

Universality of Intonational Meanings: A Note on Gussenhoven's Biological Codes *

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1. Introduction

Traditionally, the linguistic form-meaning relations are assumed to be arbitrary, as Saussure (1916) formulated; however, the paralinguistic form-meaning relations between intonation contours and meanings are less arbitrary as we can see from the cross-linguistic popularity of rising intonation in interrogatives.¹ A number of studies have addressed the issue of whether intonational meanings are language-specific or universal (Bolinger 1978; Ladd 1981; Ohala 1983; Gussenhoven 2002, 2004, 2016). This paper contends, following Gussenhoven, that despite linguistic intonational meanings are language-specific, paralinguistic intonational meanings are universal in terms of metaphorical interpretations of the anatomical and physiological properties of the speech production process. Paralinguistic intonational meanings are determined by the three 'biological codes'²: Ohala's Frequency Code (1983), the Effort Code and the Respiratory Code.

2. Intonational meanings based on 'biological codes'

Intonational meanings have multiple layers, including paralinguistic or attitudinal meanings (e.g., surprise and emphasis), interactional or social meanings (e.g., contextualization cues for turn-taking and floor management), and linguistic meanings (e.g., the use of rising intonation for interrogative mood) (Warren 2016). These meanings and functions can be analysed from the three aspects: 'affective' status related to emotions, 'informational' status related to attributes of the message, and grammar, (Gussenhoven 2002, 2004, 2016). To give an illustration of both 'affective' and 'informational' meanings, the former would be 'surprise' and 'friendliness', while the latter would be 'interrogative' and 'focus'. The following sections will explain each of the 'biological codes' proposed by Gussenhoven, defining the 'affective' and 'informational' interpretations, together with the grammatical (linguistic) meanings.

2.1. The Frequency Code

The Frequency Code is originally created by Ohala (1983), who extended the explanation of Morton (1977). Morton observed that the aggressive or threatening birds and mammals emit

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¹ A rising intonation in interrogatives is prevalent over 70% of the languages (Bolinger, 1978).

² The newly introduced Sirenian Code which attributes whispery phonation to a part of feminine attractiveness will not be discussed here in the absence of explanatory evidence.

low-pitched vocalizations, whereas the submissive or nonthreatening species produce high-pitched vocalizations in face-to-face competitive encounters. In line with this correlation, Ohala suggested that the fundamental frequency (F0)³ which is linked to vocal pitch, varies depending on the size of the larynx, sex, and age of the individual.⁴ Higher pitches are associated with ‘small’ meanings while lower pitches are associated with ‘big’ meanings. He termed this size association the Frequency Code.

The association of ‘small’ meanings with high pitch yields ‘affective’ interpretations such as ‘feminine’, ‘submission’, ‘friendliness’ and ‘vulnerability’, while ‘big’ meanings with low pitch are their opposites: ‘masculine’, ‘dominance’, ‘aggressiveness’ and ‘protectiveness’. With regard to ‘informational’ interpretations, ‘uncertainty’ versus ‘certainty’ properties are indicated by high and low pitch respectively. The ‘informational’ meanings are widespread in grammar such as the use of rising intonation contours for interrogatives and falling contours for statements, while not found in all languages.

2.2. The Effort Code

The Effort Code refers to how articulatory effort affects pitch movements. The greater articulatory effort will generate not only greater articulatory precision, but also wider excursion of pitch movements. Speakers expend effort on pitch events to project ‘enthusiastic’, ‘insistent’ and ‘cooperativeness’ (as seen in infant-directed speech). The opposite values are operated by narrow pitch range: ‘uninterested’ and ‘lacking in commitment’. A further interpretation of wide span is ‘obligingness’, which is due to the effort seen as the speaker’s intention to appear clear and unambiguous.

Other than these ‘affective’ interpretations, ‘informational’ interpretations of the Effort Code can be identified as ‘emphasis’ or ‘significance’. The extent of informational salience is typically expressed by the pitch range of utterance. However, some language communities like the Dutch interpret high pitch as signalling emphasis instead.⁵ Hence, the role of peak height and pitch excursion should be differentiated.

The grammatical meanings realised with the ‘affective’ interpretations of speaker effort have been found in Dutch, which exploits ‘obligingness’ as a ‘politeness’ morpheme.⁶ That is, the movement towards the accented syllable, regardless of direction, is positively evaluated, whereas the absence of movement receives negative evaluation. Furthermore, a well-achieved

³ The lowest frequency of a periodic waveform, which measures how high or low the frequency of a person’s voice sounds.

⁴ The male larynx is positioned lower than female’s, and thus the male vocal tract is 3.5 cm longer than the female’s.

⁵ Rietveld, T; Gussenhoven, C.; Wichmann, A.; Grabe, E. (1999). Communicative effects of rising and falling pitch accents in British English and Dutch. *Proceedings ESCA Workshop on Dialogue and Prosody*. 111-116.

⁶ Grabe, E.; Gussenhoven, C.; Haan, J.; Marsi, E.; Post, B. (1997). Preaccentual pitch and speaker attitude in Dutch. *Language and Speech*, 41, 63-85.

grammaticalisation of the Effort Code is ‘focus’ which is based on ‘significance’ interpretations as can be seen in many languages. As another informational-oriented grammar, the reverse of a ‘significant’ value; withdrawal of information, i.e., ‘negation’ by the reduction of pitch span, is operated in the tone language Engenni. High tones are lowered and low tones are raised in negative sentences from the verb onwards. This operation is the only way to express negation in that language.⁷

2.3. The Respiratory Code

The Respiratory Code, unlike the other two codes, involves ‘informational’ interpretations only. This code relates to the process of energy generation or dissipation in the course of utterance. There is a natural tendency that speakers spend more effort on the beginning of utterances than on the ends. This comes from the fact that subglottal air pressure is gradually falling from the beginning of exhalation phase (just after intake) toward the end, which results in a gradual lowering in F₀ over the phrase, i.e., ‘declination’ (Cohen and Hart, 1967). Thus, the natural intonational phrase of high pitch at the beginning and low pitch at the end associates with ‘new topics’ for high beginnings and ‘finality’ or potentially a ‘turn-shift’ for low endings. In contrast, low pitch starts signal ‘continuation of a topic’, while high pitch endings signal ‘turn-maintenance’ and ‘non-finality’.

Regarding grammaticalisations of this code, high final boundary tone (H%) as a marker of ‘non-finality’, known as ‘comma-intonation’, is exploited in many languages. It is important to remember that final rises signal ‘interrogativity’ in light of grammatical meanings through the Frequency Code. This implies that in the same language H% may be differently interpreted as either ‘non-finality’ or as ‘interrogativity’. Under such conditions where incompatible cues exist like Dutch, the continuation cue is lower than the interrogative cue, while a rise at the boundary (H%) is added to be interpreted as a question.⁸

3. Dual-structure of paralinguistic and linguistic meanings of intonation

Intonational meanings have two dimensions: the universal form-meaning relations based on the metaphors of biological conditions that effect the phonetic implementation, and the language-specific form-meaning relations embedded in the phonological grammar. They are encoded the paralinguistic meanings and linguistic meanings respectively. Notably, the universal form-meaning relations are frequently grammaticalised, and English intonational grammar largely involves ‘informational’ meanings. The speakers with different language backgrounds (e.g., phonological system, semantic or pragmatic framework) make different choices from various interpretations of the ‘biological codes’, or that listeners employ a

⁷ Thomas, E. (1978). *A grammatical description of the Engenni language*. Dallas, TX: Summer Institute of Linguistics.

⁸ Caspers, J. (1998). Who’s next? The melodic marking of question vs. continuation in Dutch. *Language and Speech*, 41, 375-398.

different code than the speaker intended (Gussenhoven 2002, 2004). For instance, the former British Prime Minister Margaret Thatcher used to use the lowering pitch so as to sound authoritative (Frequency Code) according to the advice of the speech consultant; however, her speech was frequently interpreted by interviewers as the end of the turn (Respiratory Code) because of her lowering pitch (Gussenhoven 2002).

Furthermore, the exploitation of these universal meanings will to some extent be conventionalised within speech communities (Gussenhoven 2002, 2004). As a good example of this is 'Uptalk' which sounds like a question posed at the end of the declarative utterances. It is often used to refer to the "Valley Girl" speech and devaluated as 'insecure', 'powerless', 'lacking in confidence', or even 'wishy-washy empty-headed' (Warren 2016). In the grammatical context which is rooted in the 'informational' meaning associated with the Frequency Code, the speakers presumably seem to be 'powerless' and 'lacking in confidence'. Meanwhile, they may just want to maintain the floor by exploiting the 'turn-maintenance' through the Respiratory Code. What's more, if the focus is on the 'affective' meanings of the Frequency Code, then a possible interpretation is that they are expressing 'feminine' and 'friendliness'.

Another key thing to remember is that '[w]hen the universal form-function relations become grammaticalised, and thus are encoded in the discrete prosodic structures of the language, there is no longer a guarantee that they are maintained' (Gussenhoven 2002). That is to say, languages may alter form-meaning relations in their grammars which go against the universal, 'biological codes'. For instance, Chickasaw actually do not hold the universal form-meaning relation, in which the declarative intonation ends in a high rise (H*H%) and the interrogative in a fall to low (H*L%).⁹

4. Conclusion

In conclusion, it is reasonable to think that intonational meanings are assumed to be partly universal in terms of paralinguistic form-meaning relations which derive from the 'biological codes' (including Ohala's Frequency Code, the Effort Code and the Respiratory Code.) based on metaphorical interpretations of the anatomical and physiological effects in the phonetic implementation. On the other hand, the grammatical intonational meanings are structured discretely by arbitrary linguistic form-meaning relations. Then again, the intonational grammar naturally favours the universal form-meaning relations.

⁹ Gordon, M. K. (1999). The intonational structure of Chickasaw. *ICPhS, 14*, 1993-1996.

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