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1990

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Accentual Patterning in 'New' vs 'Given' Subjects in English

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Abstract
Data from American and British English are examined to see whether the discourse
parameter 'new/given' has any measurable effects on the accentual patterning in initial
subject constituents. The results show no significant difference for the American speakers.
For the British English speakers, however, it was observed that the width of the Fo register
on the subject was considerably greater in the 'new' context than in the 'given' context. The
data also show that American and British English speakers differ in the way they associate
tones, both phrase internally and at phrase boundaries. Furthermore, the accents on
sentence-initial feet for all speakers can be accounted for in a rule system if one assumes a
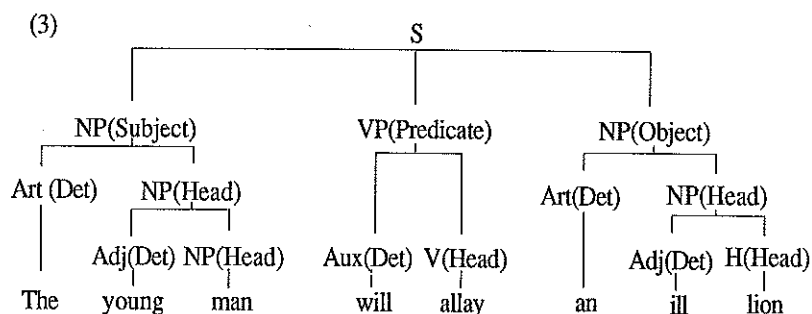rhythm component which interprets these constituents as rhythmically strong.

INTRODUCTION

The discourse parameter 'new/given' (see Halliday 1967) has, as is well-
known, significant effects on the realization of fundamental frequency in
post-focal position in English. That is to say, it is typically the case that
after the final focussed word, all accents are deleted. In other words, in this
environment, stressed syllables are deprived of Fo prominence, i.e.
'deaccented' (Horne 1990 for English; see also Gårding 1981 for Swedish,
French and Greek). In prefocal position, on the other hand, it is observed,
nevertheless, that 'given' lexical material is as a rule still assigned accents in
contrast to the situation in postfocal position (Eady et al. 1986, Gussenhoven
1985). Although it is generally assumed that an important function of an
accent is to mark new information (Terken 1985), in this prefocal
environment, however, the observed accents on 'given' information must be
assumed to have some other function. In Horne 1988, following Gårding
1981, it was assumed that these prefocal accents functioned mainly to
indicate phrase boundaries. Consequently, in the algorithm for synthesizing
Fo contours developed there, Fo prominence was assigned to all lexical
heads in prefocal position regardless of whether they had the status of 'new'
or 'given' information. This produced an acceptable result, but the
synthesized curves did not, in all cases, correspond closely to the observed
data.

THE RHYTHMIC FUNCTION OF ACCENTS

This shortcoming in the approach stems to some degree from the fact that the algorithm did not incorporate rules accounting for another important function of accents, namely their contribution to the creation of linguistic rhythm (see Bolinger 1981, 1986; Bruce 1981). The model in Horne 1988 has as input a strictly grammatical representation in terms of phrase and functional categories. Focal accents are assigned on the basis of grammatical functions and the coreferential status of a given constituent with respect to previous parts of the discourse, phrase accents on the basis of syntactic phrase categories. So, for example, the sentence in (2B), where *young man* constitutes 'given' information, is assigned the syntactic structure in (3).

(2)   A: What will the young man$_i$ do?
           B: The young man$_i$ will allay an ill lion.

(3)   S

        NP(Subject)   VP(Predicate)   NP(Object)

    Art (Det)   NP(Head)   Art(Det)   NP(Head)

            Adj(Det) NP(Head)   Aux(Det) V(Head)   Adj(Det) H(Head)

    The   young   man   will   allay   an   ill   lion

On the basis of this structure, the intonation contour in (4) is generated:

(4)
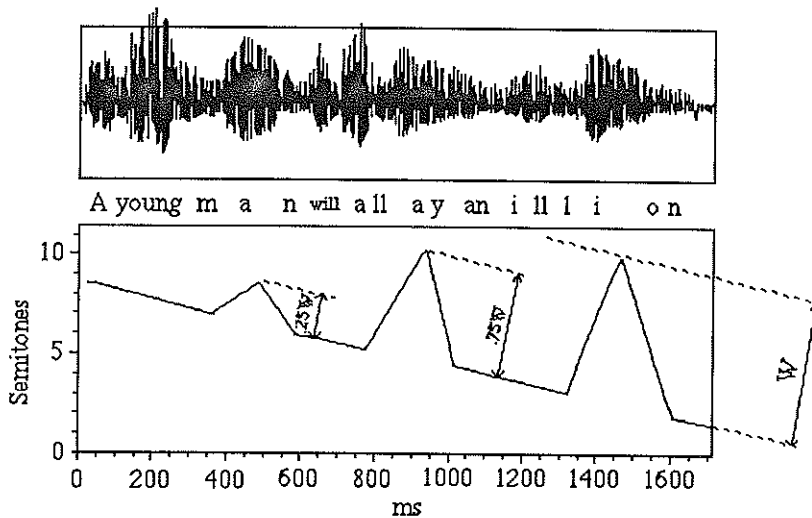
Accents are assigned by an algorithm which assigns degrees of prominence which are realized by Fo levels corresponding to varying fractions of the distance between the baseline and the topline of a phonological 'grid', overall contour lines within which a given sentence's intonation can be described (Gårding 1981).The Object (Head) receives an amount of prominence corresponding to the W(idth) of the grid, the Predicate (Head), an Fo top reaching 75% of this distance, while the ('given') Subject (Head) is assigned a Phrase Accent, which measures 25% of this same distance (see Horne 1988 for details).

If one compares the synthesized curve in (4) with an actually occurring curve for this sentence such as that in (5), one obvious discrepancy can be seen. In (5), there is an accent on *young* which is not captured by the rules in the algorithm which regards accents as functioning solely to highlight 'new' information and as phrase boundary indicators.The accent on *young*, however, is an example of what can be classified as a 'rhythmically motivated' accent. It is the first accent in the Subject NP and in the sentence, and can thus be expected to function to highlight this rhythmically strong position on analogy with the internal rhythmic structure of words, which in English, as in other Germanic languages, typically have a foot structure

S   W   W   S   W

characterized by strong initial syllables (e.g. *Constantinople*). The accent on *man*, on the other hand, is to be considered as 'weak' in relation to that on *young*. Accents within intonational phrases, therefore, can be assumed to function in creating accentual feet in a way which corresponds to that in which duration, in combination with intensity, functions in the creation of 'syllabic' rhythm in English and other Germanic languages (see Bolinger 1981, 1986; Bruce 1981; Horne 1990).

Accentual rhythmic patterns

In Gussenhoven 1988b, a set of rules is presented which assign abstract underlying accents to English lexical items. These have as their domain the 'syllabic' foot. (Feet are built up according to the principles outlined in Hayes 1981.) The Base Accent Assignment rule places a pitch accent on the last foot: F → F/----]. Another one, Initial Accent Assignment, places an accent on the initial foot: F→ F/[--- . In order to capture the accentual rhythmic patterns, therefore, it is necessary to augment the model with a foot structure as is shown in (6). This prosodic level is in line with that assumed by Nespor & Vogel 1986, where (σ) stands for 'Syllable' and (Σ) for 'Foot'.

(5)

(6)
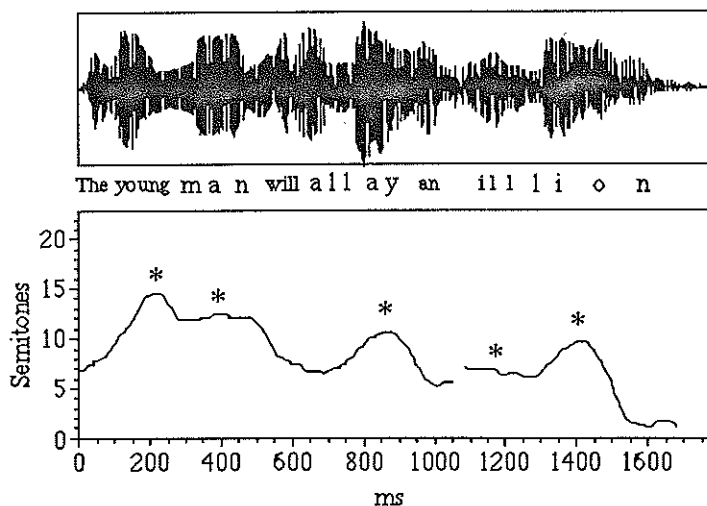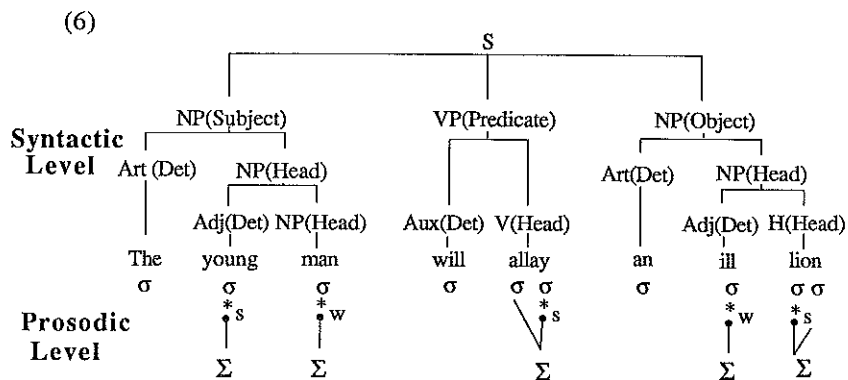
According to the structure in (6), *young* is assigned an accent (*), as well as are *allay*, *ill*, and *lion*. The non-lexical items *the*, *will*, and *an* do not, on the other hand have foot status and do not, as a consequence, receive accents. *Young*, then, being the first accented syllable, will be classified as rhythmically strong. The accent on *man*, then, can be expected to be weak in relation to the preceding one on *young*. One way in which this relationship is reflected is by means of 'down-stepped' tones realizing the accents, as is represented in (7a). Another way in which this relationship can be realized is by means of the so-called 'hat pattern' (Cohen & 't Hart 1967) Fo contour within phrases, where the H of the tone realizing the initial accent is associated with the H of the tone realizing the second accent, i.e., it is assumed that the L of the initial tone is deleted (see Gussenhoven 1988a). This situation is schematically represented in (7b) :

(7)(a)

```
              |
         NP(Subject)
      ┌───────┴───────┐
   Art (Det)      NP(Head)
      │         ┌──────┴──────┐
      │      Adj(Det)   NP(Head)
      │         │           │
     The      young        man
      σ         σ           σ
                *           *
                HL         ↓HL
```

(b)

```
                    |
               NP(Subject)
            ┌───────┴───────┐
         Art (Det)      NP(Head)
            │         ┌──────┴──────┐
            │      Adj(Det)   NP(Head)
            │         │           │
           The      young        man
            σ         σ           σ
                      *           *
                      HL         HL
```
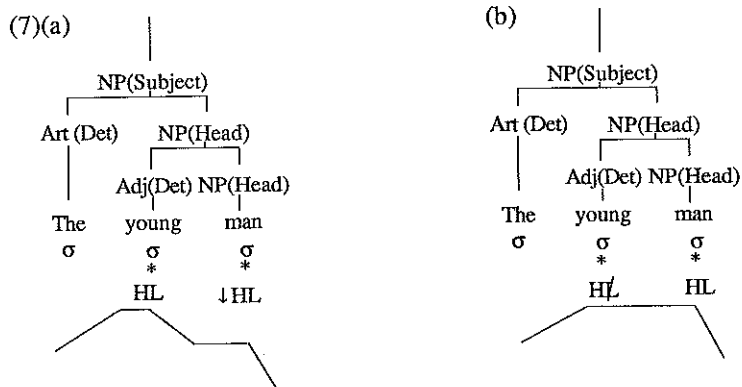
These two patterns can be considered to be the 'rhythmically motivated' realizations of the accents in the subject NP. There is a third possibility, namely that where the speaker chooses to use the accent on *man* to highlight the following syntactic/prosodic phrase boundary. In this case, the second accent is given more weight; in other words, the Fo peak on *man* is higher than that on *young* . This is represented as an 'upstepped' high (↑H) in (8):

(8)

```
              |
         NP(Subject)
      ┌───────┴───────┐
   Art (Det)      NP(Head)
      │         ┌──────┴──────┐
      │      Adj(Det)   NP(Head)
      │         │           │
     The      young        man
      σ         σ           σ
                *           *
                HL         ↑HL
```
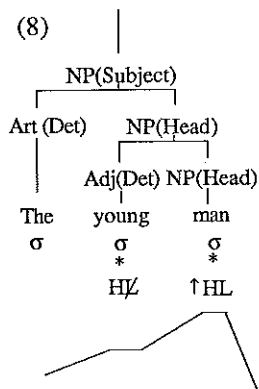
Association of final L in Subject constituent.
In the schematic Fo curves in (7) and (8), the L of the final accent in the subject NP is associated with the phrase boundary. This is one possible association point. Another potential association, however, is that the fall after the final H tone stretches over all unaccented syllables lying between this phrase final accented syllable and the following accented syllable, i.e. that it disregards phrase boundaries and results in a pattern such as the dashed line in (9), where the L of *man* can be assumed to be shifted rightwards and 'partially linked' to the tone on *allay* (see Gussenhoven 1988a for tone linking rules). This pattern can be regarded as more rhythmically motivated than that where the phrase boundary functions as the association point (corresponding solid line in (9)) since in this case, one only needs recourse to the accentual structure in order to link up the tone.

(9)
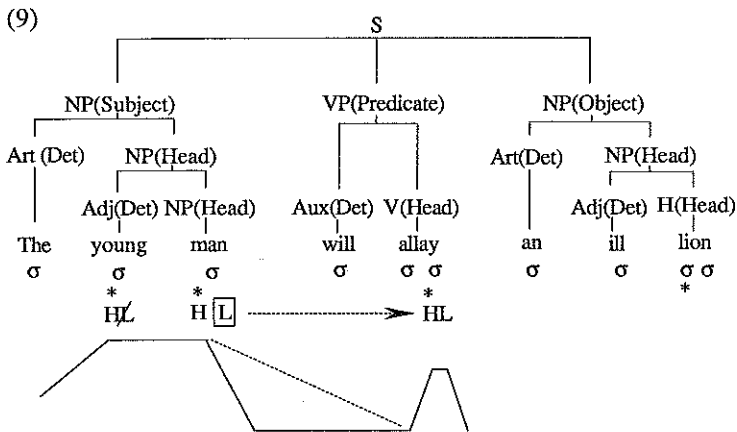
INVESTIGATION OF PRODUCTION DATA
In order to get a better picture of the distribution of the possible Fo contours discussed above as well as to investigate whether the patterns found on 'given' Subjects differed from those on 'new' Subjects, we analyzed a number of sentence pairs where the only difference was the status of the Subjects with respect to the parameter 'new/given'.

Data
The data in (10) were used in the investigation. Four speakers participated in the experiment (2 American English, one male (Kansas) and one female (Louisiana), and 2 British English, one male (S. England) and one female

(N. England). All subjects had some degree of linguistic and/or phonetic background; they had not, however, been informed as to the particular parameters being investigated. The sentence triplets were written on cards and were presented in random order along with 9 other sentence triplets to the speakers. They were asked to read the A sentences, while the author read the B sentences. The Subject constituents in the final sentence of each short dialogue constituted the material to be investigated in detail, i.e. *a/the man*, *a/the mormon*, and *a/the young man*.

(10) (a)(i) A: I'm almost finished writing the first act of my new play.
            B: Oh...Do you think you could let me in on how it is going to end?
            A: Yea, sure. A man will win a million.

     (ii) A: My second short story will be about a man on a gambling spree.
            B: Oh...What will happen at the end?
            A: Oh...The man will win a million.

(b) (i) A: I'm just about finished writing my new book.
            B: Oh, do you think you could let me in on how it's going to end?
            A: Yea, sure. A Mormon will marry a mayor.

     (ii) A: My new book is going to be about a Mormon living in Malmö.
            B: Oh, do you think you could let me in on how it is going to end?
            A: Yea, sure. The Mormon will marry a mayor.

(c) (i) A: I'm almost finished writing the first act of my new play.
            B: Oh, do you think you could let me in on how it's going to end?
            A: Yea, sure. A young man will allay an ill lion.

     (ii) A: My first story will be about a young man on an adventure in Africa.
            B: Oh, what will happen in it?
            A: Oh...The young man will allay an ill lion.

Analysis procedure

The sentence triplets in (10) were read two times and recorded in the sound studio at the Dept. of Linguistics, U. of Lund. Acoustic analysis of the final sentence in each of the dialogues was performed using the ILS program package implemented on a VAX 11/730 computer. The speech was first digitized at a sampling rate of 10 kHz. Analysis was performed with an interactive program developed by Lars Eriksson (Dept. of Ling., U. of Lund). The following measurements were made: a) Fo peak in the first

accented syllable of the subject (i.e. *man*, *Mor-*, and *young*), and b) the size of the Subject 'register', i.e. the distance between the (highest) Fo peak on the subject and the bottom of the fall (L) after the final H on the Subject.

Results
The results of the analysis are presented below in Tables 1 to 3.

Table 1. Results for **A man/The man** will win a million. Values within parentheses are Fo measurements using a semitone (ST) scale. *AM* = Am. male, *AF* = Am. Female, *BM* = Br. Male, *BF* = Br. Female.

	Fo(Peak)		Fo Register	
	NEW	GIVEN	NEW	GIVEN
		Fo	Hz(ST)	
AM	208	192	66(6.5)	43(4.0)
	156	154	24(2.9)	34(4.3)
Mean	**182**	**173**	**45(4.7)**	**39(4.2)**
Ratio		1.05		1.15 (1.12)
AF	278	333	86(6.5)	129(8.5)
	294	244	94(6.5)	40(3.5)
Mean	**286**	**289**	**90(6.5)**	**85(6.0)**
Ratio		0.99		1.06 (1.08)
BM	167	200	71(10)	57(5.0)
	189	179	87(7.5)	51(5.7)
Mean	**178**	**190**	**79(8.8)**	**54(5.4)**
Ratio		0.94		1.46 (1.63)
BF	313	263	63(4)	69(5.5)
	286	217	94(6.9)	21(1.2)
Mean	**300**	**240**	**79(5.5)**	**45(3.4)**
Ratio		1.25		1.76 (1.62)

Table 2. Results for **A mormon/The mormon** will marry a mayor.

	Fo(Peak)		Fo Register	
	NEW	GIVEN	NEW	GIVEN
		Fo		Hz(ST)
AM	200	169	63(6.5)	30(3.1)
	179	175	59(7.0)	53(7.25)
Mean	**190**	**172**	**61(6.8)**	**41.5(5.2)**
Ratio	1.10		1.47(1.31)	
AF	270	238	70(5)	38(3)
	294	263	77(5)	55(4.25)
Mean	**282**	**251**	**74(5)**	**47(3.6)**
Ratio	1.12		1.57(1.39)	
BM	213	179	131(17.5)	91(12)
	145	137	62(9.6)	48(7.5)
Mean	**179**	**158**	**97(13.6)**	**70(9.75)**
Ratio	1.13		1.39(1.39)	
BF	313	333	105(7.0)	141(9.5)
	323	333	134(9.5)	144(10)
Mean	**318**	**333**	**120(8.25)**	**143(10)**
Ratio	0.95		0.84(0.83)	

Table 3. Results for **A young man/The young man** will allay an ill lion.

	Fo(Peak)		Fo Register	
	NEW	GIVEN	NEW	GIVEN
	Fo		Hz(ST)	
AM	217	185	102(11)	68(8.25)
	159	169	36(4.5)	52(6.25)
Mean	**188**	**177**	**69(7.8)**	**60(7.25)**
Ratio	1.06		1.15(1.08)	
AF	313	303	80(4.75)	95(6.5)
	313	294	113(7.5)	90(6.1)
Mean	**313**	**299**	**97(6.1)**	**93(6.3)**
Ratio	1.05		1.04(0.97)	
BM	133	175	38(6.1)	52(6.0)
	137	143	48(7.8)	35(4.6)
Mean	**135**	**159**	**43(7.0)**	**44(5.3)**
Ratio	0.85		0.98(1.3)	
BF	286	270	149(10.0)	82(6.5)
	244	238	134(9.3)	59(4.6)
Mean	**265**	**254**	**142(9.6)**	**70.5(5.5)**
Ratio	1.04		2.01(1.75)	

The average ratios for each subject are presented in graph form in Figure (1). The results for American subjects vs British subjects are averaged and presented separately in Figure (2).
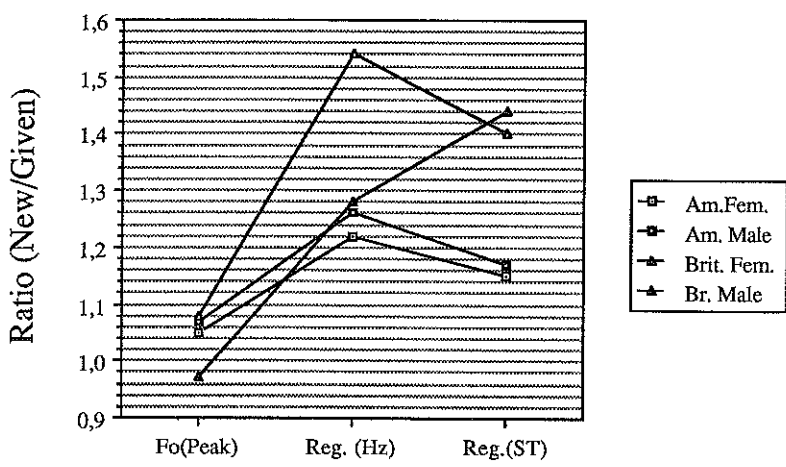
Figure 1. Average ratios for all test sentences for each subject.
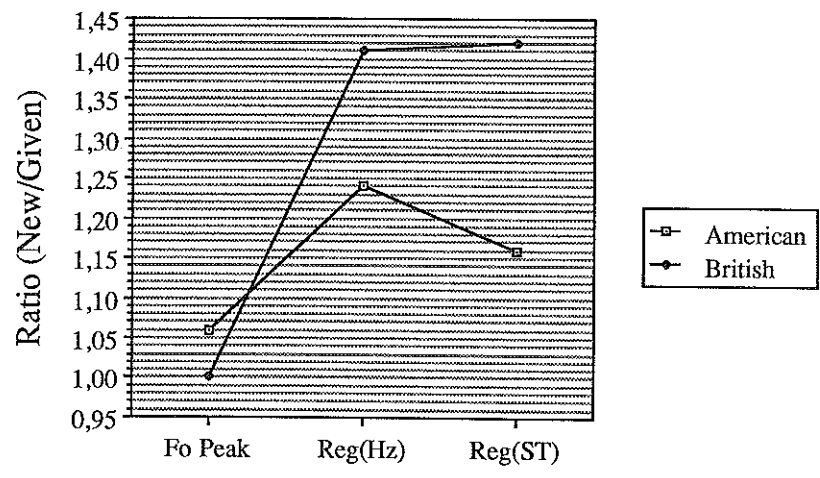

**Figure 2.** Results for American subjects vs. British subjects.

As one can see, the difference between 'New' and 'Given' with respect to the parameter Fo peak height on the first accented syllable is not particularly great. There is on the average no difference in the height of the Fo peak for the British speakers, whereas for the American speakers, there is a mean difference of 1.06, which implies an actual difference of around 10 Hz, or 1.0 ST for the male speaker, which is not perceptually significant (Rietveld & Gussenhoven 1985). This result is in agreement with those of Eady et al. 1986. A more interesting difference is observed, however, as regards the parameter (Reg)ister size. For the American speakers, there was a difference ratio of 1.24 with respect to the Hertz scale and a ratio of 1.16 using the Semitone scale. This latter difference corresponds to only about 0.5 semitones for the American male speaker. For the British English speakers, the register difference was much greater than the American, 1.41 averaged for both speakers with respect to the Hertz scale and 1.42 with respect to the semitone scale. For the male speaker, this corresponds to an actual difference of around 4 semitones. This difference can be ascribed to the more prominent phrase accents used in the case where the subject was 'new'. This is particularly obvious in the case of the 'young man' subject with two accents. Here the British female used an significant upstep on the second (phrase) accent, while the male speaker marked the phrase boundary with a HLH tone. In (11) are presented for comparison examples of patterns on 'new' versus 'given' subjects produced by the British female:

(11)

'New Subject'   'Given Subject'
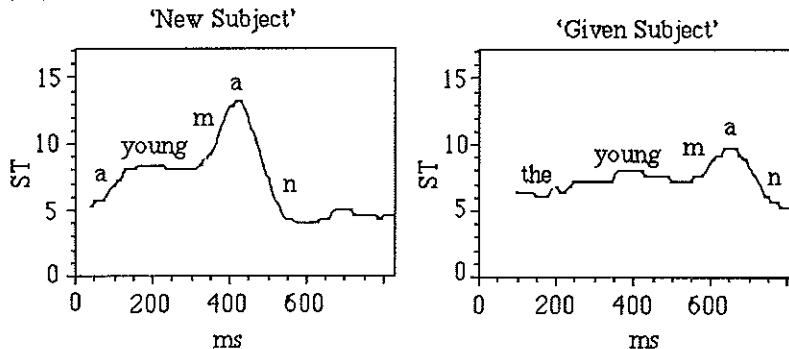
Contour patterns

The data was also examined to see whether the type of contour used for 'new' subject differed from that used for 'given' subjects. In Figure (3), we have summarized the results. In 32 of the 48 analyzed sentences (67%), the low of the HL of the last accented syllable of the subject was linked to the next accent ('rhythmically motivated' association illustrated with bold contours). For the American speakers, this type of linking was observed in all sentences (100%). Moreover, for these speakers, in the sentences with the subject containing two accents (i.e. 'young man'), the 'down-step' pattern (cf.(7a)) was used phrase internally in all cases except one (where the 'hat pattern' (cf. (7b)) was used). For the British English speakers, there was a much greater tendency to link the L of the final accent in the subject phrase with the phrase boundary. For the female speaker this was the case in 10 of the 12 sentences (83%). Linking with the following accent took place only in the sentences where *man* functioned as 'given'. The female British speaker was, furthermore, the only one who used an upstep Fo contour (cf. (8)) in the subject constituent with two accents ('young man'). For the male speaker, the situation was somewhat more complicated. He linked the L of the final subject accent to the following accent in 50% of the cases (for *man*, both 'given' and 'new', and for *young man*, 'given'. In the other 50% of the cases, he used either phrase-final linking (*Mormon*, both 'given' and 'new'), or used a HLH tone (non-neutral tone) to realize the final accent of *young man* ('new'). After the final H of this tone, the Fo fell to the next accented syllable. This can be accounted for if one assumes a L (foot?) boundary tone preceding the next HL tone (see Pierrehumbert 1980). Again, the tendency in the data seems to be that the American speakers use a 'rhythmic' strategy as regards tone association, whereas British speakers use a 'phrasal' strategy. The fact that the British male speaker had studied and worked in America for some years can possibly account for his using more rythmically motivated contours than the British female. More data is, however, needed in order to verify the results. There was, furthermore, a constancy in the data as regards the type of contour chosen. In only two cases did the speaker use two different contours for a given sentence.
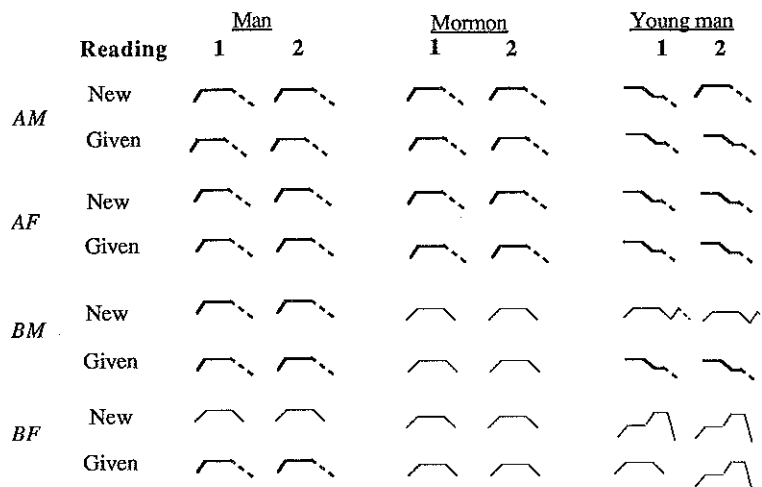
Contour types observed in the data. AM=American Male, AF=American Female, BM=British Male, BF=British Female.

Contours in bold with dashed final falls are the 'rhythmically motivated' contours where the L of HL tones is linked to the accent in the following phrase.

} = HL on single words or HHL ('hat pattern') on more than one accented word

='hat pattern' but with HLH tone on final accent of subject followed by a low boundary tone

= downstepped H on second accent in subject

= upstepped H on second accent in subject

Figure 3. Contour types present in the data analyzed.

CONCLUSION

The data presented here would seem to illustrate the need for including a rhythmic component in rule systems for generating intonation contours. All sentences analyzed exhibited accents on initial 'feet' regardless of whether the associated lexical items functioned as 'new' or 'given' information. If accents can be assumed to group into left-headed 'accentual feet' in English just as syllables group into 'syllabic feet', then the accent on the initial foot can be interpreted as functioning to realize a rhythmically strong position.

The fact that the height of the Fo peak realizing the H of this accent did not vary significantly in 'given' vs 'new' position would tend to support this interpretation. Nooteboom & Kruyt (1987), following Fuchs (1984), have suggested that accents can be used to signal thematicity. However, they note that this is only possible when the theme is at the beginning of a constituent and not at the end. In order to illustrate this restriction,they cite an example from Berman & Szamosi (1972):

(12)   The children didn't want to go to bed, so
(12a)   John SCOLDED the bastards.
(12b)   The BASTARDS were SCOLDED.

Although *bastards* is the theme in both (12a and b), it is accentable only in (12b). The view presented here of accents functioning to create linguistic rhythm provides, we feel, a more general account of the patterns observed in (12a and b). Accordingly, one would expect a strong (accented) element in the initial position of an intonational phrase (12b) but not in final position (12a), i.e. s/w accentual rhythmic patterns are preferred.

When there are two accents in the initial (subject) constituent, the strategy chosen by the speaker when realizing the second accent seems to vary between a rhythmic strategy, where the following accent is weak in relation to the first, and a 'phrasal' strategy, where the second accent is given more prominence than the first in order to mark a phrase boundary. The data analyzed would seem to indicate that American English speakers tend to follow the former strategy, whereas British English speakers follow the latter. This is further corroborated when one examines the way the L of the phrase-final neutral HL tone is associated. For the American speakers, this was invariably linked up across the phrase boundary with the following tone, whereas for the British speakers, there was a tendency to associate the L of the HL tone with the immediately following phrase boundary.

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