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example, the sentence ‘Where am I?’ might be used to ask for the country in which one is located, the street on which one is located, the room in which one is located, etc. In some situations, one counts as knowing who killed Lady Chittlesworth when one knows simply that the murderer is the person that was wearing the yellow shirt. In other situations, this would not count as an acceptable answer. See Boër and Lycan (1985) for an account of knowing who someone is.

This brief survey of issues is far from exhaustive. For a very useful overview of both metasemantic approaches to interrogatives and semantic issues concerning interrogatives, see Groenendijk and Stokhof (1994).

See also: Mood, Clause Types, and Illocutionary Force; Truth Conditional Semantics and Meaning.

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Semantics of Prosody

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From the speaker’s perspective, ‘intonation’ is the systematic variation in rate of vocal fold vibration that cannot be attributed to lexical properties of words (lexical tone) or to effects that are a result of consonants or vowels (‘microprosody’). In more recent discussions of intonational meaning, a distinction is generally drawn between ‘linguistic meaning,’ which is associated with the structural elements making up the intonation contour, and ‘paralinguistic meaning,’ which derives from the way an intonation contour is pronounced (e.g., Ladd, 1996). The first section of this article discusses linguistic meaning and identifies three aspects of the structure that contribute to that meaning, phrasing, pitch accent distribution, and pitch accent type. The following section

discusses paralinguistic meanings and links these to physiological conditions in the speech production process which have an effect on the rate of vocal fold vibration.

Linguistic Meaning

There are three aspects of the prosodic structure that can convey meaning: prosodic phrasing, pitch accent location, and type of pitch accent or melody. ‘Prosodic phrasing’ is the division of utterances into word groups, whereby smaller word groups can be distinguished within larger word groups (‘prosodic hierarchy’). The difference between {*To govern, people use language*} and {*To govern people, use language*} illustrates a difference in ‘intonational phrasing,’ while that between {*They’ll award*} {*Áberdeen*} {*Architecture*} (i.e., during a centralized redistribution of academic disciplines over universities) and {*They’ll award*} {*Áberdeen architecture*} (i.e., give a prize to) illustrates a difference

in ‘phonological phrasing.’ Two comments are in order here. First, a direct reflection of syntactic structure in prosodic structure may be upset by the length of constituents. For instance, if there is only a single word after *award* in the first of the last two examples, it would form a single phonological phrase with the verb, as in {*They’ll award Aberdeen*}. Second, many languages require that the ‘focus constituent’ – the part of the sentence which the speaker intends to contribute as the new information – should begin or end at a prosodic phrase boundary. Thus, for example, Bengali ends the focus constituent with a phonological phrase boundary, regardless of the syntactic phrase structure, and while {*Shamolir bari*} ‘Shamoli’s house’ could be an answer to ‘What’s that?’, {*Shamolir*} {*bari*} implies a question: ‘Whose house?’ In a similar way, many languages, English among them, use pitch accents to convey information structure. Information structure concerns the status of the propositional information contained in the focus constituent relative to what the speaker assumes the hearer already knows. This need not be confined to marking ‘newness,’ as in the Bengali example, but also includes the status of the proposition as a description of a real event, as shown by *THIEVES will be PROSecuted* versus *THIEVES will be prosecuted*. In the second sentence, the absence of a pitch accent on the verb does not signify it is meant to be ‘old’ information, but causes the proposition to describe an upcoming event (cf. Gussenhoven, 2005).

Approaches to linguistic meaning of speech melody, the third structural aspect of prosody, can be distinguished on the basis of the size of the meaning-bearing (melodic) morpheme, which in principle ranges from a single tone (high or low) to the whole contour. The most fine-grained morphemic structure was proposed by Pierrehumbert and Hirschberg (1990), for whom each pitch accent and each boundary tone is a morpheme, and the most coarse-grained one by Liberman and Sag (1974) and Sag and Liberman (1975), who saw utterance-wide contours as morphemes. Intermediate positions were proposed in the mid-1970s by Brazil (1985), followed by Gussenhoven (1984), both of whom attached meanings to nuclear tones, i.e., combinations of pitch accents and boundary tones.

Consensus would appear to have been reached on the issue of whether the meaning of an intonation contour can be described independently of the meaning of the sentence it is used with, with Ladd’s (1978: 139) ‘lexical’ approach to intonational meaning. Intonational meaning has alternatively been viewed as something that can only be characterized in combination with sentence type, which Cruttenden (1996: 91) refers to as ‘local’ meaning, where the suggestion is

that a common element may be difficult or impossible to isolate from the meanings of a given tune in declaratives, questions, commands, etc. There is widespread agreement that intonational morphemes in fact have ‘lexical’ meaning and that this concerns discourse structure or information structure, rather than speech acts (e.g., Sag and Liberman, 1975) or speaker attitudes (e.g., O’Connor and Arnold, 1973). That is, intonational morphemes typically do not mean ‘promise’ or ‘skepticism,’ but rather define the way the speaker intends the proposition to be fitted into what he believes the hearer already knows at that point in their conversation (Brazil, 1985; Gussenhoven, 1984), or, as Pierrehumbert as Hirschberg (1990: 285) put it, “speakers use tunes to specify a particular relationship between the ‘propositional content’ [...] and the mutual beliefs of participants in the current discourse.” For instance, the falling-rising tune of English has been characterized as somehow reactivating information by several authors (e.g., Brazil, 1985; Steedman, 1991), while the falling tune conveys that the information is new. In this view, the melodic meanings and the meanings conveyed by pitch accent distributions come from the same class. Since morphemes are acquired, they may and often do differ from language to language. For example, a pattern such as the English declarative fall signifies a question in Chickasaw (Gordon, 2003), and the number of languages in which rising pitch is regularly used for statements must be fairly large (Bolinger, 1978).

Paralinguistic Meaning

Just as segment duration and voice quality can be varied for expressive purposes (e.g., *How sa-ad!* or *I want it!* said with breathy voice) without changing the identity of the linguistic expression, so can pitch be varied, independent of the identity of the intonation contour. ‘Pitch span,’ the distance between the highest and the lowest pitch, and ‘pitch register,’ the average pitch of the contour, can be varied to express such meanings as insistent, sad, confident, etc. Relating pitch to the size of the larynx, and hence to the size of the creature that possesses it, Ohala (1983, 1996) extended the explanation for the widespread similarities among avian and mammalian vocalizations in face-to-face competitive encounters to human speech. Vocalizations by dominant individuals are low-pitched, suggesting a large creature, while those by subordinate individuals are high-pitched, suggesting a small creature. In speech, high and rising pitch is used to signal yes-no questions, while low and falling pitch signals statements. For Ohala, high pitch expresses that the speaker is

dependent on the other's good will for the information requested – but making statements implies certainty, hence dominance. Metaphorical extensions are politeness, submission, lack of confidence vs. assertiveness, authority, aggression, confidence, and threat.

Paralinguistic meanings may be seen as more or less metaphorical interpretations of three physiological conditions that influence the rate of vocal fold vibration, the main determinant of voice pitch. One of these is Ohala's 'frequency code' (Gussenhoven, 2004: ch 5). A second condition affecting rate of vocal cord vibration is degree of effort. The 'effort code' relates wide excursions, and generally precision in the articulation, to the expenditure of energy, and hence with importance, emphasis, and obligingness. Third, the physiological condition underlying the 'production code' is the exhalation phase of the breathing process used for speech production, and the way it leads to a fall-off in subglottal air pressure toward the end of the utterance, associating high pitch with utterance beginnings and low pitch with utterance endings. High beginnings thus signal new topics and low beginnings continuation of topics, while high endings signal continuation and low endings finality and end of turn. The effects of these conditions have to a large extent been brought under speaker control. Even derived effects, such as the later realization of higher peaks relative to lower peaks, may be exploited such that later peaks are used to signal the meanings of higher peaks. For instance, in many languages, early peaks signal statements and later peaks signal questions (e.g., D'Imperio and House, 1997).

In view of their biological basis, it is not surprising that paralinguistic form-meaning relationships are exploited across groups of speakers with different language backgrounds in strikingly similar ways. Nevertheless, crosslinguistic perception research suggests that the structure of the native language, along with phonetic factors such as the average pitch span, influence the listener's sensitivity (Chen, 2005). For instance, speakers of languages with narrower pitch spans may perceive greater meaning differences across a given pitch span than speakers of language with wider average pitch spans.

Whereas linguistic meaning is discrete – in the sense that if a language has two intonational morphemes (high-low and low-high, for instance), any well-formed utterance has either one or the other – paralinguistic meaning is gradient. A paralinguistic meaning is more or less present, depending on the value of the relevant pitch variable: the wider the span, the more effort is suggested, and the higher the register, the more submissiveness will be expressed.

See also: Animal Communication: Overview; Evolution of Phonetics and Phonology; Expressive Power of Language; Focus; Information Structure in Spoken Discourse; Intonation; Phonetics: Overview; Phonological Phrase; Prosodic Cues of Discourse Units; Register Variation: Core Grammar and Periphery; Sound Symbolism; Syntax-Phonology Interface.

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