

Prosodic Effects of Syntactic Distribution in Vocatives in European Portuguese

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Main Goal

To verify if there is a correlation between the prosody and the syntactic distribution (initial, medial, and final) of the vocative in European Portuguese (EP), taking into account:

- (i) acoustic measures;
- (ii) pitch accents;
- (iii) boundary tones;
- (iv) intonation contours;
- (v) phrasing.

Theoretical Background: General Issues

- Vocatives have been studied on a par with other elements (e.g., appositions, comment clauses, dislocated elements, and question tags).
- Different theoretical approaches led to different designations for these elements:
 - (i) “parentheticals” (Dehé & Kavalova, 2007; Dehé, 2009a);
 - (ii) “extra-sentential elements” (Astruc, 2005; Astruc-Aguilera & Nolan, 2007);
 - (iii) “peripheral elements” (Prieto, 2002).
- Moreover, this kind of elements is described as a group of heterogeneous expressions that vary in syntactic category and function, as well as in length and complexity.

Theoretical Background: Studies on Parentheticals

- Factors like length and complexity can influence the prosodic phrasing of parentheticals (Peters, 2006; Dehé, 2007, 2009b).

“Certain types of relatively short parentheticals such as comment clauses, reporting verbs, question tags and vocatives may be prosodically integrated into either the preceding or following intonation domain (...).”(Dehé, 2009b)

- Initial and non-initial parentheticals have a different prosodic behavior (Prieto, 2002; Astruc, 2003, 2005; Astruc-Aguilera & Nolan, 2007).

“In general we can say that initial elements (...) form independent tonal units, get an independent tonal contour, separated by clear pauses, and show a tendency to have a final rise (...). Non-initial elements (...) may form independent phrases, which can be separated by pauses, phrase accents or mere lengthening.” (Astruc, 2003)

Theoretical Background: Studies on Parentheticals

- Intonation contours of non-initial parentheticals can be influenced by the intonation contour of the sentence (Prieto, 2002; Astruc, 2003, 2005; Astruc-Aguilera & Nolan, 2007).

“Segon, [els constituents perifèrics a l’oració — vocatius, elements parentètics, dislocacions —] solen pronunciar-se amb un registre més greu que el de l’oració principal i, en molts casos, repeteixen el contorn melòdic d’aquesta en una tonalitat més baixa.” (Prieto, 2002)

- Interpolated constituents are associated with a diversified behavior, since they are characterized by rising pitch accents and by high and low pitch accents comparing to the intonation contours of the sentence (Wichmann, 2000).

“There are in addition a number of other ways of dealing prosodically with parenthetical items. They can for example be pitched both higher and lower than the surrounding talk, depending on their communicative function.” (Wichmann, 2000)

Theoretical Background: Studies on Vocatives

- Intonation contours of initial vocatives show similarities with the ones described for isolated vocatives (Prieto, 2002).

“Els vocatius situats a l’inici de l’oració no reproduïxen el patró de l’oració principal — tal com fan els vocatius interns i finals—, sinó que presenten l’entonació típica dels vocatius aïllats (...).” (Prieto, 2002)

- In **EP**, two types of isolated vocatives have been described (Frota, in press):

(i) vocative chant (greeting): (L+) H* !H%, with the possibility of lengthening and split up of the nuclear syllable of the vocative when there is no post-tonic syllable;

(ii) low vocative chant (insisting call): (L+) H* L%.

Methodology: Corpus

- Subjects:

Two female subjects (CA and TA), native speakers of standard EP.

- Variables of the Target-sentences:

- (i) the three distributional patterns of the vocatives: initial, medial and final;
- (ii) the number of syllables of the sentence (5, 7, and 10) and the vocative (1, 2, and 3);
- (iii) the stressed syllable of the vocative (last, penultimate, and antepenultimate syllables).

- Data Collection:

Elicited reading task motivated by a situational context, accordingly with the *Atles interactiu de l'entonació del català* (Prieto & Cabré, 2008).

The corpus is composed by 432 sentences (54 target-sentences and 54 distractors read twice by each subject).

Methodology: Annotation

- Material: 216 target-sentences (108 by each subject).

- Parameters:

(i) acoustic measures:

(a) relative length;

(b) intensity (maximum and minimum);

(c) f_0 (maximum, minimum, and range);

(ii) pitch accents;

(iii) boundary tones;

(iv) intonation contours;

(v) break indices.

- Conventions:

Towards a P_ToBI (Viana & Frota, 2007).

Praat (Boersma & Weenink, 2009), 5.2.10.

Methodology: Statistical Analysis

- Descriptive Statistics:

(i) acoustic measures:

(a) mean values;

(ii) pitch accents, boundary tones, intonation contours, and break indices:

(a) crosstabs.

- Inferential Statistics:

(i) acoustic measures:

(a) Mann-Whitney (U) (for two independent samples);

(b) Kruskal-Wallis (H) (for more than two independent samples);

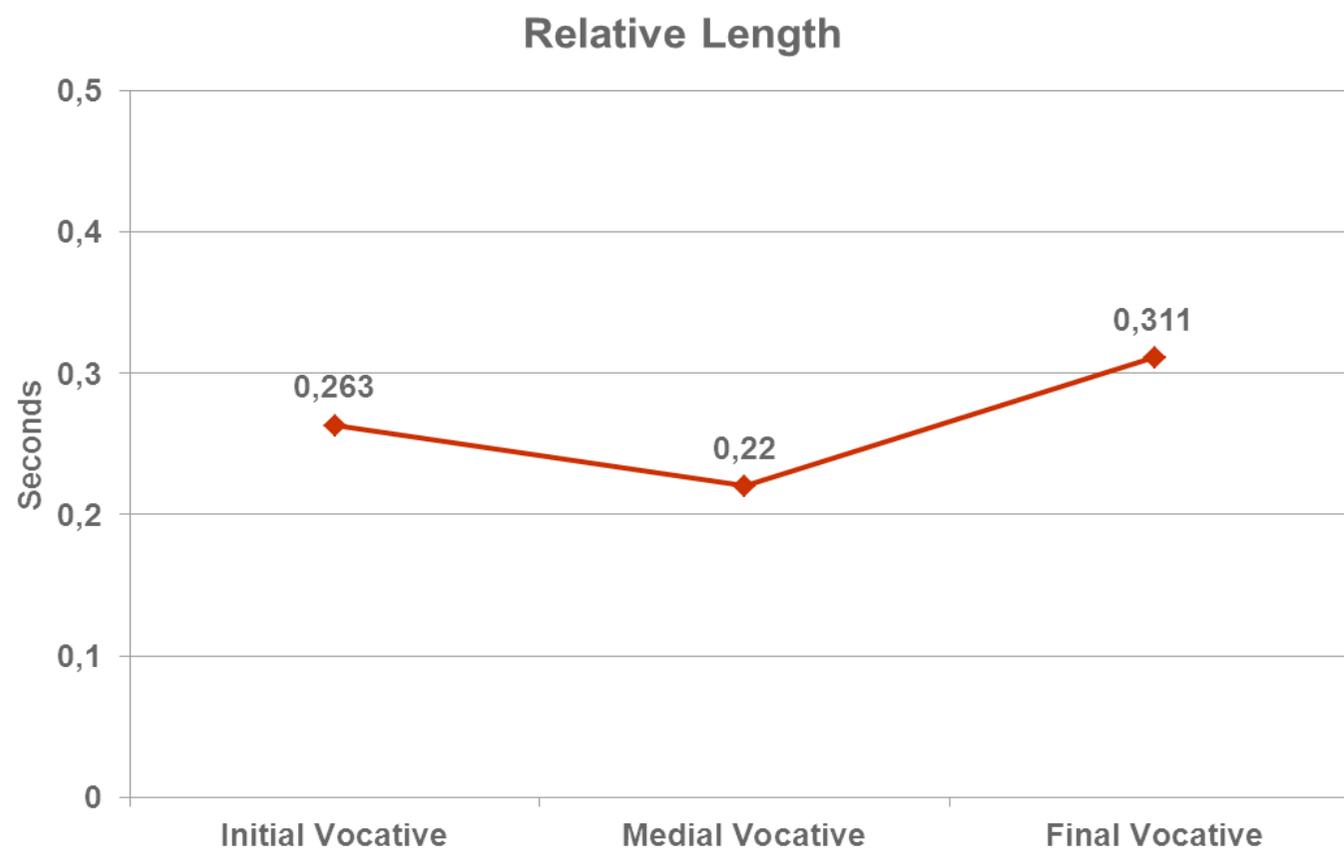
(ii) pitch accents, boundary tones, intonation contours, and break indices:

(a) Chi-square (χ^2).

SPSS (Statistical Package for the Social Sciences), 18.0.0.

Data: Relative Length

There is a significant effect of the distributional patterns of the vocative on the relative length of the vocative ($H(2) = 56,788, p < ,001$).

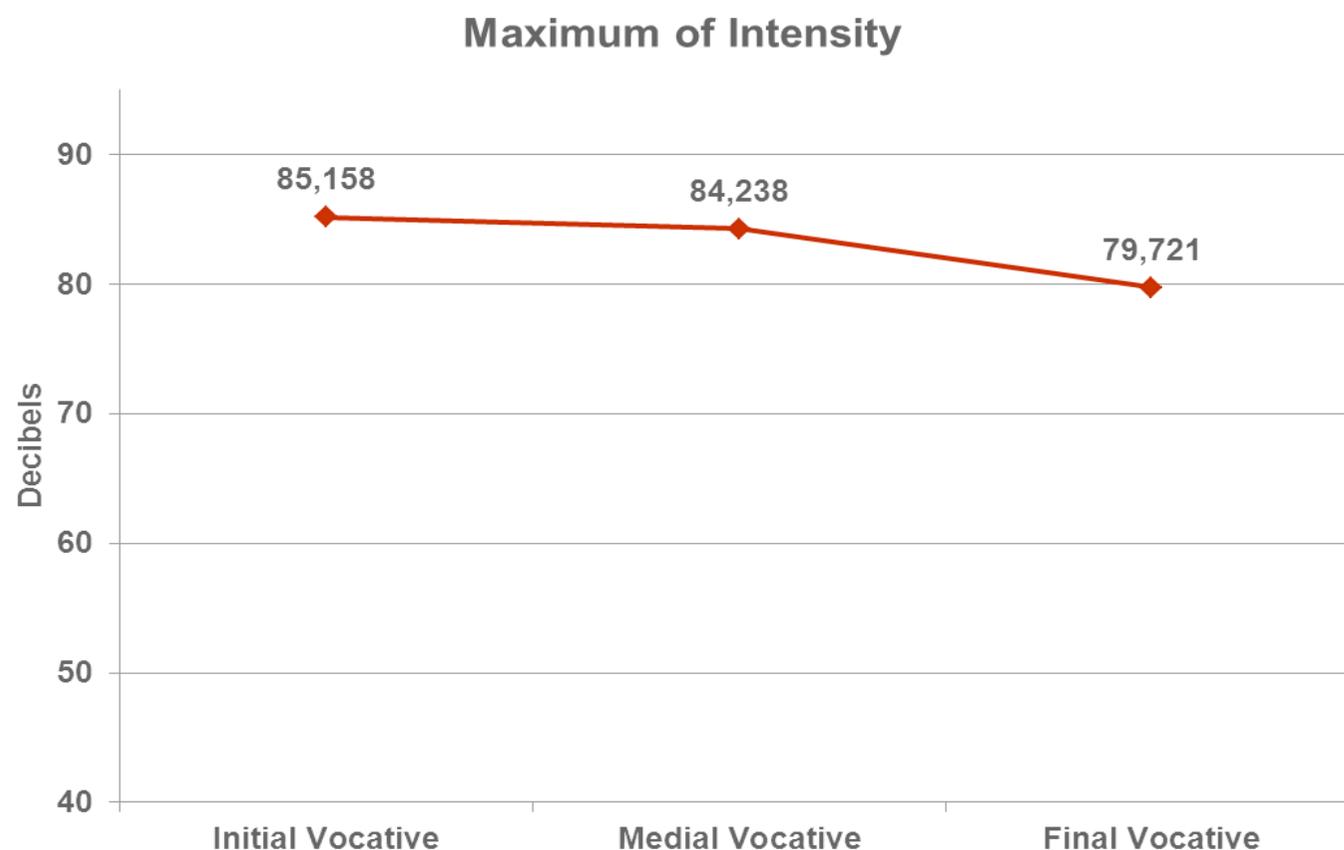


The statistical analysis shows significant differences between each of the distributions:

- initial and medial vocatives ($U = 1492,5, p < ,001$);
- initial and final vocatives ($U = 1552, p < ,001$);
- medial and final vocatives ($U = 836,5, p < ,001$).

Data: Maximum of Intensity

There is a significant effect of the distributional patterns of the vocative on the maximum of intensity of the vocative ($H(2) = 121,737, p < ,001$).



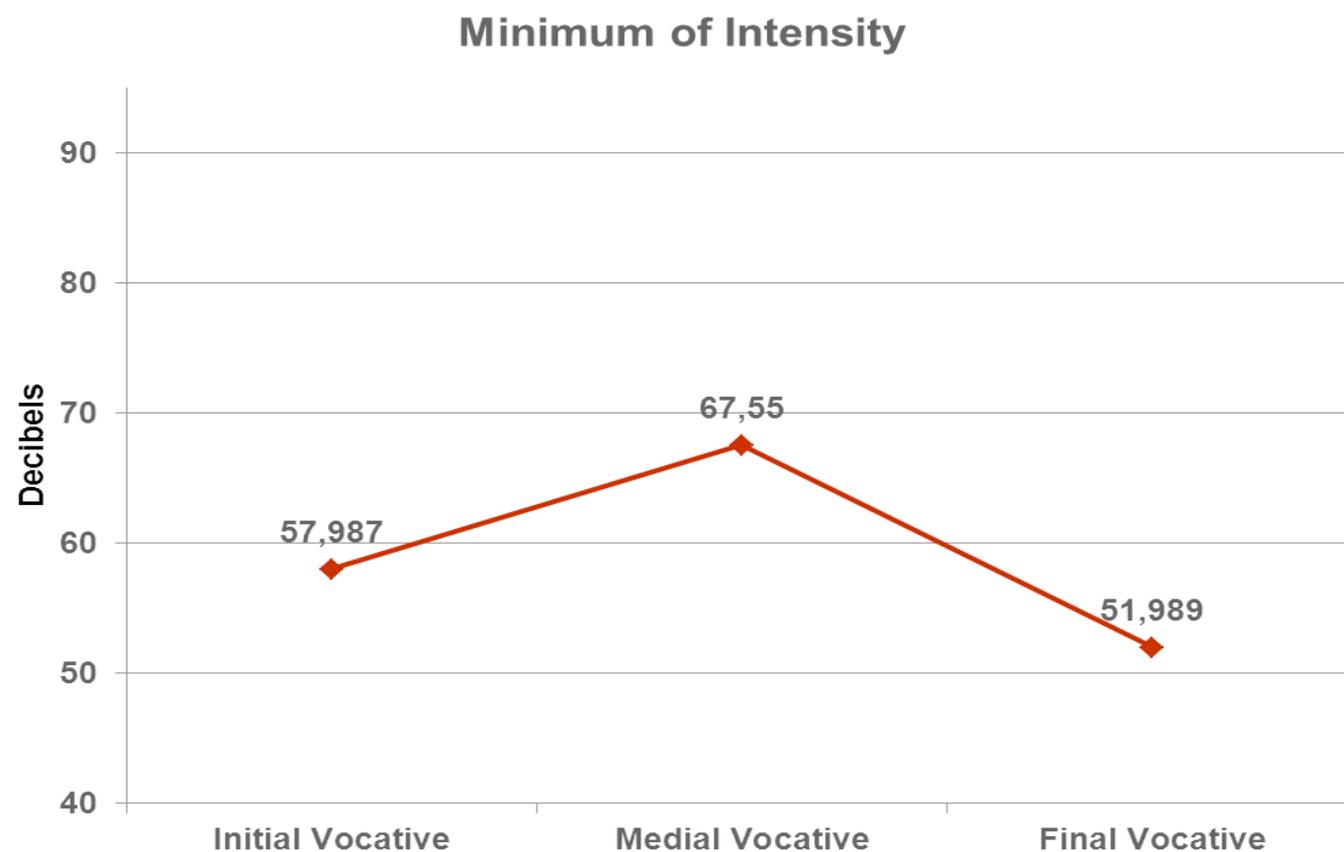
The statistical analysis shows significant differences between each of the distributions:

- initial and medial vocatives ($U = 1923,5, p = ,008$);
- initial and final vocatives ($U = 89, p < ,001$);
- medial and final vocatives ($U = 415, p < ,001$).

Data:

Minimum of Intensity

There is a significant effect of the distributional patterns of the vocative on the minimum of intensity of the vocative ($H(2) = 77,061, p < ,001$).

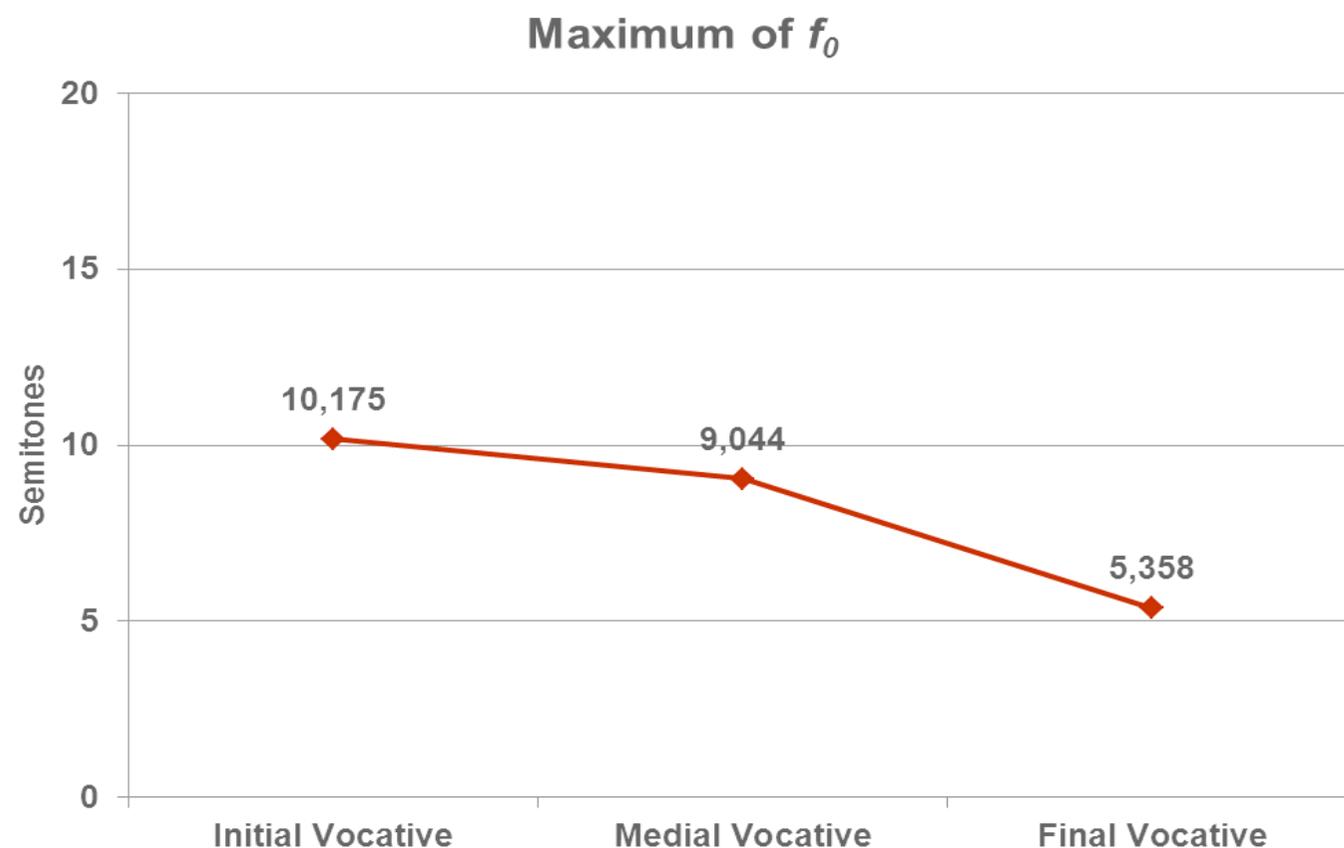


The statistical analysis shows significant differences between each of the distributions:

- initial and medial vocatives ($U = 1114,5, p < ,001$);
- initial and final vocatives ($U = 1501, p < ,001$);
- medial and final vocatives ($U = 601,5, p < ,001$).

Data: Maximum of f_0

There is a significant effect of the distributional patterns of the vocative on the maximum of f_0 of the vocative ($H(2) = 108,188, p < ,001$).

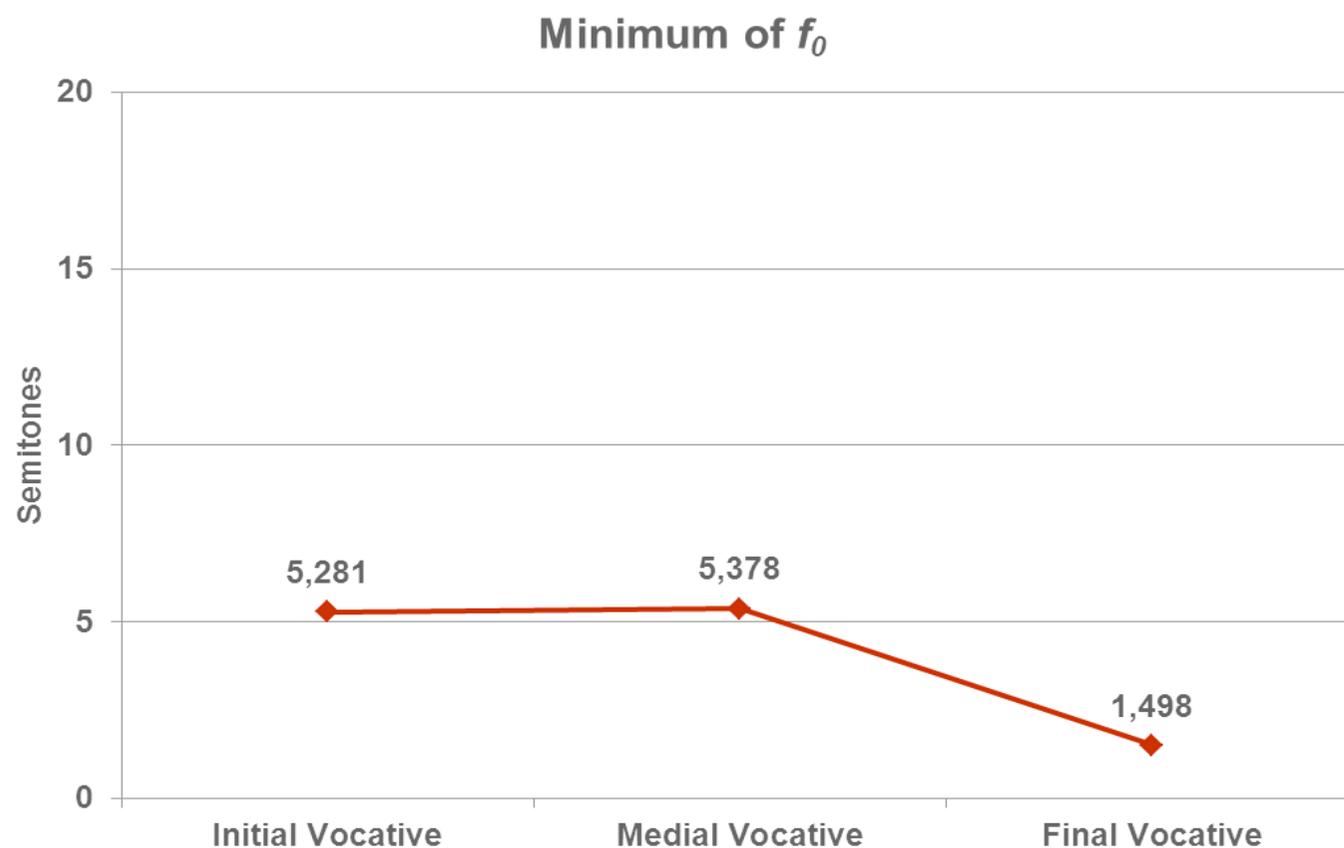


The statistical analysis shows significant differences between each of the distributions:

- initial and medial vocatives ($U = 1877, p = ,004$);
- initial and final vocatives ($U = 221,5, p < ,001$);
- medial and final vocatives ($U = 578,5, p < ,001$).

Data: Minimum of f_0

There is a significant effect of the distributional patterns of the vocative on the minimum of f_0 of the vocative ($H(2) = 130,826, p < ,001$).



The statistical analysis shows significant differences between the follow distributions:

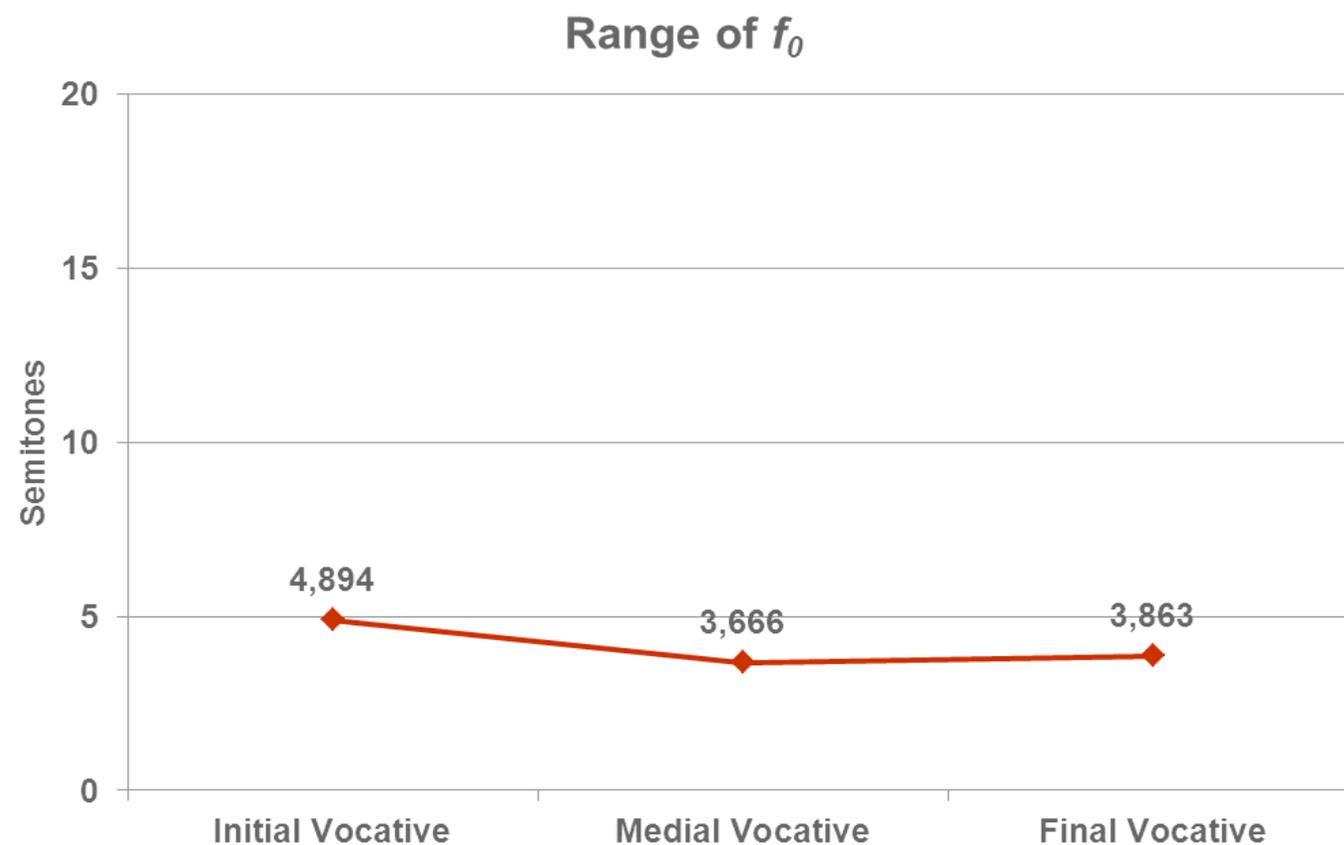
- initial and final vocatives ($U = 219, p < ,001$);

- medial and final vocatives ($U = 15, p < ,001$).

However, there is no significant differences between initial and medial vocatives ($U = 2555, p = ,882$).

Data: Range of f_0

There is a significant effect of the distributional patterns of the vocative on the range of f_0 of the vocative ($H(2) = 14,387, p = ,001$).



The statistical analysis shows significant differences between the follow distributions:

- initial and medial vocatives ($U = 1716, p < ,001$);

- initial and final vocatives ($U = 1971, p = ,013$).

However, there is no significant differences between medial and final vocatives ($U = 2134,5, p = ,068$).

Data: Pitch Accents

There is a significant effect of the distributional patterns of the vocative on the pitch accents of the vocative ($\chi^2(10) = 125,144, p < ,001$).

		Pitch Accents						Total
		H*	H*+L	H+L*	L*	L*+H	L+H*	
Initial Vocative	N	40	5	19	-	-	8	72
	%	55,6%	6,9%	26,4%	-	-	11,1%	100,0%
Medial Vocative	N	10	-	16	31	5	10	72
	%	13,9%	-	22,2%	43,1%	6,9%	13,9%	100,0%
Final Vocative	N	-	-	31	41	-	-	72
	%	-	-	43,1%	56,9%	-	-	100,0%
Total	N	50	5	66	72	5	18	216
	%	23,1%	2,3%	30,6%	33,3%	2,3%	8,3%	100,0%

The statistical analysis shows significant differences between each of the distributions:

- initial and medial vocatives ($\chi^2(5) = 59,479, p < ,001$);

- initial and final vocatives ($\chi^2(4) = 96,880, p < ,001$);

- medial and final vocatives ($\chi^2(4) = 31,176, p < ,001$).

Data: Boundary Tones

There is a significant effect of the distributional patterns of the vocative on the boundary tones of the vocative ($\chi^2(2) = 25,692, p < ,001$).

		Boundary Tones				Total
		!H- / !H%	H- / H%	L- / L%	No Boundary	
Initial Vocative	N	25	8	35	4	72
	%	34,7%	11,1%	48,6%	5,6%	100,0%
Medial Vocative	N	-	4	18	50	72
	%	-	5,6%	25,0%	69,4%	100,0%
Final Vocative	N	-	-	72	-	72
	%	-	-	100,0%	-	100,0%
Total	N	25	12	125	54	216
	%	11,6%	5,6%	57,9%	25,0%	100,0%

The statistical analysis shows significant differences between each of the distributions:

- initial and medial vocatives ($\chi^2(3) = 70,971, p < ,001$);

- initial and final vocatives ($\chi^2(3) = 49,794, p < ,001$);

- medial and final vocatives ($\chi^2(2) = 86,400, p < ,001$).

Data: Intonation Contours

There is a significant effect of the distributional patterns of the vocative on the intonation contours of the vocative ($\chi^2 (14) = 168,382, p < ,001$).

The statistical analysis shows significant differences between each of the distributions:

- initial and medial vocatives ($\chi^2 (7) = 88,305, p < ,001$);
- initial and final vocatives ($\chi^2 (5) = 96,880, p < ,001$);
- medial and final vocatives ($\chi^2 (4) = 31,176, p < ,001$).

Data: Intonation Contours

		Intonation Contours								Total
		H* / H* H- / H* H%	(L+)H* !H- / (L+)H* !H%	(L+)H* L- / (L+)H* L%	H*+L L- / H*+L L%	H+L* / H+L* L- / H+L* L%	L* / L* L- / L* L%	L*+H	L+H* / L+H* H-	
Initial Vocative	N	11	25	12	5	19	-	-	-	72
	%	15,3%	34,7%	16,7%	6,9%	26,4%	-	-	-	100,0%
Medial Vocative	N	10	-	-	-	16	31	5	10	72
	%	13,9%	-	-	-	22,2%	43,1%	6,9%	13,9%	100,0%
Final Vocative	N	-	-	-	-	31	41	-	-	72
	%	-	-	-	-	43,1%	56,9%	-	-	100,0%
Total	N	21	25	12	5	66	72	5	10	216
	%	9,7%	11,6%	5,6%	2,3%	30,6%	33,3%	2,3%	4,6%	100,0%

Data:

Intonation Contours

Taking into account the distribution patterns...

... in initial vocatives:

- there are some intonation contours that only occurred in this distribution, crucially the ones associated, in EP, with:

(i) vocative chant (greeting): $(L+)H^* !H^- / (L+)H^* !H\%$;

(ii) low vocative chant (insisting call): $(L+)H^* L^- / (L+)H^* L\%$;

(iii) command: $H^*+L L^- / H^*+L L\%$;

... in medial vocatives:

- there is a higher frequency of $L^* / L^* L^- / L^* L\%$, but there is also intonation contours with high ($H^* / H^* H^- / H^* H\%$) and rising ($L+H^* / L+H^* H^-$ and L^*+H) pitch accents;

... in final vocatives:

- there are only $L^* L\%$ and $H+L^* L\%$.

Data: Break Indices

There is a significant effect of the distributional patterns of the vocative on the break indices of the vocative ($\chi^2 (9) = 127,323, p < ,001$).

		Break Indices				Total	
		0	1	3	4		
Initial Vocative		N	-	4	43	25	72
		%	-	5,6%	59,7%	34,7%	100,0%
Medial Vocative	Left Boundary	N	7	7	57	1	72
		%	9,7%	9,7%	79,2%	1,4%	100,0%
	Right Boundary	N	21	29	19	3	72
		%	29,2%	40,3%	26,4%	4,2%	100,0%
Final Vocative		N	13	16	43	-	72
		%	18,1%	22,2%	59,7%	-	100,0%
Total		N	41	56	162	29	288
		%	14,2%	19,4%	56,3%	10,1%	100,0%

The statistical analysis shows significant differences between each of the distributions:

- initial and medial (right boundary) vocatives ($\chi^2 (3) = 66,515, p < ,001$);
- initial and final vocatives ($\chi^2 (3) = 45,200, p < ,001$);
- medial (left boundary) and final vocatives ($\chi^2 (3) = 8,282, p = ,041$);
- medial (left boundary) and medial (right boundary) vocatives ($\chi^2 (3) = 40,444, p < ,001$).

Data: Break Indices

Taking into account the distribution patterns...

... in initial vocatives:

- there is a prevalence of break indices of 3 and 4 (94,4%);

... in medial vocatives:

- there is a higher percentage of break indices of 3 and 4 on the left boundary (80,6%) than on the right one (30,6%);

... in final vocatives:

- there is no break indices of 4;
- there is a balance between break indices of 0 and 1 (40,3%), one the one hand, and 3 (59,7%), on the other hand.

Data: Break Indices

Additionally...

... there is a significant effect of the number of syllable of the vocative on the break indices of the vocative ($\chi^2 (9) = 127,323, p < ,001$).

The statistical analysis shows significant differences between:

- vocatives with 1 syllable and with 3 syllables ($\chi^2 (3) = 11,827, p = ,008$);
- vocatives with 2 syllables and with 3 syllables ($\chi^2 (3) = 23,088, p = ,000$).

However, there is no significant differences between vocatives with 1 syllable and with 2 syllables ($\chi^2 (3) = ,678, p = ,878$).

Discussion

There is a correlation between the prosody and the syntactic distribution of the vocative, since there are prosodic differences related to the distribution (initial, medial, and final) of the vocative in EP.

Discussion

Initial Vocatives:

- presence of intonation contours associated with isolated vocative in EP (Frota, in press):
 - (i) vocative chant (greeting): $(L+)H^* !H^- / (L+)H^* !H^\%$;
 - (ii) low vocative chant (insisting call): $(L+)H^* L^- / (L+)H^* L^\%$;
- presence of intonation contours associated with command in EP (Frota, in press): $H^*+L L^- / H^*+L L^\%$;
- higher levels of intensity can be related with emphasis (Ladd, 2008), and, therefore, with the pragmatic values of greeting, insisting call, and command;
- higher levels of f_0 (specifically maximum and range of f_0) can be associated with phonetic features of order in EP (Falé, 2005; Falé & Faria, 2007);
- the higher tendency to form major and minor intonation phrases points to the fact that initial vocatives tend to form an independent tonal unit (in fact, they are the only ones that form major intonation phrases);
- split up of the nuclear syllable when no post-tonic syllable is available (8 cases in 36 vocatives, about 22%) as described for isolated vocatives in EP (Frota, in press).

Discussion

Medial Vocatives:

- presence of a diversified behavior, since there are low, high and rising pitch accents, which have been associated with interpolated constituents in British English (Wichmann, 2000);
- presence of a lower and narrower pitch range, since there is a higher frequency of L*/ L* L- / L* L% and lower levels of range of f_0 , which have been associated with interpolated constituents in British English (Wichmann, 2000);
- presence of rising pitch accents (L+H*/ L+H* H- and L*+H) that suggest continuity and that, therefore, allow a parallel with interpolated parentheticals in EP (Viana & Frota, 2007; Frota, in press);
- the absence of major intonation phrases points to the fact that medial vocatives do not tend to form an independent tonal unit;
- the asymmetry between left and right boundaries of the medial vocative concerning break indices is evidenced by the higher percentage of break indices of 3 and 4 on the left boundary than on the right one;
- that asymmetry suggests that medial vocatives tend to be associated to the material that occurs at the end of the sentence.

Discussion

Final Vocatives:

- presence of a unified behavior regarding intonation contours and break indices;
 - (i) presence of only low and falling pitch accents ($L^* L\%$ and $H+L^* L\%$);
 - (ii) balance between break indices of 0 and 1, on the one hand, and 3, on the other hand;
- higher values of relative length can be related with the final lengthening preceding a major intonation phrase boundary in EP (Frota, 2000);
- the absence of major intonation phrases (like reported for medial vocatives) points to the fact that final vocatives do not tend to form an independent tonal unit.

Discussion

Furthermore...

...we can draw a distinction between initial and non-initial elements:

- initial vocatives:

- (i) tend to form independent intonation phrases;
- (ii) show similarities with isolated vocatives concerning intonation contours and the possibility of split up of the nuclear syllable;
- (iii) have higher levels of range of f_0 ;
- (iv) are related with the pragmatic values of greeting, insisting call and command;

- non-initial (medial and final) vocatives:

- (i) do not form major intonation phrases;
- (ii) have higher frequency of low pitch accents;
- (iii) show no significant differences regarding range of f_0 ;
- (iv) are probably related with the pragmatic value of a secondary interpellation (the main being the verb and its illocutionary force).

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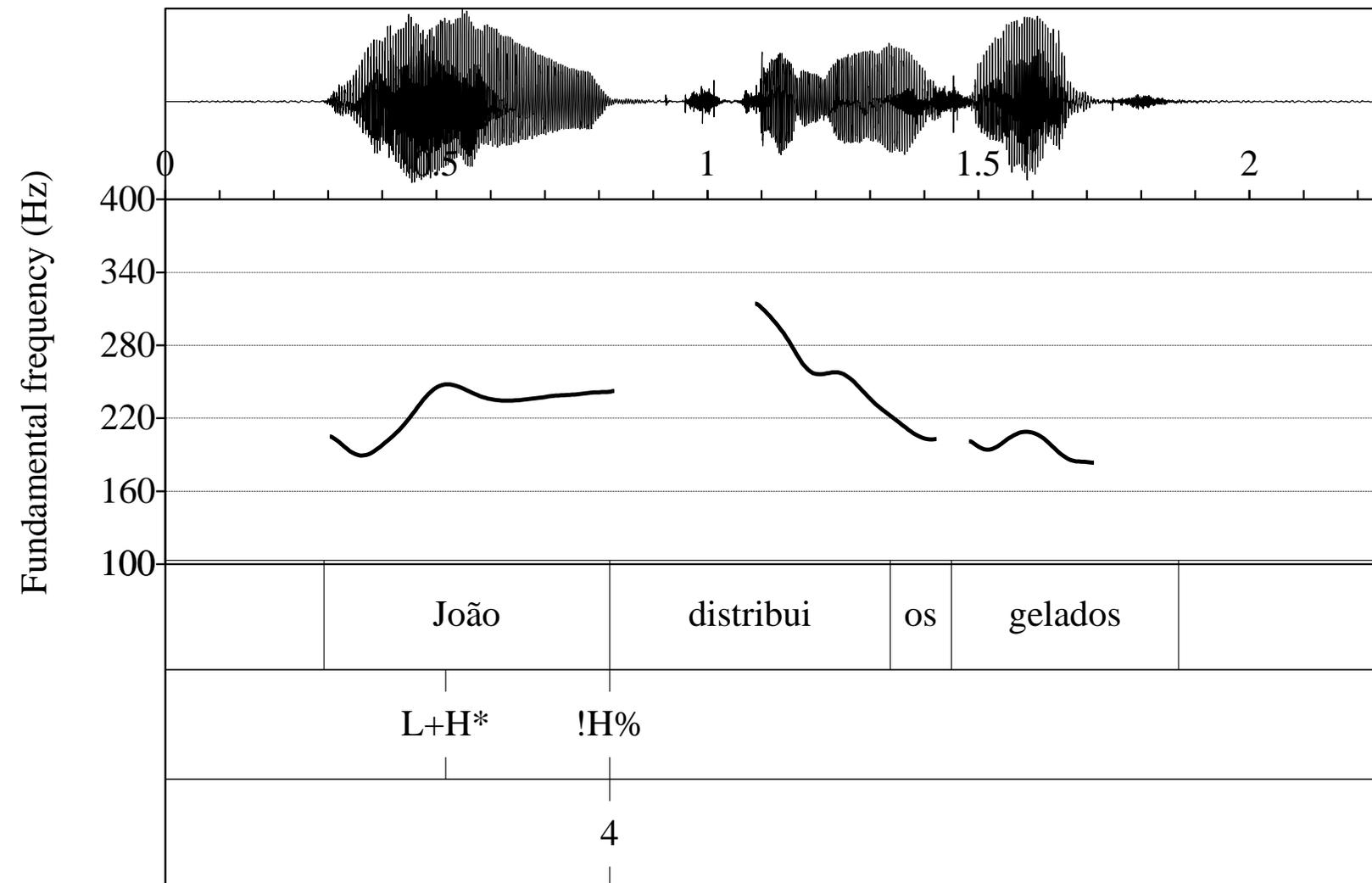
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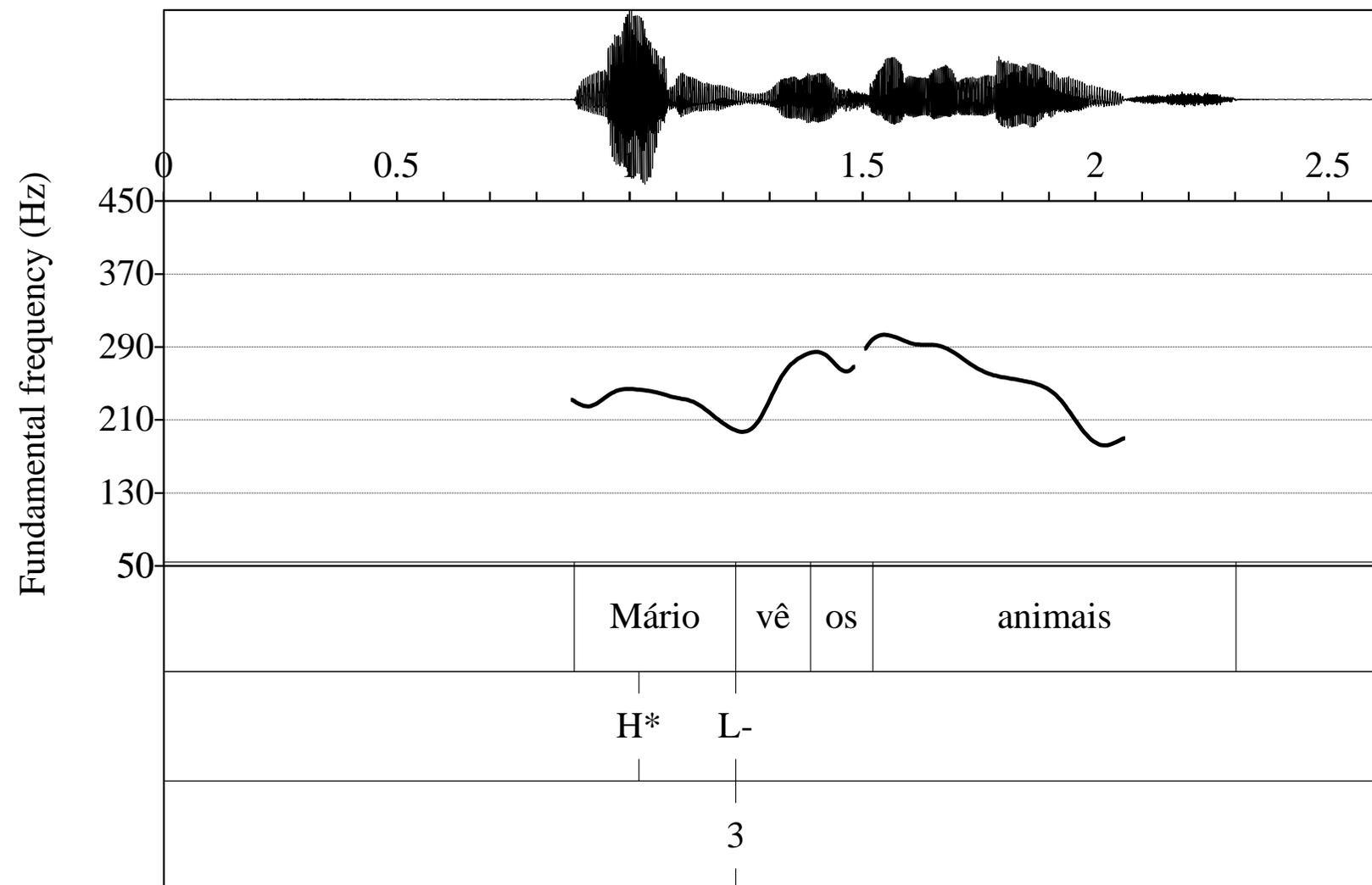
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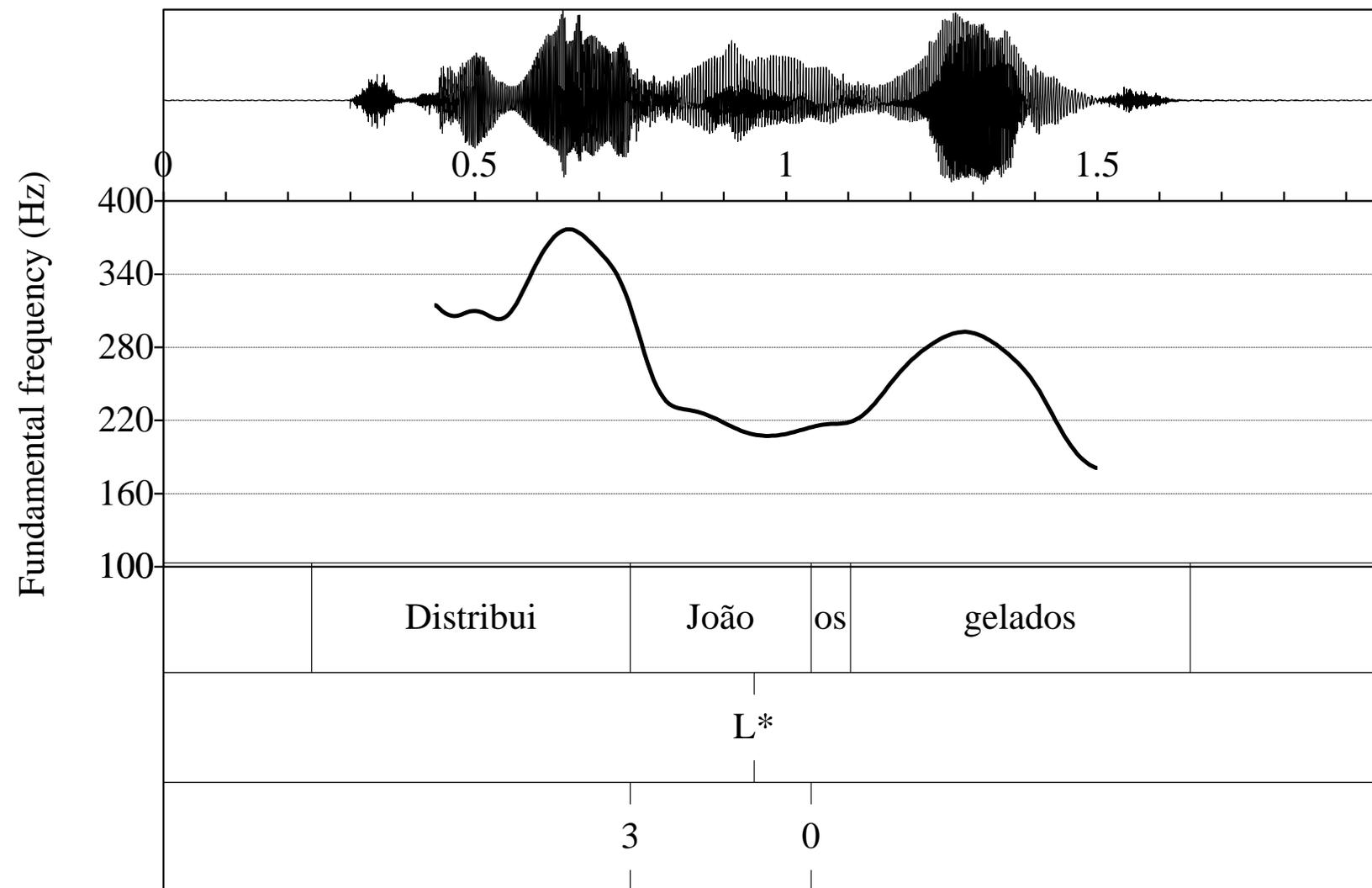
Initial Vocative



Initial Vocative



Medial Vocative



Final Vovative

