Attitudinal Intonation and the Inferential Process

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Abstract

The role of prosody in conveying affective meaning is complex. The complexity is reflected to some extent in the many labels used to describe 'ways of speaking' that could generally be described as affectively coloured. The search for prosodic correlates of emotional speech, however, is more successful for some labels than for others. I argue that some labels refer not to the affective prosody itself, but to the meanings implied by or inferred from utterances in a given interactional context. These meanings, particularly those suggestive of attitude or interpersonal stance, may, of course, arise in part from a perceived affective colouring of the voice such as sadness or anger. Some, on the other hand, may be generated by the strategic use of prosodic patterns that are not inherently 'attitudinal', but are in some way incongruent with the text or context, and set in train the process of interpretation of speaker meaning. The notion of incongruence, however, presupposes the notion of congruence, and I argue that if we are to fully understand the contribution of prosody to speaker meaning, the search for emotion in the voice should be complemented by the study of 'normative' use of prosody in interaction.

1. Attitudinal labels

Scherer [16] regards emotion as a process, consisting of several components: physiological, cognitive, socio-motivational and 'action tendency'. This complexity, he claims, is documented in the labels we use, which highlight different aspects of the 'emotion process'. In addition to what we may learn about the nature of emotion from descriptions of 'ways of being', we can also glean useful information about utterance interpretation from labels used to describe more specifically 'ways of saying' and this information is crucial to our efforts to understand the role of affect in conversational interaction. Since many studies of the relationship between affect and speech make use of labels, it is useful to look at the labels themselves.

The labels used to describe 'ways of saying' have been studied in a corpus of British English speech and writing, (ICE GB - International Corpus of English, compiled at the Survey of English Usage at University College, London) [19]. Results suggest that participants in interaction make a distinction between acoustic features of the voice, the speaker states that provoke such features, and the utterance meanings that are the result of a process of interpretation using a wide range of cues including the assumed emotional state of the speaker. We find, for example, a category of labels that describe prosodic characteristics themselves: *quiet, quick, wavering, high-pitched*. These are lay terms for features that phoneticians have little difficulty in translating. If such terms are included in a study of prosodic correlates with verbal labels, e.g. *criarde, rapide, dynamique* (shrill, rapid, dynamic)

[7], we would expect to find close acoustic correlates, precisely because these are lay attempts to describe acoustic features. Another category of labels describes the emotional state of the speaker which has been inferred from the acoustic signal As Scherer observed [16], such labels reflect different components of emotion. Some (e.g. *excited, anxious, a bit down, placid*) focus on the physiological aspects while others highlight cognitive aspects (e.g. *incredulous, scornful, convinced, disappointed*), i.e. the reason for the state rather than the state itself. The acoustic correlates of these are likely to be more closely related to the physiological response to an event than to the reasons for that response.

A very different set of labels describes ways of saying that are actually ways of behaving, in other words, actions that require a receiver and a context. These are examples of interpersonal stance - a potentially affectively coloured behaviour towards an interlocutor. In the literature on intonation, interpersonal stance is usually referred to as 'attitude', a use of the term which is different from the practice in social psychology. This difference can be the source of misunderstanding in the interdisciplinary study of emotion and speech, so it is worth explaining that 'attitude' in social psychology refers to beliefs and opinions which motivate or explain behaviour, while 'attitude' as traditionally used in the study of intonation refers to the behaviour itself. Labels referring to speaker behaviour do so primarily from the perspective of the hearer e.g. *firm, sympathetic, arrogant, patronising, insistent*. In other words they are more likely to be meanings that are inferred by the hearer than to be those necessarily intended by the speaker. Some of these perceptions may be reinforced by voice quality (e.g. a 'warm' voice may cue both 'sympathetic' and 'patronising'), others are an even more indirect interpretation of the attitude of the speaker derived from a complex interaction of text, prosody and context. Most importantly, none of these are expressions of speaker state: it is possible to be sad or happy on your own, but it is not possible to be condescending on your own.

How do such meanings arise? The kind of prosodic behaviour that might give rise to such interpretations is suggested by the final category of labels found in the study. These refer to discourse behaviour (*abrupt, sudden, final*), behaviour which may be intrinsic to the utterance itself (such as the extreme finality of a low terminal), but may also reflect how the utterance relates to other utterances, such as the timing of turns. Such effects may play an important part in the participants' experience of the interaction. If a speaker sounds 'final' when the hearer wishes to continue, the experience may be a negative one for the hearer, and may generate the kind of impressions captured in the kind of labels already described above - those which reflect the hearer's perception of the speaker's attitude or behaviour towards them, e.g. the impression that the speaker is being *uncooperative, unfriendly or inattentive*.

On the basis of this evidence, and of similar accounts in the past, we can assume that we perceive different components of 'ways of saying'. We may be consciously aware of the voice itself, or we may directly infer an emotional state. We may be consciously aware of the timing or finality of an utterance, but sometimes we simply perceive that the speaker is behaving in a certain way towards us, and the process of interpretation which led to this perception is not conscious. The process by which we judge speaker meaning, either implied or inferred, is the domain of pragmatics, but pragma-linguists do not attempt to label all possible speaker meanings, and they certainly do not expect to find direct correlates of these in the verbal message. Instead they focus on the mechanism, or mechanisms, whereby such meanings are generated. This should apply equally to intonation. We know from earlier attempts to label intonation contours attitudinally that there is no one-to-one relationship between attitudinal meanings of utterances and their prosody (either in terms of phonological choice or in terms of phonetic realisation). The prosody is just one of the cues, together with the speech act, the event, the participants, their prior knowledge and their relationship to one another, which enable the utterance to be interpreted. In searching for acoustic correlates of affect we need to be sure that we are dealing with affect, and not with utterance or speaker meaning.

2. The interpretive process

The verbal communication process is a process of successfully transmitting intended meanings (propositional, interpersonal) to hearers, and recognising those of speakers. How this works is a major concern of pragma-linguists, who are particularly interested in the 'unspoken' meanings communicated in speech. Since people do not always say what they mean or mean what they say, it is a matter of interest to find out how human beings nonetheless manage to communicate rather successfully. The answer to the question lies in the process of interpretation.

As Keller [10] puts it: 'Communication is an inferential process. It is the attempt to bring the addressee to certain conclusions. … 'Communication is an intelligent guessing game.' (pp. ix, x) The 'intelligent' part of the guessing game is the systematic use of knowledge of different kinds to make sense of the linguistic signs and other cues provided by the speaker. One possible cue to utterance interpretation may be some evidence of speaker affect. This is a signal that may be unintentional and involuntary, or may be intentional for the purpose of achieving certain social goals. Whether voluntary or involuntary, such signals can under certain circumstances be used interpretatively by the hearer as one of the many factors that lead to utterance interpretation. What is not clear, however, even assuming that there may be a direct correlation between the affect and the signal, is whether these signals are reflected in continuously varying phonetic parameters, or whether at least some of the emotional meaning can be conveyed through phonological choices. There seems to be a greater tendency, at least in the speech community, to favour the former assumption and neglect the latter. According to Ladd [11], '"acoustic correlates" have been sought for a variety of meaningful aspects of utterances, including …. speaker emotion and attitude. For the most part the authors of such studies make no attempt to identify phonological categories. Instead they simply take a set of intonational functions for granted, and assume that the most appropriate

description of how these functions are expressed is in terms of continuously varying parameters of speech …' (p.20).

Experiments carried out by by Scherer et al. [15] cited by [11], aimed to test these two assumptions about the way in which emotion affects prosody, which they call 'covariance' (the search for continuously covarying parameters), and 'configuration' (the effect of phonological chocies in relation to the utterance type). They showed that 'some of the emotional message of an utterance is .. non-phonological, or works according to the assumptions of the 'covariance' view'. However, subsequent experiments showed also that the 'categorical presence or absence of certain elements at specific points in the contour (e.g. boundary rise or boundary fall) in conjunction with other categorical linguistic properties of utterances' contribute to the perception of attitude and emotion in the message. In other words it is not enough to look for 'continuous acoustic variables that directly signal the strength of some emotional message.'

3. Links between prosody and affect

Attempts to relate phonological choices (e.g. pitch contour type) to attitudinal or affective meanings have a long tradition in British intonation research, not because the search for global phonetic parameters was felt to be unhelpful, but because such analytical techniques were technically not widely available at the time. In this tradition, attitudinal meaning is assumed to be the result of the choice of nuclear tone or composite pitch contour in conjunction with sentence type. For example, Halliday [9] claims that a wh-question with a rising tone is 'tentative', while a yes/no question with a falling tone is 'peremptory'. A statement ending with a rise can, he says, be *challenging, aggressive, defensive* or *indignant.* For O'Connor and Arnold [13] wh-questions with a 'high drop' (they give their contours rather imaginative names) are said to sound *brisk, businesslike, considerate, not unfriendly, lively,* or *interested.* It rapidly becomes clear, however, that the profusion of meanings frequently ascribed to one and the same contour serves only to show that the contour itself 'means' none of them. Yet we know intuitively that such meanings can be generated, and so the current challenge is not only to describe them but to explain how they arise.

Scherer et al.'s 'configuration' model is analogous to, but more rigorous than, this early, impressionistic and rather anecdotal work (although it has to be said that none of O'Connor and Arnold's descriptions are counterintuitive). They, too, found that emotional meanings could be generated by the conjunction of contour and sentence type. They found, for example, that yes-no questions with final fall, and wh-questions with final rise were judged much less agreeable and less polite than the 'normal' association of yes-no question plus final rise and wh-question with final fall.

Ladd [11] in his account of these findings, leaves it at that, and concludes simply that the conjunction of utterance type and phonological choices plays an important part in conveying attitude and emotion. But we need to take a further step and endeavour to understand why this is so. The study by Scherer et al. used the intonation of questions - one utterance type for which there is a fairly widespread agreement as to what is the default contour (in English: falling terminal for wh-questions and rising terminal for yes-no questions) and which has more recently been extensively studied for Dutch [8]. The change in perceived attitude - to a more negative perception - was the result of reversing this pattern. In other

words, their findings provide evidence for the claim that <u>marked</u> choices generate attitudes and in particular negative ones. If we are to predict the effect of such conjunction, however, we must have a clearer idea of what <u>unmarked</u> choices might be, and not just on questions, but on a whole range of utterance types.

3.1. The case for conventionalised contours

The meanings expressed in many of the labels we use to describe speaker attitude are clearly composite inferences. Any emotional colouring in the voice is an important cue to interpretation, but it may be the case that it signals only in a very general way a degree of arousal and valence. We may also make use of physiologically derived iconic meanings which have been proposed for intonation. Ohala [14], for example, suggests that high and low pitch is physiologically related to large and small, and may therefore by extension signal submission or power. Bolinger [4] suggests a relationship, also physiological, between high pitch and 'strain', and low pitch and 'rest'. In addition to possible interpretations of global parameters, it is also possible to ascribe very general meanings to more local pitch events such as the choice of boundary tone or terminal. More abstract meanings recently ascribed to high and low terminals are, for example, the notions of 'open' and 'closed' suggested by Cruttenden [5] and 'non-final' and 'final' suggested by Wichmann [18].

It is possible, however, that at least some emotional meaning is conveyed in a more coded way. Lindsey [12], working within the framework of Relevance Theory [17], claims that certain contours may become conventionally associated with utterance types and generate more localisable meanings, which are generated directly and no longer need to be inferred because they have become stereotyped ('well worn inferential paths become hard-wired'). In other words, stereotypical meanings are interpreted by directly accessing the associated meaning rather than by inferential evaluation of its more abstract general meaning.

Stereotyped intonational meanings are more like verbally coded meanings, and the more coded the message the 'stronger' the communication (see [17]) (unlike affective intonation which is non-specific and allows many interpretations). These stereotypical associations of contours and utterance types are not necessarily incompatible with more iconic meanings in the intonation, but are processed more directly.

This then offers a further possible source of affective information in prosody, but in order to study this we need to know more about the contours conventionally associated with utterance types. The difficulty with notions such as 'question', as in the study by Scherer et al. described above, is that questions may perform a variety of different functions (speech acts) in interaction, including, for example, a request for information, an exclamation, an invitation or a request for action. In the following I report a corpus-based study of stereotypical contours associated with a particular speech act: the speech act 'request', or at least that subset that contains the 'magic' word *please.*

4. Polite requests and conventionalised contours

4.1. Please-requests

The speech act 'request' poses a potential threat to the interlocutor's face, and politeness requires some kind of mitigation. Mitigating strategies are, of course, language and culture specific, but in English the most common strategy is indirectness. This often involves posing a modal question (could you, would you), allowing the interlocutor a face-saving opportunity to ignore the intended illocutionary force and interpret only the literal meaning as a question. A further way of mitigating a request in English is thought to be the addition of the word *please*. There is some controversy as to whether *please* is indeed a politeness marker or in fact a requestive marker, i.e. simply a marker of illocutionary force. If the latter is the case, the fact that it is only used in the company of the most conventionalised requests, whose illocutionary force is unambiguous even without the marker, requires some explanation. If the former is the case, we need an explanation as to why the word *please* can in some contexts render a request impolite rather than polite [3]. Nonetheless, the common occurrence of the word in the kind of requestive exchange that is of interest to those concerned with human-machine interactive systems (e.g. service encounters) means that *please*-requests are interesting in terms of how they are realised prosodically.

We know intuitively that a request can lie on a continuum from neutral and uninvolved, to highly involved - from a simple routine request at one end of the scale, to an appeal or emotional plea at the other. This study shows, among other things, how prosody might contribute to the distinction between these affective nuances.

4.2. A corpus-based study

A study of *please*-requests in the ICE GB corpus (600,000 words of speech) reveals first of all some interesting syntactic and pragmatic characteristics of such requests, in relation to speech style and context. These include the position of *please* in the utterance, the choice of sentence type (e.g. imperatives, declaratives, wh-questions, yes-no questions, modal interrogatives), and the choice of modal expression in modal interrogatives. The distribution and frequency of such characteristics formed the basis for a systematic study of related intonation contours, and the discussion here focusses on the findings concerning the prosodic realisation of *please*-requests.

In total, 88 tokens of *please*-requests were identified, but because of the extreme mobility of *please* (it can occur in positions that are sentence initial, sentence medial and sentence final), and since the prosody of the request is different for each position, the numbers of each kind extracted from the corpus are too low to justify any inferential statistics. However, they do highlight trends that are not counter-intuitive and that generate interesting hypotheses for further testing. The most common pattern in the corpus is a request with a sentence-final *please*, usually in the form of a modal interrogative. These are realised systematically with one of two contour sequences: ending in H% or ending in L%.

     Can you [H*open the [H*L% door please]
     Can you open the [H*L door [L*H% please]

Additional contextual information encoded in the corpus allows a study of the distribution of these patterns according to the situation in which they are used. This shows a clear association between H % endings and requests in what is broadly categorised as a 'private' situation, and those with L% endings with requests in a 'public' situation.

Requests with a sentence-initial *please* are almost exclusively mitigated imperatives. These occur in both public and private contexts, but in the latter case the form - both syntactic and prosodic - is most variable. In public speech the use is more uniform: we observed an almost exclusive use of the positive imperative, rarely negative, and a consistent prosodic realisation. The pattern associated with the utterance was a high pitch accent on *please* followed by a H* L% pattern (or downstepped !H*L) - any potential intervening Low tones are deleted.

[H*Please open the [(!)H*L% door]

A closer investigation of the the categories defined in the corpus as 'public' and 'private' showed that the latter were for the most part conversations between equals in an informal setting (e.g. friends, colleagues). Situations classed as 'public', on the other hand, were for the most part unequal encounters in a formal setting. The *please*-requests in this section of the corpus were nearly all uttered by the more powerful of the participants to the less powerful. These requests, whether in the form of modal interrogative or positive imperative, almost invariably end low (L%). Requests in private situations, on the other hand, where (in this corpus) the participants are of equal status, end with a high boundary tone (H%).

We thus have a consistent pattern for both imperatives and modal interrogatives according to situation: low terminals in formal, unequal encounters and high terminals in informal, equal encounters. This is consistent with the iconic association between pitch and physical size: high pitch being interpreted as small and therefore submissive, and low pitch being interpreted as large and therefore carrying authority. It is also consistent with the more abstract meanings of 'open' and 'closed', or 'final' and 'non-final'. Finality permits no other choice than to comply, while non-finality leaves the matter 'open' for negotiation.

This study reveals intonation contours that appear to be stereotypically associated with requests. The contour with the rising terminal is used in informal situations, is associated with requests of low imposition, and offer the interlocutor (at least nominally) the choice whether or not to comply. The contour with the falling terminal is used in formal and more impersonal situations, by the more powerful participant, and in association with requests that are either invitatory (i.e. for the benefit of the receiver, where a refusal would be inappropriate) or in the nature of a directive, where the receiver is not in a position to refuse.

4.3. Flouting the convention: the potential for conveying attitude

The situationally constrained conventionalisation of such contours suggests that they will lead directly to the intepretation of an utterance as a request, either with or without the option to comply, depending on the high or low terminal. If they are used in the 'normal' way, it is unlikely that they will be perceived as reflecting any particular attitude. If the conventions are flouted, on the other hand, the discrepancy between the expected and the actual will have a marked effect. A request spoken in an authoritative way to someone of equal status may be interpreted as exhibiting inappropriate power (overbearing, condescending etc), whereas a 'submissive' sounding request from someone in a position of authority may sound too tentative and weak. This would be the result of violating the stereotypical associations causing a 'mismatch'. This has an effect on a hearer analogous to the effect of an unusual event as the precursor to an emotional response. It causes the hearer to pay attention, and because the normal 'meaning' is not obviously relevant the hearer is obliged to begin an inferential process in order to assign meaning. The speaker meaning generated in a situation such as described above would of course depend on many other contextual and cotextual features. The use of an authoritative contour to a hearer who did not perceive themselves to be in a less powerful situation might be interpreted as *sarcastic, pushy, overbearing, rude, bossy* etc. Similarly, a request made by a speaker in a position of power, and for action that the hearer may not refuse, but realised with a rising terminal, will also be perceived as inappropriate, in this case perhaps *weak* or *sarcastic*.

4.4. An emotional variant

Of the 88 *please*-requests in the ICE GB corpus there are four requests, all imperatives, where a consistently different pattern is used: the sentence initial *please* is given a H*L contour followed by a L*H contour on the nucleus, as in *Please open the /door.*

H*L Please open the L*H door

In each of these cases the intuitive native-speaker impression is that these are not neutral, formulaic requests, but requests of greater urgency, and can be placed towards the emotive end of the continuum. In other words they constitute more of an appeal or plea than a request. Given the low numbers, always a problem when researching low frequency items, we need to consider what might constitute independent evidence for our intuitive judgements. For this we need to appeal to the text and context in a number of ways. In the following examples, falling and rising intonation contours are indicated with the symbols \ and /.

For one example (in a university meeting) *Please urge your /students to apply for funds*…, evidence that this request is not simply a routine one is to be found in the subsequent talk. A subsequent justification for the request (*it's really important…., and it's rather absurd that the funds are there but not used…),* together with the fact that the request is made twice in the same interaction, makes it clear that there is some urgency implied. The information preceding an appeal can also justify its categorisation as such. In the example: *it's not dead forever? \Please don't tell me /that*, the exclamation (at the news that a favourite TV series is to be discontinued) means that we already know that the speaker is distressed, or at least feigning mock distress for comic effect. Independent evidence of heightened affect can also be found in exclamative particles, such as the 'Oh' in the following: *Oh Colin, \please eat /something,* together with additional prosodic cues such as the stress shift to *something,* a marked position that suggests a contrast with *nothing,* and we know that eating nothing can sometimes cause concern. The evidence for the following example: *\Please /phone in credit card donations,* is to be found not in the text but in the context. The setting is a broadcast charity appeal, and the

request for donations is by definition an appeal rather than a routine request or directive.

If these cases are typical, they may be evidence of a further conventional association between contour and utterance type - in this case one in which added emotional force is conveyed.

These observations support the claim made implicitly by O'Connor and Arnold, and explicitly by Scherer et al., that affective meanings are conveyed not only by continuously variable phonetic parameters, nor only through iconic associations with relative pitch height, but also by the conjunction between categorical choices of contour and utterance type. Conventionalised, stereotypical associations of this kind in an appropriate context will not draw attention to themselves; they will be processed directly, and therefore not set in train any inferencing process. If the stereotypical associations are violated in some way, however, the hearer beomes aware that a direct interpretation will not yield maximum relevance. The complex process then begins of attributing meaning to the utterance.

5.   Discussion

Whatever the psychological nature of emotion, our understanding of it is insufficient to explain how affective meaning is conveyed in verbal communication. We process a wide range of information, both non-linguistic and linguistic, and the reflection in the voice of the internal state of a speaker may be one of the many elements of information, coded and non-coded, used by a hearer in the process of interpretation. However, if we are to understand how certain 'meanings' arise we must bear in mind that verbal communication does not consist only of encoding and decoding information, but that this is subservient to the inferential process itself [17].

The labels we use to describe affect in relation to speech will, in some cases, refer to physically present information. This may be the involuntary result of physiological change, or it may be produced intentionally to fulfil a socially defined goal. Such features can be expected to have fairly direct acoustic correlates. There are many labels, however, that describe the meanings inferred by means of the interpretive process, and can have no direct correlate in the acoustic signal.

Such meanings are pragmatic inferences which are generated in the same way other inferences and implicatures are generated: by using linguistic features in an unexpected way, creating a mismatch, or incongruence between two or more aspects of the talk. It is possible that intonation patterns that are regarded as attitudinally marked also use the intonation system in an unusual way, possibly in conjunction with other linguistic patterns. In other words, the source of affective meaning may lie in the incongruity between contour and utterance type, as in the reversal of patterns on questions, which gave rise to negative meaning in Scherer et al.'s work, or between contour and context, such as, for example, making a request with a low terminal despite not being in a position of power.

Hitherto, such mismatches have been accounted for in terms either of continuously varying parameters, or in terms of abstract meanings underlying the choice of, say, high or low terminals. It seems reasonable to suppose that there is another source of affective meaning: the existence of conventionalised associations between speech act and contour, which can be flouted intentionally or unintentionally.

If the conjunction between the two is 'normal' then it will be processed directly, without accessing more abstract meanings. If the convention is flouted it will set in train an inferencing process on the part of the hearer, in an attempt to 'make sense' of what on the surface does not 'make sense'.

6.   Conclusions

The search for prosodic sources of affective meaning in interaction should not be restricted to the study of global phonetic parameters. In order to understand how affective meaning is conveyed in speech, it is necessary to pay more attention to the distinction between what is directly and explicitly signalled, and what is the end result of the inferential process. Inferencing is triggered by mismatch, and the greater the mismatch between the expected and the actual (whether prosody, lexis or other linguistic element) the more likely it is that a meaning is generated.

If we are to identify mismatch, or incongruity, as a possible source of affective meaning it will be necessary to investigate more closely the kinds of contours that may be considered conventionalised.

Finally, the search for direct acoustic correlates of affective meanings such as interpersonal stance cannot succeed if these meanings are arrived at by a process of inference.

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