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Abstract

This paper explores an issue usually regarded as coming under the interaction of syntax and phonology. Sentential adverbs are a type of extra-sentential element and, like all extra-sentential elements, they are assumed to be both prosodically and syntactically independent of the phrase to which they are attached. For instance, the adverb ‘naturally’ in ‘She eats, naturally’ is considered to be syntactically independent and also to form an independent prosodic unit, as indicated by the comma in writing. One problem with this account is that extra-sentential elements are very different from each other syntactically, since they include parts of speech as diverse as nouns, adjectives, and adverbs. Another problem is the existence of prosodic variation. Using experimental data from English and Catalan, we have discovered a great deal of cross-linguistic variation in the intonation of sentential adverbs. This evidence suggests that the intonation of sentential adverbs, and that of extra-sentential elements in general, does not interact directly with syntax, and that it is better accounted for by a combination of semantic and pragmatic factors.

Keywords

Sentential adverbs, phrasing, extra-sentential elements, syntax, information structure

Languages

English, Catalan, Spanish, Portuguese, French, German, Dutch, Estonian

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Variation in the intonation of sentential adverbs in English and Catalan*

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1. Introduction

1.1. Sentential adverbs as a type of ‘extra-sentential element’

Sentential adverbs are adverbs such as “fortunately”, “frankly”, or “obviously”. These adverbs “represent modifications of the applicability of the clause content” so that “their semantic effect is to characterise how the propositional content of the clause relates to the world or the context” (Huddleston and Pullum 2002: 576). For instance, in “Fortunately, this did not happen” it expresses the extent to which something happening is a good or bad thing; or, as in “Frankly, I’m just not interested” it expresses the attitude the speaker has towards the speech act itself. Verb-phrasal adverbs, on the other hand, “denote modifications of the details of the predicate of a clause”. For instance, in “She walked defiantly to the door”, the adverb specifies the way in which the action denoted by the verb was carried out (Huddleston and Pullum 2002: 575ff).

Sentential adverbs have been traditionally considered as a type of “extra-sentential element”, along with vocatives (“*Anna*, your meal is ready”), dislocated phrases (“They are nice, *those girls*”), and non-restrictive relatives (“The necklace, *which her mother gave her*, was in the safe”), among others. Extra-sentential elements have also been called “sentence-external elements” (Ladd 1996), “tags” (Lieberman 1975), and “parentheses” (Fagyal 2002a, 2002b). They are assumed to have a similar phonological form in all languages that use them, in that, where they occur, they obligatorily form independent units, which are separated from the rest of the phrase by pauses, by lengthening, by tonal movements, or by a combination of these (Pierrehumbert 1980; Cooper and Paccia-Cooper 1980; Nespor and Vogel 1986; Nespor 1993; Cruttenden 1997). Extra-sentential elements (henceforth ESEs) seem to trigger the formation of independent phrases, and because of that they have commonly been regarded as an exception to the general lack of correspondence between the elements of the syntactic structure and the elements of the prosodic structure (e.g. Nespor and Vogel 1986; Nespor 1993). Hence, by closely signalling the syntax, ESEs appear as a counter-example to the theoretical tenet in intonational phonology that says that the influence of syntax over intonation is indirect, since it is mediated by factors such as prosodic constituency, meaning, and the distribution of information in the utterance.

ESEs have figured prominently in phonological studies where they have been used to justify the intonational phrase, or, in those approaches that recognise it, the intermediate phrase. The main problem with such phonological accounts is that ESEs do not fall into a single syntactic class; appositive clauses are syntactically governed because they are attached to the NP they modify while parentheses and vocatives are commonly analysed as being external to the syntactic structure. The status of non-restrictive relatives is subject to debate: for Emonds (1976, 1979), they are attached to S, the root sentence; for Safir (1986), they are attached at the level of Logical Form; for Fabb 1990, they belong to the level of discourse structure; and for Kempson et al. (2000), they are syntactic constituents. The

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status of other categories such as epithets (“He wouldn’t lend me his car, *the bastard*”) has not been addressed in the literature.

Another problem is that ESEs show puzzling differences between elements which are initial in the sentence and elements which are not. Initial elements receive full intonational prominence, while non-initial elements receive an intonation which is tonally subordinated to that of the main phrase. This tonal subordination is manifested either by reductions in prominence, leading even to total deaccentuation (Bonet 1984: 31-32 90; Ladd 1980: 163, 164-165; Liberman 1975: 182-184; Gussenhoven 1985, 1993, 2004: 290-295; Beckman and Pierrehumbert 1986: 293-298; Nespor 1993: 265; Prieto 2002b: 409ff), and/or by tonal reduplication (Gussenhoven 1985: 107; 2004: 315-316; Bonet 1984: 30, 34; Recasens 93: 214; Prieto 2002b: 428-430). It is not clear, however, why the same element in the same phrase should be pronounced in a different way depending on whether it appears in first position or not, as it is not clear whether the different mechanisms used for signalling tonal subordination also have different functions.

A further problem is the evidence of prosodic variation among ESEs, as observed in the literature and also in the results of a previous study (Astruc 2003, 2005a). It has been observed, for instance, that vocatives in initial position constitute the exception to this rule, since they can also be integrated into the main phrase. In medial and final position, different types of ESEs show different types of tonal subordination: dislocations, quotations markers, and epithets show deaccentuation while parentheses, non-restrictive relatives, and appositions show tonal reduplication at a lower level and with a compressed pitch range (Astruc 2005a, 2005b). This lack of prosodic homogeneity casts doubts on the commonly assumed view that ESEs should compulsorily form independent phrases, since this prosodic property is taken to follow from their assumed syntactic independence. The reported asymmetry between initial and non-initial elements, together with the evidence of prosodic variability, casts further doubts. In this study we are examining a clear-cut category, that of sentential adverbs. Variation in the prosodic form of this category, within or across the languages in the study, would point to the inadequacy of the usually held view that the prosodic form of ESEs is determined by their syntactic form.

1.2. Sentential adverbs and verb-phrasal adverbs

Adverbs probably constitute one of the most frequently used and also one of the least homogeneous of all grammatical categories, as has been observed in the literature, from early studies (Karcevskij 1936) to recent work (Huddleston and Pullum 2002). Heterogeneous as adverbs are, however, it is generally agreed that they fall into one of two broad groups: those that are obligatory and those that are optional. Obligatory adverbs are associated with a verb of movement, situation, or behaviour, as in “John goes there”, “John stays here”, or “John treats his friends well” (Laenzlinger 1998: 40-41). Optional adverbs in turn are divided into two categories: those that are said to modify sentences, and those that are said to modify verb phrase constituents (Jackendoff 1972: 47ff, Nilsen 1972: 156-157, Swan 1988: 1, McCawley 1980: 664, Reinhart 1983: 63, Huddleston and Pullum 2002: 575ff). The first category is known as sentential adverbs, and the second category is known as verb-phrasal adverbs, and both have different semantic and pragmatic functions, which correlate with their respective syntactic and distributional differences (Huddleston and Pullum 2002: 576). These differences can be picked up by testing their distributional properties and their breadth of scope, and can be used to distinguish one category from the other.¹ Therefore, sentential adverbs constitute a relatively clear-cut subcategory even if the general category “adverb” is in itself not easily amenable to definition.

Sentential adverbs can be divided into two main categories and several semantic sub-categories, which vary in number and type according to different authors. The two main categories are content-oriented sentential adverbs (that is, adverbs that modify, qualify, or add information to the content of the proposition) and speaker-oriented sentential adverbs (adverbs that are only concerned with the speaker’s judgement about the content of the

proposition) (Jackendoff 1972: 56ff, Schreiber 1972: 321; Lindquist 1989: 39ff; Hoyer 1997: 180-199; Laenzlinger 1998:42-43; Salazar 2005: 4).

Huddleston and Pullum (2002) propose five sub-categories of sentential adverbs:

- i) domain: “Politically, the country is always turbulent”
- ii) modality: “This is necessarily rather rare”
- iii) evaluation: “Fortunately, this did not happen”
- iv) speech-act: “Frankly, I’m just not interested”
- v) connective: “Moreover, he didn’t even apologise”

Allerton and Cruttenden (1974), following semantic criteria, propose that sentential adverbs can be subcategorized into four main types and ten sub-types. Other authors identify seven or more sub-categories. We assume that the core categories are those identified in Huddleston and Pullum (2002), as listed above. Of those, *modality*, *evaluation*, and *speech-act* are the most relevant ones for this study because they can be contrasted with the homophonous manner adverbs in final position. Modality and evaluation adverbs are content-oriented while speech-act adverbs are speaker-oriented.

1.3. Intonation of sentential adverbs: previous studies

Sentential adverbs in English have received more in-depth attention than any other category of ESE. They have been studied in detail by Allerton and Cruttenden (1974, 1976, 1978), and also by Gussenhoven (1985), and by Bing (1984, 1985), and have also been discussed by Pierrehumbert (1980), and in Catalan by Bonet (1984), Recasens (1993), and Prieto (2002b). There is widespread agreement about sentential adverbs forming independent units, although there is less agreement regarding their accentuation. Most work in English describes them as deaccented, with the exception of Cruttenden (1997, and elsewhere) and Hoyer (1997). As for sentential adverbs in Catalan, no strong claims are made as regards whether they receive a pitch accent or not.

Bing, in her doctoral dissertation (1975, published in 1985) and in a follow-up article (1984) deals with sentential adverbs, among other ESEs. Sentential adverbs, like other ESEs (her “Class 0 elements”), are not taken into consideration in the semantic interpretation of the sentence, and they are characterised (in non-initial position) by being deaccented, by being set off by prosodic breaks, and by taking optionally a final rise (Bing 1985: 26-27, 48).

Allerton and Cruttenden (1974) present a detailed account of the intonation of sentential adverbs in medial and final position. As regards accentuation and phrasing status, three possibilities are considered. Sentential adverbs can be deaccented and prosodically integrated in the main phrase, as part of the postnuclear tail; they can be accented and integrated in the main phrase, as the nucleus; or they can be in an independent intonational unit with its own contour. The possibility of finding sentential adverbs which are both deaccented and prosodically detached is not contemplated by these authors. Despite the tendency for adverbs to diverge in intonation as much as they do in meaning, a few generalizations about the behaviour of sentential adverbs in final position arise from the description in Allerton and Cruttenden (1976). To start with, sentential adverbs receive an independent intonational contour when there is a possibility of confusing them with a manner adverb in final position. For instance, “naturally” would be integrated in the main phrase in “Richard played naturally” (“in a natural manner”) but not in “Richard played, naturally” (“of course”), in which case the sentential adverb would receive an independent intonational contour.

Pierrehumbert includes sentential adverbs in the class of ESEs, which she calls “tags”, following Liberman 1975 (Pierrehumbert 1980: 49-54). All categories of ESEs are supposed to behave homogeneously as regards phrasing and intonation, except for an asymmetry in the intonation of ESEs in final position (“He forgot, *unfortunately*”), where the ESE has a “distinctive lack of pitch accents”, and in initial position (“*Unfortunately*, he forgot”), where

the ESE either receives an independent contour or is treated as a part of the following phrase (Pierrehumbert 1980: 53). Pierrehumbert also points out that, in spite of substantial pre-boundary lengthening, the ESE is not felicitously set off from the rest of the phrase. The argument is that, if it was, the ESE would be interpreted as a completely unrelated statement. However, as becomes clear in Beckman and Pierrehumbert (1986: 293-298), the problem in recognising the independence of the ESE seems to be caused by the mismatch between melody and rhythm. Beckman and Pierrehumbert (1986) propose that ESEs (which in their study are considered also to include accented categories such as polarity questions, as in “Mary will win, won’t she?”) form independent intermediate phrases and that they are accented, though with a very subordinated tonal pattern.

Cruttenden (1997: 35-36) maintains that sentential adverbs in final position should be analysed as forming independent intonational units, and that those cases in which they occur in the same unit as the main phrase should be considered as instances of “tonal sandhi”, that is, as the merging of independent tonal groups.

Previous studies tend to agree about sentential adverbs forming independent units but they do not agree about their accentuation. Such discrepancies in the literature can reflect true variability, can be theoretically motivated, or perhaps both. The objective of this study is to elucidate this point by analysing the phrasing and intonation of sentential adverbs in two languages, English and Catalan.

2. Goals and predictions

2.1. Goals

The broad research question is concerned with the accentuation and with the separateness of the core sentential adverbs (that is, modality, evaluation, and speech-act adverbs) in relation to the main phrase. Are these sentential adverbs deaccented? Are they independent of the main phrase?

A further research question is concerned with cross-linguistic differences in the accentuation of sentential adverbs between English and Catalan. It is known that English and Catalan have different ways of marking the information which is assumed to be familiar (the “theme”) and the information which is new (the “rheme”). In English, this distinction is marked mainly by intonation, that is, by shifting around the accentual prominence to signal the most informationally relevant part of the phrase. It has been argued that in Catalan, and in Romance languages in general, the same result is achieved mainly by syntactic means, namely, by changing the word order while the nuclear accent remains in a fixed position, which generally coincides with the last stressed syllable (Bolinger 1954; Vallduví 1990, 1994, 1996, and elsewhere; Steedman 1991, 2000; Swerts et al. 2002; Koktovà 1998). Consequently, languages can be classified into “intonationally non-plastic” and “intonationally plastic” (Vallduví’s terms) according to whether they predominantly use changes in word order or changes in intonation to encode information structure. Languages such as English, German, and Dutch are “intonationally plastic”, and languages such as Spanish, Catalan, and Romance languages in general, are “intonationally non-plastic” (Vallduví 1990, 1994, 1996).

It can be expected that sentential adverbs in final position will be prosodically marked in an equally unambiguous way in English and in Catalan, though their precise prosodic form might be slightly different. For instance, Catalan speakers are not expected to deaccent sentence-final adverbs as readily as English speakers do. From descriptions in the literature, it is expected that sentential adverbs will form independent phrases. One of the main goals of the experiment is to test this claim. The other main goal is to quantify the instances of deaccentuation in English and Catalan to check whether any differences can be found between these two languages. Since these languages differ in their degree of intonational plasticity, that is, in their capacity for encoding pragmatic contrasts intonationally, finding cross-linguistic differences would offer support for a pragmatically-oriented analysis of sentential adverbs and of extra-sentential elements in general.

Therefore, given the difference in the degree of intonational plasticity of English and Catalan, we predict:

1 Cross-linguistic differences in the accentuation of sentential adverbs, but not in their phrasing. Sentential adverbs are expected to be deaccented less frequently in Catalan than in English.

2 Differences between manner and sentential adverbs. It is expected that manner and sentential adverbs can be unambiguously distinguished prosodically, either by their phrasing, by their accentuation, or by both.

In this study, phrasing and accentuation are considered to be independent systems, as proposed by Trim (1959) and by Ladd (1980: 164), among others. Phrasing is taken to be based on junctural cues (such as pauses and/or pre-boundary lengthening²), without tonal movement being obligatory.

3. Methodology

3.1. Experimental material

A controlled production experiment was designed to compare pairs of sentential and manner adverbs in final position, such as:

- (1) a. I don't agree with you, personally (sentential adverb)
b. She deals with me personally (manner adverb)

The phrases were designed to compare three groups of sentential adverbs (modal, evaluative, and speech-act adverbs), as well as their equivalent manner adverbs, in two languages, English and Catalan. The material used in this experiment consisted of 78 phrases in English and 74 in Catalan. They were read twice by five Southern British speakers and five Central Catalan speakers, thus making a corpus of 760 tokens in total (see Appendix).

The target sentential adverbs are seven modal adverbs (possibly, probably, evidently, actually, really, undoubtedly, obviously), ten evaluative adverbs (fortunately, unfortunately, happily, sadly, amazingly, oddly, rightly, naturally, inevitably, normally)³, and five speech-act related adverbs (frankly, honestly, simply, personally, strictly). All of them have a manner counterpart, with the exception of the first five modals (possibly, probably, evidently, actually, really)⁴⁵. The adverbs were inserted in phrases adapted from examples found in the Oxford English Dictionary on-line, which was used as a searchable corpus, and they were translated into Catalan. The main criteria were that the examples had to be semantically equivalent in English and Catalan and that they had to sound natural. It was decided to favour semantic and pragmatic naturalness, even though this might imply the loosening of segmental control, because it was important to ensure that every phrase was interpreted unambiguously. It was also considered important to keep the pragmatic context as constant as possible, with a broad focus interpretation, so as to avoid anaphoric deaccenting. Whenever necessary, the carrier phrase was preceded by an introductory sentence that clarified the intended interpretation, as for instance in:

- (2) a. Am I enjoying the concert?
b. It is rather boring, *frankly*

The target sentences were mixed with fillers (two sentences per page, one at the top and one at the bottom) to avoid discontinuities in the reading, and with distractors. The fillers were discarded but the distractors, which were different types of ESE, were selected for a later analysis (reported in Astruc 2005a).

3.2. Informants

There were eight Catalan and eight English informants. The Catalan informants, four males and four females, were in their mid-thirties and they had undertaken graduate studies. They were holding different professional jobs. They were born and raised in the province of Tarragona, or they had been living and working there for over 15 years. They spoke “Tarragoní”, or “Tarragona Catalan”, which is considered as a sub-dialect of Central Catalan (Recasens 1977). Of all eight recordings, five were analysed for this experiment and three were left for a later analysis. The criteria for picking these five recordings were, first, the quality of the recording, second, the fluency in reading, and, third, the absence of voice source characteristics likely to cause perturbations in F0 tracking.

The English group consisted of eight Southern British speakers, four males and four females. All had been born and raised in this dialectal region, with the exception of one of them who has been living there for over 20 years. Their ages ranged from mid-twenties to early forties, and all of them had undertaken graduate studies. Five of the speakers were working as teachers (of various subjects such as mathematics, physics, and languages) in Cambridge, and three of them were graduate students. As before, five speakers were selected for the analysis on the criteria of fluency and of absence of voice source characteristics that would cause problems for F0 tracking.

4. Results

4.1. Phonological analysis

Using Praat 4.1.2.1, the target utterances were digitized at 16kHz and analysed auditorily and instrumentally. The analysis consisted in identifying and labelling any pitch accents in the target adverbs and of identifying the location and type of any prosodic break. Also, a selection of Catalan data was measured at the syllabic centres to study the scaling of the nuclear accent

The location of prosodic boundaries was a straightforward task, just as also was the identification of pitch accents. Labelling the Catalan nuclear accents was more challenging. It is known from descriptions in the literature that the nuclear accent of Catalan unmarked declaratives has different manifestations according to the metrical structure of the text. In shorter texts, where there is only one metrical position available, the nuclear accent is marked by a pitch peak. In longer texts, after one or more pitch accents, the nuclear accent is relatively low. Fig. 1 below shows two examples (adapted from Prieto 2002a: 191) of the low-high nuclear alternation.

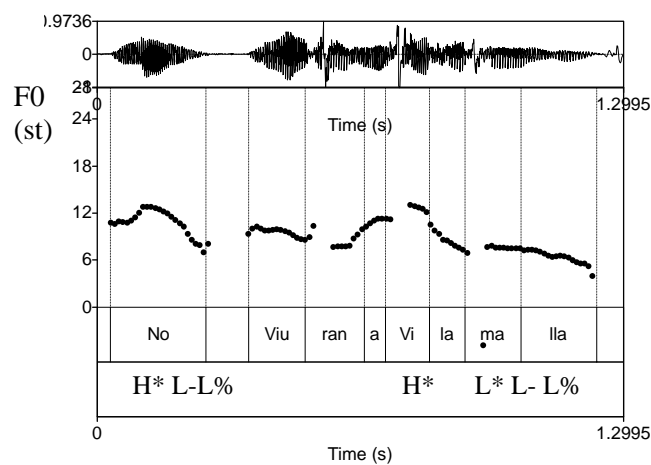


Fig. 1. Pitch traces corresponding to the phrases *No* (‘No’) and *Viuran a Vilamalla* (‘They will live in Vilamalla’)

The “low” nuclear accent of longer utterances, as shown in the pitch trace of the second phrase, usually lacks any tonal excursion, and its prominence is mainly manifested in its duration and its amplitude. It sounds loud, as can be deduced from the amplitude of the speech wave in Fig. 1 and also in Fig. 5 below, and it is also perceived as long, and the two traits combined determine that it sounds prominent. It was not difficult to decide between deaccentuation and “low nuclei”. However, the phonological characterisation of such nuclei has proved more difficult. Previous work on Catalan has proposed either a L^* (eg Bonet 1984, Prieto 1995) or a $!H^*$, that is, a strongly downstepped H^* subjected to final lowering (Estebas-Vilaplana 2000), or a $H^*[L^*]$, a tune composed of an overt and of an underlying tone, which would surface or not depending on the segmental structure of the text (Prieto 2002a). It is this underlying L^* which would form the low nucleus of longer utterances. The disadvantage of the L^* analysis in Catalan is that one-accent tunes cannot receive the same analysis as longer tunes can receive. This peculiarity, the alternation of H^* and L^* nuclei depending on the metrical positions available in the phrase, has already been described by Bonet (1984), by Estebas-Vilaplana (2000), and by Prieto (2002a, and elsewhere). The theoretical discussion runs in parallel with the discussion in other totally unrelated languages, such as for instance Estonian. As discussed in Asu (2003: 93-94), there are mainly two approaches in the literature to the phonological classification of the so-called “low” nuclear accents. One approach considers them as actual low accentual targets, and thus categorically distinct from peaked accents. This is the view taken in the analysis of German in Baumann et al. (2001), of Portuguese in Frota (1998), and of Estonian in Asu (2003). The other approach treats “low” nuclei as downstepped and strongly lowered realisations of high targets. This is the proposal adopted in Gussenhoven et al. (1999) for Dutch, in Grabe (1998) for German, in Post, for French (2000), and in Estebas-Vilaplana (2000) for Catalan.

Therefore, a subset of the data, 83 four-syllable sentential adverbs from 5 speakers, was measured to explore the alignment and scaling of the “low” Catalan accents, as described in Astruc (2005). Five measurements were taken at the mid-point of the four vowels (s1 to s4) and at the final low ($L\%$). It was found that the nuclear accent (on the fourth syllable, s4) was scaled lower than any other target, with the exception of the final low ($L\%$). The F_0 descent from the nuclear accent to the final low formed a gradient continuum of falling slopes, in a very similar way as reported in Grabe (1998) for German.

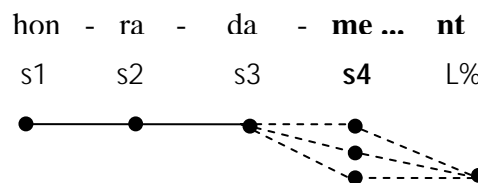


Fig. 2. Schematic representation of the scaling of the nuclear accent in four-syllable sentential adverbs, after Grabe (1998)

Fig. 2 (adapted from Grabe: 1998, her Fig. 10) shows the schematic representation of the pitch contour of a four-syllable sentential adverb, “honradament” (“honestly”) with the four syllables marked as s1, s2, and so forth, and the final low as $L\%$. The nuclear syllable is the last one, s4, “-ment”. The dashed lines connecting the syllables, s3, s4, and the final low indicate that the speakers can vary the scaling of F_0 on s4, the nucleus, and thus the slope of the fall. Grabe analyses this accent as a H^*+L^6 bitonal accent, the same phonological entity as in English, but which in German receives a totally lowered phonetic realization. We also propose for the Catalan nucleus a downstepped and lowered bitonal accent, which receives variable scaling. Unlike Grabe’s analysis of the German nuclear accent, we analyze the nuclear accent of Catalan sentential adverbs as a $H+L^*7$, on the grounds that there is no further lowering after the stressed syllable, in fact nearly all the realisations are already low on the stressed syllable. An $H+L^*$ analysis would be in line with the analysis proposed for

other Romance languages (varieties of Spanish: Beckman et al. 2002; European Portuguese: Frota 1998).

The advantage of analysing the “low” nucleus of both multi-accent and one-accent tunes as a bitonal H+ L* accent is that it allows us to treat in the same way multi-accent phrases and one-accent phrases. It also allows us to account for the tonal reduplication found with other type of ESEs, such as appositions, non-restrictive relatives, and parentheses. Other analyses, which account equally well for the short-long tune alternation, are also possible. However, more detailed consideration falls beyond the scope of this study (see Astruc 2005a for a discussion of alternative proposals).

After examining the phonetic and phonological characteristics of the Catalan nuclear accent, two more rounds of analysis were carried out a few weeks apart, without having at hand the previous transcriptions. Virtually no divergences were found between these last two analyses.

Another problem in the analysis of sentential adverbs and of ESEs in general stems from an important tenet of the Autosegmental metrical framework (the framework assumed in this study), which postulates that every intonational unit should have at least one pitch accent. The potential for conflict originating from this tenet has been noted, for instance, by Cruttenden (1997: 35-37), and more recently, by Hansson (2003: 9-11) in her work on phrasing in spontaneous Swedish. Extra-sentential elements, especially in phrase-final position, provide many instances of mismatch between rhythm and melody, as shown in the pitch traces below.

4.2. Results

In Fig. 3 below is the English adverb “inevitably”, as an example of a sentential adverb in the phrase “He ended up with no money, *inevitably*”, and in Fig. 4 is the same adverb as an example of a manner adverb in “This conclusion follows *inevitably*”. Both are read by MR, a male speaker.

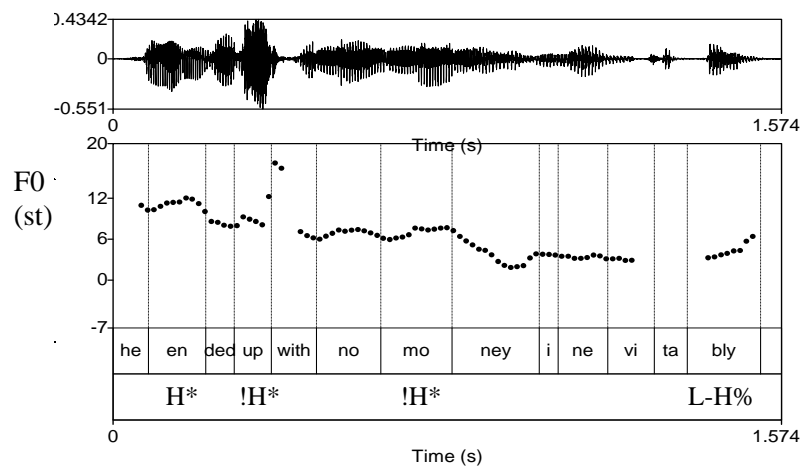


Fig. 3. An example of sentential adverb in English: “He ended up with no money, *inevitably*”

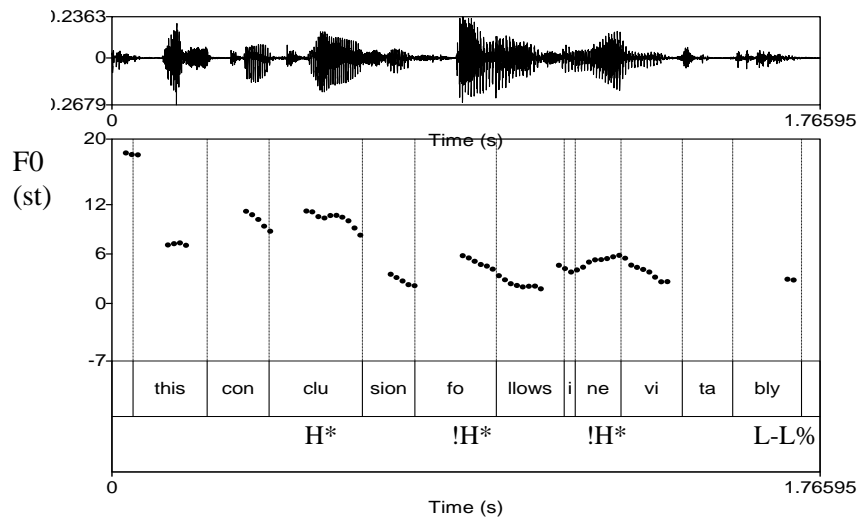


Fig. 4. An example of manner adverb in English: “This conclusion follows *inevitably*”

Where it functions as a sentential adverb, as in Fig. 3, “inevitably” does not receive any accentuation. Perceptually, deaccented sentential adverbs such as “inevitably” in Fig. 3 sound monotonous, and also less loud and overall less prominent. Instrumentally, the lesser intensity can be deduced from the reduced amplitude of the speech wave, while the flat intonation is visible in the F0 contour. The small rise in pitch at the onset of the first syllable, /i/, reflects the re-setting of F0 after the low boundary tone at the end of the word “money”. And the rise right at the end is not aligned with any stressed syllable, but, rather, is a final boundary tone (in this case a H%). Conversely, where it appears as a manner adverb as in Fig. 4, “inevitably” both receives a pitch accent, a H* which sounds loud and prominent, and forms an intonational unit with the main phrase.

The characteristics of the contour of the sentential adverb “inevitably” are common to most sentential adverbs in English. These characteristics are deaccentuation, prosodic independence (in this case marked by a low boundary tone), and being followed by a terminal rise. The combination of deaccentuation and independent phrasing poses a theoretical problem for the Autosegmental metrical framework.

Catalan sentential adverbs also have a set of identifiable characteristics, as exemplified with the Catalan adverb “desafortunadament” (‘unfortunately’), which in Fig. 3 appears as a sentential adverb in the phrase “El cotxe es va espallar, desafortunadament” (‘The car broke down, unfortunately’), and in Fig. 5 below appears as a manner adverb in “De vegades fem servir les paraules desafortunadament” (‘We sometimes use words unfortunately’). Both are produced by the same male speaker.

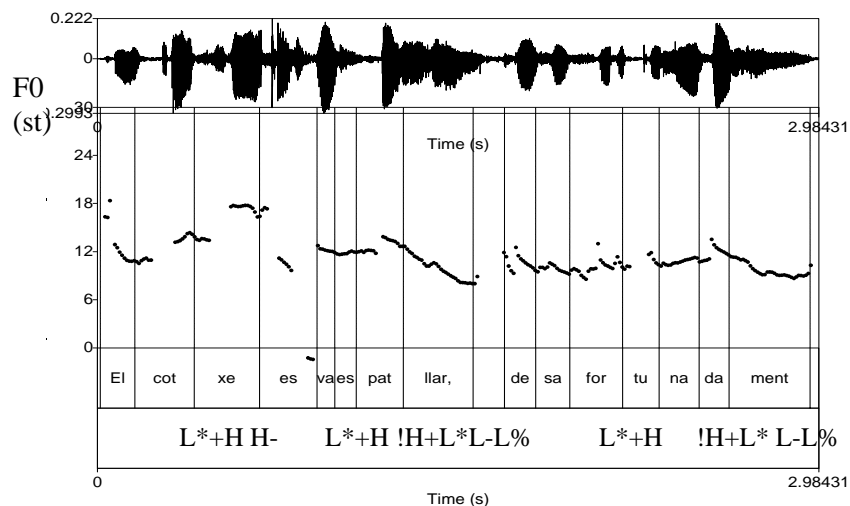


Fig. 5. An example of sentential adverb in Catalan: “El cotxe es va espavillar, desafortunadament” (‘The car broke down, unfortunately’)

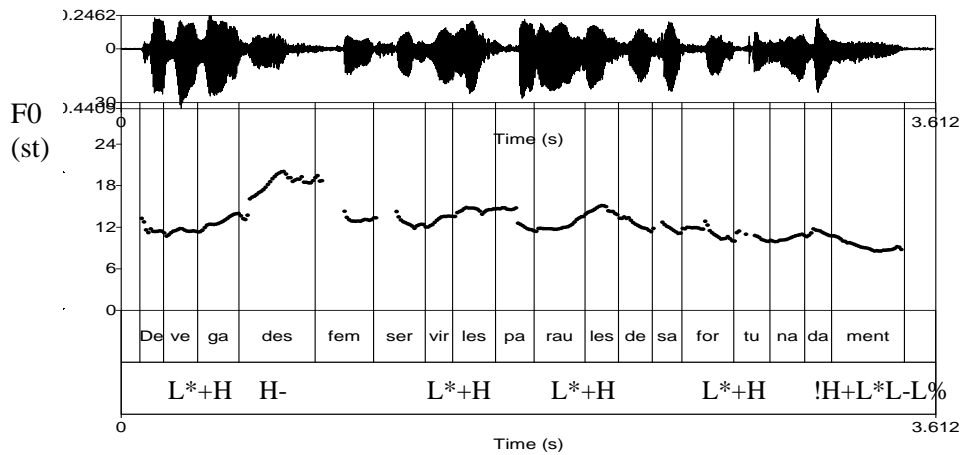


Fig. 6. An example of manner adverb in Catalan: “De vegades fem servir les paraules desafortunadament” (‘We sometimes use words unfortunately’)

As in English, in Catalan the manner adverb in Fig. 6 is accented, with an accent which is already low over the nuclear syllable, *-ment*, and it forms a single intonational unit together with the main phrase. Like the English example in Fig. 4, its sentential counterpart in Fig. 5 forms an intonational phrase of its own, separated by a phrase accent and a low boundary tone (L-L%). But it differs from the English adverb in that it is accented: it receives the same “low” accent as the Catalan manner adverb in Fig. 6 does. An example of Catalan deaccented sentential adverb is shown in Fig. 7 below:

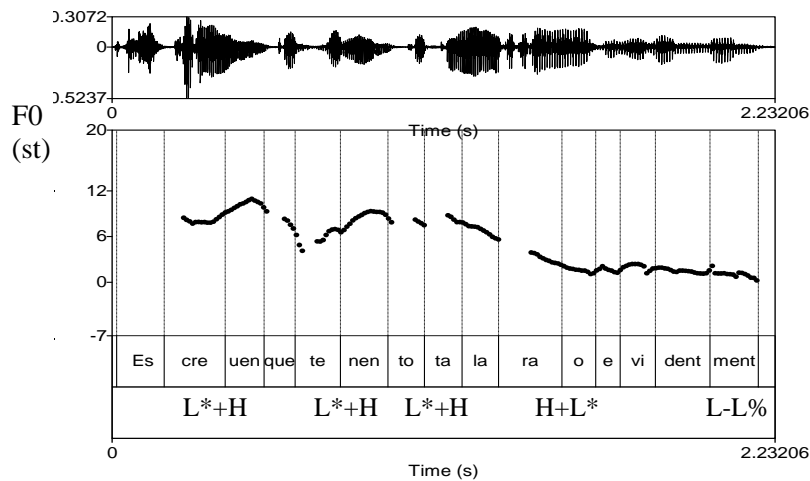


Fig. 7. An example of deaccented sentential adverb in Catalan: “Es creuen que tenen tota la raó, *evidentment*” (‘They think that reason is on their side, evidently’)

Therefore, it appears that English sentential adverbs tend to be mostly deaccented, and that this intonational cue correlates with rhythmic cues to distinguish them unambiguously from manner adverbs. In Catalan, both types of adverbs can be accented, though the proportion of accented tokens is significantly higher for manner adverbs than it is for sentential adverbs, as we see in the pie charts in Fig. 8, and as was confirmed statistically.

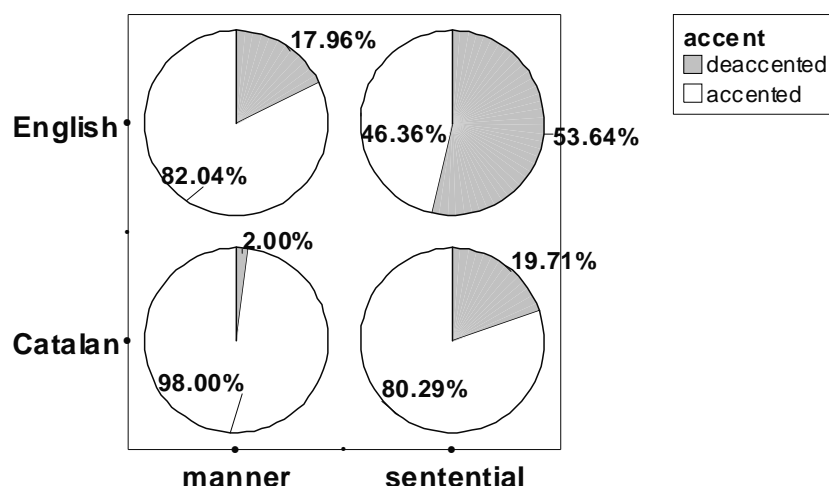


Fig. 8. Percentages of accented and deaccented sentential and manner adverbs in English and in Catalan

The pie charts in Fig. 8 show the percentages of accented and deaccented sentential and manner adverbs in English and in Catalan for the 10 speakers of this study. The type of adverb appears on the x-axis, and the language on the y-axis. In English, nearly 18% of the manner adverbs are deaccented, while in Catalan the proportion amounts to just 2% of the total. As for sentential adverbs, they are deaccented 54% of the time in English, and just 20% in Catalan approximately.

This outcome is supported statistically by a Cramér's V test⁸, both for English and for Catalan (English: $V=.364$, $df=1$, $p<.05$; Catalan: $V=.266$, $df=1$, $p<.05$). This means that the null hypothesis can be rejected, and that there are indeed significant cross-linguistic differences in the frequency of accentuation of sentential adverbs. In English, sentential adverbs show a more marked tendency to be deaccented than they do in Catalan. In both languages, however, the proportion of deaccented tokens is much higher for sentential adverbs than it is for manner adverbs (54% against 18%, in English; 20% against a mere 2%, in Catalan), and this is statistically supported by a Cramér's V test ($V=.302$, $df=1$, $p<.05$). The strength of the correlation is $V=.302$, which is interpreted as medium, according to the guidelines in the most common textbooks in statistics (such as Morgan et al. 2001, Kinnear and Gray 1999).

However, the stronger cue for telling apart sentential and manner adverb seems to be prosodic separation. The results show that almost all the sentential adverbs in the corpus received a separate prosodic unit. The pie charts in Fig. 9 summarize this:

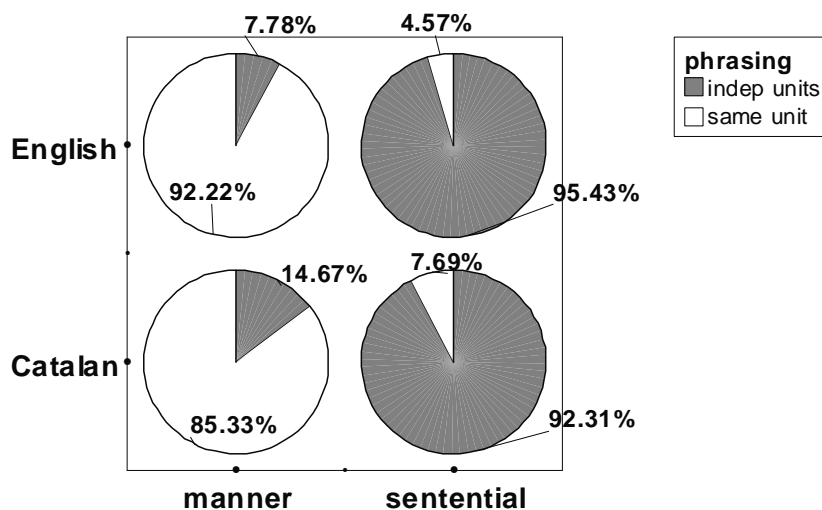


Fig. 9. Proportion of manner and sentential adverbs in English and in Catalan uttered in independent units and in the same unit

Nearly all the sentential adverbs in the corpus (95% in English and 92% in Catalan) received a separate prosodic unit. A Cramér’s test shows that there is indeed a statistically significant association between the type of adverb and the type of phrasing, and that this correlation is very strong ($V = .832$, $df=1$, $p < .05$). There are no cross-linguistic differences in phrasing. A Pearson chi-square test shows that the phrasing into one or two units is independent of the language, since the p value is non-significant ($p = .225$). These results confirm, as was expected, the observations in the literature. Independent phrasing would seem to be, therefore, the crucial prosodic cue for telling apart sentential and phrasal adverbs.

The prediction that there would be differences in accentuation between manner and sentential adverbs is borne out by the data. Sentential and manner adverbs are differentiated by both rhythmic and melodic cues, although the rhythmic cues are much stronger. Nearly all sentential adverbs receive a separate tonal unit, and, as confirmed statistically, there is a strong correlation between the type of adverb and its forming an independent unit or not.

Phrasing into independent units, with a couple of exceptions, tends to be fairly constant, and inter-speaker differences in phrasing are minimal. Phrasing into one or two units is independent of the language, as confirmed by a Pearson chi-square test. And as borne out by a Cramér’s V test of correlation, there is a very strong and significant correlation between the type of adverb, whether sentential or manner, and the phrasing into independent units or a single unit, regardless of the language. Inter-speaker variation in Catalan, though very reduced, is slightly larger than in English ($SD = 8.17$ in English, $SD = 4.5$ in Catalan).

Melodic cues are also important in telling apart sentential from manner adverbs, though these are weaker than rhythmic cues. Although in both languages the proportion of deaccented tokens is significantly higher for sentential adverbs than it is for manner adverbs (54% against 18%, in English; 20% against a mere 2%, in Catalan), the correlation between the type of adverb and its receiving accentuation is only significant in Catalan, and is rather weak (Catalan: $V = .265$, $p < .05$; English: $V = .196$, $p = .08$). Furthermore, there is also a significant amount of variation across the languages in the study and across the speakers. It was predicted that Catalan speakers would deaccent sentence-final adverbs less frequently than English speakers would do. We see that the results bear this out as the proportion of deaccented tokens is much lower in Catalan. Examining the data in more detail we find a substantial amount of inter-speaker variability in English, but not in Catalan ($SD = 20.94$ in English, against $SD = 8.97$ in Catalan). There is confirmation for the prediction that in Catalan, being an intonationally non-plastic language, sentential adverbs would be less frequently deaccented than in English. Furthermore, inter-speaker variability in accentuation is much lower among Catalan speakers.

The semantic type of the sentential adverb, that is, whether this is a modal, evaluator, or speech-act adverb, does not seem to have overall clear-cut effects on the phrasing or the intonation. While in Catalan, each semantic type is associated with a tendency towards accentuation or deaccentuation (modals are deaccented 34% of the time, evaluators and speech-act adverbs only about 12%), and this is confirmed statistically (Cramér’s $V = .261$, $df=2$, $p < .05$), no particular trends can be observed in English. However, an adverb by adverb analysis of the frequency of accentuation highlights some similarities between English and Catalan. The first column of Table 1 below shows the sentential adverbs included in this study, columns two and three show the proportion of deaccented and accented tokens in English, and columns four and five show the proportion of accented and deaccented tokens in Catalan.

Table 1. Accentuation of each sentential adverb in English and in Catalan

Sentential adverbs	English	Catalan	Type of sentential adverb	
	deaccented	deaccented		

rightly	60%	0%	evaluative
naturally	20%	20%	evaluative
inevitably	80%	0%	evaluative
undoubtedly	0%	0%	modal
obviously	20%	10%	modal
evidently	40%	20%	modal
actually	80%	80%	modal
really	90%	50%	modal
possibly	20%	40%	modal
probably	70%	40%	modal
happily	100%	0%	evaluative
sadly	50%	40%	evaluative
unfortunately	40%	10%	evaluative
amazingly	70%	0%	evaluative
oddly	80%	30%	evaluative
frankly	70%	10%	speech-act
honestly	56%	0%	speech-act
normally	50%	20%	evaluative
simply	60%	10%	speech-act
personally	30%	20%	speech-act
strictly	50%	10%	speech-act
fortunately	40%	-	evaluative

As seen in Table 1, the four most frequently deaccented adverbs in both languages belong to the group of modal adverbs. They are, in descending order of frequency, “actually”, “really”, “possibly” and “probably” (“probably” precedes “possibly” in English). On the other hand, “undoubtedly” (which also belongs to the group of modals) is always accented by all the speakers in both languages. Very frequently accented adverbs in English are “personally”, “obviously”, “naturally”, and “evidently”. All four adverbs, as is also the case with “undoubtedly”, share a strong sense of commitment to the content of the proposition. In Catalan, where the frequency of accentuation is high for all adverbs, the group of adverbs which are always accented does not coincide with the four most accented ones in English (with the exception of “undoubtedly”). The most frequently accented Catalan sentential adverbs are “rightly”, “inevitably”, “honestly” (which convey a strong commitment to the truth of the proposition), and “happily”, “unfortunately”, and “amazingly” (which, as can be argued, take the truth of the proposition for granted). Asserting the truth of the proposition seem thus be associated with accentuation, while qualifying it, denying it, or not evaluating seems to be associated with deaccentuation.

5. Discussion

In English there seems to be fairly little inter-speaker variation in the phrasing of sentential adverbs ($SD=4.5$) but a rather large variation in their accentuation ($SD=20.94$), while in Catalan, both for phrasing and for accentuation, variation among speakers is fairly constant and moderate ($SD=8.17$, and $SD=8.97$). One possible reason for this variation in the accentuation of English sentential adverbs is the use of two different reading styles, which might be described as careful and casual. Half of the speakers in the corpus, both English and Catalan, are language teachers, and therefore it is to be expected that they are accustomed to reading aloud expressively and accurately. They are expected to be more adept readers – readers who exploit to the maximum the expressive power of prosody. The fact that this difference in accentuation occurs in English but not in Catalan is attributed to the greater intonational plasticity of English in general. There seems to be a trade-off

between phrasing and intonation, so that the separateness of the sentential adverb is marked either rhythmically, with the use of independent tonal units, or melodically, by means of deaccenting, and that the choice of one or another strategy is highly speaker-dependent. Although further work is needed to test this point, a Cramér's V test shows a moderate to large positive association between the use of independent intonational units and the use of pitch accents with Catalan sentential adverbs ($V=.492, p<.05$), which is absent in English ($V=.116, p=.087$).

This seems to further corroborate the initial prediction, that Catalan has a rather fixed intonation, as corresponds to its status as a non-plastic language. Melody in Catalan seems to be used less frequently and less flexibly than it is used in English, and furthermore, it appears to fulfil a restricted set of specific semantic/pragmatic functions, such as the differentiation between manner and sentential adverbs.

6. Conclusions

This study examined the phrasing and the intonation of the core categories of sentential adverb, that is, modality, evaluation, and speech-act adverbs, in English and Catalan. Sentential adverbs were compared to homonymous manner adverbs in final position in the sentence, a position where these two types can be ambiguous. The main research questions were: Are these sentential adverbs independent of the main phrase? Are they deaccented? And, are there any cross-linguistic differences in the phrasing and accentuation of these adverbs in Catalan and English?

The results of the study show that sentential adverbs nearly always form independent phrases in both languages, thus supporting claims in the literature. Independent phrasing appears to be the crucial prosodic cue to signal that a given adverb has a sentential rather than a verb-phrasal function. Phrasing seems to be a strong cue in the processing of certain types of semantic and pragmatic information, such as the differences in semantic scope exemplified by sentential and manner adverbs.

Accentuation is also used, although far less consistently than phrasing, for keeping apart sentential and phrasal adverbs. Catalan speakers tend to deaccent the sentential adverb less frequently than English speakers do, as was expected from the initial assumption that Catalan, unlike English, is a "non-plastic" language. The results point to the existence of a trade-off between melodic and rhythmic cues, with a certain amount of redundancy. This is confirmed statistically in Catalan, but not in English, pointing to further differences originating perhaps from their respective degrees of intonational plasticity.

A detailed examination of the accentuation of the different adverbs in the study reveals, however, certain common trends in both languages. Adverbs which assert the truth of the proposition expressed in the main clause, such as "undoubtedly" or "naturally", are always accented while adverbs that qualify, contradict, or remain agnostic about the contents of the proposition tend to be deaccented.

Sentential adverbs are just one example of extrasentential elements (ESEs). The analysis presented here confirms the value of ESEs for probing the way that intonation is determined. The syntactic relation of ESEs to the rest of an utterance is controversial, hence their designation as 'extra-sentential'. However the study presented here shows that there are strong trends in the treatment of sentence adverbials, distinguishing them from manner adverbials and reflecting their semantic and pragmatic function. Furthermore their prosody reflects cross-linguistic differences in intonation in a partially predictable way. Exploration of other kinds of ESE should shed further light on the extent to which syntactic, semantic, and pragmatic factors interact in determining the intonation of utterances.

7. Appendix

Sentential adverbs in Catalan

Sentential adverbs

Manner adverbs

Modal adverbs

- 1 Que tens una mica de sucre?
Me'n deu quedar una mica, *possiblement*.
- 2 On anireu aquest estiu?
Anirem a les Bahames, *probablement*.
- 3 Es creuen que tenen tota la raó, *evidentment*.
- 4 Has rebut alguna felicitació, aquest Nadal?
N'he rebut unes quantes, *de fet*.
- 5 I què més m'expliques? Això és tot, *realment*.
- 6 Volen ampliar l'aeroport.
Això no agradarà els veïns, *indubtablement*.
- 7 Et va dir que eres un beneït?
Devia estar de mal humor, *òbviament*.

És veritat això?
T'ho asseguro *indubtablement*.

No va mostrar gaire subtileza.
Tirava floretes a les noies ben *òbviament*.

Evaluative adverbs

- 1 El cotxe es va espatllar, *desafortunadament*.
- 2 Em vaig despertar tard, però no vaig perdre el bus, *feliçment*.
- 3 No va passar la prova, *tristament*.
- 4 Els nens encara creuen en els Reis, *sorprenentment*.
- 5 No va rebre el meu missatge, *estranyament*.
- 6 La mama, on ha deixat les llavors? Les ha deixades al jardí, *correctament*.
- 7 Seràs discret, oi?
No ho diré a ningú, *naturalment*.
- 8 Va acabar sense diners, *inevitablement*.
- 9 Mai no plou en aquest mes, *normalment*.

De vegades fem servir les paraules *desafortunadament*.

Vam estar a punt de perdre el vol quan el cotxe es va espatllar, però a l'últim moment, algú ens hi va portar. Tot va acabar *feliçment*.

El nen plorava *tristament*.

No m'ho esperava pas. El meu pare es va comportar *sorprenentment*.

No sé què els passa pel cap. Aquests nens es porten *estranyament*.

No té cap sentit moral. És incapaç d'actuar *correctament*.

No fan servir productes químics. Fan la fruita *naturalment*.

D'aquestes premisses, la conclusió es deriva *inevitablement*.

Ja parla *normalment*.

Speech-act adverbs

- 1 Que si m'agrada el concert?
És ben avorrit, *francament*.
- 2 No estic d'acord amb tu, *honradament*.
- 3 I això és el que va passar, *simplement*.
- 4 Què quina és la meva opinió? Estic a favor del canvi, *personalment*.
- 5 Que si parlo *idiomes*? Parlo català, *estrictament*.

Parlaré amb tu *francament*.

Els polítics no saben comportar-se *honradament*.

No necessiten gaire. Viuen *simplement*.

M'agradaria parlar amb la directora. Sempre tracto amb ella *personalment*.

La mare els va fer pujar *estrictament*.

Sentential adverbs in English

Sentential adverbs

Modal adverbs

- 1 Do you have some sugar for me?
I might have some, *possibly*.
- 2 Where are you going this summer?
We'll go to the Bahamas, *probably*.
- 3 They think that reason was on their side, *evidently*.
- 4 Did you get any cards this Christmas?
I got a few cards, *actually*.
- 5 What else do you need to tell me?
That is all there is to say, *really*.
- 6 They are going to build a new airport. The residents

Manner adverbs

Is that true?

- won't be happy, *undoubtedly*.
 7 Did she say you were insane? She was in a foul mood, *obviously*. I assure you most *undoubtedly*. He wasn't subtle at all. He chatted her up quite *obviously*.

Evaluative adverbs

- 1 Fortunately
 They were found alive, *fortunately*. Anything can go wrong, but let's hope things work out *fortunately*.
 2 The car broke down, *unfortunately*. We sometimes use words *unfortunately*.
 3 I got up quite late. But I didn't miss the bus, *happily*. We nearly missed the flight because the car broke down, but then someone gave us a lift. It all ended up *happily*.
 4 She didn't pass the test, *sadly*. The little boy cried *sadly*.
 5 The children still believe in Santa, *amazingly*. I was taken aback. My father behaved *amazingly*.
 6 She didn't get my message, *oddly*. I don't know what came upon them. Those children behave *oddly*.
 7 She said all the truth, *rightly*. He's got no morals. He's incapable of acting *rightly*.
 8 Can you be discreet?
 I won't mention this to anyone, *naturally*. They don't use chemicals. They grow their fruit *naturally*.
 9 He ended up with no money, inevitably. From the premises of the argument, this conclusion follows *inevitably*.
 10 It never rains this time of the year, *normally*. She's been hoarse for weeks. But now she speaks *normally*.

Speech-act adverbs

- 1 Am I enjoying the concert?
 It is rather boring, *frankly*. I want to speak to you *frankly*.
 2 I don't agree with you, *honestly*. Politicians can't behave *honestly*.
 3 This is what happened, *simply*. They don't need much. They live *simply*.
 4 What's my opinion?
 I'm in favour of the change, *personally*. Can I speak with the director?
 She deals with me *personally*.

Notes

- The distinction between sentence and verb-phrasal adverbs is not clear-cut in some specific cases, as for example with adverbs such as 'courageously' and 'slowly' (Laenzlinger 1998: 40-41; López and Morant 2002: 1832-1835).
- A pause, in this pre-planned, read speech has been defined here as a period of silence (which is not caused by the presence of obstruents) of 100 ms or longer. Anything shorter than 100 ms has been considered as pre-boundary lengthening.
- 'Normally' is not a clear-cut sentential adverb, since it can be used with the same meaning as 'usually'. In its sentential use, 'normally' involves a contradiction of some general rule as it does, for instance, in the statement used in the corpus: 'It never rains at this time of the year, *normally*', which implies 'but now it does rain'.
- In Catalan there are just nine evaluatives because the examples with 'afortunadament' ('fortunately') were not judged to be natural enough by the speaker who took part in the pilot experiment, and they were removed from the experimental material. Hence, the difference in the number of phrases in Catalan (74) and English (78).
- The test material contains more evaluative adverbs than modal and speech-act adverbs. This distribution mirrors linguistic use, since evaluative adverbs usually constitute a highly productive group (Swan 1988: 66, 536).
- Grabe's H*+L can be considered as functionally equivalent to H*. The IViE style of analysis adopted by Grabe lacks phrase tones, hence the need to assign a +L trailing tone to account for the lowering after the high target.
- Our intuition is that there are two types of nuclear accent in Catalan. One, analysed as H*, would be realised as a peak on the stressed syllable. It would correspond to the nucleus of standard declarative sentences under identificational focus, such as 'Va veure la núvia' '(S/he saw the bride)' in response to 'Who did he see?' The other, a smooth transition from the last of the prenuclear accents to the end of the phrase (as described in Prieto 1998) would correspond to the nuclear accent

of broad focus declaratives and also to that of sentential adverbs. It would be analysed as H+L* (see Astruc: 2005a: 175-176).

8. Cramér's V and related tests (contingency coefficient, phi, lambda) are based on the chi-square statistic and measure the degree of association between two nominal variables (that is, frequency data such those in this study). Their advantage over chi-square is that they are independent from sample size (Goodman and Kruskal 1979, Liebetrau 1983, Morgan et al. 2001). Cramér's V was chosen because is the appropriate test for contingency tables equal or bigger than 2-by-2, just as the one required in this study (language: English, Catalan; group: manner, sentential).

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