

# INTONATION IN ENGLISH, FINNISH AND FRENCH: ETHOLOGY VERSUS TYPOLOGY?

Riitta Välimaa-Blum

*Université de Lille 3 and CNRS-ESA 7018*

## ABSTRACT

Vaissière proposes that the fundamental intonational shapes across languages are motivated by biology, psychology and ethology so that there is one basic, archetypal prosodic configuration - a rise followed by a fall - and all other patterns are derived from this one shape. At the same time, Donegan and Stampe argue that the general intonational type of a language - rising or falling - is the result of the intimate interaction of the global typological characteristics of that language. In this paper, we compare the typologies of English, Finnish and French and conclude that the two views of the origins of the intonational universals are based on the fact that intonation may express two different kinds of information simultaneously, one superposed on the other.

## 1. INTRODUCTION

Donegan and Stampe (D&S) [6] compare the morphosyntactic structures of various South-East Asian languages with their intonational and word stress patterns and propose that, in languages in general, the morphosyntax and prosody interact holistically to the point where the two are interdependent. D&S suggest that there are two basic intonational types, one with a rising and the other with a falling contour. The falling type tends to have the following other typological characteristics: word initial stress, free constituent order, adjectives before nouns, enclisis, grammatical cases and suffixing morphology. The second, rising type typically comes with word final stress, rigid word order, adjectives after nouns, proclisis, analytic syntax and prefixing morphology.

This interdependence is motivated by the ultimate function of every language to express meaning. The kinds of meaning the authors consider are the invariant linguistic meaning and the expression of the information structure so that it is as if there were an implicit 'maxim' dictating that a language should make prominent what is semantically or pragmatically important. This means, that, for example, within a word, the lexical morphemes would be more prominent than the inflections, and within phrases and clauses, the operators (modifiers, arguments) would be more prominent than the operands (heads, verbs), and then also, what is asserted is more prominent than what is presupposed. D&S thus propose that the common intonational patterns found in languages are due to typological factors, which ultimately link to the central function of language, which is the expression of meaning.

Vaissière [14], on the other hand, advances the idea that the basic intonational shapes we observe across languages have their origin in the human biology, ethology and psychology. She argues that the human perceptual and

phonatory systems are such that certain shapes are produced naturally and, over time, they have become natural 'signifiants' and 'signifiés.' In what follows, we are going to discuss, first, Vaissière's view and then briefly describe the general typological properties of English, Finnish and French, three languages, which are normally considered to have very different intonational structures. In the concluding part, we will try to see whether it is possible at all to attribute the universals to one source or another, that is, to the language systems themselves or the inherent characteristics of the language user.

## 2. PSYCHOLOGICAL, ETHOLOGICAL AND BIOLOGICAL MOTIVATIONS

Vaissière [14] considers the cross-linguistic similarities in the intonational patterns. She proposes that there is one basic, archetypal prosodic configuration, a rise followed by a fall, which is motivated by human biology. All the other patterns - a rise followed by a non-fall - are then derived from this one basic type and are further motivated by psychology and/or ethology. These two types of shape, rise+fall and rise+non-fall, are then recursive in contours of longer utterances. And if there is a valley between a fall and a rise, it signals disjunction. A rise has become conventionalized as the signal of either the beginning of or an incomplete semantic unit, and a fall, in its turn, signals the end of a semantic entity.

The basic rise+fall shape is hypothesized to be the consequence of the simple fact that to produce an utterance, the speaker first needs to fill his/her lungs with air, and when speaking, the vocal folds need to be positioned in such a way that the production of sound is possible [14:125]. The F0 then rises at the beginning of an utterance, and as the air slowly goes out during phonation, there is almost universally declination over the contour. And since all speakers have to go through this same sequence when they speak, it would seem that, in diverse languages, this archetypal shape has become conventionalized as the phonetic sign of a completed utterance. And the same Gestalt is then universally interpreted as a signal that the speaker has reached the end of a semantic unit.

Now, if the fall has come to signal completion, then why is the non-fall interpreted as continuation or incompleteness? One explanation, preferred by Vaissière, is that provided by Ohala [11]: the human voice itself may have characteristics with specific signifying values and their interpretation then follows the same natural tendency. Ohala proposes that there is a kind of innately specified 'frequency code,' which associates high acoustic frequency with the primary meaning

'small vocalizer' and such secondary meanings as 'subordinate, submissive, non-threatening, desirous of the receiver's goodwill, etc.' And low acoustic frequency is then linked to the primary meaning 'large vocalizer' and to such secondary meanings as 'dominant, aggressive, threatening, etc.' [11:1]. For example, a completed utterance is in itself sufficient, and its falling F0 (to the low range) signals the independence and self-sufficiency of the speaker. But an interrogative utterance with a rise (to the high range) signals that the speaker submits him/herself to the other for the satisfaction of his/her need to know. This explanation is thus oriented toward the social character of man. There is evidence provided by Scherer, however, that high F0 values may be interpreted as signalling greater assertiveness, aggressiveness and dominance than low values [13]. Ohala concludes on this particular point that basically, what is at issue here is the shape of the contour: the high F0 may enable the speaker to make steeper terminal falls and these then signal dominance, etc.

It is not clear to us why the absolute high or low F0-values would have to relate to the interpretation of the rising and falling *shapes*, for both are produced by the male and female voices. While we accept the proposed source and interpretation of the archetypal shape, as presented by Vaissière, we prefer Karcevskij's [8] more psychologically oriented view as to the interpretation of the falling and rising patterns. For Karcevskij, the intonation of a sentence is a unitary pattern, not composed of smaller units, and each global shape contrasts with the other existing patterns. In other words, if we interpret the fall as completion, then its absence must mean something else. We find this explanation appealing because linguistic information is interpreted not only with respect to what is present in the signal but also with respect to what is absent. For example, lexical items, such as 'and' and 'or' as well as 'the' and 'a' form 'mini-systems' where the one not used is nevertheless implicitly present. But whatever the right answer about the interpretation may be, the rise+non-fall is generally associated with non-completion in different languages.

Vaissière's basic suggestion thus is that spoken language has certain natural properties whose origin is due to the inherent characteristics of the human being, and these properties have then become natural signifiers over time. They have become natural signifiers because they exploit the capacities of the human phonatory and perceptual systems. And it is precisely because these intonational phenomena have to do with the human being as a talking animal that the same characteristics are shared quasi-universally across languages.

### 3. TYPOLOGICAL DESCRIPTION

#### 3.1. English

Every content word in English has at least one stressed syllable but the locus of the primary stress is variable; function words are ordinarily reduced. The canonical intonation is falling, with declination and final lowering, but questions and other non-terminal utterances may have a final rise. An intonational phrase may consist of several pitch accents [12],

composed of low (L\*) or high (H\*) tones, or they may be rising (L+H\* or L\*+H) or falling (H\*+L or H+L\*). And at the end, and maybe also at the beginning, there are phrase accents (L- or H-) and boundary tones (L% or H%). An intonational phrase may also consist of several intermediate phrases, each with their own phrase accents [1]. Because of the intermediate phrases, the relatively great variety of pitch accents, and the phrase and boundary tones, the global shapes of the intonational contours may thus be extremely varied [12]. The main functions of intonation in English are the expression of the information structure and the speaker attitude. English syntax is analytic and constituent order, which is rigid, encodes syntactic roles. Morphology is both prefixing and suffixing, and encliticizing. Adjectives appear before the head noun. As far as the general typological characteristics of D&S go, English appears to be a mixed type, falling in between the two typological end points.

#### 3.2. Finnish

In Finnish, word stress is always on the first syllable, be it a content or a function word. Intonation is virtually always descending, with declination and final fall. In the list intonation, there may be, if not an actual rise, a sustained, non-declining pattern. Finnish can be analyzed as having two pitch accents, L+H\* and L\*+H, and two boundary tones, L- and H- [16, 18]. The morphology is exclusively suffixing - there are no prefixes at all, nor is there enclisis nor proclisis. There are 15 grammatical cases and numerous speech act particles. The latter are said to express what other languages express using intonation [7]. For example, polar questions are marked with a second-position particle, and, while the overall F0 level may rise in a question, there is no other, explicit suprasegmental marker such as final rise in the style of English and French. Constituent order is free and it expresses various pragmatic functions such as the information structure. Finnish does not have articles, and in the absence of morphological markers, constituent order can be used to express the definiteness of the grammatical subject, and intonation is sensitive to the interaction of word order and the subject definiteness [16, 17]. The relative absence of intonational variability in Finnish can then be explained by the presence of the speech act particles. And the fact that the F0 height is sensitive to the interaction of the subject definiteness and word order also results in reduced F0 variability. Typologically, Finnish is then very close to the falling type.

#### 3.3. French

French does not have word stress in the same sense as English and Finnish do, but an isolated word has a final F0 rise, which then disappears in a concatenated sequence. This same final rise can then be observed at the end of a non-terminal intonational phrase, while a terminal phrase ends in a fall [4, 5]. So, there are no other major pitch movements than those associated with the boundaries [4, 5]. The information structure is expressed by morphology and syntactic phrasing [9]. The speaker attitude too,

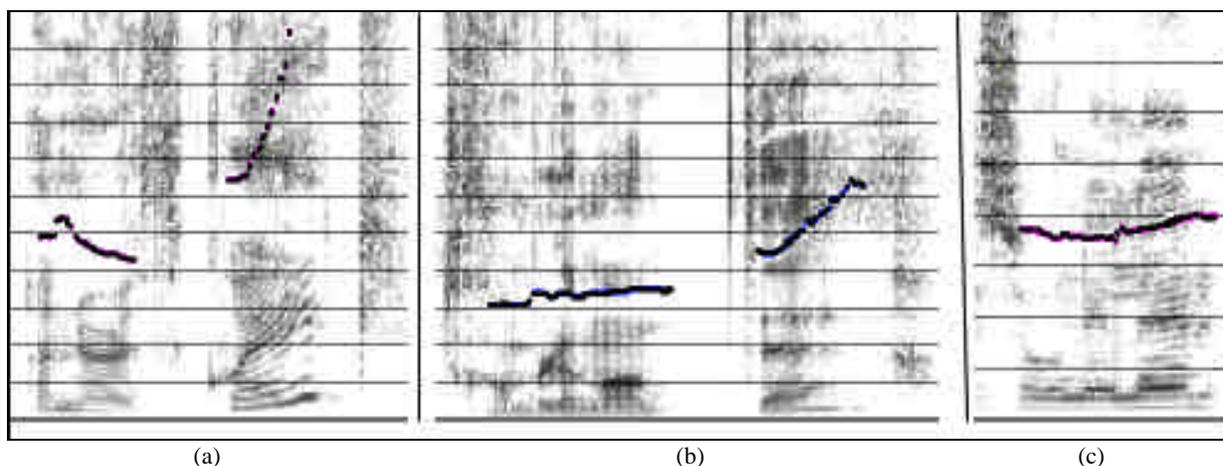


Figure 1. In (a) and (b), two interrogative rises, and on the right, what comes closest to a rise in Finnish, a continuation contour.  
 (a) English: (An) earthquake? (b) French: (Un) tremblement de terre? (c) Finnish: ...suunnilleen. 'approximately'

uses morphosyntax, and it may also use the F0 height but not F0 shape. French syntax is analytic, constituent order is rigid and it expresses syntactic roles. Proclisis is characteristic to French, and adjectives follow the head noun; these two features are typical of languages with rising intonation, and French indeed falls very close to the rising end of the typological continuum.

### 3.4. Summary of the Comparisons

Across these languages, we find three different basic intonational structures, but individually, each language has an analogous pattern between words and phonological phrases, as predicted by D&S: the 'intonation' of the word resembles the intonation of the phonological phrase. The linking of intonation with the text is of the simplest type in French: intonation only needs to consider the phrase boundaries since, in the absence of word stress, intonation has no reason to fluctuate within the contour, and there is thus no particular other place in the utterance to consider. In English, the alignment of the F0 with the text needs to consider both the beginning and the end of the intonational phrase, the locus of word stresses, the information structure and the speaker attitude. The presence of word stress in English thus seems to allow for more intonational variety than its absence in French. Intonation in Finnish, in its turn, needs to consider word stress, which is predictable, the information structure, constituent order and, in certain cases, the definiteness of the subject. As a consequence, intonational variability is more constrained in Finnish than it is in English but it is freer than in French.

## 4. DISCUSSION

Bolinger considers intonation to be a 'half-tamed savage' [2] and it is apparently for this reason that Vaissière decided not to include the affective and attitudinal uses of intonation in her discussion [14:124]. This was perhaps an unnecessary

precaution, for languages do not allow just anything in their intonation, whatever the speaker attitude and affect are. English does allow a great range of intonational phenomena, but it does so because in this language the typological properties, and in particular, its word stress patterns, permit it. But then English, with its great variety of shapes, is constrained elsewhere, for example, it excludes the linguistic use of the F0 height [10], which Finnish allows [17]. The strength of the typological constraints in Finnish, however, does not allow true rises such as those found in English and French. This is illustrated in figure (1), where we see that the kind of 'rise' Finnish can have (continuation) is far from the (question) rises of English and French, which patterns are totally excluded from Finnish. But we can say that French, too, excludes most of the patterns found in English and even in Finnish, for while French allows movements at the beginning and at the end, it does not allow them in the middle of the contour, nor in the middle of the word [15]. Also, French has an absolute interdiction of utterance initial intonationally marked focus *à la* English [9]. In other words, the basic F0-patterns of English, Finnish and French are so 'rigidified' because of their other typological properties, that even in the expression of affect and attitude their intonational contours cannot be 'distorted' beyond the permitted patterns. So, while the intonational beasts may be different across languages, they actually look more like fully tamed in a given language.

The types of meaning and function that are discussed in the ethological contexts, that is, continuation and completion, are aspects of language that deal with discourse management and turn-taking [3], not linguistic meaning *per se*. D&S, however, talk about the context-invariant linguistic meaning and information structure. All these kinds of meaning and function, however, are part of every language and must therefore be present in one form or another in every language. But since languages grammaticize the same linguistic

meanings and functions differently, it is perhaps only to be expected that the 'true' intonational universals, that is, the global rise+falls *and* the global rise+non-falls, are not to be found in the domain of the strictly linguistic meaning but at the level of discourse management and turn taking.

What is the status of interrogatives since they also tend to have a rising contour in many languages and they are included in the discussions of the continuation pattern? They clearly belong to the turn taking patterns of discourse management, for they signal adjacency pairs [3]. In languages like English and French, where polar questions are formed by morphology and syntax, the rising intonation is redundant and perhaps for this reason, this rise is optional, for polar questions may have a falling contour as well. The rise in these two languages is obligatory only when a declarative or another non-interrogative sentence type is used to ask a question, in which case there is thus no double marking and the rise must be there. But in Finnish, where constituent order is free, polar questions are formed essentially by the question particle alone and, in particular, there is no final rise, neither optionally nor obligatorily. So the case of Finnish would seem to imply that when there is only one obligatory marker, it is sufficient to the point where the language does not allow other markings. Should Finnish one day start to signal the presence of interrogatives also intonationally, then perhaps the particle would become optional.

We have now considered two different conceptions of the origin of the universal, cross-linguistic intonational shapes. The first takes the point of view of the users of language, the human beings, and seeks to find 'signifiants' and 'signifiés' that are natural to man in the sense that they are due to man's natural abilities to produce and perceive speech and to man's essentially social character. The other sees the intonational patterns to be the result of the general typological make-up of the language, that is, it looks for the explanation in the language system itself and its semantic-pragmatic functions.

Are these two views contradictory? It is a fact that languages fall within a relatively small range of typologies, and since these typologies exist, it means that languages do not vary in infinitely many ways. Our comparisons above showed that French is the 'purest' type as far as the ethological explanations go, for French has nothing but boundary-linked rises and falls, apparently because the information structure and speaker attitudes are expressed in the morphosyntax, and also because there is no word stress. English can have rises and falls all through the contours, apparently, because it expresses the information structure and speaker attitude primarily with intonation, and variable word stress contributes to the variability. Finnish with its large number of speech act particles and free word order shows less intonational variety than English and a quasi-absence of true rises such as those found in the other two languages.

But, as we have seen now, there are two different kinds of information involved in the discussions about the intonational universals: one has to do with discourse management and the other with semantic-pragmatic meanings and functions. The latter is obligatory while the former is optional. A piece of

discourse that is continuous need not contain any instances of the rising contour, and an end may well be accompanied by a rise. But a piece of discourse necessarily contains linguistic meaning and the information structure related meanings and functions. It would thus seem, as is implicit in Vaissière's model [14], that the rises and falls relating to discourse management are superposed on the properly linguistic patterns of F0, when allowed by typology. There is thus no contradiction between the two views. We then suggest that the human perceptual and phonatory systems may indeed be responsible for a certain number of basic intonational shapes that are made available to all languages, but what is actually used in a given language depends on its general typological characteristics.

#### ACKNOWLEDGEMENT

I wish to express my gratitude to Jean-Claude Desruque and Jean-Yves Schonseck, members of the technical staff at Université de Lille 3, for their generous help with the computers.

#### REFERENCES

- [1] Beckman, M. and J. Pierrehumbert. 1986. Intonational structure in Japanese and English, *Phonology Yearbook* 3.
- [2] Bolinger, D. 1978. Intonation across languages. In Greenberg, J. (ed.) *Universals of human language*, Stanford University Press, pp. 471-524.
- [3] Clark, H. and E. Schaefer. 1989. Contributing to Discourse, *Cognitive Science* 13, 259-294.
- [4] Delattre, P. 1962. Comparing the Phonetic Features of English, French, German and Spanish. *International Review of Applied Linguistics* 1, 193-210.
- [5] Di Cristo, A. and D. Hirst. 1994. Rythme syllabique, rythme mélodique et représentation hiérarchique de la prosodie du français, *Travaux de l'institut de phonétique d'Aix*, Vol. 15, 13-24.
- [6] Donegan, P. and D. Stampe. 1983. Rhythm and the Holistic Organization of Language Structure. In Richardson, J. (ed.) *Chicago Linguistic Society*, 337-353.
- [7] Hakulinen, A. and F. Karlsson. 1979. *Nykysuomen lauseoppia*, Suomalaisen Kirjallisuuden Seura, Helsinki.
- [8] Karcevskij, S. 1931. Sur la phonologie de la phrase. *Travaux du Cercle Linguistique de Prague* 4, pp. 188-227.
- [9] Lambrecht, K. 1994. *Information structure and sentence form*, Cambridge University Press.
- [10] Liberman, M. and J. Pierrehumbert. 1984. Intonational Invariance under Changes in Pitch Range and Length. In Aronoff, M. and R. T. Oehrle (eds.) *Language Sound Structure*, Cambridge and London, The MIT Press.
- [11] Ohala, J. 1984. An Ethological Perspective on Common Cross-Language Utilization of F0 of Voice. *Phonetica* 41, 1-16.
- [12] Pierrehumbert, J. 1980. *The Phonology and Phonetics of English Intonation*, Ph.D. dissertation, MIT, distributed by Indiana Linguistic Club.
- [13] Scherer, K. R. 1979. Personality markers in speech. In Scherer, K. R. and H. Giles (eds.) *Social markers in speech*, Cambridge and London: Cambridge University Press.
- [14] Vaissière, J. 1995. Phonetic Explanations for Cross-Linguistic Prosodic Similarities. *Phonetica* 52, 123-130.
- [15] Vaissière, J. 1999. Utilisation de la prosodie dans les systèmes automatiques: un problème d'intégration des différentes composantes. *Faits de Langues*, n° 13, Paris-Gap: Ophrys.
- [16] Välimaa-Blum, R. 1988. *Finnish Existential Clauses: Their Syntax, Pragmatics And Intonation*. Ph.D. dissertation, The Ohio State University, University of Michigan Microfilms.
- [17] Välimaa-Blum, R. 1993. Intonation: A Distinctive Parameter in Grammatical Constructions. *Phonetica* 50, 124-137.
- [18] Välimaa-Blum, R. 1993. A Pitch Accent Analysis of Intonation in Finnish. *Ural-Altische Jahrbücher N.F.* 12, 82-9.