SEMANTIC DIVERSITY IN INTONATION

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1. Even if *intonation* is taken in the restricted sense (as a synonym of 'tune' or 'speech melody'), what the term covers is highly heterogenous, both at the level of content and expression, as well as in the relation between expression and the content expressed.
Lecturers in French as a second language are compelled to teach such intonation patterns as the triangular pattern (rise of an augmented fifth, fall of a major third) of questions expressing doubt and disbelief; or that of sudden rise expressing evidence in face of doubt, in contrast to an apparently quite similar rising pattern, that of neutral *Yes/No* questions. Hardly any teacher would, however, feel obliged to teach how to express anger or tenderness in French by vocal means. It seems advisable to distinguish between *primary emotions* [29], *social attitudes* and *modalities (moods)*, both as the level of expression and content.

2. Primary emotions, such as anger, hatred, joy, fear or tenderness, are *reflected simultaneously at all levels* of the vocal apparatus : at the respiratory and glottal level as well as at the pharyngeal and oral level. One type of anger (angry quarrel) is reflected in English, French and Hungarian by features such as : forceful expiration; imperfect voicing; higher tension in the articulatory organs; increase of the maxillary angle; withdrawal of the mandible; withdrawal of the tongue in vocalic segments etc. [19]; at the same time, angry quarrel is characterized by at the prosodic level by a rigid metrical pattern with equally distributed heavy stresses; a rigid melodic base-line interrupted by sudden rises, resulting in a peaking melodic contour [14]. The relevance of the prosodic patterns could be confirmed by means of semantic tests based on laryngographic recordings [12] and synthesized variants [17]. Anger and tenderness are easily identified by the listeners even in the absence of voice production. (Angry whisper is rarely confounded with tender whispering.)

3. The vocal expression of *social attitudes*, as opposed to primary emotions is clearly *confined to the glottal level*, and can easily dispense with oral mimetics. Attitudinal intonation patterns are at the same time more language dependent than emotional vocal displays [8] [14]. Parallel tests with 20 French and 22 Hungarian informants show that both French and Hungarian subjects clearly distinguish angry and tender variants of *Viens ici, regarde un*

peu ce qu'ils font ! At the same time, Hungarian informants, in contrast to French subjects, were unable to identify correctly the triangular echo question expressing disbelief, *Il était là ?!* [= 'You pretend he was there. I don't believe it'], or to distinguish the indignant exclamation *Il était là !* [= 'He was there ! why do you pretend he was not ?' from the neutral question *Il est là ?* Clearly, language dependent (unpredictable) features seem to play a more important role in the case of signalling definite attitudes than in that of primary emotions. Such melodic clichés are strictly patterned. Thus, the tune of indignant exclamation contrasts with the interrogative pattern essentially by the steeper rise : quantity turns into quality : two patterns differing in grade function as different configurations. According to semantic tests presented in a previous study [15] the quotient *rise in semi-tones/duration in csec* is more than 1 in sentences perceived as exclamations, and less than 0.5 in those perceived as Yes/No questions.
A similar precision is required in the case of some twenty melodic clichés in contemporary Parisian French [16]. E.g. the cliché expressing, among others, a gentle approach requires a *descent in quarter-tones*. According to synthesized variants presented to French listeners, a descent in halftones proved to be 'unacceptable'. The compelling force of the clichés clearly appears in the course of mimicking experiments. The average deviation between the individual reproductions of the stimulus was 0.82 quarter-tone in the case of the cliché *Oh qu'il est mignon !*, and of 2.37 in that of a neutral statement. Regular interval simply intrasyllabic regularity of laryngeal vibrations, perceived as chanting [26: 65], as stylized speech [25: 169-196]. To account for differences in intrasyllabic regularity we have to stipulate a third dimension of speech melody, characterized by different degrees of perceived *melodicity* and we also need appropriate measures [20: 39-41]. The degree of intrasyllabic regularity approximated by means of different measures proved to be significantly higher for melodic clichés than for plain discourse [16].
No wonder that foreign speakers often fail to reproduce such melodic patterns accurately. Melodic divergences are perceived by native French speakers as a kind of 'melodic accent'. Semantic tests based on the presentation of laryngographic recordings of French sentences spoken by Chilian, Hungarian [18], Japanese [27] show that French listeners detect the 'foreign accent' most easily if the speakers impro-

perly reproduce melodic clichés. Paradoxically, a French speaker may be taken for foreign, if he does not make use of melodic clichés at all [18].

4. The high degree in tonal precision corresponds to a higher degree of semantic organization. The expressed attitudes are definitely hearer-oriented, and linked with typical social situations. They refer to these situations without providing a further, conceptual analysis of the situations they are pointing at. They have no descriptive function, in contrast to lexical tones. However, they pave the way for conceptual analysis. We made an attempt to define the semantic field of French melodic clichés (a) by grouping the situations which frequently elicit them; and (b) by means of semantic tests where the informants were invited to associate sentences with the wordless 'utterances', i.e. with the clichés presented in a filtered version (recorded with a laryngograph). The informants assign to the *slightly descending* cliché the following meanings: (a) tender approach, (b) gentle warning, (c) complaint, (d) joyful surprise, (e) longing, (f) invitation, in form of a conditional phrase *(Si on allait boire un pot ?)*, (g) Yes/No question introduced by an interrogative morpheme, (h) allusive, elliptical questions *(Et l'année prochaine ?)*, (i) disbelief, refusal *(Mais qu'est-ce que tu racontes ?)* [16]. We could hardly trace back all the different uses of *slight descent* to a basic meaning, in the same way as Robert Ladd attempted to interpret the divers uses of the English fallingrising tune as derivatives of the basic meaning 'focus is in the given set' [25: 52-162]. 'Damping, softening' (sordino) seems to be a semantic distinctive feature common to (a), (b), (e), possibly to (c) and (d). In other cases we cannot dispense with the concept of 'melodic homonymy' [30: 137-146].
Let us add that meaning (i) of the smoothly descending cliché is, in fact, more elaborate than the label seems to suggest. The cliché is elicited by a specific situation. The interlocutor *I* makes a remark or a suggestion. The locutor *L* refutes the statement or rejects the proposal, giving expression to his surprise ('How could you say/propose such a nonsense ?').
It is a significant that in a number of cases the attitudes expressed by such intonation patterns can be also conveyed by means of lexical or grammatical morphemes, conjuctions [1] or adverbs ('modals') without any semantic loss [32] [25: 121-123]. In Hungarian the word *hiszen*, a derivative of *hiszem* 'I believe it' can be considered as a translation of the melodic cliché consisting of *a fall of a fourth followed by a rise of a flat third*. If this pattern is assigned to the sentence *Megmondtam* 'I told it', the utterance implies : 'You pretend that I didn't tell *p.*. This is not true : I did tell *p.* I am really surprised that you pretend I did not'. The sentence *Hiszen megmondtam* would have exactly the same implication. This is certainly not true for 'super-sentences' such as 'I tell you in anger that...' which could hardly be considered as an equivalent of the vocal expression of anger, as proposed by Yorio [34].

4. Modal intonation patterns represent the highest level of semantic organization that can be reached

by prosodic means. We could even be tempted to attribute a referential function (Darstellungs-Funktion) to modal intonation. Roman Jakobson is, however, probably right in rejecting such a claim : "The interrogative sentence is not a reference but only a kind of appeal for reference" [23 : 281]. Intonation had to cover, nontheless, a long distance in semantic space to become from a mere reflection of emotional states a mark of a modal category.
It is not easy to draw a demarcation line between moods (modal categories) and attitudes. Modal categories correspond to the most essential, the most general attitudes. Verbal communication could not do without them. Attitudinal intonation patterns are always felt as stylistically marked. Modal intonation patterns may be neutral, stylistically unmarked. Stylistic markedness is, however, an elusive feature. The most satisfactory way of tracing the demarcation line between attitudes and modalities is offered by the grammar itself. Nonmarkedness and generality is acknowledged by the grammar's providing grammatical morphemes in order to distinguish different moods. This implies that languages might widely differ in this respect. Most languages have non-prosodic (segmental) markers for Yes/No questions. Few languages have, however, grammatical markers for such moods as *probabilitive, necessitive, precative, pejorative* mood that are inherent features of the verbal system in Vogul [24]. Consequently, we will have to consider 'imploring' as an emotive attitude for Indo-European languages, and as a grammatical mood as far as the Vogul is concerned.

5. Even if clear cut demarcation lines could be traced between basic emotions, social attitudes and moods, this would certainly not prevent melodic configuration switching unperceived from one category to the other [9: 55]. Thus, attitudinal melodic patterns may metamorphose into neutral indicators of mood. In English, German or Hungarian, the steep rise and sudden fall characterize in English, German or Hungarian control-questions expressing mistrust or irony in connection with a previous statement (e.g. *Really ?*, Hung. *Jo ?* 'Well ?'), as it appears from the listener's reaction in the face of synthesized variants [12]. The speaker seems to echo the partner's categorical statement ironically exaggerating its melodic profile. This stylistically marked melodic form became the dominant, unmarked intonation pattern of Russian Yes/No questions probably in the first half of this century [3] [4]. Similarly, during the last decades, an *intonation metaphor* – the transfer of interrogative melody to imperative sentences – yielded in Hungarian a new category of mood, that of (gentle) invitation vs. (categoric) order [10]. According to Dwight Bolinger the transfer of (interrogative) final rise to assertive sentences "will be probably taken in some sense of *Why do you ask ?*" [2].

6. The three kinds of melodic patterning represent *different levels of human signalling behaviour*, and mental elaboration. The vocal expression of primary emotions can be considered as a reduced reproduction of some fundamental ancestral activities [7]. As formulated by G.W. Crile [5] : anger is a phylogenetic product of fight, fear reproduces flight. Similarly, Plutchik retraces primary emotions to prototypic adaptive patterns : anger to destruction,

fear to protection against threat, joy to reproduction, disgust to rejection [29: 160]. (For a detailed and pertinent analysis of the theories of emotion and their vocal expression, see Scherer [31]. Social constraints reduced real activity to an acting-out at the level of the respiratory, laryngeal and oral level. I attempted in previous publications to draw a preliminary sketch of the vocal encoding of emotions [14]. I should lay emphasis on its high complexity and diversity. Thus, we have to distinguish a primary glottal gesturing and a secondary vocal mimicking. The expression of hatred by means of a *strangled voice* - due to an excessive innervation of the constrictors, a reduced and quite harmless form of strangling the partner or a third person - could exemplify a direct acting-out of emotion at the glottal level. Secondary tonal mimicking is based on the perception of pitch as spatial movement. The rigid melodic base line interrupted by sudden rises in angry arguments, and sweetly undulating melodic line in tender speech are such forms of projective tonal gesturing.

Direct acting-out of emotions at the different levels of the speech apparatus plays a secondary role in the expression of emotive attitudes. The messages are conveyed essentially by melodic movements. Speech melody is the only prosodic vehicle of grammatical moods. Emotive vocal patterns are *ex-pressions* in the literal sense of the word. As far as we can dissociate the form and content intermingled in the acting out of emotions, the content is directly present at the level of expression. Despite the partial overlapping of expression and content, the forms of melodic expression of primary emotions are language dependent. Intonation patterns at all the three levels are motivated (iconic) conventional signs. They differ, however, in the degree of motivation (iconicity). The motivation is more subtle and complex in the case of attitudinal intonation patterns than in the expression of primary emotions. The isomorphism between melodic movement and semantic content may be concealed by previous transfers in modal intonation patterns.

The *polysemy of intonational patterns* is either due to the genuine polyvalence of melodic gestures, or to the metaphoric use of a pattern. Genuine polyvalence may be the source of the polysemy of 'open' forms highlighted by Alen Cruttenden [6]. The multiple meaning of the Hungarian rising-falling pattern, conveying polite solicitation as well as interrogation, results from recent melodic transfers. The same melodic pattern may express different attitudes in function of its 'phonetic context'. According to semantic tests based on the presentation of 46 variants of the pseudo-Hungarian 'sentence' /'kisera 'mera 'ba: vatag/ to 25 university students, falling-rising melodic pattern tends to be interpreted as the expression of *coquetry* if a swift final rise is palliated by a drop of intensity; as a *menace* if the falling-rising melody is accompanied by a parallel fall and rise in intensity [14].

Let us add, that recurrent (typical) confusions of vocally expressed attitudes, "remarkably stable" errors [8: 144 f.], may *reveal* more or less *hidden analogies* between attitudes. Thus, in semantic tests based on laryngographic recordings [12] 'hatred' was frequently interpreted as 'disdain' or 'reproach'; all these affects share an element of aggression. The semantic tests on the emotive version of /'kiser 'me:ra 'ba:avatag/ offer some other revealling surprises : 'jubilation' is confused with 'anger' (Davitz refers to the same confusion o.c. 144); this points at a possible common feature : violent emotion and its sudden discharge. Fight and flight are both emergency responses in face of a conflictual situation, involving the activation of the sympathetic autonomous nervous system. This could account for the confusion of anger and fear [33], corresponding to fight and flight, in the framework of the Darwinian theory of emotions. The most unexpected typical error committed by the foreign informants of the /'kisera/ test was the confusion of 'anger', 'menace' and 'argumentation'; and the confusion of 'logical deduction' and 'command' or 'peremptoriness'. The confusion seem to corroborate hypotheses regarding the aggressive instinctual basis of logical reasoning, as formulated by I. Hermann [22]. Metaphoric expression such as *sharp intellect, scientific rigor*, the French nominal phrase *esprit tranchant*, or the recent semantic development of the word *argument* might reflect our preconscious knowledge of such parallels. Such cases of typical errors can be best interpreted is the frame-work of Klaus Scherer's component patterning theory, a biologically based distinctive feature analysis of emotional processes [31: 215-222].

In view of the fundamental diversity of the encoding of primary emotion, on one hand, and social attitudes and modalities on the other, it is most unlikely that all kinds of intonation should have the same neuro-physiological underpinning. The production and analysis of highly conventional distinctions, such as sharp and slow rise in French assertive exclamation vs. question, incomprehensible without the mastery of French, could hardly be produced and analysed without the participation of the left hemisphere.

The *superposition and integration* of two of three different melodic patterns is a further source of semantic complexity. The components of the complex pattern can be dissociated by means of mimicking tests. It characterizes artistic vocal performances [13]. The integration of two different melodic configurations may give rise to a new melodic pattern. Thus, in Hungarian, the superposition of the rising-falling question melody and the falling tune of surprise resulted in a straight melodic line at midhigh level with a final fall in the last syllable, and is the recurrent, conventional melodic expression of surprised questions. The integration of accent, tone and intonation in a complex curve is probably the general way to convey multiple prosodic information [28] [21]. The integration of different attitudinal and modal patterns may announce a new phase in the evolution of melodic encoding.

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