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## Fluency profile: comparison between Brazilian and European Portuguese speakers

### *Perfil da fluência: comparação entre falantes do Português Brasileiro e do Português Europeu*

### ABSTRACT

The purpose of the study was to compare the speech fluency of Brazilian Portuguese speakers with that of European Portuguese speakers. The study participants were 76 individuals of any ethnicity or skin color aged 18–29 years. Of the participants, 38 lived in Brazil and 38 in Portugal. Speech samples from all participants were obtained and analyzed according to the variables of typology and frequency of speech disruptions and speech rate. Descriptive and inferential statistical analyses were performed to assess the association between the fluency profile and linguistic variant variables. We found that the speech rate of European Portuguese speakers was higher than the speech rate of Brazilian Portuguese speakers in words per minute ( $p=0.004$ ). The qualitative distribution of the typology of common dysfluencies ( $p<0.001$ ) also discriminated between the linguistic variants. While a speech fluency profile of European Portuguese speakers is not available, speech therapists in Portugal can use the same speech fluency assessment as has been used in Brazil to establish a diagnosis of stuttering, especially in regard to typical and stuttering dysfluencies, with care taken when evaluating the speech rate.

### RESUMO

O objetivo do estudo foi comparar a fluência de fala de falantes do Português Brasileiro com a de falantes do Português Europeu. Participaram deste estudo 76 indivíduos, sem distinção de raça e cor, com idades entre 18 e 29 anos, sendo 38 residentes no Brasil e 38 em Portugal. Foram obtidas amostras de fala de todos os participantes e analisadas segundo as variáveis de tipologia e frequência das disfluências e velocidade de fala. Foi realizada análise estatística descritiva e inferencial para verificar a associação entre as variáveis do perfil da fluência e da variante linguística. Foi observado que a velocidade de fala dos falantes do Português Europeu em palavras por minuto ( $p=0,004$ ) é maior que a dos falantes do Português Brasileiro. A distribuição qualitativa das tipologias das disfluências comuns ( $p<0,001$ ) também diferencia as variantes linguísticas. Enquanto não há um perfil de fluência de fala dos falantes do Português Europeu, para se estabelecer um diagnóstico de gagueira, os fonoaudiólogos podem utilizar em Portugal a mesma avaliação de fluência de fala utilizada no Brasil, principalmente no que se refere às disfluências comuns e gags, tendo cuidado apenas no que se refere à velocidade de fala.

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## INTRODUCTION

Studies show that Portuguese spoken in Brazil and Portugal differs in several linguistic levels<sup>(1)</sup>, including semantic, morphosyntactic, phonetic/phonological, among others. The differences between Brazilian Portuguese (BP) and European Portuguese (EP) go beyond the segmental level, reaching the prosodic level<sup>(2,3)</sup>. It is questioned, then, if the speech language fluency patterns, the aim of this study, would also present their particularities in EP and BP.

The parameters commonly used to objectively assess speech fluency are the common dysfluencies, stuttering dysfluencies, speech discontinuity percentage or total rupture rate, percentage of stuttered syllables, and speech rate<sup>(4)</sup>; the last one is also called elocution and/or articulation rate<sup>(5,6)</sup>.

Such parameters have been researched in Brazil, designing a normative profile for fluent speakers<sup>(4,7,8)</sup> and characterizing different communication disorders<sup>(5,9-11)</sup>. However, studies describing the profile of EP speech language fluency are required<sup>(3)</sup>.

Assessing fluency is extremely relevant to provide parameters on the effectiveness of language, rather than only diagnosing stuttering<sup>(12)</sup> and other communication disorders. In this sense, studies providing reference values for fluent speakers, considering the particularities of each language, are important to increase the accuracy of diagnosis<sup>(7)</sup>.

The objective of this work was to compare fluency parameters of native adult speakers of BP and EP.

## METHODS

This research was considered and approved by the research ethics committee of the Universidade Federal de Minas Gerais under the protocol CAAE 01460612.4.0000.5149, authorized by the Department of Speech Language Therapy of the Universidade do Algarve (Portugal). All participants signed the informed consent term.

This study comprised melior included 76 subjects of both gender, with no distinction as for race and color, with 38 of them living in the metropolitan region of Belo Horizonte (the capital of the state of Minas Gerais, Brazil) and 38 of them living in the city of Faro (District capital of Faro, in the region of Algarve, Portugal). All subjects were aged between 18 and 29 years.

As an exclusion criteria, the participants could not present personal and/or family complaints of stuttering and/or communication or health deficits that would impair speech language production.

The methodology used to collect and analyze the speech samples considered the following fluency parameters: rupture typology (common dysfluencies: hesitation, interjection, revision, repetition of words and/or segment and/or phrase, and unfinished word; stuttering dysfluencies: repetition of syllables and/or sounds, prolongations, blocking, pause, and intrusion of sound and/or segment); speech rate, in words per minute; and rupture frequency (speech discontinuity percentage and stuttering dysfluencies)<sup>(13)</sup>.

A descriptive analysis of the data was performed, calculating values such as the median, mean, and standard deviation. To analyze the independence between the studied groups, we used the  $\chi^2$ -test. To compare the medians, we used the nonparametric Mann-Whitney test. A significance level of 5% was considered.

## RESULTS

In relation to the typology of dysfluencies, Table 1 shows the values found for BP and EP, as well as their qualitative distribution.

**Table 1.** Comparison of the distribution of common and stuttering dysfluencies among speakers of Brazilian Portuguese variant spoken in Minas Gerais (*variante mineira*) and European Portuguese variant spoken in Algarve

	Brazilian Portuguese n (%)	European Portuguese n (%)
Typology of common dysfluencies		
Hesitation	277 (42.8)	370 (57.2)
Interjection	64 (60.4)	42 (39.6)
Review	56 (60.9)	36 (39.1)
Unfinished word	17 (70.8)	7 (29.2)
Word repetition	21 (44.7)	26 (55.3)
Segment repetition	18 (90.0)	2 (10.0)
Phrase repetition	1 (100.0)	0 (0.0)
p-value	<0.001*	
Typology of stuttering dysfluencies		
Syllable repetition	2 (100.0)	0 (0.0)
Sound repetition	7 (87.5)	1 (12.5)
Prolongation	55 (56.7)	42 (43.3)
Blocking	0 (0.0)	0 (0.0)
Pause	5 (50.0)	5 (50.0)
Intrusion	4 (66.7)	2 (33.3)
p-value	0.311	

\*p<0.05.

Speakers of both groups were compared for each dysfluency typology. The variable “hesitation” presented a significant difference (p=0.006), with higher median to the EP speakers (9.0 versus 7.0). The variables “segment repetition” and “sound repetition” also presented significant difference (p=0.005 and p=0.048, respectively). Despite the medians being the same (less than zero), they do not distribute equally among the countries, with higher values for the BP speakers.

The results and the comparison of parameters of the fluency profile are shown in Table 2.

## DISCUSSION

This study raised the speech fluency profile of a group of young adult speakers of the BP variant spoken in Minas Gerais (*variante mineira*) and a group of young adult speakers of the EP variant spoken in Algarve (*variante algarvia*).

**Table 2.** Comparison between the speech fluency of adult speakers of Brazilian Portuguese variant spoken in Minas Gerais (*variante mineria*) and European Portuguese variant spoken in Algarve

Variable	Brazilian Portuguese			European Portuguese			p-value
	Median	Mean	Standard deviation	Median	Mean	Standard deviation	
Total of common dysfluencies	11.0	12.0	6.5	13.0	12.7	4.8	0.590
Total of stuttering dysfluencies	1.0	1.9	2.0	1.0	1.3	1.5	0.187
Words/minute	113.4	109.1	23.4	128.7	131.3	39.1	0.004*
Syllables/minute	214.3	211.2	48.3	213.0	213.5	60.8	0.857
Percentage of speech discontinuity	6.0	6.9	3.4	7.0	7.0	2.6	0.881
Percentage of stuttering dysfluencies	0.5	1.1	1.2	0.5	0.7	0.8	0.221

\*p&lt;0.05.

As for the total number of common and stuttering dysfluencies, both BP and EP presented results close to those described in the literature<sup>(4,14)</sup>. Despite not being quantitatively different, a qualitative difference was observed in the typology of the dysfluencies: in BP, the review, the unfinished word, and the segment repetition were the most often found dysfluencies, whereas EP speakers used hesitation and word repetition more often.

Due to the reduced number of informants in this research, which figures as an initial attempt to raise questions regarding the variability between BP and EP, it is suggested that a deeper study on the typology of dysfluencies should be conducted to better clarify this particularity. However, while the fluency profile of EP adults is not established, the normality values of the six parameters of fluency may be used in the assessment of these individuals.

Regarding the speech rate, EP speakers present higher rates than BP ones only when it comes to words per minute, without statistical difference as for syllables per minute. One of the possible explanations for this difference is the qualitative distribution of the dysfluencies: in BP, more review dysfluency is observed. In a study on the dysfluency of review, the authors agreed that there was a decrease in speech rate in the moment of pronunciation of this dysfluency<sup>(8)</sup>, which could, in relation to segmental and suprasegmental levels, influence this parameter. Another explanation would be the high standard deviation, a fact observed in several studies on speech rate<sup>(5,7,9)</sup>.

Although studies that considered the measure syllable per minute presented results with some variation, in BP we considered that these values may vary between 202.9 and 247.6<sup>(4,5,10,14)</sup>. They agreed on the findings of this study for both BP and EP.

## CONCLUSION

The parameters analyzed in this study on fluency profile point toward a tendency for similarity between BP and EP. However, it was observed that the speech rate of EP speakers is higher than that of BP speakers in words per minute. Despite the number of common dysfluencies being similar, their qualitative distribution differentiates the languages from one another. In BP, we found a higher frequency of reviews, unfinished words, and segment repetition, whereas EP speakers present more hesitation and repetition of words.

*\*BSAC was responsible for the collection and tabulation of the data and elaboration of the manuscript; ACB supervised data collection and elaboration of the manuscript; LCC and VOMR were responsible for the project and design of the study and overall guidance of execution steps and elaboration of the manuscript.*

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