

# Analysis of prosodic variation in different styles of TV news reports

## Análise da variação prosódica em diferentes estilos de reportagens telejornalísticas

Thalita Evaristo Couto Dias<sup>1</sup>, Priscila Campos Martins<sup>1</sup>, Leticia Caldas Teixeira<sup>2</sup>, Ana Cristina Côrtes Gama<sup>2</sup>

### ABSTRACT

**Purpose:** To characterize TV news reports of serious, neutral and relaxed style of perceptual form and identify acoustically their prosodic variation. **Methods:** In the first phase the authors selected out of vision scenes from open channels sites, subsequently divided into three style groups: serious, neutral and relaxed. The final sample was defined by the trial of 20 subjects lay people who chose the top five out of vision scenes for each style. In the second phase three speech therapists characterized the sample through perceptual evaluation, and the third phase was carried out acoustic analysis of the fundamental frequency parameters, intensity and duration. **Results:** In three styles the sample is characterized by a neutral voice quality with balanced melodic curve, using emphases the importance of the word in the phrase, expressive pauses and speech rate average. In the acoustic analysis, serious style showed lower minimum frequency, intensity variation and duration of the stressed syllable. The neutral style obtained the lower maximum frequency, variation in semitone and amount of pauses per minute, and larger intensity variation and speech rate. The relaxed style obtained the lower speech rate and the highest maximum frequency, minimal variation in semitones, number of breaks per minute and duration of the stressed syllable. Was statistical difference in the rate of speech comparing the relaxed and serious, relaxed and neutral styles. **Conclusion:** The perceptual evaluation results were similar in all styles. The acoustic analysis reveals that the speech rate as the parameter that differentiates the serious and neutral styles of the relaxed.

**Keywords:** Speech, language and hearing sciences; Voice; Speech acoustics; Communication; Journalism

### RESUMO

**Objetivo:** Caracterizar reportagens telejornalísticas de estilo sério, neutro e descontraído, de forma perceptivo-auditiva, e identificar acusticamente sua variação prosódica. **Métodos:** Na primeira fase, foram selecionados 30 *offs* de reportagens de *sites* de canais abertos, posteriormente divididos em três grupos de estilos: sério, neutro e descontraído. A amostra final foi definida por meio do julgamento de 20 sujeitos leigos, que escolheram os cinco melhores *offs* para cada estilo. Na segunda fase, três fonoaudiólogos avaliaram a amostra de forma perceptivo-auditiva e, na terceira fase, foi realizada análise acústica dos parâmetros de frequência fundamental, intensidade e duração. **Resultados:** Nos três estilos, a amostra foi representada por uma qualidade vocal neutra, com curva melódica equilibrada, uso de ênfases conforme importância da palavra na frase, pausas expressivas e velocidade de fala média. Na análise acústica, o estilo sério mostrou menores valores de frequência mínima, de variação de intensidade e de duração da sílaba tônica. O estilo neutro obteve os menores valores de frequência máxima, de variação em semitom, de quantidade de pausas por minuto e maior variação de intensidade e de taxa de elocução. O estilo descontraído obteve a menor taxa de elocução e as maiores frequências máxima, mínima, variação em semitons, quantidade de pausas por minuto e duração da sílaba tônica. Houve diferença estatística na taxa de elocução, quando comparados os estilos descontraído e sério e descontraído e neutro. **Conclusão:** A avaliação perceptivo-auditiva obteve resultado igual em todos os estilos. Na análise acústica, a taxa de elocução diferenciou os estilos sério e neutro do estilo descontraído.

**Descritores:** Fonoaudiologia; Voz; Acústica da fala; Comunicação; Jornalismo

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(1) Speech-Language Pathology Course, Medical School, Universidade Federal de Minas Gerais – UFMG – Belo Horizonte (MG), Brazil.

(2) Speech-Language Pathology Department, Medical School, Universidade Federal de Minas Gerais – UFMG – Belo Horizonte (MG), Brazil.

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**Correspondence address:** Thalita Evaristo Couto. Av. Alfredo Balena, 190, sala 251, Belo Horizonte (MG), Brazil, CEP: 30130-100. E-mail: thalitata@hotmail.com

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## INTRODUCTION

Voice professionals are individuals who depend on their voices professionally. An reporter is one of such professionals who have their voices as a work tool and who need efficient oral communication to convey news with credibility<sup>(1-5)</sup>.

Reporter voice training has been used by TV networks since the 1970s. With the growth and scientific advancement of speech therapy, voice training has expanded its field of action to include the support to and improvement of reporters' oral communication skills. This change took place in TV journalism when the reading of news pieces started to require greater expressiveness and mainly a greater naturalness from reporters who had previous experience only in the press and the radio<sup>(6)</sup>.

As the subjects in newscasts are varied, ranging from behavior to politics to economy, there is a great need of communicative adaptation of the text and voice dynamic flexibility. An reporter needs to build a connected text and impart the communicative intention to the narration according to the subject matter<sup>(7-9)</sup>.

Voice features contribute to vocal plasticity so that the communicative intention is appropriate in the prosody, which can be defined as a set of speech features related to variations in pitch, intensity, duration and pause placement<sup>(10-14)</sup>. Prosodic variations convey information relevant to the meaning of the narration and define the characteristics of the voice dynamic, such as happiness or sadness.

We believe that understanding prosody dynamic with a greater support of speech therapy will contribute to a sounder basis in TV newscast communicative support. To this end, this study sought to characterize TV newscast in serious, neutral and informal styles from the perceptive and auditory viewpoint and identify prosodic variation through acoustic analysis.

## METHODS

The descriptive cross-sectional experimental design adopted in this study was approved by the Research Ethics Committee of the *Universidade Federal de Minas Gerais* (UFMG), n<sup>o</sup>. ETIC 441/07.

In the first phase of the study, the researchers selected 30 newscast pieces from TV newscasts available on the Internet. The newscasting segments were classified according to narration styles serious, neutral and informal<sup>(15)</sup>. The style classification criterion was based on term definitions drawn from the *Michaelis Dictionary*: serious is that which "expresses seriousness, circumspection, gravity", neutral is that which is "not clearly marked or colorful", and informal is that which is "relaxed, unconstrained, unrestrained."

Software Fast Video Download 4.2.6 was used to download the news pieces from the Internet. aTube Catcher was used to convert the video segments from mp4 video format into wav format and Audacity was used to cut 15 seconds from the second part of the news story when the reporter's voice is heard

while images are shown on screen (out of vision - OOV) and remove any background music and noise.

The 30 OOVs that were selected were presented to 20 lay listeners, one male and 19 females, aged between 18 and 25, who were speech therapy students from the first to the fourth terms at UFMG. All participants involved agreed to participate in the research and signed the informed consent. The students were presented the news segments in a quiet room in the University, upon which they had to fill out a detailed protocol prepared by the researchers with the following instructions: "Tick the communicative style that best describes the reporter's performance". The serious, neutral, and informal style concepts had been previously presented to the participants and they were instructed to evaluate the reporter's communicative performance regardless of the news content. The OOVs were reproduced through loudspeakers at random and numbered in the protocol, each with three style options: serious, neutral and informal. Later, the percentages of selection of the five most chosen news segments from each style were calculated, totaling a final sample of 15 OOVs.

In the second phase, the sample selected by the lay participants were submitted to perceptual-auditory analysis by trained listeners for the characterization of the reporters' expressiveness.

The 15 OOVs were presented at random to three graduated voice therapists who were voice professionals with at least five-year experience. In the evaluation performed through a protocol prepared by the researchers, the participant had to indicate: voice quality (neutral or altered), melodic curve (balanced or absent), criterion of choice of use of emphasis (word importance or word position in the phrase), pause (expressive, repetitive, excessive, scarce) and speech velocity (moderate, fast, slow). The characteristics most chosen for each feature were used in the perceptual-auditory evaluation.

In the third and last phase, the 15 OOVs were submitted to acoustic analysis. The following acoustic features were manually analyzed with software Praat version 5.4.08<sup>(16)</sup>: fundamental frequency (f0), intensity and duration.

The values of F0 maximum and semitone variation were used in the analysis of f0. The values of f0 maximum and f0 minimum were manually obtained by visual determination of the highest and lowest frequency curve points, respectively. To analyze the semitone values, the maximum and minimum f0 values were entered in the software available at <http://users.utu.fi/jyrtuoma/speech/semitone.html>.

Considering that the news segments taken from the TV Network websites had different recording and intensity parameters, only the sound pressure level (dB SPL) variation was measured by determination and subtraction of the maximum and minimum values obtained with the program.

In the analysis of the duration, the following were measured: narration rate, determined as the number of syllables per narration time, duration of the first stressed syllable and number of pauses per minute, calculated by multiplying the number of

**Table 1.** Perceptual-auditory evaluation of expressiveness according to newscast narrative style

Parameters		Serious (%)	Neutral (%)	Informal (%)
Vocal quality	Neutral	80	80	100
	Altered	20	20	0
Melodic curve	Balanced	100	100	100
	Absent	0	0	0
Use of emphasis	Word importance	80	80	100
	Word position	20	20	0
Pause	Expressive	60	80	60
	Repetitive	20	20	40
	Excessive	0	0	0
	Scarce	20	0	0
Speech velocity	Mean	60	100	100
	Accelerated	40	0	0
	Slow	0	0	0

pauses lasting more than 200 ms by 60 s and dividing by the narration time. All measurements were visually determined from the segment plots of intensity versus time and the markings were corrected by listening to the segments. Arithmetic means were calculated in order to obtain the acoustic parameters and were compared for each of the three news narration styles.

The descriptive analysis of the data was performed by central tendency and dispersion measurement. The statistical analysis of the values of the three TV newscast narration styles was performed with the t test at 95% confidence level using software SPSS version 17.0.

## RESULTS

In the perceptual-auditory analysis carried out by the trained participants, the three narration styles were characterized in terms of neutral vocal quality, balanced melodic curve, criteria of choice of emphasis based on the importance of the word in the phrase, expressive pause and mean speech velocity (Table 1).

In the acoustic analysis (Table 2), the informal style had the highest mean maximum frequency (451.51 Hz). The lowest mean minimum frequency was observed for the serious style (104.84 Hz), while semitone variation was the greatest in the informal style (24.65 ST). The intensity of the neutral style (64.97 dB) varied the most. The informal style had the greatest number of pauses per minute (16.20) and the first stressed syllable was the longest in the informal style (238.60 ms). The highest narration rate was observed in the neutral style (5.55), with a statistical difference between the informal and serious styles and the informal and neutral styles (Table 3).

## DISCUSSION

Prosody is characterized by suprasegmental features of speech related to frequency, intensity and duration. In turn,

**Table 2.** Mean acoustic parameters per newscast narration style

Parameters	Serious	Neutral	Informal
Maximum frequency (Hz)	403.15	399.43	451.51
Minimum frequency (Hz)	104.84	108.16	111.56
Semitone variation (ST)	22.93	22.58	24.65
Intensity variation (dB)	52.62	64.97	57.51
Pauses per minute	13.4	12.8	16.2
Stressed syllable duration (ms)	177.6	183.2	238.6
Narration rate	5.47	5.55	4.8

these variations help shape communicative style by means of features such as emphasis, rhythm, speech velocity and pause. Newscasting is then an interesting phonostyle in itself<sup>(10)</sup> as it allows the visual support of news reading in association with spontaneous speech features.

Despite the numerous studies in the literature on newscast prosody, the comparison and verification of prosodic findings in this type of professional narration is difficult due to the variety of methods that are employed. In addition, most studies in the prosody field favor a deep investigation of specific parameters and few<sup>(15,17)</sup> have investigated and evaluated prosodic variation in different communicative intentions.

Perceptual-auditory evaluation (Table 1) was employed in this study to characterize reporters' expressiveness in newscast samples selected by lay participants in terms of neutral vocal quality, melodic curve balance, word emphasis criterion based on the importance of the word in the phrase, expressive pause and mean speech velocity in all styles.

In the acoustic analysis (Table 2), the serious style presented the lowest minimum frequency, intensity variation and the shortest stressed syllable duration. The neutral style had the lowest maximum frequency, smallest semitone variation, smallest number of pauses per minute and the greatest variation in

**Table 3.** Tests of independent samples for newscast narration styles

Parameters	Serious x Neutral	Informal x Serious	Informal x Neutral
Maximum frequency	0.958	0.348	0.451
Minimum frequency	0.842	0.757	0.866
Semitone variation	0.916	0.651	0.47
Intensity variation	0.898	0.631	0.428
Pauses per minute	0.872	0.586	0.358
Stressed syllable duration	0.802	0.136	0.089
Narration rate	0.189	0.034	0.017

intensity and narration rate. The informal style had the highest maximum and minimum frequency and semitone variation values. It also had the greatest number of pauses per minute, greater syllable duration and lowest narration rate. Only narration rate was different when the informal and serious and informal and neutral styles were compared and thus differentiated styles significantly in the studied samples (Table 3).

Therefore, we can infer that factual narrations in serious style were the most objective, with flatter tones, smaller intensity variation and shortest stressed syllable prolongation in relation to the other styles. The neutral style was characterized mostly by a more linear melodic curve. In the informal style, such as in sports and behavior news, the narration had sharper tones and a richer melodic curve, a greater number of pauses and longer stressed syllables, in addition to a smaller number of syllables per minute.

The acoustic analysis of the same loud reading in the three styles has been reported in the literature<sup>(15)</sup>. The informal style had greater frequency variation and vowel prolongation. The serious style had a flatter tone, more pauses and fewer prolongations. The neutral style fell in between them and was the most misjudged by the participants. This contrast with the present study results can be attributed to methodological differences. In the present study, public access newscast recordings were used and afforded actual samples of newscasts and favored prosodic analysis in the professional context of reporter. The literature results<sup>(15)</sup> were based on controlled recordings, that is, the reporters read the same text with different intentions, which may have contributed to an exaggeration in the prosodic variation to highlight the style being used.

Investigations of communicative styles in sports news<sup>(17)</sup> reported longer vowels, increased loudness and greater pitch variation and a fast narration rate. On the other hand, vowels are shorter in kidnapping, robbery and death news, similar to the present results, which suggests that voice gestures exert a great influence on news delivery as they carry specific emotions that the reporter has to adjust to his or her expressiveness to catch and maintain the viewers' attention<sup>(6)</sup>.

This study contributes to professional voice training by directing therapists' look to different newscast genre and the most adequate possibilities for the reporter's vocal adjustment.

It also contributes to further investigation and correlation of prosodic behavior in newscasts using different means of evaluation.

## CONCLUSION

Samples of each of the three narration styles were characterized in terms of neutral vocal quality, melodic curve balance, use of emphasis based on the importance of the word in the phrase, expressive pause and mean speech velocity. In the acoustic analysis, the investigated styles presented different frequency, intensity and duration patterns; however, only the narration rate statistically differentiated the serious and neutral styles from the informal style.

## REFERENCES

1. Azevedo JBM, Ferreira LP, Kyrillos LR. Julgamento de telespectadores a partir de uma proposta de intervenção fonoaudiológica com telejornalistas. *Rev CEFAC*. 2009;11(2):281-9. doi:10.1590/S1516-18462009000200013
2. Netto WF, Consoni F. Estratégias prosódicas da leitura em voz alta e da fala espontânea. *Alfa*. 2008;52(2):521-4.
3. Cotes C. O uso das pausas nos diferentes estilos de televisão. *Rev CEFAC*. 2007;9(2):228-37. doi:10.1590/S1516-18462007000200012
4. Borrego MCM, Behlau M. Emphatic accent used by individuals with and without voice and speech training. *Rev Soc Bras Fonoaudiol*. 2012;17(2):216-24. doi:10.1590/S1516-80342012000200019
5. Chun RYS, Servilha EAM, Santos LMA, Sanches MH. Promoção da saúde: o conhecimento do aluno de jornalismo sobre sua voz. *Distúrb Comun*. 2007;19(1):73-80.
6. Cotes C. Estudo dos gestos vocais e corporais no telejornalismo brasileiro [thesis]. São Paulo: Pontifícia Universidade Católica de São Paulo; 2008.
7. Torres MLGM, Behlau M, Oliveira CA. Estudo da intenção comunicativa do repórter de TV na transmissão de textos noticiosos com dois conteúdos diferentes. *Fono Atual*. 2004;7(27):65-77.
8. Gravina AP, Svartman FF. Syntax-phonology interface: disambiguation by prosodic structure in Brazilian Portuguese. *Alfa Rev Linguist*. 2013;57(2):639-68. doi:10.1590/S1981-57942013000200013

9. Caldeira CRP, Vieira VP, Behlau M. Analysis of reporters' vocal changes in the presence of noise. *Rev Soc Bras Fonoaudiol.* 2012;17(3):321-6. doi:10.1590/S1516-80342012000300014
10. Constantini AC. Mudanças na estruturação prosódica de texto jornalístico antes e após intervenção fonoaudiológica. *J Speech Sciences.* 2012;2(2):23-42.
11. Pell MD. Influence of emotion and focus location on prosody in matched statements and questions. *J Acoust Soc Am.* 2001;109(4):1668-80. doi:10.1121/1.1352088
12. Banse R, Scherer KR. Acoustic profiles in vocal emotion expression. *J Personal Soc Psychol.* 1996;70(3):614-36. doi:10.1037/0022-3514.70.3.614
13. Scherer KR, Banse R, Wallbott HG. Emotion inferences from vocal expression correlate across languages and cultures. *J Cross-Cult Psychol.* 2001;32(1):76-92. doi:10.1177/0022022101032001009
14. Batista RJ. A ênfase na locução do repórter de telejornal [dissertation]. Belo Horizonte: Universidade Federal de Minas Gerais; 2007.
15. Panico ACB, Fukusima SS. Análise acústica e percepção do telespectador de diferentes estilos de emissão em telerreportagem. In: Gama AC, Kyrillos L, Feijó D. *Fonoaudiologia e telejornalismo: relatos do IV Encontro Nacional de Fonoaudiologia da Central Globo de Telejornalismo.* Rio de Janeiro: Revinter; 2005. p. 93-110.
16. Boersma P, Weenink D. Praat: doing phonetics by computer. Version 5.4.08 2015 [cited 2015 May 22]. Available from: <http://www.praat.org/>
17. Stier C, Neto BC. Expressividade: falar com naturalidade e técnica no jornalismo de televisão. In: Kyrillos L. *Expressividade: da teoria à prática.* Rio de Janeiro: Revinter; 2005. p. 179-96.