The multifunctionality of epistemic parentheticals in discourse

Prosodic cues to the semantic-pragmatic boundary

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The aim of this study is to identify the relation between the interpretation of epistemic parentheticals in discourse and their prosodic realisation. Data drawn from a corpus of British English speech suggests that epistemic parentheticals (comment clauses such as *I think, I believe*) convey a spectrum of meaning from propositional to interpersonal. They have long been categorised simply as sentence adverbials with a meaning that relates to the truth value of the proposition. However, a study of their prosodic realisation suggests that they occupy a transitional place in the process of semantic change. They can express a wide range of meanings from propositional (sentential) meaning, through discourse meaning to the status of verbal filler. The analysis draws on theories of discourse, historical change and prosody. It makes an important contribution to the understanding of how prosody conveys apparently subtle shades of meaning that are nonetheless crucial for utterance interpretation, including degrees of speaker certainty, the identification of disfluency and the expression of politeness.

1. Introduction

Parentheticals are expressions of varying length and category that are interpolated into the current string of the utterance (cf. Dehé & Kavalova 2007 for a recent overview). Their function is to, e.g., modify, add to, or comment on the current talk. Parentheticals may, among other cues, be identified by prosodic means. The typical parenthetical prosody is often, although not always, a marked shift to a compressed pitch range, reduced loudness and increased tempo, and a tendency for the pitch to rise at the end (e.g. Bolinger 1989; Crystal 1969; Wichmann 2001).

The present study focuses on the function and prosodic realisation of a subset of short parenthetical interpolations of the form ‘1st person Sg pronoun — verb’,

In the syntactic literature, there has been a debate as to whether comment clauses in English are best analysed as base-generated parentheticals (e.g. Jackendoff 1972: 94–100; Emonds 1973, 1976; Peterson 1999) or whether they are derived by some movement operation from an underlying structure which features the parenthetical as a main clause taking the rest of the sentence as object (e.g. Ross 1973). Arguments in favour of the movement analysis include (i) the superficial relation between sentences such as (1a) and b on the one hand and (1c) on the other hand, and (ii) the fact that parenthetical verbs lack an object which under the movement analysis is provided by the main utterance. Arguments in favour of the parenthetical analysis include (i) the fact that the string that precedes the comment clause is often not a constituent (cf. (1b)) and can therefore not be the result of a syntactic movement operation, and (ii) the behaviour of comment clauses in examples such as (2) and (3). In (2), the main verb but not the interpolated comment clause can be questioned (cf. Asher 2000: 33). (3b) is ungrammatical because in English simple present tense can only be used for future reference when the future event is highly predictable. In (3c), the future reference is indicated by the main verb *hope* in the matrix clause. In (3d), however, *I hope* is a comment clause and *hope* thus fails to have this effect (see Peterson 1999).

- (1) (example from Emonds 1973: 133)
- a. John came later than Sue, *I think*.
 - b. John came, *I think*, later than Sue.
 - c. *I think* (that) John came later than Sue.
- (2)
a1. A: Mary, I think, left early.	B: # Do you?
	B: Did she?
a2. A: I think (that) Mary left early.	B: Do you?
	B: Did she?

b1. A: The party, Mary assures us, is over. B: #Does she?

(adapted from Asher 2000)

b2. A: Mary assures us that the party is over. B: Does she?

(3) Tense (Peterson 1999: 235; examples reordered)

a. The rain will stop before Sunday.

b. *The rain stops before Sunday.

c. I hope the rain stops before Sunday.

d. *The rain stops, I hope, before Sunday.

In this study, we will assume the parenthetical analysis and we will show that there is prosodic evidence in favour of it. However, either way, the comment clause is separated from the rest of the clause by a syntactic phrase boundary which in standard prosodic theory (Nespor and Vogel 1986; Selkirk 1986, 1995; Truckenbrodt 1995; among many others) coincides with a strong prosodic boundary. Based on the assumption that parentheticals are “external to the root sentence they are associated with”, Nespor & Vogel (1986: 188) assume that they “form intonation domains on their own”.

In the prosodic literature, however, it has been shown that comment clauses and related expressions can in general be realised prosodically in a variety of ways. As parentheticals, they may be in a separate prosodic domain and bear a nuclear pitch accent. In their prosodic domain, they may be joined by some material from the host utterance (Dehé 2007: 277–278). Comment clauses may be accentless and may be integrated in another prosodic domain either as the prehead (Crystal 1969: 235) or the tail (Crystal 1969: 268; Wichmann 2001: 186; Dehé 2007: 270–272) of that domain. Specifically, comment clauses like *I think*, *I suppose*, *you see* in final or medial position may bear (the rising part of) a fall-rise contour, and can come without a preceding pause (Aijmer 1997: 24; Bing 1985: 32f; Crystal 1969: 268; Wichmann 2001: 186). Semantically, the final rise has been assumed “to express some reservation about the preceding sentence” (Bing 1985: 33). In final position, comment clauses can occur without prominence tones (Bing 1985: 32f), typically as a stretch at low pitch level. According to Aijmer (1997: 24f), “parenthetical *I think* can [...] form a separate intonation group”, in which case it functions as a qualifying afterthought, or it can be “presented as a post-nuclear “tail” pronounced on a low pitch [...] or carry the nucleus in a larger tone unit pattern”. Stenström (1995) mentions a corpus study revealing prosodic integration as the typical pattern for tone-carrying *I think*, while other tone-carrying comment clauses, specifically *you know*, *you see* and *I mean* usually form a separate tone-unit. It has also been previously indicated that comment clauses may be part of a transitional, hesitant phase (Wichmann 2001: 186). For some short parenthetical clauses it has been argued that their prosodic realisation is directly related to aspects of their interpretation

(Reinhart 1983). Unlike the present work, these analyses either fail to provide any prosodic/phonetic evidence (e.g., Stenström 1995; Reinhart 1983), or they fail to spell out the relation between the individual prosodic patterns of comment clauses and their contribution to interpretation in discourse.

From a semantic or pragmatic point of view, comment clauses such as *I think* have been seen as epistemic phrases (e.g. Thompson & Mulac 1991; Aijmer 1997; Precht 2003; and Kärkkäinen's 2003 interactional study of epistemic stance). The status of items such as epistemic expressions and discourse markers is an issue within the study of historical language change. One approach, within a functional view of language, is Bybee's (2001) usage-based model, which accounts for change as the result of the uses to which a certain expression is put. Bybee claims that patterns of change are affected by frequency of use: frequently used items are more vulnerable to phonological change involving a reduction of form. High-frequency items are also subject to reduction of meaning (bleaching, habituation), and emancipation (i.e., disassociated from the original motivation). This process may be referred to as grammaticalisation (Traugott 1995), according to which semantic change over time involves a gradual loss of propositional meaning in favour of a grammatical or pragmatic meaning. This process underlies, for example, the formation of adverbs, including fixed expressions (*kind of, of course, indeed, in fact*) whose component words have lost their independent meaning (Biber *et al.* 1999). It also accounts for different meanings of *now* or *well*, already the subject of earlier literature on the prosodic disambiguation of discourse markers (Hirschberg & Litman 1993; in their terms "cue phrases"). According to Thompson & Mulac (1991), grammaticalisation (or: grammaticisation) also accounts for the use of comment clauses as epistemic adverbs. Consider the examples in (4) (from Thompson & Mulac 1991:313).

- (4) a. *I think* that we're definitely moving towards being more technological.
- b. *I think* exercise is really beneficial, to anybody.
- c. It's just your point of view you know what you like to do in your spare time *I think*.

Based on frequency calculations, Thompson and Mulac argue that *I think* in (4b) without the complementiser *that* is a grammaticised form of (4a), reanalysed by the speaker as an epistemic phrase (but see Kearns 2007). The grammaticalised form becomes a single lexical item of the category adverb, which is then free to occur elsewhere in the sentence, including medial and final positions (cf. (4c)). Aijmer (1997:6–8) sees *I think* and related expressions (*I believe, I guess, I suppose*, etc) on a "cline of pragmaticalisation" consisting of three stages (essentially corresponding to the three cases in (4)). Expressions at stage 1 (with complementiser *that*) are weakened forms of the verb and have already lost their status as main

clause. This is argued to be evident from the fact that main-clause phenomena such as the use of tag-questions occur in the complement clause rather than with *I think*. The development of *I think* to a mobile discourse marker is seen as the result of conversational implicatures and the Gricean principle of quality. Aijmer (1997: 21) also touches on intonational properties of *I think* suggesting that prominent *I think* expresses certainty, deliberation and objectivity, while non-prominent *I think* comes with a more tentative meaning. This assumption will be further investigated below.

Just like other epistemic (stance) adverbials with similar meaning, including *maybe* (Thompson & Mulac 1991: 313), *probably*, *possibly*, *presumably* and *apparently*, comment clauses thus have an epistemic relationship to the proposition they modify in that they limit its truth value. The stance expressed can be in relation to certainty or doubt, to reality, or to the source of knowledge (e.g. *evidently*, *apparently*). In addition to epistemic stance adverbials, there are other adverbials of stance expressing attitude (*sadly*, *fortunately*) and the manner of conveying the message (*frankly*, *honestly*) (Biber *et al.* 1999). Kärkkäinen (2003: 1) notes that “epistemic stance is highly pervasive in everyday spoken interaction” and that the occurrence of stance markers is best described in terms of prosodic structure. As for the prosody of such adverbials, it has been argued that they are mostly independent of the phrase to which they are attached. This varies, however, according to their utterance position. Cruttenden (1997) and Astruc-Aguilera & Nolan (2007) claim that utterance-final adverbials are typically realised in a separate domain bearing a L*H rising contour.¹ Stenström (1990), however, finds different patterns in her data for different categories of adverbial. Disjuncts (mainly stance adverbials), for example, are prosodically separate when in initial position, but when in utterance-medial or utterance-final position, they tend to be prosodically integrated into a larger domain and are typically unstressed.

As with other cases of semantic change, there is some evidence that the reduced clauses under investigation here are becoming pragmaticalised, losing their more transparent meaning and resembling discourse markers in that they are taking on a cohesive or interpersonal (e.g. politeness) function in which the epistemic value is greatly reduced. In some contexts — in phases of disfluency and hesitation — they even appear to be reduced to the value of verbal fillers. There is also evidence, however, that the transparency of meaning can be prosodically enhanced, rather than ‘bleached’, emphasising rather than diminishing the speaker’s uncertainty towards the proposition expressed. Although the semantic/pragmatic boundary may at times be fluid, there is a spectrum of meaning from being related in some way to the proposition expressed, at the most semantically transparent end of the scale, to the least transparent or ‘opaque’ (House 1989: 104) extreme, where desemanticisation leads to increasing pragmaticalisation. The present study

focuses on the prosodic correlates of these extremes of meaning — from transparent to opaque and from propositional to interpersonal. It is based on a careful auditory and instrumental analysis of data drawn from the spoken part of the British component of the International Corpus of English (ICE-GB). This takes into account those parameters that have been shown to be relevant in previous work on the prosody of adverbials and discourse markers (e.g. Hirschberg & Litman 1993; Wichmann *et al.*, to appear), including segmentation, boundary characteristics, accentual status and choice of tone or pitch contour.

The remainder of the article is organised as follows. We will begin by describing the data and methodology used in this study (Section 2). In Section 3, we will report the results of the instrumental analysis carried out on the selected sound files, and in Section 4, these results will be discussed, relating prosody and interpretation. Section 5 serves as a conclusion.

2. Method

2.1 Data source

The data for this study were drawn from the spoken part of the British component of the International Corpus of English (ICE-GB version 3.0; cf. Nelson, Wallis & Aarts 2002) which contains approximately 640,000 words from various text types, ranging from direct casual conversations and private telephone calls to scripted monologues and broadcast news, all recorded in the 1990s. The comment clauses discussed here were retrieved together with other types of parenthetical expressions, using a systematic search followed by manual sorting. Examples of items taken from the transcribed version of the spoken part of the ICE-GB are given in (5). A key to the text types from which the examples used in the present study are taken is given in the Appendix to this article.

- (5) a. Corpus item containing one comment clause:
You could *I suppose* commission some prints of you yourself (ICE-GB: s1a-015#37)
- b. Corpus item containing more than one comment clause:
That that was <,>*I suppose* a sign of frustration *I suppose* cos I had two canvasses working in a space (ICE-GB: s1b-018#121)

Overall, 312 corpus items containing 316 comment clauses in sentence-medial or sentence final position (204 *I think*, 70 *I suppose*, 18 *I believe*, 9 *I guess*, 7 *I hope*, 2 *I suspect*, 2 *I reckon*, 2 *I understand*, 1 *I imagine*, 1 *I assume*) were initially retrieved from the corpus. However, given the limited availability and varying quality of

sound files, not all 316 comment clauses entered the acoustic analysis. The key criterion in data selection for the acoustic and ultimately for the instrumental analysis had to be clarity of recording. The 312 corpus items were therefore assigned to two categories. The sound files of the 158 corpus items (160 comment clauses) in the first category were either unavailable or essentially useless for various reasons, among them incompleteness, quiet recordings, overlapping speech, and too much noise. The sound files of the 154 corpus items (156 comment clauses: 102 *I think*, 27 *I suppose*, 15 *I believe*, 3 *I guess*, 3 *I hope*, 1 *I suspect*, 1 *I reckon*, 2 *I understand*, 1 *I imagine*, 1 *I assume*) assigned to the second category were clear enough to enter the auditory analysis. 113 of the 156 comment clauses were in clause-medial position, 43 were clause-final. Examples of comment clauses occurring in sentence-medial and sentence-final position are given in (6) and (7).²

- (6) Comment clauses in sentence-medial position:
 - a. And the work that I've done with him in the early stages has uhm *I think* helped <,> a lot (ICE-GB: s1a-003#90)
 - b. I mean uh it'd be nice to have the possibility of portability to other operating systems *I suppose* in the future (ICE-GB: s1a-029#139)
- (7) Comment clauses in sentence-final position:
 - a. The rice is marvellous *I think* (ICE-GB: s1a-022#92)
 - b. It was a slightly futuristic production *I suppose* (ICE-GB: s1b-023#48)

Of these 156 comment clauses, 36 (18 clause-final, 18 clause-medial; 22 *I think*, 8 *I suppose*, 3 *I believe*, 2 *I guess*, 1 *I imagine*) were of good enough quality to enter the instrumental analysis. Despite the fact that an instrumental analysis was carried out on only a subset of the data, it is important to note that this final selection represents the full range of patterns observed in the auditory analysis of the larger group of 154 comment clauses.

2.2 Data treatment

The 152 corpus items containing 154 comment clauses, selected in the way described in the previous section, first underwent an auditory analysis which helped to identify location and type of perceived pitch accents, pitch direction and perceived pauses. For the purpose of the instrumental analysis, the 36 sound files taken from the corpus materials were edited into individual files containing the comment clause and as much surrounding material as necessary for the analysis. The instrumental analysis was done in Praat (Boersma 2001; Boersma & Weenink 2008), which was also used to visualise and print the tonal contour. Praat was used to measure length of pauses preceding and/or following comment clauses (in ms),

and actual F0 values (in Hz). In particular, pitch maxima and minima were measured both on the comment clauses and the host utterances, and pitch ranges were calculated for comparison between host utterance and interpolation. For each utterance, intonational domain boundaries were identified based on domain-external and domain-internal criteria. Among the external criteria, filled and silent pauses and changes in pitch level/direction on unaccented syllables were considered. Given that pauses are not always a reliable cue to prosodic boundaries and that in many cases pauses at the left and right edge of comment clauses were absent, a change in pitch direction on unstressed syllables between nuclear tones was often used as the key criterion in boundary identification (Cruttenden 1997). As for the internal criteria, an intonational domain minimally contains one stressed syllable, often referred to as the nucleus, and there is pitch movement to or from at least one accented syllable. The major patterns of nuclear pitch movement (also referred to as ‘tones’ or ‘nuclear tones’) identified in the British tradition of intonation analysis include the fall (from a high accented syllable, cf. Figure 1a), rise (from a low accented syllable, Figure 1b), fall-rise (Figure 1c), and rise-fall (Figure 1d). Nuclear tones begin on the nucleus and cover the stretch of utterance up to the right-hand boundary of an intonational domain.

Figure 1. Nuclear tones; tadpole transcriptions from Wichmann (2000: 11)

Within an intonation domain, the nucleus is the only obligatory element. It is optionally preceded by the prehead (any unstressed syllables preceding the head) and head (the first accented syllable preceding the nucleus), and followed by the tail (any unstressed syllables following the nucleus before the end of the intonation domain), yielding the structure in (8) (Crystal 1969: 207f, 1972: 112; optional components in parentheses).

- (8) Intonation Domain: (prehead) (head) nucleus (tail)

In particular, prosodic boundaries in the immediate vicinity of the relevant comment clauses were analysed on the basis of these criteria.

3. Results: The prosody of epistemic parentheticals

Our findings suggest a threefold classification across the comment clauses investigated here: firstly, we identify cases where the interpolation is, as predicted in prosodic theory, given its own intonation domain which may or may not be complemented by material from outside the comment clause (prosodic separation; cf. Section 3.1); secondly, there are cases where, despite the syntactic disjuncture, the clause is integrated melodically (if not temporally) into a larger intonation domain (prosodic integration; cf. Section 3.2). Finally, we identify cases where the clause is melodically integrated within a hesitant planning phase (Section 3.3).

3.1 Prosodic separation

A prosodically separated comment clause is in its own intonation domain and it bears a nuclear pitch accent. Essentially two patterns of prosodically separated comment clauses can be found. The nuclear tone, usually a fall or fall-rise, and a low rise occasionally, is on the comment clause in both cases, but it can either be on the verb or on the pronoun. In the former case, the nuclear tone, especially the rise of a fall-rise, may be completed on material following the comment clause (cf. Figure 3), or additional unstressed material may occur as the prehead (cf. Figure 4). Figures 2 to 6, picturing examples (9) to (13) respectively, illustrate the observed patterns. Intonation domains are indicated by round brackets.

- (9) Speaker A: Because of the breathing the way the breathing really <unclear-words> and the positioning (ICE-GB: s1a-045 #31)
 Speaker A: I mean it's basically Alexander Technique *I think* (ICE-GB: s1a-045#32) that based on it a lot <,> and the movements <,> the straight back (ICE-GB: s1a-045 #33)

Figure 2. Prosodic separation: nuclear fall on *think*:

... Alexander Technique) (*I think*) (...
 H*L

- (10) Speaker C: I have the feeling myself that <,,> lots and lots of people listening think that it's all over that secularisation means that religion is dead or dying (ICE-GB: s1b-028 #18)

Speaker C: Your argument *I believe* is that it's died so to speak more in some realms than in others and crucially that there is something there left which is the basis for renovation <,,> (ICE-GB: s1b-028#19)

Speaker A: That was Professor Halsey who was in so quickly I didn't have time to say so (ICE-GB: s1b-028 #20)

Figure 3. Prosodic separation: nuclear fall-rise on *believe* complemented on material following the comment clause: (Your argument)

(*I believe is that*) (it's died ...
H*L H

- (11) [...] it's not so much the fundamental ideology of Communism that that has failed it's simply that nobody found a form of uh organisations and institutions to put the philosophy into practice because *I suppose* in a way what Marx was uh uh having a go at was uh obviously capitalist institutions [...] (ICE-GB: s2a-049#82)

Figure 4. Prosodic separation: unstressed *because* constitutes the prehead; nuclear fall on *suppose*:

(... into practice) (*because I suppose*) (in a way ...
H*L

- (12) Speaker A: Now funnily enough this fi these people that we went to for this fiftieth wedding anniversary uhm (ICE-GB: s1a-019 #245)
Speaker A: the lady there (ICE-GB: s1a-019 #246)
Speaker A: she used to work at Boroughs Wellcome (ICE-GB: s1a-019 #247)

Speaker A: and she uhm <,> uh was quite high up *I think* cos she had degree (ICE-GB: s1a-019#248)

Speaker A: And I think she 's got one or two bugs or something named after her now (ICE-GB: s1a-019 #249)

Figure 5. Prosodic separation: nuclear rise on *think*:

... quite high up) (*I think*) (cos she had a degree)
L*H H* !H*L

- (13) And once again we'll have a situation *I think* where the majority will set the pace and the British will slowly but eventually follow (ICE-GB: s2b-013#28)

Figure 6. Prosodic separation: nuclear fall on the pronoun *I*:

... a situation)
(*I think*) (where the majority ...
H*L

Figure 2 (representing (9)) is an example of a prominent clause-final comment clause (*I think*) in its own intonation domain, without complementing material. The verb *think* bears a nuclear fall. In Figure 3, illustrating example (10), the comment clause *I believe* is in its own intonation domain and is joined in its domain by the following *is that*. The nuclear tone is a fall-rise (H*LH), with the fall being realised on the comment clause (specifically the verb) and the rise being realised on *is that*. Along with the tonal contour, the long pause after *I believe is that* is a cue to the presence of a boundary. Figure 4 (example (11)) illustrates a nuclear fall on *I suppose* which is preceded by unstressed *because* constituting the prehead of this intonation unit. Additional cues to the presence of prosodic boundaries at the left and right edge of *because I suppose* are the step-up in pitch on the unstressed

first syllable of *because* after the nuclear fall on *practice*, and the pause following *suppose*, at first silent, then filled by *uh*, accompanied by a step-up in pitch on the initial unstressed syllable from the low level reached on *suppose*. Figure 5 (representing (12)) shows an example of a comment clause in a separate intonation phrase but carrying a low rising contour (L*H).³ And finally, in Figure 6 (example (13)) there is again a fall on the comment clause (*I think*) forming a separate intonation domain, but here the pronoun is most prominent. Its prominence is reflected in the high pitch extreme realised on the pronoun, which is the starting point of the nuclear fall. Following the pause after *I think* there is a step-up in pitch on unstressed *where*, indicating the beginning of a new intonation domain.

What all these cases of comment clauses have in common is that they are prosodically prominent and in an intonation domain of their own. The rising pattern in Figure 5 is consistent with what is known about the intonation of final sentence adverbials (cf. Section 1 above and the discussion in Section 4.1.1 below). Notice that from the perspective of prosodic theory, although the pattern of prosodic separation comes closest to the idea of parentheticals being given their own intonational domain, the edges of the prosodic domain do not always coincide with the syntactic edges of the comment clause (cf. Figures 3 and 4). From a discourse perspective, prosodic separateness and the H*L(H) accent come with greater saliency and more propositional and potentially interactive meaning, while the L*H rise reflects a degree of grammaticalisation from clause to sentence-final adverbial (cf. below).

3.2 Prosodic integration

By far the most common in our data were cases in which comment clauses were prosodically integrated into the surrounding material as part of unstressed post-nuclear material, either the rising part of a fall-rise (Crystal 1969, Wichmann 2001; illustrated here by example (14), plotted in Figure 7) or a continuation of the low pitch level at the end of a fall (cf. example (15), plotted in Figure 8). Crucially, and unlike the separation patterns, the nuclear syllable is outside the comment clause.

- (14) Speaker B: [By-elections] they're certainly in the interests of the tourist trade (ICE-GB: s1b-029 #90)
 Speaker B: They're in the interests of all the commentators and the press who go there and uh claim generous expenses in doing so (ICE-GB: s1b-029 #91)
 Speaker B: The voters *I think* just have an opportunity to stick two fingers up to whoever seems to be on top at the moment (ICE-GB: s1b-029#92)
 Speaker B: so you can call it sophisticated (ICE-GB: s1b-029 #93)

Figure 7. Prosodic integration: *I think* is the rising part of a fall-rise:

(The voters *I think*) (just have an opportunity) (...)

H* L H

- (15) Eh the other thing *I suppose* to learn about it is how much simple qualities like friendly and helpful matter to people <,> (ICE-GB: s1a-037#191)

Figure 8. Prosodic integration: *I suppose* as part of post-nuclear material: continuation of low tones at the end of a fall:

(The other thing *I suppose*) (to learn about it is) (...)

H* L (L)

In Figure 7, *I think* joins the prosodic domain of the preceding *The voters*. The nuclear tone is a fall-rise (H*LH), with the fall being realised on the most prominent element, *voters*, and the final rise being realised on the comment clause *I think*. The fall-rise tonal pattern is then repeated on the next domain (*just have an opportunity*). In Figure 8, *I suppose* is prosodically integrated with *the other thing* in such a way that the comment clause continues the low target reached at the end of the nuclear fall started on the first syllable of *other* and continued on the second syllable of *other* and *thing*.

Although less common than the post-nuclear position described above, there is a further integrated pattern in which the comment clause is (part of) unstressed pre-nuclear material, i.e. it is (part of) the prehead of its domain, as previously described by Crystal (1969). In Figure 9 (example (16)), *I think* forms the prehead of the domain (*I think shows what might have come*) with a nuclear fall on the modal auxiliary. The boundary preceding *I think* can be identified by the pause following *Lad* and subsequent step-up in pitch on unstressed *I*.

- (16) And uh that marvellous tone poem Shropshire Lad *I think* shows what might have come from a a most talented man (ICE-GB: s1b-032#159)

Figure 9. Prosodic integration: *I think* forms the prehead of the intonational domain:
 (...) (Shropshire Lad)(*I think* shows what might have come) (from a a most talented man)
 H*L

Both prosodic separation and prosodic integration allow for the comment clause to be in the same intonational domain with surrounding material. However, in the case of prosodic separation, the comment clause crucially bears the nuclear tone, while in the case of prosodic integration the comment clause is complementing material in the domain of another prominent element.

3.3 Comment clause as part of hesitant phase

The third major pattern that can be observed with comment clauses is the hesitant phase. A number of tokens co-occur with silent or filled pauses, and lengthened syllables or segments, all of which are symptoms of a hesitant planning phase. Moreover, the pitch level is maintained from where the hesitant phase begins. An example is given in (17), Figure 10. The comment clause *I suppose* co-occurs with a preceding filled pause (*uhm*) and a following silent pause, as well as preceding syllable lengthening, specifically lengthening of the preceding preposition *in*. Moreover, the pitch is maintained at the low level reached on *in* and changes only after the transitional phase, specifically with a pitch rise on the first syllable of *undertaking*. This pattern represents a transitional planning phase which serves as a floor-holding link between the initial sequence *There's no point in* and the material following the comment clause. This is reminiscent of Stenström's (1990:225) finding that another type of comment clauses, namely *you know, I mean* and *you see* "in combination with a pause were most often found within the turn", as well as of Aijmer's (1997:27) claim that *I think* can function as hesitational material in a planning phase. In the case at hand, it may well be a repair strategy to retrospectively mitigate the directness of *There's no point*.

- (17) There's no point in uhm <,>I suppose undertaking experiments if people can't read them ... (ICE-GB: s1a-059#286)

Figure 10. Hesitant phase:

(There's no point in) uhm I suppose [p:](undertaking experiments ...

A reviewer notes that this classification is very similar to recent work by Kaltenböck (2007). Kaltenböck, whose study, like the present one, is based on data drawn from the ICE-GB, essentially identifies four different prosodic patterns for comment clauses: (i) 'left-binding', which as we understand it corresponds to what has elsewhere been described as integration as tail (Crystal 1969: 268, Wichmann 2001: 186, Dehé 2007: 270–272 and Section 3.2 above); (ii) right-binding, which in our view corresponds to integration as prehead (see Crystal 1969: 235 and Section 3.2 above); (iii) left-right-binding, which to our mind corresponds to integration as tail except that the comment clause is followed by more unstressed material in the same domain; and (iv) prosodic independence which corresponds to the pattern assumed in standard prosodic theory (e.g., Nespor & Vogel 1986), where the syntactic boundaries coincide with prosodic boundaries and the comment clause is thus prosodically separate (see Section 3.1 above). A few remarks about Kaltenböck's study are in order. First, we disagree with quite a few of his individual data analyses. Consider the following representative example. Kaltenböck (2007: 12) claims that *I think* in (18) is "prosodically a separate intonation unit" without providing evidence. Auditory and visual inspection of the corresponding sound file reveals that *I think* is unstressed with no pitch movement from the high level reached on the last syllable of *schizophrenia*. In the framework Kaltenböck uses (he refers to Cruttenden 1997), an intonation group minimally contains one stressed syllable and "there must be a pitch movement to or from at least one syllable" (Cruttenden 1997: 34). *I think* in (18) has neither of the two, thus does not qualify as a separate intonation unit. See Figure 11.

- (18) Uh or <,> you could have depressive illness <,> or schizophrenia I think <,>
(ICE-GB: s1b-016 #18)

Figure 11. *I think* without pitch accent

Secondly, cues to boundaries in Kaltenböck's analysis often remain unclear or imprecise. For *I think* in (19), for instance, Kaltenböck (2007: 22) argues that it "has to be classified as initial as it is part of the following tone unit" which, he continues, "is indicated by the considerable step up in pitch (from around 100 Hz on *you* to around 180 Hz on *think*)". Here, Kaltenböck seems to make use of the pitch of unaccented syllables as an external boundary criterion (Cruttenden 1997: 34). Crucially, however, the step-up in pitch should be at the boundary, i.e. on the unstressed first syllable of the new domain (cf. Cruttenden's 1997: 37 example). In Kaltenböck's example, if the comment clause is preceded by a boundary, the step-up should thus be on *I* rather than on *think*. Strictly speaking, if the step up is on *think*, the boundary could be between *I* and *think*. From Kaltenböck's analysis it is also unclear whether this step-up in pitch is in fact pitch movement to a stressed syllable (*think*) or whether *think* is unstressed. Moreover, Kaltenböck fails to provide evidence for the lack of boundary following *I think*. On the basis of a preceding boundary alone, an intonational domain is not sufficiently established.

- (19) Speaker A: But these features (ICE-GB: s2a-021 #97)
 Speaker A: and they'll be familiar to you ((ICE-GB: s2a-021 #98)
 Speaker A: *I think* (ICE-GB: s2a-021 #99)
 Speaker A: they include such things as uh uh a a a certain distrust of fact
 (ICE-GB: s2a-021 #100)

Thirdly, we believe that the introduction of a new four-way classification and new terminology is not justified on the basis of the data Kaltenböck provides. As indicated above, all patterns described by him have previously been observed in the literature. The term 'binding' lacks a prosodic definition and thus remains unclear. In particular, while 'left-binding' makes reference to a preceding nucleus such that left-bound material constitutes the tail of that nucleus, and while 'right-binding' makes reference to a following nucleus such that right-bound material forms the prehead of its domain, 'left-right-binding' makes reference to both a preceding nucleus and to following unstressed material. 'Right-binding' on its own thus means 'bound' to following nuclear material, while 'right-binding' in 'left-right-binding' means 'bound' to following unstressed material.

For these reasons among others, we do not consider Kaltenböck's (2007) study a serious challenge to our analysis.

4. Discussion: Relating prosody and functions of epistemic parentheticals

In this section, we will first discuss the relation between the prosodic patterns we found with comment clauses and their interpretation. We will then address the implications for the syntax of comment clauses. Finally, we consider the possible status of utterance-initial comment clauses in the light of our current findings.

4.1 Prosodic patterns and interpretation

4.1.1 *Prosodic separation: Comment clauses as epistemic markers of stance*

Prosodically separated comment clauses as described in Section 3.1 are best interpreted as epistemic markers of stance. This is consistent, for example, with Precht's (2003) results based on a corpus analysis. She treats *I think* and related expressions on a par with adverbials such as *probably* and modals such as *would* as epistemic stance markers, specifically as hedges (cf., e.g., Precht's 2003:252f example of *I think* used by the speaker as a means to avoid an insult). However, Precht does not analyse the prosody of these epistemic markers, and thus does not relate prosody to interpretation. This part of our results is also consistent with Kärkkäinen's (2003) finding that stance markers may be encoded in a separate intonation domain.

In our data, there are two realisations that can be understood as genuine expressions of uncertainty. In this sense, they are semantically richer than their more opaque relatives discussed below. The first is illustrated in Figure 5: a separate intonation domain and a rising contour (L*H). This is consistent with what has already been observed for utterance-final adverbials (e.g. Cruttenden 1997; Astruc-Aguilera & Nolan 2007). Specifically, adverbials "which limit the information in the main clause take a rise" (Cruttenden 1997:95), among them *usually*, *accidentally*, *presumably*. By the same token, comment clauses bearing a final rise limit the information in the preceding sentence, such that they express a reservation regarding the main proposition. This can be illustrated along the lines of example (12) (Figure 5), taken from a conversation between college friends. Speaker A tells speaker C about the people speaker A and some other person went to see for their fiftieth wedding anniversary. Speaker A is not sure about the actual position the person she is talking about had in her company, i.e. whether she really was that "high up", but the assumption is based on the fact that the person had a degree. This *I think* could easily be replaced by an adverb like *presumably*. The interlocutor

Secondly, the separated comment clause can be realised with a complex tone (H**L*(H)) which can in some cases be completed on material following the comment clause (see, e.g., Figure 3). This pattern occurs both in sentence-medial and in sentence-final position (compare Figures 2 and 3). Of all the prosodic possibilities, it conveys the strongest degree of reservation, uncertainty or doubt on the part of the speaker. For example, in (9) (Figure 2) the speaker is uncertain whether it is Alexander Technique, but he seems to believe it is. His interlocutor then confirms it. Shortly after *I think* she steps in saying *Well, something like that* in response to *I think*. In example (10) (Figure 3), speaker C is uncertain whether the argument he repeats really is the argument of his interlocutor, but he believes so. His interlocutor (speaker A in the corpus transcription) reacts to this expression of uncertainty confirming that it was not him who expressed the argument in question but that it was somebody else, Professor Halsey, who did.

(20) a. The rice is marvellous *I think* (ICE-GB: s1a-022 #92)
 b. (The rice is marvellous) (*I think*)
 H*L
 c. Interpretation:
 I don't know if you like it but I think the rice is marvellous. Or: I like it
 but you might think differently.

In their most common medial and final position, epistemic comment clauses such as *I think* etc. can be analysed grammatically as an adverbial, but are semantically variable in the degree of their effect on truth conditionality. According to a theory of intonational meaning (Pierrehumbert & Hirschberg 1990), the degree of prosodic salience of a word is related to its meaning. Words with the greatest semantic weight, i.e. lexical words such as verbs, nouns, adjectives etc., have a greater potential to attract sentence stress than grammatical or function words, which are normally unstressed and frequently reduced. It is consistent with the view that medially and finally occurring comment clauses have become grammaticalised that a large number of tokens are unstressed. These unstressed tokens

are prosodically integrated into a larger intonation domain, usually forming part of the post-nuclear phonetic material (the nuclear tail), and occasionally being part of the prehead material of a domain (cf. Section 3.2 above). While clearly of epistemic derivation, these unstressed tokens contribute little to the truth value of the proposition. We take them to have a discorsal or interactional function — creating narrative cohesion, or simply a courteous gesture of modesty or politeness towards the hearer. For instance, *suppose* in (15) (Figure 8) and *think* in (14) (Figure 7) and (16) (Figure 9) have lost their lexical meanings. They are not used to express speaker attitude, but as part of politeness strategies, or they function as mitigators. They are thus prosodically non-prominent and they join the preceding or following intonational domain. For illustration, consider the *voters* example ((14) and Figure 7) taken from a broadcast discussion about the usefulness and impact of by-elections. One idea emerging shortly before the target comment clause is that by-elections are in the interest of the tourist trade because they are held out of season in hotels, and they are in the interest of journalists who go there and “claim generous expenses”. Voters on the other hand “just have the opportunity to stick two fingers up to whoever seems to be on top at the moment”. *I think* in this context does not express speaker attitude, doubt or uncertainty. If anything, it tones down the force of the utterance, and thus has a mitigating function, or it may be interpreted as a politeness marker in the context of the broadcast discussion. Note that unlike the prosodically prominent comment clauses discussed in the previous section, this instance of *I think* does not evoke a reaction on the part of the interlocutors such as confirmation or disagreement. *I think* can also be taken to create narrative cohesion. It is prosodically attached to *the voters*. The *voters* form a contrast to the tourist trade and the journalists, which is similar to saying “the voters on the other hand” or “returning to the voters”. Note that Kärkkäinen (2003) finds the position at the beginning of intonation domains to be the most frequent one for speakers to express epistemic stance. She however does not seem to distinguish between epistemic stance and discourse function, while our results suggest that this distinction is in fact reflected in prosody.

4.1.3 Hesitation: Comment clauses as verbal fillers

At the most opaque (least informative) end of the transparency scale we find the use of *I think*, *I suppose* etc., analogous to other comment clauses such as *I mean*, *you know* and *you see*, and to related expressions such as *kind of*, *well*, *anyway* (e.g., Stenström 1990), as verbal fillers in a hesitant phase. Verbal fillers are often considered to be a kind of filled pause, commonly occurring in spontaneous speech at moments of disfluency. Early research into speech performance (e.g., Beattie 1983) observed regular cycles of hesitant and fluent phases, assumed to be reflective of the mental planning process during speech. This view also accounts for the

frequent co-occurrence during such planning phases of various pausing strategies (silent pauses, filled pauses and verbal fillers). Examples are given in (21). Stenström (1990:222) cites an extreme example from the London Lund Corpus showing the clustering of hesitation phenomena (cf. (21a), transcription modified). Using examples from the same corpus, Aijmer (1997:27) makes a similar point specifically for *I think*, noting the frequent co-occurrence of *I think* with similar expressions such as *I mean*, as well as repetitions, hesitation noises and the like (cf. (21b) taken from her work, transcription modified). Example (21c) is repeated from Section 3.3 (example (17)) above and represents a combination of *I suppose* as a verbal filler with silent and filled pauses.

- (21) a. And all this was done \ uh <> by <>kind of letting<> uh <> | well | really
by just uh <>sort of uh<> starting from nothing.
b. I mean there's a *I think* there's a limit to how much a m a man can take.
c. There's no point in uhm <,> *I suppose* undertaking experiments if
people can't read them ... (ICE-GB: s1a-059#286)

While it is assumed that some core meaning remains in all such grammaticalised items, which serves to motivate the choice of expression, the prime meaning is interpersonal. While these verbal fillers reflect mental planning (Aijmer 1997) and word-searching phases, they also operate as a floor-holding device, and may also be a response to, or elicit, feedback.

It is important to emphasise in this context that unlike filled pauses, comment clauses in these positions may serve to indicate reasons for hesitation, including repair. Prosodically, both verbal fillers and filled pauses are realised at a pitch that does not diverge from their immediate prosodic environment, normally a level contour with few fluctuations at a mid-range pitch (see the sequence *uhm I suppose* in Figure 10). All three prosodic patterns may ignore syntactic boundaries, i.e., there is no one-to-one relation between the syntactic boundaries separating comment clauses from their host sentences and prosodic boundaries, as one would expect on the basis of some previous studies in prosodic theory. The reasons for this failure of mapping syntactic edges onto prosodic boundaries are at least two-fold. First, as argued by Dehé (2007:270–271), prosodic factors play a crucial role, among them size constraints and tonal parallelism. Second, discourse factors are responsible. As outlined above, prosodic prominence goes along with a genuine semantic contribution, while semantic bleaching and grammaticalisation correspond to unstressed material. By definition, an intonation domain has to have at least one pitch accent. It follows from this that a comment clause which is semantically bleached and accordingly unstressed cannot be in its own prosodic domain.

4.2 Implications for the syntax of comment clauses

Returning to the debate on comment clauses between a parenthetical analysis and a syntactic movement approach, we argue that our results regarding the prosody of comment clauses support the parenthetical analysis in syntax. Some of the examples discussed above are repeated in (22) below. They can be rephrased as in (23).

- (22) a. I mean it's basically Alexander Technique *I think* (ICE-GB: s1a-045#32)
 b. Your argument *I believe* is that it 's died so to speak more in some realms than in others and crucially that there is something there left which is the basis for renovation <,> (ICE-GB: s1b-028#19)
 c. The voters *I think* just have an opportunity to stick two fingers up to whoever seems to be on top at the moment (ICE-GB: s1b-029#92)
- (23) a. I mean *I think* that it's basically Alexander Technique
 b. *I believe* that your argument is that it's died so to speak more in some realms than in others [...]
 c. *I think* that the voters just have an opportunity to stick two fingers up [...]

On a syntactic movement account, *Your argument* in (22b) and *The voters* in (22c) originate in a position in the clause subordinate to *believe* and *think*, respectively (cf. (23)). In order for them to end up in a position preceding the comment clause, they move across the (empty) complementiser *that* of the embedded clause and across the matrix clause *I think* and adjoin to the projection of the matrix clause. Similarly, in (22a), the whole subordinate clause *it's basically Alexander Technique* would under this account be analysed as having moved across the matrix clause *I think*. As a motivation for movement, the relevant string could be raised under focus movement. This operation targets a constituent which it adjoins to, i.e., a node in the extended verbal projection, marking it as the focus of the sentence, or, as has been argued more recently, marking the sister of the landing site of the movement as background (Neeleman & Van de Koot 2007; cf. references there). However, under the general assumption that background information is deaccented in English, it is surprising to observe several prosodic patterns with the comment clauses in cases like these, among them, crucially, prosodic prominence on the comment clause as in (22a) and (22b) (cf. Figures 2 and 3). Also, prosodic theory predicts a phrasal prosodic boundary at the right edge of a phrasal syntactic constituent in adjunction position, which should be reinforced by the focus status of that constituent (e.g. Selkirk 2000). Thus, prosodic integration of a comment clause, as described for instance for (22c) in Section 3.2, comes as a surprise if *The voters* ends up in initial position as a result of focus movement. We therefore conclude that in some cases at least, prosodic realisation can be seen as evidence against focus

movement. Instead, it is perhaps more fruitful to regard the relevant comment clauses as fixed expressions which have, through a process of grammaticalisation, acquired the status of adverbials, as discussed above. This corresponds to Aijmer's (1997) and Thompson & Mulac's (1991) assumptions about the development towards grammaticised forms summarised in Section 1 above, and to Jackendoff's (1972: 94–100) analysis of comment clause type parentheticals as adverbials. In more general terms, the prosodic realisation of these expressions serves as indication of where a particular token lies on the continuum from transparent, sentential meaning, to opaque, discoursal meaning.

4.3 Outlook: Initial comment clauses

In the discussion above we have focused on comment clauses occurring medially or finally, mainly because initial occurrences are ambiguous between comment clauses and main verbs (see footnote 2). We have seen that their prosodic characteristics serve as evidence for an analysis as epistemic parentheticals rather than main verbs. However, there are a number of reasons why some initial tokens might also be considered as having a pragmatic function and thus being syntactically separate from the rest of the utterance. The prosodic realisations we have described in Section 3 above are all consistent with the behaviour of discourse markers or discourse particles in similar sentential positions. However, discourse markers also commonly occur in initial positions (the 'discourse marker slot', Aijmer 1996: 212). It will therefore be interesting whether the realisation of initial *I think*, *I believe* etc could suggest a discourse function in this position too, rather than being obligatorily analysed as a main verb. Notice once again that Thompson & Mulac (1991) make a difference between initial *I think* followed by complementizer *that* and initial *I think* without *that*. The latter, they argue, are epistemic phrases "expressing the degree of speaker commitment" (Thompson & Mulac 1991: 313). Kärkkäinen (2003: 5), in her study of *I think*, notes that even in initial position, its functions differ according to "finer prosodic detail, especially in accent and tempo". Other discourse markers occurring in initial position (e.g. *now*: Hirschberg & Litman 1993; *of course*: Wichmann *et al.*, to appear) display three main prosodic patterns: the first is as unstressed material before the first accent in a tone group (prehead material); the second is as unstressed material that is melodically integrated in what follows, but at the same time separated from the rest of the utterance by a pause. The third pattern realises the discourse marker in its own separate tone group. It is intonationally prominent and may carry a range of pitch contours: falls are typical of reinforcing markers such as *of course*, *certainly*, *definitely*, while fall-rises are typical of items that come with a limiting function. It remains to be seen in future research whether similar patterns can be found with

initial comment clauses, but given the parallels between adverbials and comment clauses described in this paper, it would be surprising if these did not extend to initial *I think*, *I guess*, *I assume*, etc.

5. Conclusion

This work extends our knowledge of certain strings often analysed as syntactic parentheticals and their prosodic behaviour. Typical parentheticals are assumed to be longer strings inserted into the ongoing talk for a variety of reasons, often the result of real-time speech production. Shorter strings, such as the comment clauses described here, have been less frequently addressed. The results of our prosodic analysis of such strings suggest that we may regard the prosodic realisation as evidence that these items are no longer amenable to syntactic analysis but have become fixed expressions in their own right.

The data described here also provides important evidence for the theory of semantic change, especially the process known as grammaticalisation or pragmaticalisation. Discourse markers such as *now* and *well* are examples of this ‘bleaching’ process. The need for disambiguation arises from the fact that the different meanings, propositional or discoursal, can co-exist in contemporary speech. Adverbials, including fixed phrases such as *of course*, *kind of*, whose component words have lost their independent meaning, are already a product of grammaticalisation, and many develop into discourse markers; but some, such as those described here, occupy a middle ground, with meanings hovering between the formulaic and the propositional. Our data provides a good example of a transitional stage of development. It is also consistent with the notion that accent status is related to information status (Pierrehumbert and Hirschberg 1990): the unstressed tokens are formulaic pragmatic markers, while the tokens with H* alert the hearer to the fact that the proposition is only the view, assumption, or belief of the speaker. As we find with limiting adverbials such as *probably*, *presumably* (see Section 4.1.1) the H terminal (of H*LH) projects a range of alternative possibilities, including that the proposition may be false.

In common with other clausal expressions (*I mean*, *you know*), epistemic comment clauses occur in hesitant phases of speech, together with filled pauses and other symptoms of disfluency. The tokens can therefore be classed as verbal fillers, which are not identical to filled pauses, but rather they make explicit the reason for hesitation, such as word-searching or, as in (17) (Figure 10) above, a repair strategy. Secondly, the prosodic integration of *I think* etc. in larger intonation phrases is analogous to the behaviour of discourse markers (cue phrases). Although the literal meaning is still semi-transparent, such tokens function as politeness markers,

rather than expressing genuine uncertainty about the proposition. Finally, when *I think* is realised in a separate intonation domain, and assigned a pitch accent, the clause acquires, or regains, propositional meaning, and relates to the truth value of the proposition. The most marked expression of uncertainty is, of course, the version with the high pitch accent and complex contour (H*LH). These results are summarised in (24).

(24) Cline of grammaticalisation

propositional		→ formulaic
Prosodic separation and prominence go along with semantic transparency: expression of speaker attitude (genuine uncertainty, doubt, etc).	Prosodic integration and deaccentuation go along with semantic bleaching: comment clauses are used for discoursal, interactional and interpersonal purposes (politeness, mitigation, narrative cohesion).	Comment clauses mark phases of disfluency and hesitation; they reflect mental planning and word-searching phases or are used as floor-holding device; they co-occur with other disfluency markers.

Prosody is a synchronic cue to diachronic change, reflecting the “tendency to recruit lexical (propositional) material for the purposes of creating text and indicating attitudes in discourse situations” (Traugott 1995:47). The result of such change, problematic for speech processing, is a number of co-existing polysemous expressions that require disambiguation. For some items the decision is binary, as with *now* (discourse marker or time adverbial) or with the more innovative *like* (preposition or quotative particle). Epistemic parentheticals are atypical: they can still occur as main clauses, and therefore require first of all syntactic disambiguation between clause and lexicalised expression. They also, as we have seen, require semantic disambiguation between formulaic and literal, and, within the literal, varying degrees of implied uncertainty. As we have seen, prosody is an important device assisting semantic disambiguation.

Notes

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1. In Pierrehumbert's approach to intonation (Pierrehumbert 1980, Beckman & Pierrehumbert 1986, Pierrehumbert & Beckman 1988, and related work) and the ToBI transcription system (Beckman & Ayers Elam 1997) pitch accents consist of a single high (H) or low (L) tone or a combination of two tones. The tone associated with the stressed syllable, i.e. the central tone of the pitch accent, is indicated with the asterisk '*'. A tone preceding the starred tone is referred to as the 'leading tone', a tone following the central tone is called the 'trailing tone'. L*H thus corresponds to a low accented syllable followed by a rise, and it thus corresponds to a 'rise' in the British tradition of intonation analysis. H*L corresponds to a fall from a high accented syllable.
2. A reviewer queried the omission of initial comment clauses. Among our reasons to exclude them from the study was their often ambiguous status between comment clause and matrix verb. As has most recently been outlined by Kearns (2007), criteria to distinguish between initial comment clauses and main verbs have indeed been suggested. However, none of these criteria are prosodic in nature. We are not aware of a study that carefully analyses the prosodic pattern of comment clauses as compared to main verbs in initial position. It is therefore impossible at this stage to say anything about the relation between the various prosodic patterns occurring in this position and the status as main verb or comment clause. For example, we do not know whether a particular prosodic pattern on the target element goes along with the features of main verb use listed by Kearns (2007), or whether all prosodic patterns may be found for both the comment clause use and the main verb use. We believe that these questions are too complex to be integrated in the present study and that they deserve a careful separate analysis. Notice also that Kaltenböck (2007:6) considers initial *I think* etc without *that* comment clauses if they are "clearly separated from the complement/host clause by means of a pause or some intervening material such as hesitation sounds (*uh, uhm*) or other fillers (*you know, I mean*)". However, as yet we do not know whether pauses or hesitant phases are a cue to comment clause status. It seems highly unlikely that main verbs are never separated from their object clauses by a pause or hesitant stretch. Kaltenböck (2007) does not offer any evidence on the grounds of which his selection could be justified. It is precisely this arbitrariness and unmotivated kind of data selection which we aimed to avoid and which led to the exclusion of initial *I think* etc. for the purpose of the present study.
3. The apparent pitch jump to a low level on *think* in Figure 5 is due to an octave leap, a common error in pitch extraction algorithms, and is to be interpreted as a continuous rise on *think*.

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Appendix: Corpus texts cited

Corpus Text	Description (participants, date); (from Nelson, Wallis and Aarts 2002)
ICE-GB: s1a-003	Direct conversation: Instructor and dance student, Middlesex Polytechnic, April 1991
ICE-GB: s1a-015	Direct conversation: Friends, recorded in a pub, 12 June 1991
ICE-GB: s1a-019	Direct conversation: College friends, 2 June 1991
ICE-GB: s1a-022	Direct conversation: Family conversation, 10 June 1991
ICE-GB: s1a-029	Direct conversation: Programmers' conversation at the Survey of English Usage, University College London, 15 November 1991
ICE-GB: s1a-037	Direct conversation: Student friends, May 1991
ICE-GB: s1a-045	Direct conversation: Friends, 23 April 1991
ICE-GB: s1a-059	Direct conversation: Counselling interview, February 1991
ICE-GB: s1b-018	Classroom lesson: Slade School Workshop, 2nd year, 29 Oct 1991, University College London
ICE-GB: s1b-023	Broadcast discussion: Richard Baker Compares Notes, BBC Radio 4, 27 April 1991
ICE-GB: s1b-028	Broadcast discussion: The Persistence of Faith, BBC Radio 4, 27 Jan 1991
ICE-GB: s1b-029	Broadcast discussion: Tea Junction, BBC Radio 4, 5 April 1991
ICE-GB: s1b-032	Broadcast discussion: Richard Baker Compares Notes, BBC Radio 4, 9 February 1991
ICE-GB: s2a-049	Unscripted speech: Prof. John Burgoyne, 'Creating a Learning Organisation', RSA Lecture, 8 Jan 1992
ICE-GB: s2b-013	News broadcasts: Channel 4 News, 4 February 1991

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