

# The role of prosody in constraining context selection: a procedural approach

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## Abstract

*This paper explores how models of context can enhance our understanding of the role played by prosody in interactive discourse. It firstly considers different theoretical definitions of context, and the corresponding accounts of the part played by context in linguistic communication. The following section outlines a range of prosodic parameters which are known to make meaningful contributions to discourse, and suggests how contextual considerations interact with and determine linguistic form, specifically aspects of prosody. Selected prosodic characteristics of some interactive data taken from an English Map Task are analysed. Finally it is proposed that the prosodic shape of utterances primarily functions to guide the listener in how to proceed: how to access the relevant cognitive context within which to interpret the speaker's contribution, how to evaluate that contribution, and how to construct the interaction itself, to enable the communication to take place.*

## 1. What do we mean by context?

### 1.1 Informal definitions

Any spoken discourse will take place in some kind of context. Our informal notions of context are many and varied, as the word is used to denote a wide range of phenomena. For example, there is the situational context: are we engaging in monologue or dialogue, in public or private, face-to-face or over the telephone? Such considerations will influence our speaking style: the language we choose and the way we present it (Wichmann 2000). Different types of discourse will have a form that is proper to them, which provides another type of context: interactive dialogues, for example, are made up of sequences of turns, which need to be negotiated, whereas a formal address will be constructed as a monologue. Where the recovery of meaning is concerned, propositions which form part of the communicative content will have to be evaluated in a different kind of context, that provided by mutual knowledge: participants in discourse will need to be accessing the same sets of assumptions in order to reach some kind of understanding. Furthermore, participants will have an individual stock of encyclopaedic knowledge that they can bring to bear as required (part of their own cognitive context). We can also talk about the interpersonal context – the sort of knowledge participants have of each other, which may have a bearing on the interaction, and may determine the level of formality within which they conduct their discourse. This knowledge may be something they have already, or part of what they discover during their talk. Closely related to this is the paralinguistic context: attitudes and emotions which may become salient, whether deliberately communicated or not, in the course of the interaction. The term context is also used in relation to linguistic form; for example, the realisation of particular sounds may depend on their phonetic context.

A full account of all these different contexts would be well nigh impossible to achieve and unwieldy to use in any systematic way to explain how communication takes place. Rather, I shall argue that models of context taken from two very different theoretical perspectives both give us important insights into how discourse is constructed and how communication takes place. Far from being irreconcilable, the models can be regarded as simultaneously valid. We shall see that linguistic form, importantly including prosody, is sensitive to both notions of context.

### 1.2 Context in Relevance Theory (RT)

The notion of context is fundamental to Relevance Theory (Sperber & Wilson 1986/1995), a theory not just of linguistic communication but of communication in general. It relies on our ability to make inferences from what we perceive, using deduction to evaluate the relevance of what is communicated. When a speaker directly addresses us he is, according to the Principle of Relevance, guaranteeing the relevance of his contribution, and the hearer will recover the first interpretation which satisfies the relevance criterion for the least amount of processing effort. Linguistic communication specifically is achieved through a combination of linguistic decoding and inferencing processes.

The context, in RT, consists of the set of assumptions which are salient at any given time – the cognitive environment. We bring to any conversation some set of assumptions and beliefs about the state of the world from which, during the course of our interaction, we select a small subset pertaining to the content of the exchange. The set of assumptions which are made salient during the interaction is being continuously negotiated and updated by participants. Updating relies on a deductive process, whereby new information is assessed against existing assumptions. Our context is then successfully updated when the deductive process yields *cognitive effects*, which come in three basic flavours:

- The confirmation or strengthening of an existing assumption
- The contradiction or elimination of an existing assumption
- The addition of a new deductive assumption, involving the synthesis of proposition P with context C, leading to the derivation of a contextual implication.

(See Sperber & Wilson 1995, 108-137 for a fuller account.)

The assumptions constituting input to the deductive process have several possible sources, including linguistic decoding, sensory perception, encyclopaedic memory, and the product of the deductive process itself (Sperber & Wilson 1995, 107). These all feed the inferential process. As communication continues, newly communicated assumptions (analysed technically within RT as *explicatures* or *implicatures*), or background assumptions which the talk has made accessible, come to the foreground, while others drop into the background. The ever-changing context is thus whatever set of assumptions is active at a given time. Comprehension involves the processing of the new assumptions in the context of the old ones, and in the process the context is updated. For the purposes of this paper I shall call this theory-specific definition of context the *cognitive context*.

It is worth noting that contextual effects may be derived from sources other than the decoded linguistic message itself. Facial expressions, gestures and other sensory inputs may also play a part in feeding the comprehension process. Paralinguistic information inferred from the linguistic form is also assessed along with what is linguistically coded. The cognitive context subsumes all types of information intentionally communicated which contribute to comprehension.

The role of discourse participants may be summarised as follows: the speaker's task is to present his contribution in a way that optimally directs the hearer to the intended interpretation; the hearer's task is to use a combination of linguistic decoding and inferencing to derive hypotheses about the explicit and implicit content of the utterance, and to find the interpretation which seems to be most relevant for the least amount of processing effort.

### 1.3 Context in talk-in-interaction

The account above makes no specific reference to the context which is considered primary by researchers whose main focus is talk-in-interaction, using the rigorous methodology of Conversation Analysis (CA). This context, which I shall call the *interactional context*, is the verbal interaction itself, which is considered to be structurally organised, constructed and managed by discourse participants in an orderly collaboration. An important characteristic of naturally occurring conversation is that it is composed of a sequence of turns. Participants design their

contributions in terms of turn-constructive units, and provide cues to each other about turn-taking – holding or yielding the floor. This sequential-interactive context can be regarded as a ‘meta’-context: it provides the framework within which the linguistic or other content of the interaction can be shared and negotiated. Prosody has a crucial contextualising function in this interactive perspective:

Intonation and prosody ... constitute *how* something is said, not what is said, and they ultimately influence only what participants *infer* is the meaning... Prosodic contextualisation cues... stand in a reflexive relationship to language, cueing the context within which it is to be interpreted and at the same time constituting that context. (Couper-Kuhlen & Selting 1996, 21)

Indeed, it is claimed that not only prosody but many other aspects of phonetic detail are systematically used to shape and interpret contributions to talk (Local 2007).

## 2. Prosody and context

In what ways can prosody contribute to the on-going negotiation of context, in either of the theoretical frameworks we have outlined above? We will need to look more closely at the different types of prosodic parameter that are available for systematic exploitation, think about the range of functions that have been associated with these parameters, and then see what role context may play in fulfilling these functions.

### 2.1 Prosodic parameters

It is outside the scope of this paper to present a detailed formal analysis of prosodic systems, or of intonational phonology. Comprehensive accounts within different theoretical frameworks include Cruttenden (1986); Couper-Kuhlen (1986); Ladd (1996); Gussenhoven (2004). However, it is worth listing some of the individual aspects that must be taken into account in any prosodic model, in any language. These include :

- (1) Intonational phrasing : the division of the spoken text into well-formed chunks
- (2) Accentual highlighting : the distribution of prominences across the text
- (3) Pitch contours or targets : the specification of particular pitch patterns, such as rises or falls
- (4) Pitch span, or range : wide or narrow, local or global
- (5) Tempo : fast or slow
- (6) Pauses : both filled and unfilled
- (7) Rhythm : the regular occurrence of speech events in time
- (8) Voice quality : modal, creaky, breathy, and so on

### 2.2 Prosodic function

Similarly, this paper cannot explore all the different functions that have traditionally been associated with all these parameters. However, we will try to demonstrate that prosody plays a major role in selecting and constructing the contexts proposed in section 1. We will assume that prosodic choice may have different orientations:

- towards the interpretation of the linguistic content itself
- towards the affective context, to communicate paralinguistic information about a speaker’s attitudes and emotions
- towards the interactive sequencing.

It is widely accepted that prosodic factors can guide the hearer towards one interpretation rather than another. In RT terms, this would involve narrowing down the search space for contextual assumptions during the inferential phase of comprehension (see for example Vandepitte 1989, Clark & Lindsey 1990, House 1990, Imai 1998, Fretheim 2002). Also working within RT, Blakemore (1987, 2002) has proposed a distinction between *conceptual* and *procedural* meaning, focussing her discussion of procedural meaning on discourse particles. Following up this claim, House (2006) looked at four aspects of prosodic structure (the placement of IP boundaries; distribution of pitch accents; variation in pitch span; a particular pitch contour – the high rising

tone), and hypothesised that in linguistic communication, these prosodic features also encode procedures rather than concepts. The hearer interprets the prosodic cues as instructions about how to proceed – instructions which minimise her processing effort by imposing constraints on inferencing procedures. These constraints typically restrict access to certain contextual assumptions, while favouring the selection of others which in turn yield contextual effects. Since contextual assumptions and implications derived from the linguistic message may be further enriched by prosodically communicated paralinguistic information, the orientation of these cued constraints may vary: towards the linguistic content itself, or towards formulating hypotheses about the attitudes and emotions displayed by the speaker, including his attitude towards the truth-conditional status of the proposition presented. Insofar as prosody encodes anything at all, as opposed to providing some sort of natural highlighting, Wilson & Wharton (2006) also favour a procedural analysis.

Mention of the interactive context, in other words the construction of the turn sequences in talk, is missing from the above account. As we have seen, the primary function of prosody and of many other phonetic details, according to researchers on talk-in-interaction, is to cue turn-taking, and to construct and manage the interaction. But such cues are quintessentially procedural. They are giving guidance to interlocutors about how to act, as distinct from which contextual assumptions to access. A collaboratively constructed interaction then enables the linguistic content to be transmitted in an orderly and efficient manner.

Can both hypotheses about prosodic function be true? Must one orientation take precedence over another, or are we dealing with multiple orientations? Can different orientations operate simultaneously, or must the hearer make a choice as to which is the most relevant at a given point? We will look more closely at selected phenomena on excerpts of map task data to see if we can shed light on this issue.

### 3 The Map Task

In the data presented here, taken from Shobbrook & House (2003), Geoff and Annie are partaking in an exercise which has a specific goal: a map task (Anderson et al, 1991). They are visually screened from each other, so have to achieve their goal using talk alone. The task is prescribed, but the interaction itself is entirely unscripted. Each has a map on which there are certain landmarks, but only Annie's map has a route marked round these landmarks. As leader, she must explain the route to the follower, Geoff, whose task is to mark the route on his own map. The two maps are, in fact, different, though have some landmarks in common. Initially, neither talker realises this.

Map tasks have certain interesting discourse properties. Since the goal of the interaction is known, observers get some insight into how the cognitive environment is updated turn by turn. The resulting dialogues are typically rich with requests for clarification in the attempt to establish a mutual cognitive context. Since participants cannot see each other, they have no access to gaze or gesture, and *backchannel* takes on a very active role – rather as it does in telephone interactions. The nature of the task also requires regular acknowledgements of progress, which in the circumstances need to be spoken. We find that the leader explicitly elicits acknowledgement from the follower as each move in the task is negotiated, and provision of backchannel by the follower is essential to its smooth progress.

Geoff and Annie are friends and therefore interact in an informal and relatively uninhibited way. They are both in their twenties, live in Essex, and are motivated to complete the task.

#### 3.1 Analysis of map task data

Transcription conventions may require some explanation. Overlapping turns are aligned using [ ], and measurable pauses are shown in ( ) with their approximate duration. Rhythmically prominent syllables are underlined, and pre-nuclear accents marked as ∇. What have been perceived as nuclear pitch accents are marked with appropriate contour tone marks: /rise, \fall,

\fall-rise and > mid-level (sustained pitch). No attempt has been made to distinguish between high and low versions of these tones. Such tones imply an IP boundary at some point before the next pitch accent, and these are marked | when they occur turn-internally. If no pause is specified at a boundary, then no pause was perceived. Turn-final = means that there is no gap before the next turn.

*Excerpt 1 : a clarification sequence*

- 1 A \yep | \straight \down  
2 G [/yep]  
3 A [ov-] \slightly to the %left | /maybe (0.3)  
4 G |oh [-right]  
5 A [it's] \like a \snake | but a \really ex\ten\ded %snake | so it's like \got a \curve  
|  
6 that goes \left and \right (0.4)  
7 G but \really \kind of \big curves (0.5)  
8 A \no | just [\little]  
9 G [\humpy]  
10 A curves [like]  
11 G [ | all -right]  
12 A i- i-  
13 G [just a slight \wave to the %right]  
14 A [if you \looked at it \quickly | it \might look] \straight | \yeah (0.4) and you're  
\not  
15 [going]  
16 G [\cool]  
17 A \straight down | \slightly to the left (1.3)

At this point in the dialogue our participants have realised that their maps are different, and are making the best of a bad job by trying to describe the route in terms of its contour.

Lines 5-6 see Annie embarking on a clarification of her instructions with a succession of IPs, in this case four of them produced without any noticeable pause between. At the end of 5, she does pause, allowing Geoff to come in with a request for further clarification. Annie's next turn is interrupted by Geoff, as he elaborates on his request, and her turn in line 14, partly in overlap with Geoff, is again a sequence of joined-up IPs. One basic function of IPs is to divide linguistic material into coherent «chunks». An implication to the hearer is that all material contained within one IP is coherent enough to be processed together; usually, this coherence is paralleled by syntactic coherence, as would seem to be the case here. The demarcative function played by the boundary is not trivial, since placement of boundaries in a text can have an important disambiguating function (House, 2006). The orientation of this function is towards the linguistic content itself, and any coded procedure would be to instruct the hearer about the coherence of this content, from which she can make appropriate inferences. However, the procedure associated with the interactive content is a rather different one: a boundary is an important cue for a turn-taking opportunity, and co-operative listeners wait for the cue before launching into their own turn. Provided the boundary does not occur at a point which is syntactically incomplete, any tone in regionally unmarked British or American English can act as a turn-taking cue (Szczepek Reed, 2004). The strength of this cue, however, will depend importantly on the phonetic realisation of the boundary, and an absence of pause acts as a strong turn-holding signal. Annie's strategy is successful in 5-6, but once George has come in in overlap in line 9, the

turn-taking becomes more competitive, though Annie carries on regardless in 14 to make her point.

Local (2007) presents several scenarios where phenomena that would conventionally be described as «phonetic detail» -- the phonetic realisation of some apparent phonological entity -- are in fact doing the interactive context-building work, rather than the entity itself. It seems that in the case of the IP boundaries the demarcative function depends on the cue being present or absent, and shapes the linguistic content, while the turn-taking function relies on gradient cues and shapes the interaction. The functions are thus not in competition and can be expressed and interpreted simultaneously. The hearer can make appropriate inferences about the structure and content of what she hears.

Other phenomena displayed in the above excerpt, though they will not be discussed in detail, include the use of pitch accents to highlight focus structure, the differences in rhythmic integration over co-operative and competitive stretches, and the preponderance of falling tones. The clarification sequences throughout this map task tend to be characterised by tonal parallelism, using falls or fall-rises, marking the digression from the main task as a coherent stretch in its own right.

*Excerpt 2 : setting up the interaction*

- 1 A O\K | (.) \G..... (0.3)  
 2 G \yes (0.3)  
 3 A | \have to \start | (0.4) at the \bottom (0.2) \left-hand \corner | a>\bout |  
 4 (0.4) an \inch \up | and an \inch >\in | from the \very \bottom (0.2)  
 5 G mmm/hm (0.3)  
 6 A \right =  
 7 G \what corner (0.6) [\bottom w]  
 8 A [\bottom] \left =  
 9 G bottom \left | (0.2) [uh-/huh]  
 10 A [\right] | (0.5)  
 11 and \then go >\up | (0.1) \just under an /inch (0.7)  
 12 G \straight up (0.2)  
 13 A /straight up =  
 14 G /yep (0.7)  
 15 A it \curves \slightly \upwards (0.1.) to the /right (0.8)  
 16 G right /yeah | \how long does \that go (0.5)  
 17 A >u:hm | (0.3) for a>\bout | (0.6) an \inch and a /quarter (0.2)  
 18 G \can't you use /metric (0.3)  
 19 A (laugh) \no (laugh)

In this excerpt we go back to the beginning of the task, where Annie and Geoff are establishing how to start off. Of particular interest here are the simple rising tones that both participants often use turn-finally. Throughout their dialogue, sequences of such turns seem to characterise stretches where the task is running smoothly. No attempt has been made here to label rises as high or low (H\* H H% and L\* H H% in autosegmental-metrical terms) because it is not clear from the data on what criteria such a distinction can be justified.

All phrase-final pitch accents (nuclear tones) alert the hearer to the status of the IP to which they belong. This status may be oriented towards the linguistic content or to the developing

discourse. Because the different tones are in a paradigmatic relationship with one another, they are prime candidates for being the units of intonation which carry specific meanings. In practice, finding consistent tonal meanings which are independent of the text over which they are realised, has proved elusive. Generalisations can still be made. In conventional accounts of intonation, rising sequences (H H%) have an established association with:

- (i) questioning, or «testing the relevance» (Gussenhoven 1984) of the linguistic contribution to the discourse content
- (ii) signalling continuity or open-endedness, indicating that the IP is part of a larger piece of discourse structure.

Because Annie is a leader and Geoff a follower, their interaction is asymmetric and we would expect the turns they produce to have different functions – Annie essentially providing the instructions and Geoff the backchannel or other acknowledgement. Yet both are making frequent use of the simple rise turn-finally, Annie in lines 11, 13, 15 and 17, and Geoff in lines 5, 9, 14 and 18. Geoff is first to use the tone, on his backchannel in 5 and 9, and then again in 14. There is no real sense in which the backchannel can be questioning or testing the relevance of what is being communicated by «yep» or «mhm»; on the contrary, it confirms that information has been received and understood. It does not signal any incompleteness of his own turn, but rather invites Annie to continue. Having started off with a mixture of falls and fall-rises, Annie switches to the rising tone in 11, on a piece of information about which she is clearly confident. Her use of the rising tone is therefore not directed towards checking the linguistic content of what she has said. Rather, she uses the tone to check whether the follower can confirm an update to *his* cognitive environment. Her turn is designed to elicit feedback, and the tone marks an explicit turn-taking invitation. A similar analysis would hold for 11, 13 and 15. Both speakers are thus co-operating in building their interactive framework, and the tonal choice seems to be oriented essentially to the sequential context. Any open-endedness or continuity involved relate to the task itself, and to the momentum built up as it is successfully pursued.

Co-operation and affiliation are also signalled by relative register matching (Couper-Kuhlen 1996) across adjacent turns. This shows up in 13–14, and very noticeably in 17–18, when Annie uses a relatively high part of her pitch range, and Geoff moves into the same part of his range for his response, which matches rhythmically as well as intonationally. However, his response is not, as the prosody might lead one to expect, a smooth continuation of the task. He uses the turn to ask a mock-exasperated question. Annie responds with a laugh, and an answer to the question, but the discourse flow is abruptly stopped. Her response is interesting for being in the very highest part of her pitch range, conveying paralinguistic information about her light-hearted attitude to Geoff's question. Out of context, there is nothing inappropriate about Geoff's traditional use of a rising tone on a question. In the interactive sequence, however, the expectation has been set up for a continued orientation towards the sequential structure, and the sudden switch of orientation to the linguistic content causes the laughter-inducing incongruity.

Geoff produces a further unexpected turn-final rise in line 7 of excerpt 3 below :

*Excerpt 3 : a further digression*

- |   |   |   |
|---|---|---|
| 1 | A | \no   you've \curved \upwards =                 |
| 2 | G | >yeah (0.4)                                     |
| 3 | A | and >then  (0.1) \stop at four /inches (0.2)    |
| 4 | G | \oh /right   /yeah   I'm [\with you \now] (0.3) |
| 5 | A | [/yeah]   |
| 6 |   | and \then once a\gain [like a \little \snake]   |
| 7 | G | [I \can't fit four \inches] on my /page (0.4)   |

8 A /pardon (0.2)  
 9 G I \u2264can't fit four \u2264inches on my \u2264pa[ge]  
 10 A [\u2264make] it \u2264smaller [then]  
 11 G [O>K]

He has encountered a problem with following his instructions and interrupts Annie to announce the fact. He is making a statement rather than asking a question, so the rising tone could be seen as an example of *uptalk*, or quite overtly signalling an attempt to elicit feedback from Annie. It could also be seen as testing the relevance of his statement to Annie's cognitive context. She uses a similar tone in 8 to elicit a repetition, which Geoff provides in 9 with a falling tone. Both of the rising tones are designed to invite the other speaker to take over the turn, and are to that extent sequentially oriented, but do not form part of the smooth task progression we observed in excerpt 2.

We seem to be dealing here with a situation where the use of the simple rise turn-finally coincides consistently with the speaker's active desire to hand over the turn. The hearer is offered an explicit invitation rather than a mere opportunity to make her contribution. The few examples of turn-internal rises (excerpt 2, line 16; excerpt 3, line 4) are produced without a following pause, thus allowing the speaker to hold the floor. Orientation of the rise towards the status of the linguistic content, and thus to the cognitive context, is less common in these particular excerpts, but when it occurs it uses tonal pattern realisations which are seemingly identical to the interactively-oriented versions. We cannot differentiate between the entity itself and the phonetic details of its realisation in order to establish the orientation, nor can we safely associate a particular orientation with one particular phonetic realisation. Faced with a potential choice of interpretations, the hearer will presumably, in accordance with the Principle of Relevance, choose the most cost-effective orientation.

#### 4. Context, prosody and the procedural approach

We have explored two very different theoretical approaches to context: cognitive and interactive. Interestingly, neither type of context is viewed as static. In both cases, the context is developing dynamically, constructed by discourse participants themselves. Speakers and hearers are clearly multi-tasking as they construct both the communicative framework and its content simultaneously. Success in both operations is essential to communication. Turn-taking is a way of timing the delivery of new cognitive assumptions, of pacing the on-line inferencing process. Well-managed interactions will improve communicative efficiency by cutting down processing costs, consistent with RT criteria. The inferences derived from linguistic form about turn management may not yield contextual effects relating to the communicative content itself, but certainly form part of the cognitive environment alongside other inferentially derived assumptions.

Prosody is an integral part of linguistic form, shaping its temporal and pitch characteristics to achieve communicative ends. In a non-tonal language like English I have argued that prosodic features do not encode any conceptual meaning, but can be explained in a more satisfying way in terms of procedural meaning. Blakemore (2002) identified several types of procedural meaning associated with discourse particles; for example, such meanings could involve

- directly encoding the type of cognitive effect intended
- constraining the context in which the cognitive effect is derived
- orienting the hearer to access a particular set of assumptions
- setting procedural constraints on explicit content
- indicating the status of non-declaratives.

Many aspects of prosody would seem to be acting in comparable ways, in their interaction with lexico-syntactic content, by encoding procedural instructions about inferencing procedures. We have seen that these inferencing procedures can be directed to both the communicative content and the interactive structure simultaneously (e.g. the interpretation of IP boundaries), but that in other cases the same prosodic cue, such as choice of tonal contour, may have a primary orientation either to the content or to the interaction, and that the least costly interpretation which yields cognitive effects is likely to be chosen by the hearer.

Work is under way, and much more work remains to be done, to gain insight into what is «natural» and what is genuinely coded. Assigning procedural meanings to tones is particularly troublesome. Some preliminary suggestions from Clark (2007) go some way towards expressing procedural meanings for English tones. We must also not lose sight of the fact that while prosodic features are common to all languages and varieties of those languages, the details will be language or variety-specific. French map task data analysed by Post (2000) exhibit context-building behaviour comparable to that described in this paper, but the phonetic realisation of phrase-final tones and the rhythmic organisation of the text differ from the English data. We must be wary of assigning procedural properties to, say, rising tones, when these properties may be realised quite differently in a different variety. In summary, prosodic structure directs us, as hearers, towards the relevant cognitive context within which to interpret the speaker's contribution; intonation guides us towards an evaluation of that contribution; many aspects of prosody interact in indicating how to construct the interaction itself. All these procedures conspire to improve the efficiency of spoken communication.

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