

THE ROLE OF INTONATION AS A MARKER OF SEMANTIC ASSOCIATIONS AND ENUNCIATIVE OPERATIONS IN ENGLISH

J. Low

Laboratoire de phonétique,
Département de Recherches Linguistiques,
Université Paris VII, France.

ABSTRACT

The aim of this paper is to test the relation in English between the intonation of an utterance and the semantic value(s) of its constituents. A corpus of utterances illustrating varying degrees of semantic associations read by several native speakers of British English was recorded. The analysis of the intonation contours shows small differences in fundamental frequency on the verbs of strong semantic associations and large differences in fundamental frequency on the verbs of weak semantic associations. The results are linked to enunciative relations and operations such as focalisation and modalisation.

INTRODUCTION

The aim of this study is to test whether the intonation of an utterance is dependant or not on the semantic content of its constituents.

Many studies have shown the link between types of syntactic structures (Declarative statements, WH Questions and Yes/No Questions), parts of speech (content or function words), and intonation.

In order to isolate the problem of semantic content from that of syntactic structure and parts of speech the utterances studied were of the same syntactic type with the same number of content or function words.

CORPUS

The basis for this corpus was the work of Sheldon Rosenberg, the "Norms of Sequential Associative Dependencies in Active Declarative Sentences", in which

he tested the link between the memorising ability of students on "semantically well integrated sentences" and "semantically poorly integrated sentences".

Two elements which are strongly linked semantically form a strong association and two elements which are weakly linked form a weak association. The type of structure for all the utterances in the corpus is :

Noun Phrase (Determiner + Noun) + Verb + Noun Phrase (Det. + N)

The subject (NP) is an animate noun, and the object (NP) an inanimate noun. The verb is in the preterite. Five basic sets of examples were chosen in which the noun phrases remained constant and the verbs expressed five varying degrees of semantic associations, e.g. for one set : constant elements *The spider - the web*, variable element : the verb,

(1) *spun*, (2) *made*, (3) *wove*, (4) *spoilt*, (5) *tore*.

The five basic sets are :

- I *The actor - the part*
- II *The spider - the web*
- III *The author - the book*
- IV *The priest - the sermon*
- V *The cat - the mouse*

The 25 different utterances of the corpus were mixed with other utterances, and the order of the utterances illustrating the semantic associations was changed so that the informers were not aware of the aim of the test.

PROCEDURE

The material was presented individually to seven native speakers of Standard British English (3 women and 4 men between the ages of 22 and 26). They were asked first to read over the corpus

thinking of the meaning of each sentence before recording.

The recordings were listened to by 8 other native speakers who used the same phonetic system as those who produced the corpus. They were given typed examples of the sentences to listen to and were asked, if they heard one word with greater prominence in each sentence, to mark that word.

An instrumental analysis was carried out on the recordings. The different contours were analysed according to measurements of fundamental frequency, time and the form of the end of the intonation contour.

RESULTS

The results of the perception tests show that the verbs which were part of a weak semantic association correspond to the point with the greatest prosodic prominence in the utterance whereas those that were part of a strong semantic association did not. The instrumental analysis shows the importance of two separate phenomena : the prominent point within the intonation contour and the form or direction of the final part of the contour. The contour was divided into a new segment at every change in direction. The different parts of the sentence were marked as follows :

Det	Noun	Verb	Det	Noun
The		The		
AB	CDEF	GHI	JK	LMN

In such a way, the segment GHI corresponding to the verb in each utterance of each set can correspond to a complex contour rise (GH) followed by a fall (HI).

A comparison of the differences in fundamental frequency (Fo) on the segments of the intonation contours in each utterance shows the following : small variations in Fo for verbs in strong semantic associations and large variations in Fo for verbs in weak semantic associations. A table showing the mean Fo differences for all the informers for the five verbs (1-5) representing different semantic associations in each set (I-V, 25 utterances) follows. Columns 1 to 5 represent the 5 degrees of semantic association, 1 being the strongest and 5,

the weakest. The letters GH correspond to the rise and HI to the fall on the verb.

Table 1:
Mean Fo differences on verbs (segments G-H, H-I) for 5 sets of utterances (I-V).

	1	2	3	4	5	
I.	g - h	4	49	7	38	120
	h - i	24	41	40	118	112
II.	g - h	12	7	23	19	41
	h - i	25	27	35	103	103
III.	g - h	21	10	7	9	48
	h - i	15	16	35	29	128
IV.	g - h		6		25	67
	h - i	28	32	35	122	108
V.	g - h	5			65	26
	h - i	11	31	39	80	74
	i - i'				5	4

Fig. 1 shows the mean Fo differences on the verb in set II.

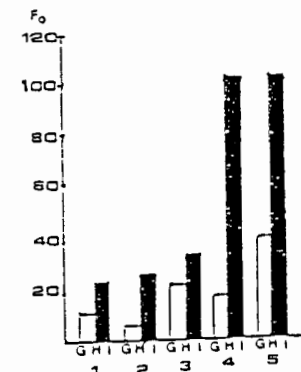


Fig. 1 Mean Fo differences on segment G-H and H-I for the 5 verbs in set II *The spider - the web*. Verbs: 1 *spun*, 2 *made*, 3 *wove*, 4 *spoilt*, 5 *tore*.

Fig. 2 shows the mean Fo differences on the verbs in each utterance of the 5 sets for all the informers.

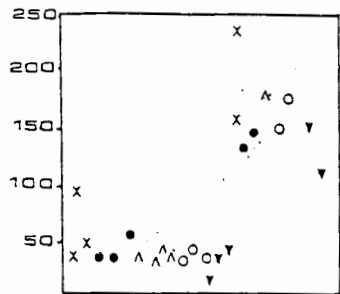


Fig. 2 Mean total F₀ for segments G-H, H-I for the 5 utterances of the 5 sets : I X, II O, III A, IV V, V V

The form or direction of the final part of the intonation contour varies, depending on whether the utterance corresponds to a strong or a weak semantic association. In a strong semantic association the intonation pattern is a fall, and for weak semantic associations, the majority of the contours correspond to a final rise.

Fig. 3 gives two intonation contours illustrating a strong semantic association (in a) and a weak semantic association (in b) from set II produced by the same speaker.

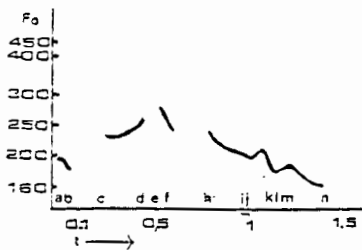


Fig. 3a :
A) The spider spun the web
AB CDEF GHI JK LMN

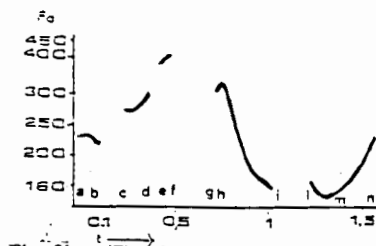


Fig. 3b :
The spider spoilt the web
AB CDEF GHI JK LMN

DISCUSSION and CONCLUSION

Both the perception tests and the instrumental analysis show that the differences perceived and produced on the five verbs representing varying degrees of semantic associations in each of the five sets of sentences were not gradual.

The verbs can be divided into two groups : group A, the verbs (1-3 in sets I, II, IV, V) that do not correspond to the prominent point of the utterance and correspond to small differences in F₀, and group B, the verbs (4-5 in sets I, II, IV, V) that correspond to the prominent point of the utterance and large differences in F₀. In set III the production of utterance 4 by all the speakers was similar to examples 1-3 in sets I, II, IV, V.

These results are in accordance with the polarity principle as analysed in the works of Edward Sapir, Roman Jakobson, Morris Halle and Harlan L. Lane.

The results can be explained within the framework of A. Culioli's linguistic theory of enunciative operations. The utterances in the corpus studied can be divided into two groups (A or B) depending on the variations in intonation on the verb in each utterance. In set II, *The spider - the web*, group A corresponds to the utterances with the following verbs : *spun, made, wove* and group B to those with the verbs : *spoilt, tore*. For group A the following definitions are possible : "A spider is a spinner, a maker, a weaver of webs". Whereas for group B the definition "A spider is a spoiler, a tearer of webs" is not possible within the framework of common acceptability.

In group 4 the subject (NP), the verb and the object (NP) correspond to notions with basic properties which are closely linked.

"A notion is a complex bundle of structured physico-cultural properties from which a notional domain is constructed with its formal properties such as the construction of a class and its linguistic complement" (A. Culioli).

The relationships between the notional domains in the utterances in group A correspond to primitive relations, and the verb can not be focalised.

Primitive relations depend on the notional status of the terms for they do not stem from any particular enunciative situation. A primitive relation is defined by A. Culioli as "a relationship between more than one notional domain, between the bundles of constituent properties which make up notions".

In group B, the notional domains corresponding to the verbs are not linked to those of the subject or the object. In this case the utterance can only be accepted if the verb undergoes an operation of focalisation marked by significant variations in intonation. The utterances in group A were produced with a final fall on the intonation contour and the majority of those in group B with a final rise.

The direction of the end of the intonation contour can be linked to the operation of modalisation.

Given a notion "P" topologically organized in an interior P ("What can be called P") and an exterior P' ("what cannot be called P", or the linguistic complement of P) separated by a boundary F(P), the choice by the enunciator of either P or P' is the modality of assertion (affirmative assertion for P, negative assertion for P'). The inability to choose between P and P' corresponds to the modality of interrogation.

The final fall corresponds to the choice of P or P' (assertion). The final rise corresponds to the point in the operation of modalisation at which the choice between P and P' cannot be made. Given this fact, it is interesting to note that, for the majority of the informers, the contours in group B correspond to a final rise. Thus, the validity of the assertion in that group seems to be

questioned. What happens in fact is that, even though the utterances in group B are in the assertive modality, the weakness of the semantic link between the constituent notions generally makes it impossible for the enunciator to credit his own assertion with full validity. Therefore the interrogative intonation contour contradicts the assertive syntactic form.

The choice of the properties involved in the different notional domains represented by the predicate and the arguments in an utterance can thus be linked to the operations of focalisation and modalisation, as well as to the type of relation involved (either primitive or not).

This shows that neither syntax alone nor prosodic form alone can account for underlying operations. What has to be taken into account is the combination of the two kinds of markers.

REFERENCES

- CULIOLI, A. (1991), "Pour une linguistique de l'énonciation. Opérations et représentations", Paris. Ophrys.
 JAKOBSON, R. and HALLE, M. (1956), "Fundamentals of Language", The Hague : Mouton.
 LANE, H. L. "A Behavioral Basis for the Polarity Principle in Linguistics", Language. Vol. 43, N° 2, 494-511.
 PETRYANKINA, V.I. (1987), "Types of semantic relations between intonation and lexico-grammatical means (LGM) of language", Proceedings, XIth International Congress of Phonetic Sciences, Vol. 4, 267-270.
 RIVIERE, C. (1983), "Modal adjectives: transformations, synonymy, and complementation", Lingua 59, North-Holland Publishing Company.
 SVETOZAROVA, N.D. (1987), "Linguistic factors in sentence stress", Proceedings, XIth International Congress of Phonetic Sciences, Vol. 6, 110-113.