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first published in:  
Journal of pragmatics. - 11 (1987) 6, S. 777-791, ISSN 0378-2166,  
DOI 10.1016/0378-2166(87)90113-5

Postprint published at the Institutional Repository of the Potsdam University:  
In: Postprints der Universität Potsdam  
Philosophische Reihe ; 53  
<http://opus.kobv.de/ubp/volltexte/2010/4198/>  
<http://nbn-resolving.de/urn:nbn:de:kobv:517-opus-41986>

Postprints der Universität Potsdam  
Philosophische Reihe ; 53

## DESCRIPTIVE CATEGORIES FOR THE AUDITIVE ANALYSIS OF INTONATION IN CONVERSATION

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A system of descriptive categories for the notation and analysis of intonation in natural conversation is presented and discussed in relation to other systems currently suggested for incorporation in discourse analysis. The categories are based on purely auditive criteria. They differ from e.g. tonetic approaches by relying more on transcribers' and analysts' perception of the form and internal cohesiveness of contours, especially with respect to rhythmicity and/or pitch contour (*gestalt*). Intonation is conceived of as a relational phenomenon; the role of intonation in conversational utterances can only be analyzed by considering its co-occurrence with other properties of utterances like syntactic, semantic and discourse organizational structures and devices. In general, intonation is viewed as one signalling system contributing to the contextualization of utterances in their conversational context. A broad functional differentiation between different types of intonation categories seems plausible: Local categories like accents might fulfill mainly semantic functions, while global categories like different contour types might fulfill primarily functions with respect to the interactive coordination of activities in conversation.

### 1. Introduction

Most researchers working in the area of discourse or conversational analysis would – upon question – stress the need to consider intonation and prosody systematically as an important feature of spoken language certainly relevant to the analysis of conversational organization. In the analysis of transcripts of conversations, analysts often rely on intuitively ascribed and interpreted forms and functions of intonation, e.g. in the interpretation of different types of questions. Yet, as a matter of fact, only seldom is the role of intonation in the constitution of utterance forms and functions systematically taken into account and only seldom are prosody and intonation systematically noted in transcripts.

The reasons for this seem to be twofold: Firstly, a lack of training in the handling of intonation and consequently a deep-rooted uncertainty as to which

\* I am grateful to Dafydd Gibbon (University of Bielefeld) for carefully reading and commenting on a first draft of this paper, and to an anonymous referee of the Journal of Pragmatics for useful suggestions with respect to dividing the original paper up into two parts.

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descriptive categories and notational systems to use. Secondly, the obstacle that (as a result) explicit intuitions about intonation are almost absent. (Except maybe for the still popular – and false – stereotype that questions have rising intonation!) Nevertheless, the need to consider prosody and intonation more systematically is seriously felt.

But for the student working with tape-recorded conversations from natural settings the attempt to draw on approaches or results in the study of intonation and prosody as provided in more phonetic-phonological frameworks is often at first sight disappointing. Either studies of intonation are so very abstract that they seem unrelated to the needs of the conversation analyst, or they deal with highly restrictive discourse types like reading aloud, lists, call-outlines, etc. More natural data from or resembling every-day conversational activities have only recently been considered by e.g. Brazil (1978,1981), Brown, Currie and Kenworthy (1980), Couper-Kuhlen (1983,1985), Levelt and Cutler (1983). Here, however, the theoretical basis of categories often seems to be at odds with intuitive analyses of natural talk.

Another attempt to apply instrumental analyses to conversational data is also often disappointing. The studio-like sound quality needed for instrumental analysis is only rarely attained in audio-tapes of natural conversation and, at least with most presently available programmes, the computer unfortunately cannot differentiate between the sounds like traffic outside double-glazed windows (which for conversationalists themselves is hardly noticeable) and speech sounds.

These obstacles might lead to the conclusion that although prosody and intonation are important aspects of conversational interaction, they have to be neglected. The result is a way of doing conversational analysis that would be more adequately labeled text analysis. If one could be certain that prosody and intonation only give additional information which is in principle also expressed in other components of utterances, this neglect might not have serious consequences.

In this paper, I want to:

- (1) present a system of descriptive categories for the notation and analysis of intonation in natural conversations which is based on purely auditive criteria (section 2),
- (2) discuss the categories presented here in relation to other approaches, especially tonetic ones as suggested for discourse analysis by e.g. Brazil (section 3), and
- (3) discuss current approaches about the relation of intonation to other levels of utterance organization (section 4).

In a follow-up paper, I will analyze the role of intonation in problem handling sequences in conversation. There I will show that intonation is not a negligible

factor, but a necessary and often crucial factor in the explication of formal categories which functional interpretation of utterances in contexts are based on.

## 2. Descriptive categories for the analysis of intonation in conversation

Intonation is conceived of here as the contour or melody of speech in terms of the temporal organization of perceived pitch of utterances (cf. Gibbon and Selting (1983: 53)). Intonation is part of prosody, if prosody is taken to also refer to the phenomena of loudness, tempo, rhythmicity, tension, and maybe pause (Crystal (1969: esp. 177)). In this paper, I will primarily be concerned with intonation and some specific prosodic features.

The categories presented here largely go back to ideas and categories developed by Gibbon (1981, 1983) and Gibbon and Selting (1983). They are, however, refined here. The descriptive categories suggested here are based on purely auditive analyses of intonation in tape recorded natural conversations. The attempt to incorporate the representation of intonation into transcriptions of conversations resulted in the successive refinement of perception and, consequently, of categories intuitively analyzed as relevant for the analysis of intonation in conversations.

An attempt was made to validate auditive analyses by instrumental analyses. Fundamental Frequency (FO) of selected sequences of conversations was computed by Dafydd Gibbon's 'Pitch-Extraction-Programme' running on a microcomputer. This, however, was only partly successful. While occasionally the instrumental analysis correlated well with auditive analysis, in the vast majority of sequences the data quality did not allow instrumental analysis. As a consequence, computer analysis can only be used as an illustration of basic categories, not as a systematic analytic tool.

In the transcription of intonation, an attempt was made to separate formal and functional analysis as much as possible. Only after formal analysis was completed, functional analysis began. This seemed necessary, for with many relational categories like e.g. higher or lower tone levels than in surrounding sequences a hypothesis about the function of these properties might easily have influenced perception. In the following functional analysis, recipient's reactions to talk with specific prosodic and intonational properties was taken as a criterion to both validate formal description and to ascribe communicative functions (for more detail on this validation procedure cf. Selting (forthcoming)). In the following, the formal descriptive categories are presented.

Let us start with a visualization of the intonation contour of an utterance. The dots in the following computer-diagramme show the intonation contour of an utterance which was computed by Dafydd Gibbon's 'Pitch-Extraction-Programme' running on a microcomputer.

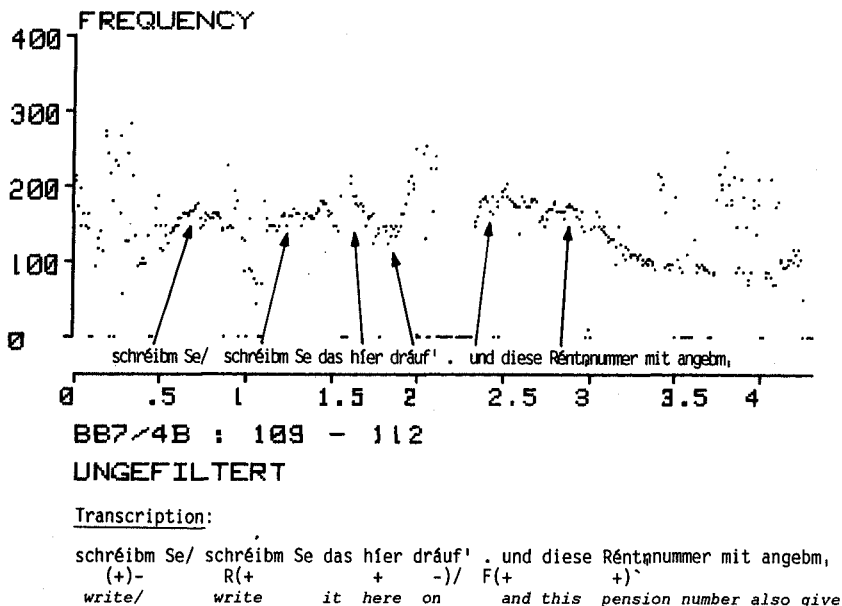


Fig. 1.

The whole contour is heard by a recipient as being rising on the first part and falling on the second part. For a more detailed analysis, it is necessary to distinguish between local and global descriptive categories for intonation.

Local categories are different accents and accent types, i.e. short range pitch movements usually realized on lengthened vowels. Accents can be upward moving, a contour of the form '∩' as the ones realized on the lexical items *schréibm*, *hier*, *und* and *Réntn* in the computer-diagram; downward moving, a contour of the form '∪' like the one realized on the element *drauf*; or staying level, a 'sing'-contour of the form '—' which is often used in call-contours, leave-takings, etc. In order to represent these categories in a typable form in transcription, in Gibbon and Selting (1983) the following notational system was developed which was somewhat refined in Selting (1987):

'+' denotes an upward pitch movement,

'-' denotes a downward pitch movement, and

'=' denotes a level pitch accent.

Accents can be locally modified, i.e. they can be realized as co-occurring with jumps in pitch (cf. Crystal's (1969) 'booster' and 'drop') e.g.:

- ‘↑+’ denotes an upward local pitch jump co-occurring with an upward accent,  
and  
‘↓+’ denotes a downward local pitch jump co-occurring with an upward  
accent.

These modifications are not realized in the example above. Accent modifications denote modifications in relation to the accents found in surrounding talk.

Global categories are cohesive series of accents as defined by the two criteria of rhythmicality and/or pitch contour (*gestalt*) properties. Descriptive parameters here are the direction and height of intonation contours: Contours can be globally falling, rising, or staying level; they can furthermore be realized on high, middle, or low tone levels. In the computer-diagramme, the global contour on the utterance *schrëibm Se das hier dräuf* is rising, the global contour on *und diese Réntnnummer mit angebm* is falling. This global direction of pitch height is the direction in which the pitch height of the unaccented syllables between the accent peaks moves. The question whether the contours are perceived as being on a globally high, middle, or low tone level cannot be answered with reference to the computer-analysis of an isolated utterance, as this is a question of relative height in comparison to the tone level of surrounding sequences in a conversation.

In our notational system, the length of a global contour is indicated by parentheses and the direction of pitch and/or tone level are noted as an operator in front of the parenthesis:

- ‘( )’ denote the extent of a sequence of cohesive accents,  
‘F’, ‘R’ denote globally falling and rising intonation respectively,  
‘H’/‘M’/‘L’ denote level intonation on high, middle, or low tone level,  
‘H/F’ denotes falling intonation on a globally high tone level, and  
‘...’ denote a sequence of weakly accented or unaccented syllables.

In the system proposed here, the sequence before a contour (‘prehead’) is not taken into account. The tails, i.e. the intonation after the last accent of a global unit, which may be falling, rising, or staying on a high, middle, or low level, or which may show combinations of these tones, are noted after the parentheses:

- ‘’ denotes a falling tails,  
‘/’ denotes a rising tails,  
‘-’ denotes a level tails, and  
‘/’’, denote combinations of tails, here rising-falling.

The notation of an intonation pattern as e.g. F(+ + -)/ in this system is thus to be read as a globally falling contour with two upward accents, one downward accent and a rising tail. In order to clarify the relation between global and

local categories, a distinction needs to be drawn between 'baseline', the global direction of pitch associated roughly with unaccented syllables, and 'peakline', the tone level of accent peaks. The peak of upward accents rises above the baseline, the peak of downward accents falls below the baseline.<sup>1</sup> Thus, contours with upward and downward accents respectively can be represented iconically as follows:



Fig. 2.

So far, I have not distinguished between primary and secondary accents of a unit in terms of the strength of an accent. In principle, the notation of accent strength by a simple differentiation in the number of symbols like e.g. '+' for a normal, '++' for a stronger and '+++ for an extra strong accent is possible. In combination with the transcription of utterances in the textual line of transcripts, if primary accents of a unit and extra strong accents are conventionally noted in conversation analysis transcripts, the strength of an accent becomes evident without noting it by extra differentiations in the intonation line. Thus in the transcription:

schréibm Se/ schréibm Se das hier drauf'.  
 (+) — R(+ + —)/  
 und diese Réntnummer mit angebm,  
 F(+ +):

the notation of accents in both transcription lines symbolizes normally strong primary accents, whereas the notation of an accent in the intonation line only as with the item *und* symbolizes a less strong, yet clearly perceivable secondary accent. Likewise, in the transcription

aber ich kann Ihp das schréibm ebm,  
 R(+ +)

*kann* is secondary accented, whereas schréibm has an extra strong accent indicated by underlining the item in the textual line.

<sup>1</sup> The baseline functions as a reference line for the perception of e.g. the strength of accents. Nevertheless, its relation to a 'declination line' as modelled theoretically by Liberman and Pierrehumbert (1984) to account for the relation between FO-computation and speaker's perceptions of relative height and prominence needs to be further investigated.

The notation of accent strength, accent types, global contour direction and tails with possible further modifications allows a fairly accurate reconstruction of the intonation of utterances from the transcription as a formal basis of functional interpretations.

### 3. Other approaches to the analysis of intonation in conversation

The proposed system differs from other systems for the analysis of intonation in some important points. Some of these differences, especially to other systems currently used or proposed for incorporation in discourse analysis, will now be discussed.

Least important is the difference with respect to local categories. There are regular correspondences between the analysis of accent types here and tones in tonetic approaches like that of Crystal (1969) with variants such as the approaches adopted by Brazil (1978, 1981), Brown, Currie and Kenworthy (1980), Gumperz (1982) and Couper-Kuhlen (1983, 1985). Whereas in the notation of accent types local upward *and* downward movements preceding *and* following an accent peak are considered, tonetic approaches only note the direction of movement following an accent peak. Thus, '+' corresponds to '↗', '-' corresponds to '↘'; in most cases combinations of '(+)/', '(+ -)', '(-)' correspond to the complex tones '↗↘', '↘↗', etc.

More important is the difference with respect to global categories. The central category of intonation contour which is used here is different from the category of 'tone group' in tonetic approaches. In tonetic approaches, a tone group or tone unit is a theoretical phonological unit which is defined with reference to its boundaries and its internal structure. Crystal (1969: 205ff.) mentions as boundaries between tone units in "normal [here meaning mainly 'not too hurried'] speech" the perceivable pitch-change after the nuclear tone of the tone group, often co-occurring with a slight pause or segmental phonetic modifications in utterances like variations in sound length, aspiration, etc. The internal structure of the tone unit consists maximally of 'pre-head + head + nucleus + tail', only the nucleus being obligatory.

As far as I understand this approach, with respect to our example given above we would have to decide which accents are nuclei. One might analyze the utterance as follows:

schréibm Se das hier drauf                      und diese Réntnnummer mit angebm,  
/HEAD + NUCLEUS NUCLEUS/ /HEAD + NUCLEUS + TAIL

The ascription of 'nucleus' to the element 'hier' is justified by the fact that on this element pitch is highest and then changing. The following element 'drauf' carries an accent as well, however, and cannot therefore be the tail of the first tone group. Thus, 'drauf' would be another nucleus or the second part of a



On a higher level, both Crystal's category of 'tone-unit sequence' and Brazil's category of 'pitch sequence' allow for the description of longer stretches of talk as a whole. In Brazil's system, however, where a pitch sequence is constituted by any number of tone units between the boundary phenomena of low termination, this category seems to correspond to topics or exchanges in discourse. This category thus refers to longer stretches of talk and does not correspond to the category of contour used here, which refers to a unit often larger than a tone unit but smaller than a pitch sequence.

In contrast to tonetic approaches, the more configurational or tune approach adopted here relies more on listeners' and transcribers' perceptions of the internal cohesiveness of contours and units than on boundaries or internal structures of tone units. Thus, the intonational cohesiveness of a tune, itself the result of the rhythmical iteration of accents and accent sequences and/or their combination to constitute a pitch contour, is taken as the defining criterion of a global contour (for a more comprehensive discussion of tonetic versus configurational approaches see Ladd (1980) and Gibbon (1976a)). This seems to provide for a clearer separation between textual and intonational phenomena: Even if a speaker breaks rhythm and hesitates or pauses in the formulation of his utterance, he can nevertheless continue his configuration or *gestalt* after the hesitation or pause and thus still present the pre- and post-hesitation parts of an utterance as a cohesive whole. This again is evidence that there are two criteria for intonational cohesion: rhythm and pitch contour. The approach adopted here is thus more phonetic in orientation; no attempt is made to isolate phonological units as pre-determinants of structures on different levels of linguistic organization.

#### **4. The relation of intonation to the locutionary level of conversational organization**

In tonetic approaches, some researchers like O'Connor and Arnold (1961), and to some extent Pheby (1975) and Fox (1984), postulated that intonations or contours have a definite meaning or express certain emotion or involvement. More recently, researchers investigating the function of intonation in sentences and in discourse have mostly taken a more relational view and have considered more abstract meanings or functions.

In the best known approach explicitly aiming at the investigation of discourse intonation, Brazil interprets the choices of prominence, key, tone and termination which the speaker makes in constructing utterances as contributions to the meaning of an utterance by "invoking some aspect of the conversational setting he shares with his hearer at the moment of utterance" (1981: 46). Intonation functions to signal the state of "speaker/hearer convergence" in discourse.

With respect to this function, each option in each choice in the intonation system carries some meaning which is derived from the contrast with its possible alternatives: The distribution of prominence signals the relative information load of particular elements in an utterance (Coulthard and Brazil (1979: 23)). From the point of view of their contribution towards speaker/hearer convergence, high key presents information as 'contrastive', mid key as 'additive', and low key as 'equative'. Falling-rising and falling tones present information as 'new' in a proclaiming tone and rising-falling and rising tones as 'given' in a referring tone. These invocations of a shared context can be further differentiated according to their use as signalling symmetrical or dominance power relationships (Coulthard and Brazil (1979: 49)).

The combination of choices within tone units and between adjacent tone units is constrained: Within a tone unit, changes in pitch between e.g. key and termination can only be made to adjacent levels: "There are no tone units having high key and low termination or low key and high termination" (Brazil (1981: 42)). Between adjacent tone units separated by a speaker change, a next speaker is constrained in his/her choice of key by the termination chosen by the last speaker. The choice of same key as last termination is interpreted as agreement with a presumably shared opinion; the choice of another key than that asked for by last termination is interpreted as annoyance and non-compliant behaviour.

For these interpretations, only intonation is made responsible. Intonation is understood as a "self-contained meaning system, the components of which are directly related to the way the utterance fits the unique state of convergence between participants, existing moment by moment in the interaction" (Coulthard and Brazil (1979: 20)). These intonational meanings can be described "at an appropriate level of abstraction without reference to co-occurring lexical or grammatical choices" (Coulthard and Brazil (1979: 21)).

In conclusion, Brazil seems to believe that certain intonations and certain combinations of intonations express certain abstract meanings which are functional with respect to the signalling and constitution of speaker/hearer convergence irrespective of properties and meanings expressed by e.g. lexical, syntactic or other means. On an abstract level, thus, this approach too seems to assume a one to one relation between intonation forms or more global intonation patterns and meanings or particular context constituting functions.

A conception like Brazil's is rejected by researchers who assume intonation to be plurifunctional with respect to different levels of utterance and discourse organization. The latter view is taken by researchers like Gibbon (e.g. (1981,1984)) and Gumperz (e.g. (1982)).

Gibbon conceives of intonation as an autonomous signalling system on a 'metallocutionary level', which is mapped onto structures on the locutionary or textual level to signal structures and functions of utterances on different levels (Gibbon (1981,1984)). The structures and functions which are signalled by

intonation concern smaller units like syllable, word, and clause structure, units on the level of discourse organization like turn-taking, speech act sequencing, topical or semantic structures of conversations, and even larger units like in the signalling of textual structures in longer stretches of talk, the signalling of genres and styles and the signalling of "speaker attitudes of modal (knowledge, belief, obligation) and appraisive types (emphasis, pejoration, amelioration)" (Gibbon (1984: 166)). Gibbon is most concerned with the organization of accentuation. He postulates prosodic speech styles which result from the different importance of the signalling of specific structures on specific levels of discourse organization in different contexts or activity types: Thus, in reading aloud, accentuation mainly serves the signalling of phrase or clause or syntactic structures; in longer contributions to dialogue like in e.g. narratives, accentuation is more concerned with the signalling of 'topical (semantic frame) structure'; in other conversational contexts, accentuation is most relevant for the signalling and indexing of discourse organization like e.g. turn-taking, speech act sequencing, etc.; finally, in stereotyped and ritualized speech, accentuation might primarily be used to generate rhythmic patterns and stylizations (cf. (1983: 204f., 1984: 166)). In a more cybernetic terminology, this mapping of different levels of linguistic organization with accentuation to constitute stylistic variation is called the 'level-selection function'.

Only in special cases does intonation have a quasi idiomatic function, e.g. the stylized level tones on different pitch heights in call contours or in ritualized sequences in conversation. E.g.: Mother calling her daughter home from the playground:

Manué:lá:

(. . = = )

Or in leave-takings:

Auf Wiedersé:hn

( = = )

(Cf. Gibbon (1976a) or Ladd (1980) for more detail on the stylized or 'chroma' tunes, and Bolinger (1986: esp. chapter 10) on intonation stereotypes in general.) In most other cases, however, intonations are plurifunctional and it is only in relation to structures on the locutionary or textual level that intonation contributes to meanings or functions.

In quite a different research context, a similar view is taken by Gumperz (1982). Gumperz is interested in the situated or context bound processes of interpretation and constitution of meanings and contexts and considers "how prosody interacts with other modalities to signal thematic connections and to generate interpretation of communicative intent" (1982: 101). In essence,

Gumperz takes prosody and intonation as signalling devices which – in connection with lexical and syntactic devices of utterance structures – serve to trigger inferences on the background of culturally expected knowledge or interpretive frames. In this sense, prosody and intonation are among other phenomena looked upon as 'contextualization cues', i.e. features that contribute to the signalling of contextual presuppositions and activity types and to the constitution of dynamic interactive contexts by virtue of shared culturally specific co-occurrence expectations between content and surface style of utterances (Gumperz (1982: 131), cf. also Auer (1986)). In inter-ethnic communication, which Gumperz analyses, intonational interference in the English language use by ethnic minorities with respect to tone groupings, nucleus placement and tune or melodic shape results in misunderstandings between native speakers and non-native speakers, as the intonations used are interpreted as contextualization cues within divergent cultural interpretive frames (cf. esp. Gumperz (1982: 118ff. and chapters 7 to 9)).

Thus, both Gibbon and Gumperz stress the interdependence of lexical, syntactic and other locutionary structures and devices and prosodic and intonational devices. This interdependence is most obvious, when in e.g. so-called repair sequences in conversation different intonations on locutionary equivalent repair initiations or similar intonations on locutionary different repair initiations are used to signal the same type of problem of understanding. In my follow-up paper I will argue that the role of intonation in such repair or – more generally – problem handling sequences in conversation can only be analyzed by considering intonation in co-occurrence with syntactic and semantic structures of utterances and turn position or the relation of an utterance to sequentially prior utterances in the conversation.

Within the general interdependence claim, so far hardly any attempt has been made to differentiate between the function of local and global categories. If, however, results of the analysis of intonation in discourse are compared, the following hypothesis seems plausible: Local categories, i.e. accents, mainly serve functions on a semantic level of discourse organization, whereas global categories, i.e. contour types and global switches in overall tone level, primarily serve functions on the level of interactive conversational organization.

This hypothesis is the result of the following reasoning: Gibbon (1981) found the role of accentuation in conversational interaction to be related to topical or semantic structures on the locutionary level of utterances. The notions of emphasis and contrast, as a result of terminology like 'emphatic accent' or 'contrastive accent' often ascribed to the accents themselves, is shown to be the result of accentuation on specific elements of the locutionary structure in specific semantic relations to each other. Gibbon (1984) and Gibbon and Selting (1983) furthermore described correspondences between accent sequences and the semantic frame structure of discourse contributions.

On the other hand, Gibbon and Selting (1983) found the use of specific global contours to be also related to the addressee of talk. Intonation seemed to be usable as a 'membership categorization device' and as an interactive strategy of discourse control. Likewise, shifts to high overall global tone level in specific conversational turns have been observed to be used as uptake securing and attention getting devices (Selting (1985: 193)). For longer stretches of monologous talk like e.g. radio news broadcasts and contributions to podium discussions, in which albeit the speaker is speaking in public, addressing a heterogeneous audience and not individual recipients, Yule (1980) and Couper-Kuhlen (1983, 1985) have described major and minor 'paratones'. These are used as a sort of topic or paragraph intonation respectively to signal cohesiveness of a stretch of talk. Both the contours described in Gibbon and Selting (1983) and the paratones described in Couper-Kuhlen (1985) are used within a single speaker's contributions as well as transcending turns, when successive speakers cooperate in e.g. question-answer sequences or in producing topical talk around the same topic (Couper-Kuhlen (1985)).

Relating these findings on semantic and interactive functions of local and global intonational categories, the following reasoning seems plausible: Especially to signal the semantic notions of emphasis and contrast, accentuation on specific locutionary elements can be used. But the assumption is justified that it can be any type of accent in principle. Likewise, in certain types of utterances not otherwise signalled as a question, a terminal rising intonation can be used to give it the status of a question in conversation. Yet, this terminal rise can in principle be equally well achieved by using a '-'-accent or a terminal rising tail.

If this is true, the choice between different accent types, i.e. especially between '+'- and '-'-accents, to constitute global contours would have to be analyzed in relation to the contours used in prior speech in the conversation and as choices related to the level of conversational organization and control as established by participants in the interaction. Convergence and divergence of contours perhaps being related to interactive processes between participants. This will be shown in Selting (forthcoming).

## 5. Summary and conclusions

Descriptive categories for the systematic analysis and transcription of intonation in conversations have been presented. Categories are based on auditive criteria, taking transcribers' and analysts' perception of intonational organization into account. The advantages of the tune or configurational approach adopted here over more rigid and theoretically based tonetic approaches have been discussed. In the discussion of some current conceptions about the relation

of intonation to the locutionary or textual level of utterances, a relational view has been adopted, in which the role of intonation can only be analyzed by considering its co-occurrence with a variety of phenomena of utterance and conversational organization.

Hypotheses about the interdependence of locutionary and intonational devices and about a possible functional differentiation between local and global categories of intonation have been put forward. These will be further developed in *Selting* (forthcoming), in which data from natural conversational interaction will be analyzed using the categories and notational conventions presented in this paper.

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