Pronunciation intelligibility in Brazilian learners' English and listeners' threshold

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Abstract
This article focuses on issues related to the role played by the listeners as evaluators of L2 learners' pronunciation intelligibility. First, I discuss listeners' threshold of intelligibility and listener variables. Linguistic and non-linguistic variables are identified. Then, I report on the qualitative results of an experimental study, whose listeners' thresholds influenced their evaluations about the intelligibility of Brazilian learners' pronunciation. Finally, I conclude with implications of the present discussion for future pronunciation intelligibility studies involving Brazilians learners' English.
Keywords: pronunciation intelligibility. listeners' threshold. Brazilian learners.

Resumo
Este artigo focaliza aspectos relacionados aos ouvintes que atuam como avaliadores da inteligibilidade da pronúncia de aprendizes de uma língua estrangeira. Primeiro, o limiar de inteligibilidade de ouvintes e suas variáveis são discutidas. Variáveis linguísticas e não linguísticas são identificadas. Em seguida, resultados qualitativos de um estudo experimental, cujo limiar de inteligibilidade dos ouvintes influenciou suas avaliações da inteligibilidade da pronúncia de aprendizes brasileiros de inglês, são relatados. Finalmente, as implicações da presente discussão para estudos em inteligibilidade de pronúncia envolvendo aprendizes brasileiros de inglês são apresentadas.
Palavras-chave: inteligibilidade de pronúncia. limiar do ouvinte. aprendizes brasileiros.

1 Introduction: Listener's threshold of intelligibility

The notion of listener's intelligibility threshold was first suggested and defined in 1950 by Catford, one of the "classic scholars of intelligibility" (NELSON, 2011, p. ix). According to the author, "A hearer's threshold of intelligibility may be defined as the point on a rising scale of perfection in selection and/or execution at which a speaker's utterance in a given context becomes completely intelligible for that hearer" (CATFORD, 1950, p. 14). Native speakers and language teachers who have been exposed and have had experience in listening to foreign speech are able to understand foreigners more easily, and, thus, have a low threshold of intelligibility.

Decades later, Tench (1981) and Field (2003) mention listener's threshold in their look at intelligibility. For Tench (1981), learner's intelligibility depends on the listener's threshold. As with Catford (1950), Tench (1981) states that language teachers have a lower, or more lenient, threshold of intelligibility, since they have experience in dealing with learners' speech; conversely, those who have less exposure and experience with foreign learners have a higher threshold of intelligibility, and, thus, experience more difficulties in understanding foreign speech.

Field (2003, p. 35), assuming that the term is his, "intelligibility threshold (the term is mine)", as with Catford (1950) and Tench (1981), refers to the low intelligibility threshold of language teachers, owing to their experience with non-native accents.[1]

On the basis of the three scholars' ideas previously mentioned, listener's intelligibility threshold determines a speaker's speech intelligibility. Assuming that the scale Catford (1950) refers to in his definition of a listener's threshold of intelligibility is likely to present

[1] Celce-Murcia (1999) also refers to intelligibility threshold, however the author refers to speakers' threshold, particularly non-natives: "there is a threshold level of pronunciation for nonnative speakers of English; if they fall below this threshold level, they will have oral communication problems no matter how excellent and extensive their control of English grammar and vocabulary might be" (p. 7). As Celce-Murcia ignores the role played by the listener, the author's notion of intelligibility threshold is discarded here.

diverse points, it is possible to suggest that, out of a group of five listeners, each individual listener is likely to have a different threshold of intelligibility to a unique speaker. This means that this unique speaker may be completely intelligible to the first listener, out of the five, partially intelligible to the second listener, unintelligible to the third, and so on.

Exposure and experience in listening to foreigners, which facilitates listeners' understanding of non-native speech, as referred to by the three authors, is named a variable. This is one, out of the many, listener variables identified in the literature, which determines listener's threshold of intelligibility. A possible representation of the relationship existing among listeners' variables, their thresholds and speaker's intelligibility[2] would be:

listener variable ↔ listener threshold ↔ speaker intelligibility.

2 Listener variables

Linguistic and non-linguistic listener variables are identified in the literature. Linguistic variables acknowledged by researchers as very influential refer to familiarity. Four are distinguished: (1) with topic (GASS; VARONIS, 1984); (2) with the speaker's accent (CATFORD, 1950; GASS; VARONIS, 1984; SMITH; BISAZZA, 1982; DERWING; MUNRO, 1997; KENWORTHY, 1987; MATSUURA; CHIBA; FUJIEDA, 1999; FIELD, 2003; DETERDING, 2005; PICKERING, 2006; NELSON, 2011; NEJJARI; GERRITSEN; van de HAAGEN; KORZILIUS, 2012); (3) with a particular speaker (GASS; VARONIS, 1984); and (4) with non-native accents in general (GASS; VARONIS, 1984).

A very important non-linguistic variable, which may be revealed irrespective of the linguistic ones, is listener's attitude towards a speaker's foreign accent (ENZ, 1982; KOSTER; KOET, 1993; KIRKPATRICK; DETERDING; WONG, 2008). As Rajadurai

[2] ↔ stands for *determines*

(2007, p. 90) puts it: "Any bias or judgemental attitude on the part of the listener could act as a formidable barrier to intelligibility".

Considering that listener variables determine their intelligibility thresholds, which, consequently, may influence speaker's speech intelligibility, as previously mentioned, the control of listener variables in experimental studies on pronunciation intelligibility is extremely relevant. One possible criterion is to focus on one familiarity variable, 'familiarity with the speakers' accent', for instance, and to select listeners who have either a high or a low intelligibility threshold in relation to this variable. This methodological procedure has actually been successfully adopted by several researchers (e.g. GASS; VARONIS, 1984; SMITH; BISAZZA, 1982; DERWING; MUNRO, 1997; MATSUURA; CHIBA; FUJIEDA, 1999; DETERDING, 2005; NEJJARI; GERRITSEN; van de HAAGEN; KORZILIUS, 2012), and their quantitative results have provided a significant contribution to a better understanding of the intelligibility construct. These studies have guided me to design my own empirical intelligibility studies involving Brazilian learners' English. I, however, as an attempt to find out more about the listeners, have, when possible, added a qualitative dimension (RAJADURAI, 2007) to the data collection, which has proved to reveal insightful aspects related to listener variables and their thresholds, hidden behind numerical results.

In one of the studies, the pronunciation intelligibility of Brazilian learners' English to British listeners unfamiliar with the Brazilian way of pronouncing English (CRUZ, 2004), was investigated. The control of this familiarity variable, and also of other variables, was not a sufficient criterion to select listeners with the same intelligibility thresholds to the participating Brazilian learners. The qualitative data revealed the emergence of unexpected variables, which contributed to facilitating the Brazilian learners' pronunciation intelligibility to individual British listeners, and to revealing the existence of varying thresholds among them.

3 The study method and qualitative results

Thirty samples containing target words pronounced with the prototypical Brazilian way of pronouncing English, produced

spontaneously by ten Brazilian learners of English, enrolled in the extracurricular courses at UFSC were presented to 25 British listeners unfamiliar with the way Brazilians pronounce English words. The control of familiarity variables, particularly the listeners' familiarity with the speakers' accent, was the criterion adopted for the listeners' selection[3]. Through the answers provided in a questionnaire the listeners were asked to fill in, it was confirmed that Brazilians were not included among the speakers of English the listeners reported as having had contact with. Portuguese speakers of English were also excluded. Twenty-four listeners had had contact mainly with Asian and European speakers of English. One listener only reported having no contact at all with non-native speakers of English.

The listeners were also naïve. None of them were involved in linguistic studies and had language experience. Seven of them were students, undergraduate and graduate, on courses other than linguistics. Fifteen had professions which were not linked to linguistics. One of them was retired, one was a housewife, and one was a mother. Their familiarity with topic and with a particular speaker were also controlled, since none of them had had contact with the participants, and were not informed of the topic discussed in the interviews from which the thirty samples produced by the Brazilian learners had been extracted. Considering the control of the familiarity variables, namely listeners' familiarity with the speakers' accent, with topic and with participants, the 25 listeners had a high threshold of intelligibility to the participating Brazilian learners' speech.

The listeners' familiarity with speakers of English other than Brazilians, however, did not allow me to control the remaining familiarity variable - listeners' familiarity with non-native accents in general - owing to the twenty-four listeners contact with Asian and European speakers of English, previously mentioned. This variable is extremely difficult to control, since, owing to the increasing number of non-native speakers of English in the world, English "has become ever

[3] The opportunity to study in Birmingham, England, on a one-year Brazilian Government scholarship (CAPES) gave me the chance of finding British listeners who were not familiar with the pronunciation of Brazilian learners of English.

more a worldwide language" (NELSON, 2011, p. 1), and England, the place where the data were collected, in particular, is regarded as having a multicultural society. Due to this difficulty, the possibility of selecting listeners with a high threshold of intelligibility in relation to all familiarity variables is likely to be very low.

The 25 listeners were asked to listen to the samples once, and carry out two tasks: (1) to rate the samples on a 6-point scale: 1 = impossible to understand; and 6 = very easy to understand; and (2) to write the samples down. After the tasks, they were asked to explain orally, if possible, how they had been able to recognise the words they had written down. Their answers and comments were recorded, and constitute the qualitative data included in the study. Although the results concerning the interrater reliability coefficient revealed in the quantitative analysis was positive, the qualitative one revealed important aspects related to the listener variables and thresholds: the influence of three unexpected variables - listener's familiarity with his own accent, listener's educational background and linguistic context - in the correct recognition of words by 6 listeners. These listeners benefited from the influence of these variables in their recognition of words pronounced by the Brazilian learners, and, thus, their thresholds differed from the remaining listeners, even though important familiarity variables had been controlled. Evidence of how the three unexpected linguistic variables emerged is shown in the next section.

4 Linguistic variables

4.1 Listener's familiarity with his own accent

The first unexpected variable was revealed in one listener's explanation of how he recognized correctly the word *introduction* [ɪntɹˈdukʃn̩], pronounced with the vowel [u] instead of [ʌ], in the sample "introduction to automation engineering":

> "*I say introduction [*ɪntrəˈdʊkʃn̩*], bus [*bʊs*]. I've got a black country accent. there's an area in the midlands, Dudley, West Bromwich, that sort of places, called black country. in the Birmingham conurbation you get the Birmingham accent. but*

> *the black country accent is slightly different. so I was brought up in the black country, so I've got a black country accent.*"

This listener, who reported having a black country accent, explained that he was able to recognize *introduction* correctly because the learner's pronunciation, particularly the production of [u] instead of /ʌ/, does not diverge from the way he says it. The comment made by this listener provides evidence that a similarity between the Brazilian learner's accent and his own accent is a variable which facilitated his correct recognition of introduction [ɪntɹˈdukʃn̩].

4.2 Listener's educational background

The second unexpected variable helped one listener to recognize correctly the complete sample "introduction to automation engineering" [ɪntɹˈdukʃn̩tuːɔtəˈmeiʃn̩endʒiˈniəɹiˀ]. This listener explained that he had studied manufacturing engineering, and even corrects the term *automation* used by the Brazilian learner:

> "*I could guess because I studied manufacturing engineering … it's automotive engineering, not automation engineering*"

This listener's educational background, thus, helped him to recognise the sample, since the words uttered are likely to be part of his vocabulary.

4.3 Linguistic context

Two listeners' comments indicate that they were able to rely on the words surrounding *vegetables* [vəʒˈteibous], pronounced with the primary stress on the second syllable, instead of on the first, in the sample "meat eh fish vegetables", to recognize correctly this target word. For this reason, the linguistic context is regarded here as a linguistic variable which influenced these two listeners' correct recognition, and revealed differences in the way they recognized *vegetables*. One of the listeners explained:

> "*I didn't really understand meat as such. I didn't … but then he said fish. and then I thought … oh, he must have said meat first, because I linked … because it sounded like a list erm and then he said vegetables, which I knew was wrong, but I knew what he meant. I understood. so the meat part wasn't very clear. that word wasn't very clear. but I guessed. and it sounded it was an i sound. so I guessed*".

This listener provided a detailed description of how she was able to guess and organise the words of the sample with the help of the linguistic context and one lexical clue. The word 'fish', the first she was able to understand, served as a clue which helped her to think of the sample as a list of food items; 'fish', hence, is the linguistic context this listener exploited to think of the sample as a list. Then, although knowing 'vegetables' was not pronounced appropriately, she was able to understand it. The sound [i] of the word 'meat' served as a phonetic clue, which, together with the linguistic context, helped her to guess this word. Although the vowel in 'meat' was pronounced with [i] instead of /iː/, it served as a phonetic clue for this listener, possibly because [mit] sounds only slightly different from /miːt/. This listener's description shows how she endeavoured to use the available words surrounding *vegetables* to compensate for its pronunciation, and construct the sample.

Another listener commented:

> "*when he says erm vegetables, he's already said meat. meat, fish, then, yeah, that's got to be vegetables*"

This listener exploited the linguistic context to guess 'vegetables', since she linked the two words she was able to recognize - *meat* and *fish* - to food. This association, consequently, helped her to compensate for the pronunciation of *vegetables*. According to her comment, as the speaker had said *meat* and *fish*, the third word would obviously be *vegetables*.

The emergence of the three variables - listener's familiarity with his own accent, listener's educational background and linguistic context - show evidence of listeners' varying thresholds. Although "the process of decoding is often not accessible to report" (Field, 2003, p.

35), a few listeners were able to explain the probable factors which influenced their orthographic transcriptions. I take the view that in case other listeners had been able to provide explanations, other variables could have, possibly, emerged from other listeners.

5 Non-linguistic variable

Attitudes are extremely difficult to assess, as they are complex and may be concealed. This means that a sample may be completely intelligible to a listener, but he/she may rate it negatively, owing to his/her negative attitude towards the speakers' accent. In rating samples through a 6-point scale in a pronunciation intelligibility quantitative study, for instance, a particular listener, even having understood a sample correctly, may rate it negatively, owing to bias.

In the study the unexpected variables emerged, the listeners' reactions during their tasks were closely observed for any signs of negative attitude. None of them made fun of the learners' speech or frowned. Two of them, however, made spontaneous comments concerning nationality, which could possibly be a negative attitude. The comment made by one of them referred to the traces of an American accent that some of the learners have. This listener stated, after rating, that there were some Americans speaking. When asked why she thought this, the answer was: "they just had an American accent". The other listener wrote beside one of his orthographic transcription the word *German*. When asked why this term had been written, the answer was: "he's German". Although no traces of negativity were noticed as the comments were made, this variable was regarded as being controlled in so far as possible, since negative attitudes may have emerged, but concealed. I take the view that listeners' negative attitude is a very important variable, which, possibly, reveals a high proportion of listeners' different thresholds.

6 Implications for experimental intelligibility studies involving Brazilians

Data collected for intelligibility investigations have followed two different approaches: (1) the observational; and (2) the experimental (FIELD, 2003).

In the observational approach, the data collected involves real world interactions, and thus the situational context is involved (JENKINS, 2000; REIS; CRUZ, 2008; CRUZ, 2005). The researcher identifies communication breakdowns in these interactions, and explains the reasons which possibly caused the lack of intelligibility. The researcher may also observe how speakers and listeners equally negotiate intelligibility as the communication breakdown occurs, since both, speaker and listener play equal roles in coping with their difficulties in understanding each other and share responsibilities in achieving intelligibility (CATFORD, 1950; NELSON, 2011). Since the situational context is involved, aspects such as gestures and surrounding objects may contribute to speaker-listener intelligibility negotiation. This converges with the interactional nature of intelligibility stated by Smith and Nelson (1985, p. 333): "intelligibility is not speaker or listener-centered but is interactional between speaker and hearer".

Intelligibility investigations which follow the experimental approach, conversely, do not provide data into which intelligibility may be negotiated between speaker and listener. In these studies, although the elicitation techniques vary (GONÇALVES; SILVEIRA, 2015), the most common procedures related to the participating speakers and listeners are as follows.

Samples produced by groups of speakers are extracted from their spontaneous speech or from a read aloud task. If necessary, their existing variables are controlled under laboratory conditions, as the samples are selected. If, for instance, L2 pronunciation is the focus of the study, samples containing lexical and grammatical inadequacies are discarded.

The listeners' role is to listen to the samples and to carry out tasks. These listeners have been referred to as judges, evaluators, raters, or merely listeners. Their tasks are mainly of three types: (1) mark their degree of difficulty in understanding the samples produced

by the speakers on a Likert-scale; (2) write down what they hear; or (3) fill in the blanks of paragraphs and/or sentences with words missing. The listeners' answers to these tasks provide the study results, since, as previously mentioned, intelligibility negotiation between speaker and listener is not possible to occur, and the situational context is excluded. These results are thus listener dependent. The listeners in experimental studies, unlike those who participate in observational ones, play a decisive role.

These elicitation techniques have been criticized and questioned by Rajadurai (2007) and Nelson (2011). Rajadurai (2007, p. 95) argues that "any investigation of intelligibility should be firmly embedded in the sociocultural and interactional context. Intelligibility, I would argue, is a dynamic notion – a negotiated process, rather than a purely fixed product." Nelson (2011, p. 7) claims that "it is impossible to discuss *Englishness* or *intelligibility* without reference to participants and other relevant aspects of the context of situation". The author directly refers to investigations carried out under laboratory conditions, such as those carried out by Derwing and Munro (2005), which "seem to show that intelligibility is rarely if ever measurable at 100% accuracy in controlled conditions" (NELSON, 2011, p. 109).

Despite Rajadurai's (2007) and Nelson's (2011) arguments, I take the view that pronunciation experimental intelligibility studies, particularly those involving Brazilians as speakers and/or as listeners, such as the ones carried out by Gonçalves (2014) and Schadech (2013)[4], are extremely relevant, and contribute immensely, not only to a better comprehension of Brazilian learners' and speakers' intelligibility, but also to the English pronunciation learning/teaching field in Brazil.

However, owing to the varying listener's intelligibility thresholds, and considering the crucial role played by the listeners in empirical intelligibility studies, as previously discussed, I suggest that in future studies more detailed listener data should be elicited, in two possible ways.

First, in addition to quantitative analysis, a qualitative perspective should be included. One possible way for eliciting

[4] For a description of these studies see Gonçalves and Silveira (2015)

qualitative data would be to record listeners' comments about the reasons which hindered them from understanding the participating speaker's speech. These comments, in addition to helping the researcher to identify additional listeners' variables, are likely to explain, on the basis of the listeners' views, what actually caused the speakers' speech (un)intelligibility. Although this procedure may be time consuming and demand a lot of effort on the part of the listener, I argue that listeners' voices need to be heard.

The second would be to place the listener as the focus of the research, as internationally done by Zielinski (2008), and to investigate the strategies listeners rely on to recognize speakers' words. Zielinski's study (2008) investigates the processing strategies that listeners rely on when listening to L2 speakers. During the data collection, the researcher observed and asked native speakers about the difficulties they experienced, while transcribing orthographically excerpts produced by L2 speakers of English. This study is a starting point for a change in focus of pronunciation intelligibility investigations.

The important role played by the listener in intelligibility studies, as discussed in this paper, is in line with Zielinski's (2008, p. 82) argument that in intelligibility studies the listener should no longer be "treated as the speaker's 'silent partner'".

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