

CENTRAL CATALAN DECLARATIVES: THE RELATION BETWEEN FOCUS AND DOWNSTEP

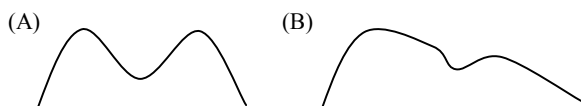
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ABSTRACT

In this paper we analyze the relationship between focus and downstep in Central Catalan declaratives produced with two peaks. In particular, we examine the hypothesis that broad focus is associated to a downstepped second peak whereas narrow focus blocks the downstep movement. Both broad and narrow focus structures have been analyzed. In utterances produced with narrow focus two variables have been taken into account, namely, the position of the focused material within the sentence (medial or final) and the triggering question (narrow focus triggered by contrast or by new information). The results seem to indicate that in Central Catalan broad focus is always associated with downstep but the link between narrow focus and non-downstep is not so categorical, but shows a continuum of downstep degrees. Overall, non-downstepped peaks are more likely to occur in contrast rather than in new information contexts and in final rather than in medial position.

1. INTRODUCTION

The main goal of this study is to analyze the relationship between focus and downstep in Central Catalan declaratives produced with two peaks (H(igh) pitch accents). In some languages (e.g. English [6]) the ordinary intonation of a declarative with two peaks can have two realizations: 1) the second peak (p2) can be equal to or higher than the first peak (p1) as in (A), and 2) p2 can be much lower than p1, as in (B). In pattern (B) p2 is downstepped with respect to p1, that is, p2 is scaled at a much lower frequency than p1. These two patterns can be found both in broad focus (i.e. focus on the whole utterance) as in “my uncle’s notebooks” (possible response to “what’s this?”), and in narrow focus (i.e. focus on a particular constituent) as in “my uncle’s NOTEBOOKS” (possible response to “your uncle’s pencils?”). Thus, both a downstepped and a non-downstepped p2 can be used in English declaratives regardless of whether there is a narrow focus intended in the last word or not.



However, in other languages (e.g. Portuguese [3] cited in [6]) a much closer relationship has been observed between the presence or absence of downstep and the conveyance of broad or narrow focus. In Portuguese, a downstepped p2 seems to be associated to broad focus, whereas the non-downstepped accent is related to narrow focus.

Since most studies on Central Catalan intonation [2, 8] agree with Portuguese in that the ordinary intonation of broad focus declaratives involves a much lower (downstepped) p2 (sometimes even described as a low tone), one of our aims here is to investigate whether in Catalan the association between broad focus and downstep, on the one hand, and narrow focus and lack of downstep, on the other, also applies.

In this study several Central Catalan declaratives produced with broad and narrow focus have been examined in line with Pierrehumbert’s model of intonational analysis [7]. This framework associates H(igh) and L(ow) tones to the accented syllables and at the edges of the contour. According to this model, the contour illustrated in (A) is interpreted as H* H* L-L%, where the star indicates association between the tones and the accented syllables and the sequence L-L% accounts for the intonation at the end of the prosodic domains. The downstepped contour in (B) can be characterized in two ways: 1) as H*+L H* L-L% [7] or 2) as H* !H* L-L% [5, 1]. The first option indicates that the trigger of the downstepped accent is the L valley after the first rise. In the second option downstep is accounted for by a particular item (!H*) in the phonological system. In this paper we assume the second proposal since H*+L can behave as a phonologically independent accent in Central Catalan [8].

2. EXPERIMENTAL DESIGN

The data analyzed in this study consisted of S(ubject) V(erb) O(bject) Central Catalan declaratives produced with broad focus (e.g. *els homes llimaven l’armari*, “the men planed the cupboard”), and the same structures with narrow focus on the verb (e.g. *els homes LLIMAVEN l’armari*) and on the object (e.g. *els homes llimaven L’ARMARI*). Narrow focus on the subject was not examined because these structures only consist of one peak. All sentences had three lexical stresses but were produced with two pitch accents. Both for broad and narrow focus, structures were elicited in a reading task, which allowed us to control the segmental string (consisting of voiced sounds only) and the stress distribution (avoiding contexts with a potential tone clash). Narrow focus structures were elicited as responses to two kinds of questions: 1) questions that prompted the correction or contrast of a previously mentioned item, and 2) questions that involved the eliciting of a piece of new information. For example, the utterance *els homes LLIMAVEN l’armari* was elicited by a contrast prompt (*els homes netejaven l’armari?* “did the men clean the cupboard?”) and by a new information question (*què feien els homes amb l’armari?* “what did the men do with the cupboard?”). The informants were 6 female Central Catalan speakers (identified as DV, ER, NM, NG, MC and CP) who read a total of 48 sentences each. Both speech and F0 signals were recorded for each sentence. An acoustic analysis and an auditory

analysis of the data were performed. For the acoustic analysis a time-aligned inspection of the speech waveform and the F0 contour was carried out.

3. RESULTS

3.1. Broad focus

As expected, sentences with a broad focus intonation were produced with two H pitch accents, associated to the first and last stressed/accented syllables. For all speakers the second H was downstepped with respect to the first H (i.e. H* !H*). This can be observed in Figure 1, which displays the mean values of p1 and p2 for all broad focus declaratives produced by each speaker. All speakers uttered p2 as a steadily falling slope, rather than a clear peak. This phenomenon has been observed in other languages, such as Mexican Spanish [9]. Here we analyze the falling slope as a possible realization of a downstepped H* that takes place when there is a considerable distance between p1 and p2 [4]. For each speaker, t-tests comparing the maximum height of the two peaks were performed in order to confirm the lowering of p2. For p2 the F0 maximum was considered to be the onset of the accented syllable. The results of the t-tests are presented in Table 1. The t-tests showed that for all speakers p2 was significantly lower than p1 ($p < 0.001$). Thus, double accented broad focus declaratives in Central Catalan are consistently produced with a markedly downstepped second peak, which seems to indicate that the relationship between downstep and broad focus is applicable in this language.

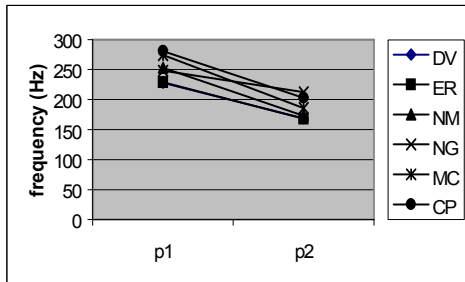


Figure 1. Mean p1 and p2 for broad focus declaratives produced by each speaker.

DV	ER	NM	NG	MC	CP
D	D	D	D	D	D

Table 1. Results of the t-test comparing the height of p1 and p2 in broad focus declaratives for each speaker. D stands for a downstepped p2 at $p < 0.001$.

3.2. Narrow focus

3.2.1. Medial position. Utterances with narrow focus in medial position (i.e. on the verb) were also produced with two pitch accents. The first pitch accent is still associated to the first stressed/accented syllable. The second pitch accent is now associated to the accented syllable of the verb. In this case, the last stressed syllable does not become accented since the word it belongs to is old information. As before, the second pitch accent is analyzed as an H tone. However, in contrast to broad focus declaratives, now the second H shows a clear peak in the F0 contour. The initial pitch accent of medial narrow focus

structures alternates between H* and L*+H. L*+H tends to convey a more contrastive nuance than H* but both tones are equally used by all speakers. As before, t-tests comparing the height of p1 and p2 were performed so as to see whether p2 was downstepped or not with respect to p1. The results of the t-tests are presented in Table 2. Figures 2 and 3 display the mean values of p1 and p2 for narrow focus triggered by contrast and by new information respectively.

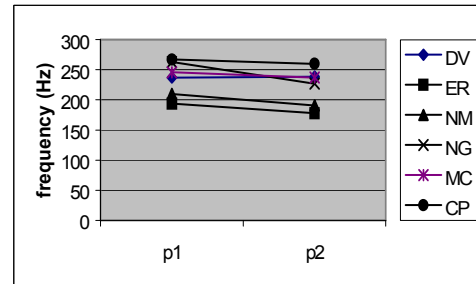


Figure 2. Mean p1 and p2 for medial narrow focus declaratives triggered by contrast.

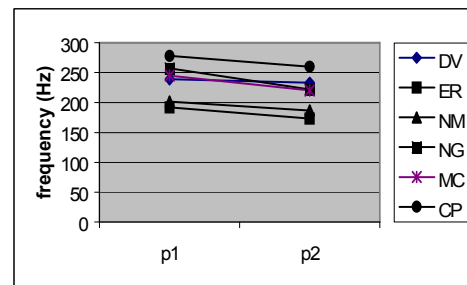


Figure 3. Mean p1 and p2 for medial narrow focus declaratives triggered by new information.

	DV	ER	NM	NG	MC	CP
Contrast	ND	D	D	D	ND	ND
New	ND	D	D	D	D	D

Table 2. Results of the t-test comparing the height of p1 and p2 in medial position for narrow focus triggered by contrast and by new information. D stands for a downstepped p2 ($p < 0.001$) and ND stands for a non-downstepped p2 ($p > 0.001$).

The results of the t-tests showed that both a downstepped and a non-downstepped p2 are used in Central Catalan declaratives to convey narrow focus in medial position. Three speakers (ER, NM and NG) produced a downstepped p2 both in new information and in contrast. One speaker (DV) produced a non-downstepped p2 in both cases, and finally two speakers (MC and CP) uttered a downstepped p2 in new information and a non-downstepped p2 in contrast. These results seem to show that Central Catalan declaratives with narrow focus in medial position do not display the expected link between non-downstep and narrow focus, since both a downstepped and non-downstepped p2 can be observed. Overall, our data shows that utterances where narrow focus is triggered by a contrast prompt are more likely to have a non-downstepped p2 than utterances where narrow focus is elicited by a new information question.

3.2.2. Final position. Utterances with narrow focus in final position (i.e. on the object) are also produced with two pitch accents associated to the first and last accented syllables. As in medial narrow focus declaratives, the first pitch accent can be associated to H* or L*+H. The second pitch accent is an H tone whenever narrow focus was triggered by new information. However, when narrow focus was triggered by contrast all speakers consistently used a different pitch accent, namely, H+!H*. According to [1], this tone consists of a step down on the accented syllable preceded by a high pitched material. This pitch accent has already been observed in the tone inventory of Central Catalan [8] and it is used with a didactic attitude. Thus, in utterances where final narrow focus was triggered by a contrast prompt, three peaks were observed in the F0 contour, the first one corresponding to the first pitch accent (H* or L*+H) and the other two corresponding to the second pitch accent (H+!H*). In this case, we still compared the scaling of p1 to that of p2 (leading tone of H+!H*). The results of the t-tests (Table 3) showed that the leading tone is not downstepped with respect to p1 for any speaker. As observed in Figure 4, all speakers uttered p2 at the same level as or even higher than p1 in focus triggered by contrast. In this case, the relationship between narrow focus and a non-downstepped p2 seems to be accomplished.

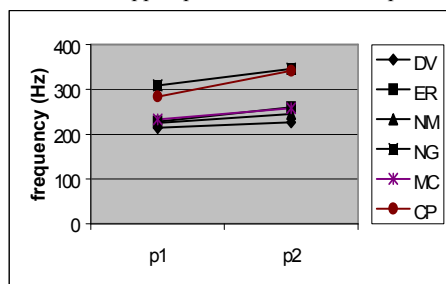


Figure 4. Mean p1 and p2 for final narrow focus declaratives triggered by contrast.

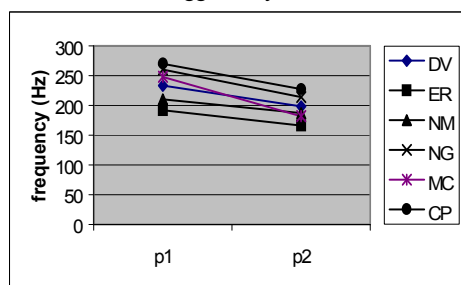


Figure 5. Mean p1 and p2 for final narrow focus declaratives triggered by new information.

	DV	ER	NM	NG	MC	CP
Contrast	ND	ND	ND	ND	ND	ND
New	D	D	D	D	D	D

Table 3. Results of the t-test comparing the height of p1 and p2 in final position for narrow focus triggered by contrast and by

new information. D stands for a downstepped p2 ($p < 0.001$) and ND stands for a non-downstepped p2 ($p > 0.001$).

Finally, the results of narrow focus in final position triggered by new information are very different from those observed in contrast, both as far as tone structure and downstep are concerned. In new information, the second pitch accent is an H tone, which is always scaled at a much lower frequency than p1. This can be observed in Figure 5. The results of the t-tests (Table 3) confirmed the behavior of a downstepped p2 for all speakers in final narrow focus elicited by a new information prompt. These results seem to coincide with the behavior observed in broad focus structures where a downstepped p2 was consistently produced. In order to see whether there are any differences between the scaling of p2 in broad focus utterances and in final narrow focus structures triggered by new information, we compared the mean difference between p1 and p2 in both kinds of structures. The values of the mean peak difference and the results of the t-test comparing the two values for each speaker are presented in Table 4. Although for most speakers (except for NG) the mean peak difference is higher in broad focus than in narrow focus, the results of the t-tests comparing the two mean differences happened to be non-significant ($p > 0.001$). This indicates that narrow focus structures triggered by a new information prompt in final position behave very similarly to broad focus sentences. This confirms the idea observed in narrow focus on medial position that in Central Catalan declaratives the relationship between narrow focus and non-downstep is not so categorical.

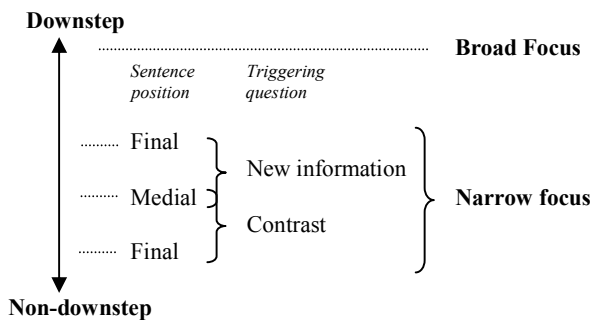
	DV	ER	NM	NG	MC	CP
Broad	59	52	49	36	87	78
Na-Fi-Ne	34	26	23	45	66	42
T-test	*	*	*	*	*	*

Table 4. Mean absolute peak difference in Hz between p1 and p2 for broad focus and narrow focus in final position triggered by new information (Na-Fi-Ne) and results of the t-test comparing the two mean differences. (*) indicates $p > 0.001$.

4. DISCUSSION

Overall, the data analyzed in this study showed that the ordinary intonation of double accented Central Catalan declaratives produced with broad focus involves a downstepped p2. The possibility of using a non-downstepped p2 in this position, as in English, is not encountered in our data. This seems to indicate that the association between broad focus and downstep is true for Central Catalan declaratives. Narrow focus declaratives, on the other hand, present a more variable behavior since both a downstepped and a non-downstepped p2 is observed in our data. Considerable differences are found in relation to the kind of question that triggers narrow focus. When narrow focus is triggered by new information, p2 tends to be downstepped both in medial and in final position. There is a possibility of using a non-downstepped p2 as well (as observed for one speaker in medial position) but the resulting intonation seems to be less natural. A perception test is expected to be carried out to confirm or discard this idea. When narrow focus is triggered by contrast, there is a much greater tendency of using non-downstepped tones. In final position this is observed for all speakers. In medial

position there is more fluctuation between a downstepped and a non-downstepped p2. This might be due to the fact that in medial position, other factors such as de-accenting of old material, also contribute to highlight the contrastive item(s), whereas in final position the focusing effect mainly depends on the last pitch accent. This might also explain the reason why all speakers used a more marked pitch accent (H+!H*) in this position. Thus, our data show that the association between narrow focus and downstep is not so categorical in Central Catalan. Different degrees of downstep can be observed in narrow focus depending on the position of the focused material within the sentence and the triggering question. This can be summarized as follows.



5. CONCLUSION

In this paper we analyzed the relationship between focus and downstep in Central Catalan double accented declaratives. We expected to find that a downstepped peak was mainly associated to broad focus and a non-downstepped peak to narrow focus. The results are true for broad focus structures where a consistently downstepped p2 is observed. However, the association between narrow focus and non-downstep is not fulfilled in our data, since both a downstepped and a non-downstepped p2 can occur in narrow focus structures. A continuum of downstep degrees is observed in narrow focus utterances depending on the position of the focal material within the sentence (medial vs. final) and the triggering context (contrast vs. new information). Narrow focus triggered by contrast is more likely to show a non-downstepped p2 than narrow focus triggered by new information. In narrow focus triggered by contrast the blockage of downstep is more consistent when the focal material is in final rather than in medial position. When narrow focus is triggered by new information a downstepped p2 tends to occur. The possibility of using a non-downstepped p2 in these structures is not ruled out but the resulting intonation seems to be less natural.

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