PROSODIC EXPRESSIONS AND PRAGMATIC CATEGORIES*

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Our earlier work in prosody has been mainly concerned with iso-
lated sentences in a fixed situational frame (e.g. Gårding and
Lindblad 1973, Bruce and Gårding 1978 and 1981). Our present
goal is to show how prosody makes isolated sentences a coherent
text and how it makes the coherent text part of situation-bound
speech act. Such functions, here called pragmaprosodic, are now
an object of current interest.

In this paper I shall present a preliminary frame for pragma-
prosodic categories and report on some experiments designed to
validate their existence.

THE FRAME

Prosody has at least four functions with a bearing on text and
speech act. This is illustrated by Table 1, which is based on
traditional analysis. The *hierarchical* function refers to prosodic
means of ordering topics and comments which may be spread over
several sentences. The *demarcative-connective* function refers to
the absence or presence of boundary signals. These two functions
are chiefly text-oriented. They divide the text into smaller u-
nits and arrange these units hierarchically. The two other func-
tions are listener-speaker oriented. The *modal* function expresses
orientation towards the listener, choice of utterance type, state-
ment or question intonation, for instance. The *expressive* function,
finally, conveys attitudes and emotions of the speaker.

Let me try to motivate the frame by looking more closely at the
corresponding classes of prosodic expressions.

The *hierarchical* class comprises accent (stress) and intonation.
Both can appear in one of three grades, neutral, upgraded and
downgraded. Upgraded accent has a prominence-lending focal effect,
downgraded accent may be anaphoric. Its physical domain is local,
which means that it hits a minor part of the speech chain, a

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Functions of pragmatic prosody

TEXT ORIENTED		LISTENER—SPEAKER ORIENTED	
hierarchical	demarcative-connective	modal	expressive
accent l	intonation g	intonation g	accent g
	volume g		intonation g
	tempo g		volume g
	voice g		tempo g
	quality		
	tonal l		lengthening l,g
	juncture		
	pause l		
intonation g⁻	accent l	tonal l	pause l
		juncture	
	lengthening l		voice g
			quality

l= local domain, e.g. syllable, morpheme, word
g= global domain, e.g. phrase, sentence, text unit

Table 1

syllable or a word. The phonetic correlates of accent are varying combinations of fundamental frequency, intensity and duration. The actual combination of these correlates depends on the function (focal, non-focal) and the position in the intonation contour.

While the hierarchical function of accent is taken for granted, the corresponding function of intonation has been more or less neglected, at least experimentally. Since the domain of intonation is global, its hierarchical function is manifest in a major part of the utterance, a phrase or a sentence. The main acoustic correlates seem to be a continuation of the general course of a contour, a repetition of a specific contour, shifts up and down of a neutral contour often combined with expansion or compression of the frequency range.

Intonation and accent also appear in the *demarcative-connective* class. It is shown in Fig. 1, which is taken from an analysis by Bruce (1981), how a declarative intonation contour stretches over two sentences. The phonetic expression is a gradual fall of the baseline and the topline which connect the local maxima and minima of the fundamental frequency curve. In this way intonation reflects a larger constituent than the sentence, a text unit, which is set off from the rest of the text. This use of intonation at the same time has a hierarchical function.

Syntactic units may be delimited by tonal junctures, a local fall as in the declarative sentence of Fig. 1 or a local rise as in the interrogative contour of Fig. 2. There it is illustrated how a question contour connects an interrogative speech act spread over two sentences.

Accent may also be a demarcative signal. In many Swedish dialects (e.g. in Stockholm) it falls on the last accentable syllable of the phrase, if it has not been used to mark an earlier word in the same sequence for focus. As Bruce demonstrated so convincingly (1977), it is this demarcative function that gives rise to the double-peaked Accents 2. In other Swedish dialects, e.g. Finland Swedish, a different strategy is used to achieve the
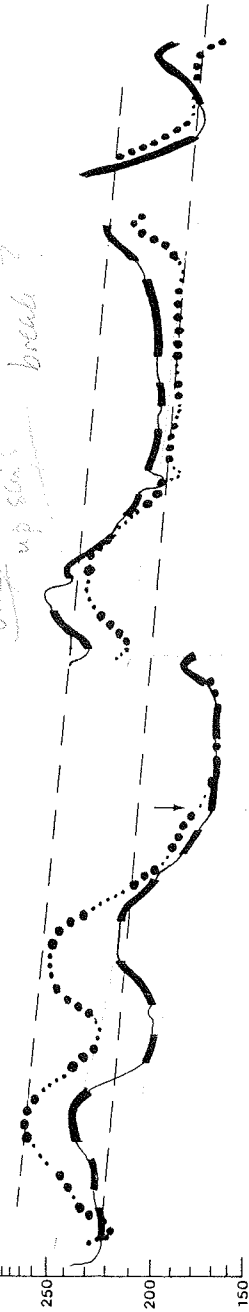
Fig. 1. F₀ manifestation of declarative intonation stretching over two connected sentences (dotted line). Pause between sentences has been omitted. Solid line shows corresponding sentences, each with a declarative contour of its own. Hatched lines connect maxima and minima in the two-sentence text. Arrow points to tonal juncture fall. From Bruce 1980.
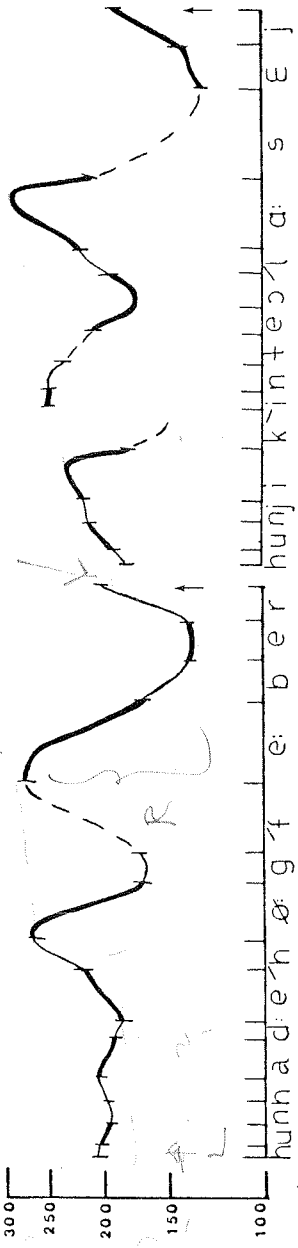

Fig. 2. F₀ manifestation of interrogative intonation in two connected sentences. Arrow points to tonal juncture rise.

same goal. Here the initial part of the intonation contour is
at an extra high level which in this way becomes a tonal junc-
ture, signalling the beginning of the sentence.

The demarcative function of accent was implied in the concept
of sentence accent (Bruce and Gårding 1978). However, the present
investigation of connected sentences suggests that this accent
is not related to the sentence but rather to the text. In any
of the two test sentences that form a coherent text in the ma-
terial used for this study (cf. Table 2), our alleged sentence
accent only appears in the second sentence. Correspondingly,
the initial tonal juncture of Finland Swedish belongs to the
text unit.

The *modal* class includes intonation and tonal junctures. As has
been mentioned already, a statement is characterized by gradually
falling intonation stretching over the whole text unit, which
may consist of one or several sentences. It is, then, the grad-
ually falling fundamental frequency which marks the statement.
Interrogative intonation is non-falling (Gårding 1979, Bredvad-
Jensen 1980). In addition, there is a non-falling intonation at
a low level, considerably lower than the question, which is very
common in spontaneous narrative style (Gårding 1967). I regard
this as the unmarked case. The speaker is too much involved in
the textual part of what he/she is saying to care about the mo-
dal function of prosody. Tonal junctures, i.e. local falls and
rises, strengthen the purport of the speech act. They are not
obligatory.

The *expressive* class comprises a whole set of prosodic features,
global as well as local. As a rule, they can be analysed as
superimposed on the other classes. What makes them expressive
is exactly their deviation from an expected pattern.

SOME EXPERIMENTS

The aim of the experiments is to explore the hierarchical function
of accentuation and intonation, in particular how speakers

The hierarchical function of accent in texts consisting of two sentences

Text	Sentence 1 Ref.A / Ref B	Sentence 2 Ref A / Ref B	Manifested class of accents in referents (Ref) 1A/2A	Manifested class of accents in referents (Ref) 1B/2B	Relation of referents* 1A/2A	Relation of referents* 1B/2B
1	Uno är åtta år 'Uno is eight'	Uno går i skolan 'Uno goes to school'	neutral/ downgraded neutral/ neutral	neutral/ neutral	Repetition	Equivalence
2	Janne är fyra år 'Janne is four'	Uno går i skolan 'Uno goes to school'	neutral/ neutral neutral/ upgraded	neutral/ neutral	Hyponymity Antonymity	Hyponymity Antonymity
3	Janne går i skolan 'Janne goes to school'	Uno går i skolan 'Uno goes to school'	neutral/ neutral upgraded/ upgraded	neutral/ neutral downgraded/ downgraded	Hyponymity	Repetition
4	Janne går på lekis 'Janne goes to the nursery school'	Uno går i skolan 'Uno goes to school'	neutral/ neutral upgraded/ upgraded	neutral/ neutral neutral/ upgraded	Hyponymity Antonymity	Equivalence Contrast
5	Janne går inte i skolan 'Janne does not go to school'	Uno går i skolan 'Uno goes to school'	neutral/ upgraded	downgraded/ downgraded	Antonymity	Repetition
6	Janne slutar klockan tre 'Janne finishes at three'	Uno går i skolan 'Uno goes to school'	neutral/ upgraded	neutral/ upgraded	Antonymity	Equivalence

*The term denotes second element as compared with first

Table 2

and listeners use these features to create coherence in a text.

The first experiment concerns accentuation, the second intonation. In both experiments I use text units consisting of two sentences in which topics and comments have been varied systematically. These texts (Table 2 and 5) were read by several speakers. Recordings were made and analysed (Figs. 3 through 6). A closer analysis of these contours in terms of the earlier mentioned intonation model (Bruce and Gårding 1978) will be presented in a forthcoming paper. Some of these sentences were later presented in tests in which subjects were asked to match them in such a way that they formed natural text units (Tables 3 and 4). Similar experiments have been reported by Fónagy (1981).

The speakers, who were all phoneticians, represented four different dialects of Swedish, southern (EG), eastern (Stockholm, UN), far east (Helsingfors, KT), and received pronunciation, as taught in the drama school of the National Theatre in Stockholm (GS). Typical productions by Speakers UN and EG are presented in Figs. 3 and 4 for accentuation and in Figs. 5 and 6 for intonation.

The speakers produced the text units in three different orders. They were asked to ponder the content of the text and express it prosodically as clearly as possible. To secure natural productions, the relevant text units were interspersed with other text units, constructed after a different design.

1. Accentuation

The material used in this experiment is presented in Table 2. The sentences in the leftmost part of this table occur in pairs. Every sentence has a topic (Referent A) and a comment (Referent B) which are differently related to the topic and comment of the neighboring sentence. All the sentences have the same syntactic structure, a noun phrase followed by a verb phrase. The content has been chosen in such a way that we can expect the speaker to strengthen and weaken the accentuation of related topics and comments according to a predetermined plan (cf. middle

part of Table 2). All sentences except one (no. 6, Table 2) have declarative intonation. For orientation let us look at the first example. There are three relations to be considered, the relations between the two referents A and B in the paired sentences and the relation between the two sentences 1 and 2. The relation between the referents is expressed in text-linguistic terms in the right-most part of the table. The middle part shows how accentuation has been expected to be used to bring out these relations. It may be neutral, downgraded or upgraded. We notice that the prosodic categories are very simple as compared to the text-linguistic ones.

In text 1, referent A, *Uno*, is repeated in sentence 2. This may happen in a communicative style used when grown-ups talk with children, as if pronouns were too weak to serve as referents. The repeated referent may be expressed by a downgraded accent. We notice how in both dialects (Figs. 2 and 4) the downgrading affects the prefocal part (*Uno går i*) by a narrower range of pitch. Referents B, on the other hand, are two equivalent pieces of information. Still, referent B of sentence 2 is upgraded. This accent is interpreted as having a demarcative function. Apart from the relation of the referents there is also the relation between the two sentences that together form a text unit. In text 1 they are given equal weight. This equivalence seems to be achieved by the use of the same contour in both sentences with a slight downshift of the intonation of sentence 2.

The referents of the sentences in text 2 can be related in different ways. We can give referents A, *Janne* and *Uno*, an equal neutral degree of accent which makes them equivalent pieces of communication (Fig. 3). We can also give *Uno* an upgraded accent and create a constrastive effect in meaning, equivalent to the expression *Uno, however*. A third possibility was used by two of the speakers: The whole of sentences 2 was contrasted with sentence 1 by the repetition of an expanded version of the same intonation pattern (Fig. 4).

Text 3 is deviant. For the recording it was supplied with the
paranthesis *Everybody is at school*. In this way sentences 1 and /e
2 actually form part of a three-sentence unit. The treatment of
the A referents varied. Either the referents were given equal
weight, or else *Uno* of the second sentence seemed to be favoured.
The intonation contour appropriate for the sentences of this text
unit is not a simple declarative intonation as in earlier cases
but one used in repetition of equal elements as in counting.
The speakers have achieved this effect by using the same into-
nation contour for both sentences but with a downshift of sen-
tence 2 in a compressed range.

Text 4 called for equal treatment of the referents by means of
neutral accents in a repeated intonation contour. There is a
slight downshift of the total pattern of sentence 2.

In text 5, on the other hand, an upgraded accent seems to be
obligatory in the A referent *Uno* to express contrastiveness.
At the same time there is an upshift of the pattern together
with a compression of the range in one speaker (EG), and an up-
shift with expansion in the other (UN).

In text 6, finally, there is a choice between neutral accents
(UN) or an upgraded accent in the referent of the second sentence
(EG). Furthermore the whole of sentence 2, which is interrogative,
seems to be contrastive with the whole of sentence 1, which is
declarative. This contrastive effect may be due to the change
of intonation contour. To summarize the comments on the produc-
tions: Accentuation was used as expected in three classes to
express hierarchical relations. These accents, however, were
often accompanied by variations in the basic contour, upshift,
downshift, compression and expansion.

The productions of Speaker UN were used in a listening test with
seven subjects. A subject was asked to match one of the six
productions of sentence 2 with a given sentence 1, called the
anchor. The matching was done with the aid of a card reader, a
device permitting comparison between different stimuli and the

Results of matching task with card reader (7 subjects).
Productions U.N.

Sentence 2

Uno går i skolan
'Uno goes to school'

	1	2	3	4	5	6
1. Uno är åtta år 'Uno is eight'	4			3		
4. Janne går på lekis 'Janne goes to the nursery'	1			5	1	
5. Janne går inte i skolan 'Janne doesn't go to school'					7	

(Sentence 1)

Table 3

Intonation

Results of matching task with card reader (7 subjects).
Productions U.N.

Sentence 2

Hon gick inte o(ch) la sej
'She didn't go to bed'

	1	2	3	4	5	6
1	7					
2		5			2	
3			4	3		.

(Sentence 1)

Table 4

anchor, any number of times and at a leisurely pace. Three anchors were used from texts 1, 4 and 5, representing pairs of sentences with neutral, upgraded and downgraded accents on the referents.

The task turned out to be quite easy. It did not take long for the listeners (all students of phonetics) to find the correct pairmate. Informal tests indicate that the tendency is the same with sentence 2 as the anchor.

The results of the matching test are given in Table 3. Broadly speaking, the listeners preferred the original mate of the anchor.

All listeners agree that sentence 5.2 is the correct mate for 5.1. Here the anchor 5.1 seems to require an upgraded accent in referent A, a downgraded accent in referent B and a terminal declarative intonation contour. Only one sentence fulfills these requirements, sentence 5.2! No. 3.2 has the required accent pattern but a non-final intonation contour which does not fit the given context.

With anchor 1.1 the sentences 3.2 and 6.2 have wrong intonations, 3.2 and 5.2 a wrong downgraded accent on referent B. Sentence 2.2 seems acceptable in intonation and accent but its tempo is too slow for the anchor. The votes are about equally divided among the two remaining ones, 1.2 and 4.2. The upgraded accent of *Uno* in 4.2 sounds plausible but intriguing. It gives an element of surprise to the message and obviously puts the example in the expressive class.

With anchor 4.1 similar arguments pertaining to intonation, accentuation and tempo show 4.2 to be the most natural match. It received 5 out of 7 votes.

To produce the two sentences as a semantically coherent unit the speaker uses not only accentuation, as planned by the experimenter for some of the text units, but also intonation and tempo and perhaps other features as well, overall volume and

The hierarchical function of intonation in texts consisting of two sentences

Text	Text unit		Manifested class of intonation		Relation of intonations
	Sentence 1	Sentence 2	Sentence 1	Sentence 2	Sentence 1/Sentence 2*
1	Hon var inte trött 'She wasn't tired'	Hon gick inte o(ch) la sej 'She didn't go to bed'	Neutral	Neutral	Additive
2	Hon var trött 'She was tired'	Hon gick inte o(ch) la sej	Neutral	Upgraded	Adversative
3	Hon SA 'She SAID'	Hon gick inte o(ch) la sej	Upgraded	Downgraded	Complement
4	Hon var alldeles säker på sin sak 'She was quite sure'	Hon gick inte o(ch) la sej	Neutral	Upgraded	Concessive
5	Hon gick ut 'She went out'	Hon gick inte o(ch) la sej	Neutral	Upgraded	Contrastive
6	Hon hade hög feber? 'She had a high temperature?'	Hon gick inte o(ch) la sej?	Neutral	Neutral	Additive

* The term denotes second element as compared with first

Table 5
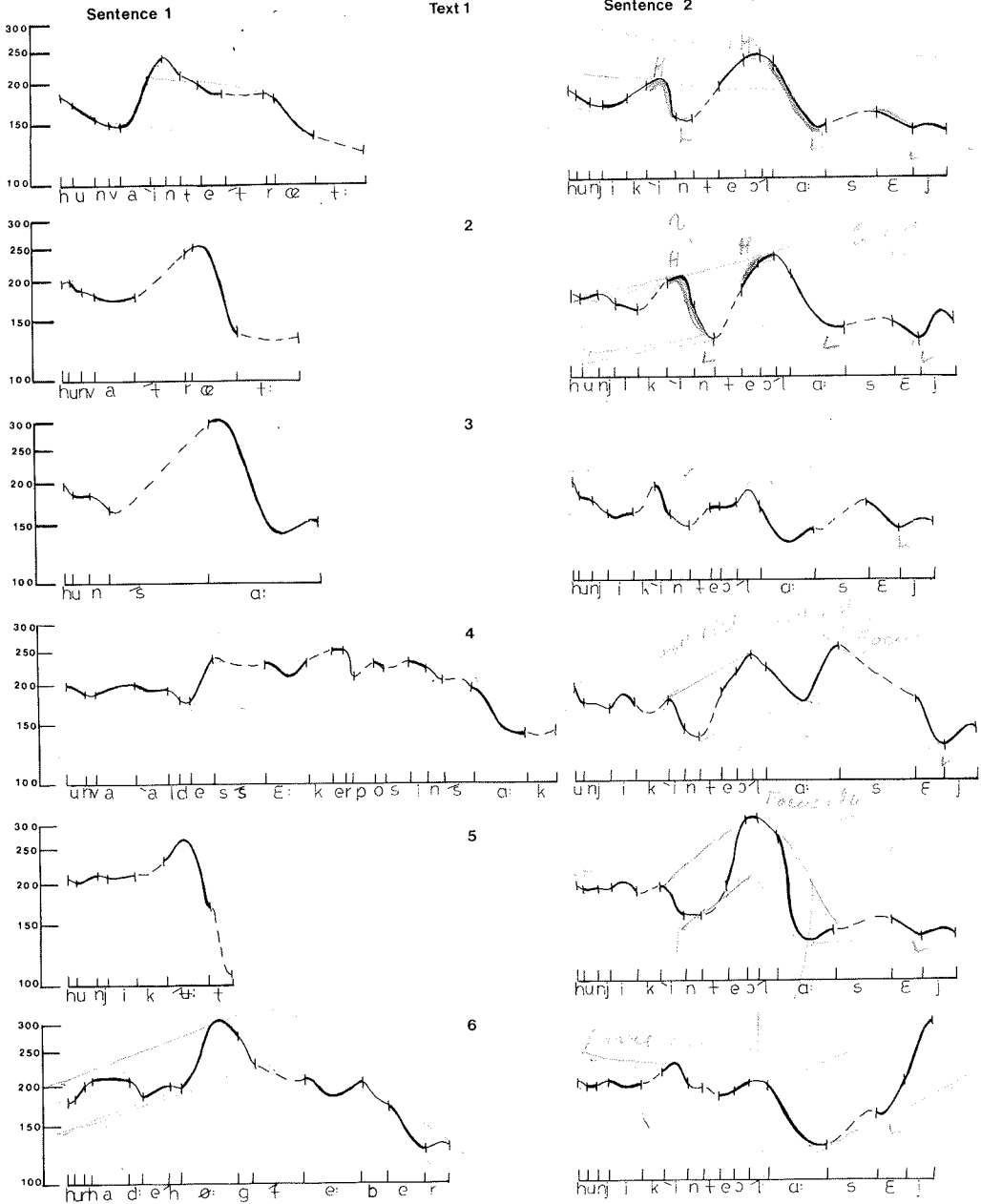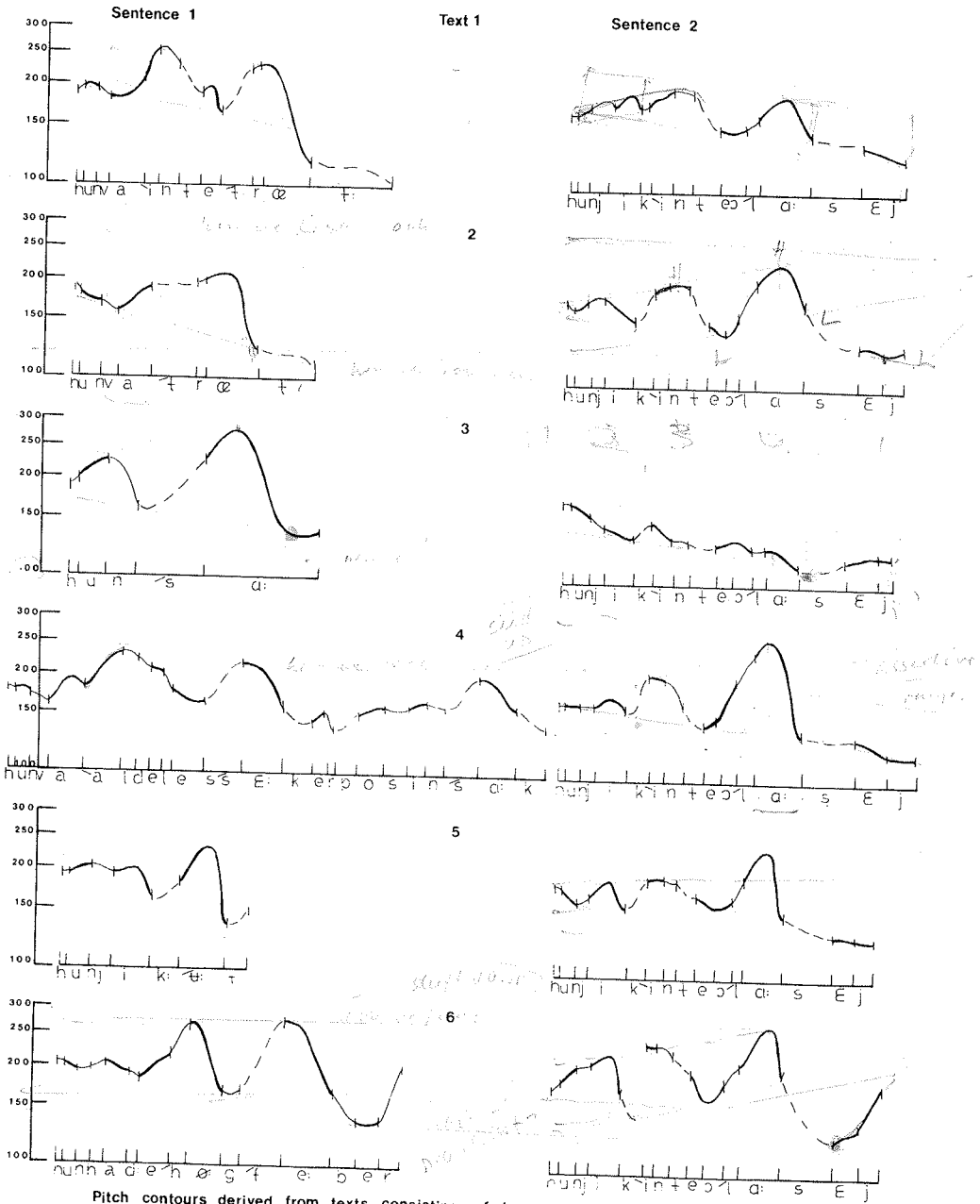
Pitch contours derived from texts consisting of two sentences

Speaker UN Stockholm

Fig. 5

The hierarchical function of intonation

Sentence 1　　　　　　Text 1　　　　　Sentence 2

hunvaihtetræ t:

2

hunvatræ t:

hunjikinteɔlɑːs ɛj

3

hun s ɑː

hunjikinteɔlɑːs ɛj

4

hunvaaidelessɛkerposinɡaːk

hunjikinteɔlɑːsɛj

hunjikinteɔlɑːsɛj

5

hunjikːuːt

hunjikinteɔlɑːsɛj

6

hunnadehøɡteːber

hunjikinteɔlɑːsɛj

Pitch contours derived from texts consisting of two sentences

Speaker EG Skåne

Fig.6

voice quality, for instance. To a large extent the use of such
features seems to follow general principles. This is evidenced
by the fact that listeners are able to recognize the missing
part of the text by prosodic features only. The test also in-
dicates that intonation and tempo are perhaps more important
cues than accentuation.

2. Intonation

Table 5 shows the sentences which have neem constructed to test
the power of intonation to express hierarchy of sentences.
The text of sentence 2 is always the same, *Hon gick inte och
la sej* 'She didn't go to bed', but it had been pronounced at
different intonation levels which I analysed as neutral, shifted
up and shifted down, depending on the situation described by
sentence 1. The different relations between the sentences in
the text have been described in text-linguistic terms in the
rightmost column of the table. In the phonetic class only three
terms are needed, neutral, upgraded and downgraded. The text-
linguistic terminology is richer. The following comments on the
production of these sentences refer mainly to Speaker EG, Fig. 6.

Text 1 was pronounced with a neutral declarative sentence in-
tonation in both sentences. These sentences are connected by a
global fall stretching over both sentences (compare also Fig. 1
from Bruce 1980). This relation is textually additive in the
sense that the information of sentence 2 is added to sentence 1.
An equivalent syntactic arrangement would be to conjoin the two
sentences by AND.

In text 2 (Fig. 6) sentence 2 has been pronounced with shifted
up intonation which has been interpreted by the experimenter as
the prosodic expression of contrast. A common text-linguistic
term for this relation between the comments is adversative.
The shifted-up intonation plays the same role as a conjunction
like BUT or an adverb like ON THE OTHER HAND.

In text 3 shifted-down intonation in sentence 2 is natural after
focus in the complement clause.

Shifted-up intonation in sentence 2 of text 4 expresses asser-
tion and plays the same role as an adverb like CERTAINLY.

In text 5 shifted-up intonation has a contrastive effect and
in the last example, no. 6, the same contour has been used in
the interrogative contour.

There is some interspeaker variation in the accentuation of
these sentences. Speaker UN has a preference for a strong accent
in the negation *inte* which in most cases is followed by an
equally strong accent in the following predicate verb *la*. But
again, the agreement is great enough to show that speakers use
neutral, upgraded and downgraded intonation in a systematic way
to interrelate phrases and sentences. These three prosodic cate-
gories may or may not coincide with syntactic coordination,
superordination and subordination.

Test 2 (Table 4) was designed to test listeners' ability to
recognize prosodic hierarchy and use it to achieve semantic
coherence. Also in this test the instruction was to find the
best match for three anchors (1, 2 and 3), one at a time.
Another group of phonetics students served as subjects. The
results are shown in Table 4.

Again the original pair-mate was found easily. In the cases
where another candidate has been suggested, this is also a
possible choice. A question intonation *Hon gick inte och la sej?*
after *Hon var trött* as in no. 6 is a quite natural continuation
and 4.2 after HON SA makes the sentence a direct quotation rather
than an indirect one.

CONCLUSION

Our experiments seem to show that speakers use different levels
of accentuation and intonation in a consistent way to express
hierarchy between referents. Similarly, listeners rely on these
cues to establish meaningful relations between sentences. The
hierarchical function, then, is effected by three classes of
phonetic expressions, neutral, downgraded and upgraded, which

is called accent (stress), if the domain is local and intonation
if it is global. It is semantic weight and semantic relations
that determine the class.

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