.** Acoustically analyzed forms

Position	<i>cê</i>	<i>ocê</i>	<i>Você</i>
Preverbal	33	6	20
Post-verbal	31	14	13
TOTAL	64	20	33

The acoustic analysis of the 117 forms above was done through *Praat*. Each utterance was segmented into phonetic syllables, as Figure 1 shows.

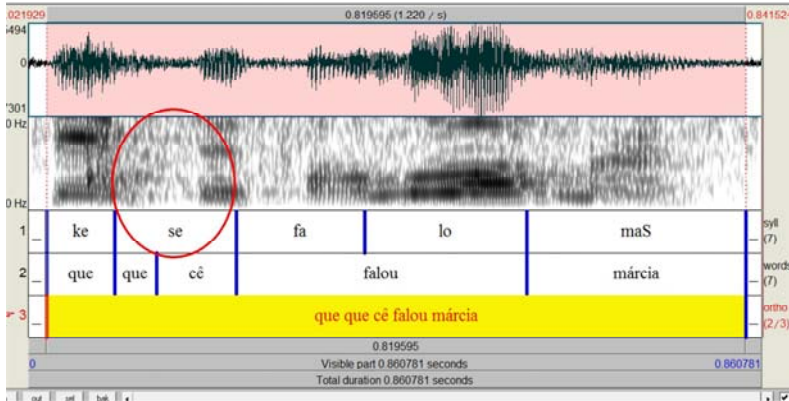
Example (6) shows the utterance in Figure 1.

- (6) \*JDL: [208] que **cê** falou / Márcia // (bfamcv18, 208)  
 ‘what did you said / Márcia //’



<sup>6</sup> For more examples and an extensive discussion of this point, see Ferrari (2015).





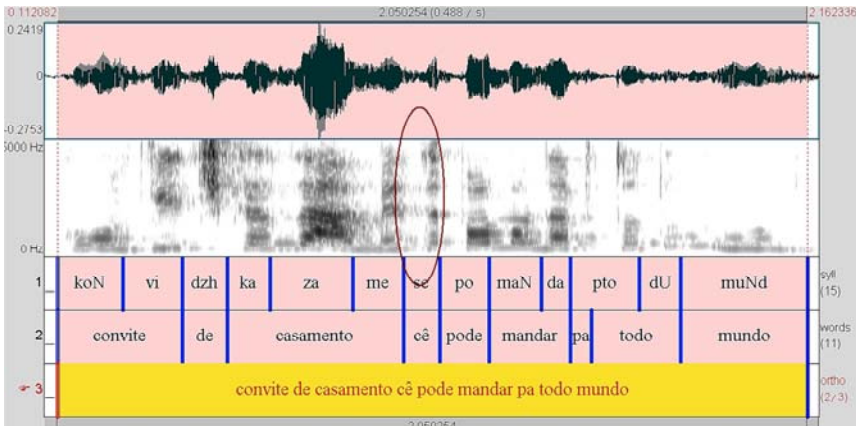
**Figure 1.** Praat screen: example of phonetic syllables segmentation (first tier in ASCII)

The durations of the phonetic syllables were extracted and subjected to normalization with the *SGDetector* script. This program is based on the notion that duration is a cardinal constant to identify stress, prominence and prosodic boundaries in languages like BP. The script was implemented in 2004 and improved in 2009 and 2010. It allows one to detect syllabic pitch durations in a semi-automatic way, and it marks prominent words by local inner-word duration pitch. The durations extracted are automatically exported to a *TableOfReal* file, which contains arithmetic means and standard deviation values of durations of BP phones<sup>7</sup>. The script generates two .txt files. The first one contains (a) syllabic transcription; (b) raw durations in milliseconds; (c) *z-score* standard deviation of the durations; (d) a five-point smoothing of the *z-score*; (e) a binary value (0 and 1) that indicates whether the position is a smoothed *z-score* local pitch or not. The second file contains (a) the raw duration of the stressed group related to the duration; (b) the number of syllabic units in the corresponding stressed group. The *z-score* is what interests us in this study, because it is the normalized value of the duration.

The analysis confirmed our hypothesis: shorter normalized durations of the phonetic syllable [se] of the forms *cê/ocê/você*, as compared to the mean durations of the phonetic syllables of their tone units, equate to unstressed syllables, while longer durations correspond to stressed syllables.

<sup>7</sup> For technical details and equations, see Barbosa (2013).

We performed acoustic analysis on 33 examples of preverbal *cê*. For 32 of them, the *z-score* outcome of [se] was lower than the mean of the tone unit *z-score*. Figure 2 exemplifies those cases.



**Figure 2.** Example of phonetic syllable segmentation of preverbal *cê*

Example (7) shows the utterance in Figure 1.

- (7) \*RUT: [335] convite de casamento / **cê** pode mandar pa todo mundo // (bfamcv02, 335)  
 ‘wedding invitation / **you** can send (it) to everybody //



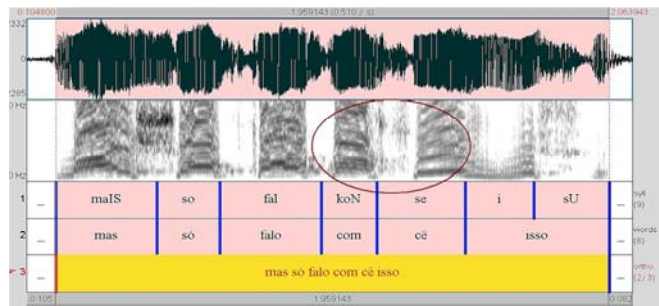
The phonetic syllable [se] presents a -3.44 *z-score* standard deviation value. The mean of the *z-scores* of the phonetic syllables of the tone unit “*cê* pode mandar pa todo mundo” is -1,28 standard deviation; that is to say, it is much larger than the phonetic syllable [se], confirming the hypothesis that preverbal position corresponds to shorter durations.

The analysis proceeded with 31 cases of post-verbal *cê*<sup>8</sup>: 28 examples exhibited a higher *z-score* outcome for the syllable [se] compared to the mean of the tone unit *z-scores*. Figure 3 and Example (8) illustrate these results.

- (8) \*JDL: [6] mas / só falo **com** **cê** isso // (bfammn29, 6)  
 ‘but /(I) just say **to you** this //



<sup>8</sup> In 29 cases *cê* was found as an indirect object, in one case in a post-verbal position in a cleft sentence *e* and in another case as a direct object.



**Figure 3.** Example of phonetic syllable segmentation of post-verbal *cê*.

This is an example of *cê* as an indirect object. The phonetic syllable [‘se] has a 3.52 *z-score* standard deviation value. The mean of *z-scores* of the phonetic syllables of the tone unit is 2.85 standard deviation. It is a value lower than that of the phonetic syllable [‘se], so we can assume that the post-verbal position corresponds to longer durations.

Then we analyzed 6 cases of *ocê* in preverbal position. In all cases, the *z-score* outcome of [se] was lower than the mean of tone unit *z-scores*. Another example will illustrate this.



**Figure 4.** Example of phonetic syllable segmentation of preverbal *ocê*

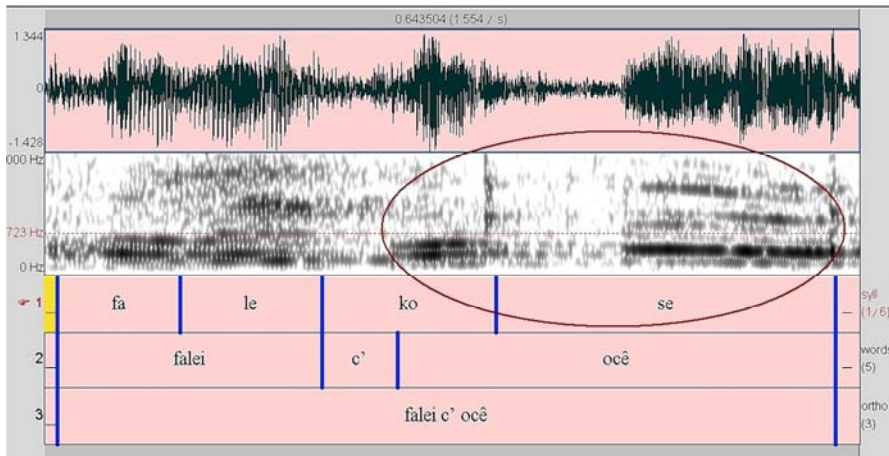
Example (9) presents the utterance shown in Figure 4.

- (9) \*DIN: [7] <pois> é / **ocê** apareceu / várias vezes lá no diálogo //  
 (bfamcv23, 7)  
 ‘<yeah> / **you** appeared / several times there in the dialogue //’



The *z-score* standard deviation of [se] is lower than that of the tone unit.

We will now discuss the cases of post-verbal *ocê*. We analyzed 14 examples, of which 11 showed a higher *z-score* than that of their tonal unit. Figure 5 and Example (10) illustrate these results.



**Figure 5.** Example of phonetic syllable segmentation of post-verbal *ocê*

- (10) \*REN: [68] falei c' **ocê** // (bfamdl30, 68)  
 ‘(I) told **you** //’



The example above shows a case of *ocê* as an object of a preposition. The phonetic syllable [se] presents a 2.01 *z-score* standard deviation value. The mean of *z-score* rates of the phonetic syllables of the tone unit is -1.02 standard deviation. It is lower than the phonetic syllable [se], so we can assume that post-verbal position corresponds to longer durations, and, hence, to tonic syllables.

We analyzed 20 preverbal tokens of *você*: 19 cases confirmed our hypothesis, with *z-score* standard deviation values of the [se] syllables shorter than the mean of their tone units. Figure 6 and Example (11) illustrate it.

- (11) \*MAR: [70] do tamanho que **você** quiser assim // (bfamdl11, 70)  
 ‘the size **you** want like this //’



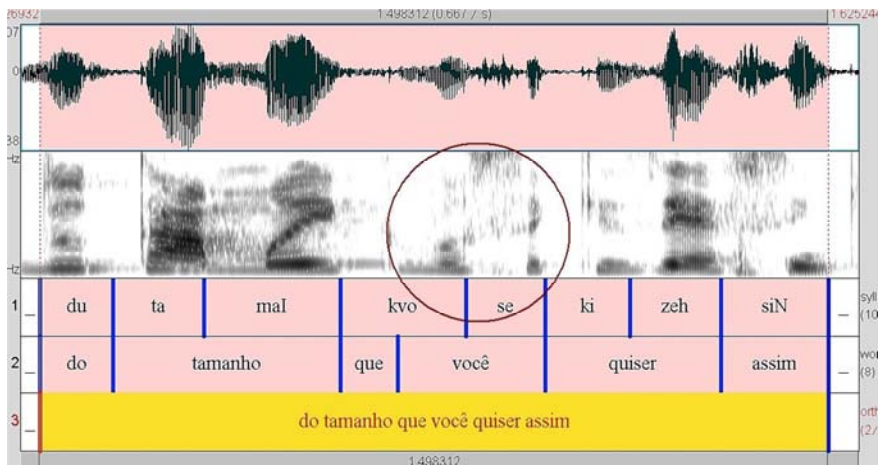


Figure 6. Example of phonetic syllable segmentation of preverbal *você*

Finally, we analyzed 13 examples of post-verbal *você*: all cases confirmed our expectations, showing *z-score* standard deviations values of [‘se] longer than their tone unit mean values. See Figure 7 Example (12) below.

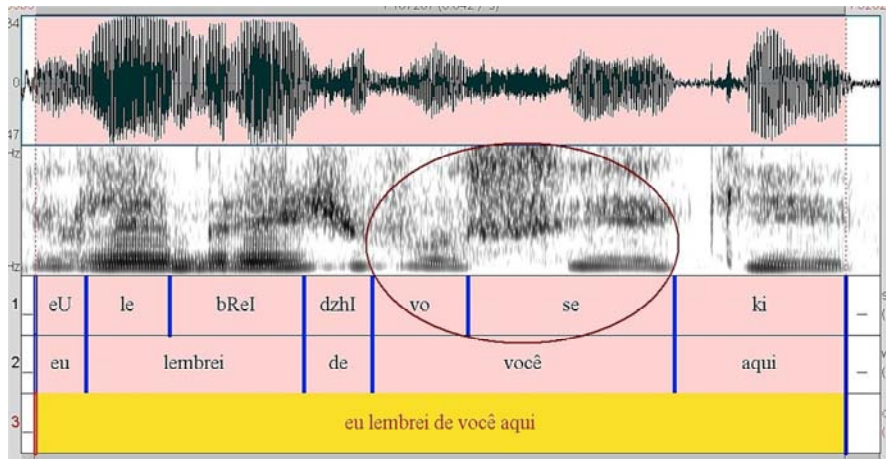


Figure 7. Example of phonetic syllable segmentation of post-verbal *você*



- (12) \*NAN: [146] eu lembrei de **você** aqui // (bfamnn07, 146)  
‘I remembered **you** here//’

### 3.1.2 Statistical analysis

All data were subjected to statistical analysis.

Shapiro-Wilk (1965) normality test was the first one to be conducted, and it showed that our data have a non-normal distribution, with a p-value of 3.995e-07 in preverbal position, and of 3.995e-07 in post-verbal position.

Then, we conducted the Wilcoxon-Mann-Whitney test for the comparison between the phonetic syllable [se], in preverbal and in post-verbal position, and the mean of the phonetic tone unit syllables. The outcome indicates a p-value of 1.36e-10. This means that there is a significant difference between preverbal and post-verbal phonetic syllables [se] in the the BP second-person pronoun forms *cê/ocê/você*, discussed in this paper.

## 4. Conclusions

We consider that this study was successful in demonstrating that an acoustic analysis is reliable for determining the tonicity or atonicity of BP second person singular pronouns *cê/ocê/você*. Based on the fact that duration is the major stress correlate, we showed that longer durations correspond to stressed syllables and shorter durations to unstressed syllables. In this case, it means that all forms can be tonic or atonic depending on their position: atonic when preverbal, and tonic when post-verbal. In contrast to what is claimed in the majority of studies, we demonstrated that all forms can realize all the following syntactic functions: subject, postposed subject, direct and indirect object. In addition, the three forms (including *cê*) are capable of carrying illocutionary value. Nonetheless, there seems to be a preference for *cê* to be realized in preverbal position as subject, and for *ocê/você* to be realized in post-verbal position with object functions.

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