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Phonetics and the management of talk-in-interaction

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1. Introduction

Since the late 1970s a body of work has built up in which analysts explore relationships between the local interactional context and social contingencies and the precise phonetic design features of the talk. Work in *interactional phonetics* proceeds on the basis that how something is said may have an impact on what that talk is doing, and what it is taken by a co-participant to have done. Consider someone at a meal table in an ordinary dining room bellowing "could you pass me the salt?" In the absence of extenuating circumstances (e.g. one of the participants has considerable hearing difficulty), this turn at talk is likely to be treated rather differently from that same utterance produced at a normal volume. It may, for instance, receive a response such as "don't shout at me". Such a response would be an accountable action had the preceding turn not been bellowed. In orienting to speech as having been bellowed, a recipient is orienting to the changes in the actions of the lungs and other vocal organs as significant. Fragment 1 shows an orientation by one participant to the phonetic design of the other participant's talk in much the same way. Joel, a male in his late teens, is sitting in a car talking with his mother.[1]

(1) Dersley and Wootton (2001: 616)

```
122   Mum:   an' it's HIGH TIME (0.4) th-at- y'pull up y' socks an' sit
123          an' think (0.4) wha'- a::ll what- (0.8) I or A:nybody in this
124          fam'ly has ever done for you.
125                    (0.9)
126   Mum:   an' stop actin' like a- big arsehole th-at y'seem to be doin'
127          right now.
128                    (1.3)
129   Joel:  that's what- I am (0.3) that's the- correct- word,
130                    (.)
131   Mum:   (w'-) yes you' geETTIN' ON LIKE ONE?
132                    (0.9)
133   Joel:  [ why:::,  ]
134   Mum:   [AND YOU HA]VE[  BETTER   T'   GET   ON   TH-[AN THAT?
                          [((emphasizing hand gestures)) [
135   Joel:                                               [DO:N' shout mum.
                                                          [((+ hand gestures))
136   Joel:  don' shout,=
137   Mum:   =BECAUSE Y'TELLIN' ME-[SHIT?
138   Joel:                         [do::n' SHOUT,
                                    [((emphasizing hand gesture, head inclined
                                       away, displaying discomfort))
139                    (1.8)
140   Joel:  y'see this is what- I don' like is when you'start (-ed)
141          raisin' your- voice, ((upset voice, hand emphasis throughout))
```

Joel's pleas in lines 135–6, "DO:N' shout mum. don' shout,", show an orientation to the

design of Mum's preceding talk. And there seems to be good grounds for Joel's pleas. Mum's talk is loud throughout this fragment. However, in line 131 Mum's talk increases in loudness and increases in overall pitch. While perhaps not "shouting" in the usual sense of the word, Mum's talk becomes demonstrably emphatic in line 131, and this emphasis is sustained through the remainder of the fragment. Support for these observations can be provided by inspection of the speech signal via computer software.[2] Relevant *fundamental frequency* (F0) and intensity measures can be found in Table 1. F0 is the acoustic correlate of pitch: the higher the frequency, the higher the perceived pitch. Intensity, often measured in decibels (dB), is the acoustic correlate of loudness. Roughly speaking, a doubling of loudness corresponds to an increase of 10 dB (Laver 1994: 502). Providing defensible quantified measures of loudness is more difficult than pitch due to a range of confounding factors , such as segmental quality, background noise and overlapping talk, and distance from microphone. However, the measures given here do reflect auditory percepts.

Table 1. Frequency and intensity measures for parts of Fragment 1. Measures given in italics are those where only part of the relevant talk could be measured. Measures are given in Hertz (Hz), semitones (ST) and deciBels (dB).

		line 126–7	line 131	line 134
F_0 (Hz)	min	138	177	*324*
	max	289	443	*450*
	mean	194	307	*369*
range (ST)		12.8	15.8	*5.68*
intensity (dB)		80.1	84.8	*83.7*

There is a clear overall raising of pitch in Mum's turn in line 131, the subsequent utterance in line 134 and beyond. With respect to loudness syllables in lines 131 and 134 have a higher mean peak intensity than in lines 126–7. These measures are indicative of audible differences. Joel is treating aspects of the delivery of Mum's talk as important: in producing "DO:N' shout mum. don' shout," (lines 135–6), Joel is showing a clear orientation to the changes in Mum's voice.

What can be seen in Fragment 1, in an especially plain fashion, is an orientation by one participant to the phonetic design of a co-participant's talk. In other words, the phonetic design of one participant's talk has occasioned a particular interactional outcome. Work in interactional phonetics has identified various ways in which manipulations of the vocal organs – sometimes very subtle manipulations – are implicated in the management of talk-in-interaction, and principally everyday conversation. It is work in this methodological paradigm which will be the focus of this chapter. The work described in the sections which follow is arranged around three main tasks which the phonetic design of talk has been shown to handle. These are:

1. the management of turn-projection and overlap (section 3);
2. the marking of relationships between turns (section 4);
3. the marking of relationships within turns (section 5).

Some concluding remarks are given in the final section, along with suggestions for future

work in interactional phonetics and some discussion of challenges which will need to be met. Some methodological principles are discussed in the next section.

2. Methodological principles

Interactional phonetics studies socially conditioned phonetic variation. It can therefore be seen as aligned with *sociophonetics,* though the focus there has mainly been on variability attributable to gender, age and class (Foulkes and Docherty 2006). Sociophonetics generally overlooks the social-interactional import of phonetic variability. Certain methodological principles – which in most cases are adapted from principles of *conversation analysis* (CA; see Drew 2004; Goodwin and Heritage 1990; Schegloff 2007) – make interactional phonetics a distinct analytic approach (see also Local and Walker 2005).

First, analysts within interactional phonetics strive to demonstrate participants' orientations to the analytic claims made. It is necessary to show that some phonetic feature or feature-cluster is not simply present in the interaction, but is treated as significant (*oriented to*) by the participants themselves. Second, only data drawn from *talk-in-interaction* are considered. Talk-in-interaction refers to talk produced such that there is some degree of interaction between the participants and includes, for instance, business meetings, unscripted lectures and interviews, as well as everyday conversation. Study is rightly not limited to everyday conversation, though everyday conversation is the principal form of talk-in-interaction. Using data from talk-in-interaction not only ensures the ecological validity of the data, but also provides analytic resources unavailable in non-interactive and scripted settings, including the demonstration of participant's orientations. Third, although there is no requirement that the analysis should be qualitative, any analytic account must handle single cases as cogently as it does the aggregate. Constructing robust statistical analyses of sequential-interactional events is notoriously problematic (see Schegloff 1993); furthermore, no quantitative measure of frequency alters the fact that an episode of interaction occurred in that way on *that* occasion for *those* participants, and nothing changes the fact that some episode of interaction ran off in that way on that occasion, and was dealt with by those participants (Wootton 1989).

3. Turn projection and overlap

One key task for participants engaged in spoken interaction is managing the entry to and exit from talk. Fragment 2 is taken from a naturally occurring telephone conversation between two middle-aged sisters from North America, Emma and Lottie. Talk has been about Thanksgiving turkeys.

(2) NB.IV.13, 10:16

```
1   Lot:   Whurdju gi:t th'turkey.
2   Emm:   Up et th'Balbo'Market
3   Lot:   Oh y[eah.]
4   Emm:       [.hhh] It hadda liddle bla:ck spot on the white skin I
5          wonder'f it wz brui::sed
```

In line 2 Emma is treating Lottie's talk at line 1 as *transition relevant*. In other words, Lottie's talk in line 1 ends at a point where speakership may legitimately change (Sacks,

Schegloff and Jefferson 1974). Speakership may legitimately occur at this point as Lottie's talk in line 1 constitutes a possibly complete *turn-constructional unit*, or TCU (Schegloff 1996). There are three factors which contribute to the status of the talk in line 1 as a possibly complete TCU. First, Lottie's talk is grammatically complete: it is a complete sentence. Second, it implements a recognizably complete action: it is an enquiry. Third, the phonetic design of the talk is such that it is hearable as possibly complete. Figure 1 provides a visual representation of aspects of this turn at talk. Time runs along the x-axis. The figure shows a waveform (lower part), and in the upper part a F0 trace (dotted line, left y-axis) and an intensity trace (solid line, right y-axis). To give an indication of placement in the speaker's range, the F0 trace is presented scaled to the speaker's base- and topline pitches, which were established on the basis of a representative speech sample. The intensity trace is not scaled as this cannot be done in any meaningful fashion for these data. Word labels run along the top of the figure, with boundaries marked by vertical dotted lines.[3]

Among those features which contribute to the talk in line 1 being hearable as possibly complete are the following:

1. an overall declination in loudness across the speaking turn; the nuclear accent in this intonation phrase is on "gi:t" which has a peak intensity of 81.8 dB while the next accented syllable (the first syllable of "turkey.") has a peak intensity of 75 dB.

2. an overall declination in pitch across the speaking turn; the nuclear accent ("gi:t") has a peak F0 of 220 Hz, while the first syllable of "turkey." has a peak F0 of 207 Hz.

3. a fall in pitch of 7.6 ST to low in the speakers' pitch range over the last foot ("turkey."; a foot consists of one stressed syllable and all following unstressed syllables up to, but not including, the next stressed syllable).

4. a slowing down towards the end of the TCU. Inspecting the waveform and boundaries in Figure 1 shows that the final foot has a longer duration than the preceding feet. The final foot has a duration of 503 ms, the penultimate foot 340 ms, and the antepenultimate 308 ms.

5. an absence of any final glottal or supra-glottal (oral) closures which can adumbrate more talk (Local and Kelly 1986; Local and Walker 2005).

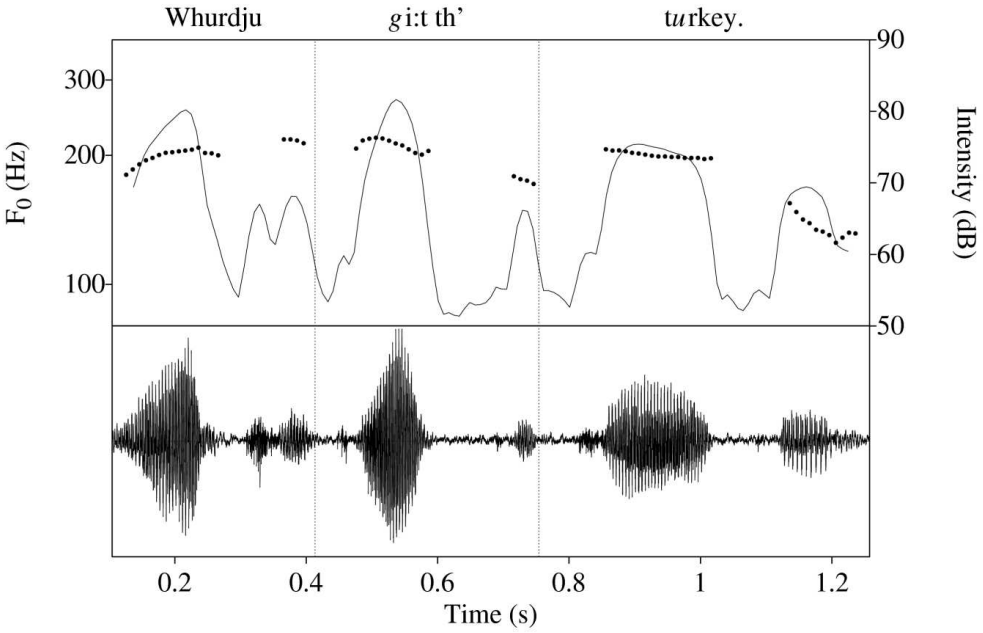


Figure 1. A visual representation of line 1 of Fragment 2.

It is important to register that in this context "hearable as possibly complete" means "hearable as possibly complete by a co-participant". We can see that Emma hears it – orients to it – as possibly complete by her electing to start up talk as Lottie's TCU reaches its conclusion. Furthermore, there is nothing in Lottie's subsequent conduct which suggests that Emma's incoming was anything other than legitimate: in other words, Emma's incoming in no way runs against Lottie's view of the design of her own talk in line 1.

There are, then, a range of phonetic features of the talk in line 1 of Fragment 2 which mark out the talk as possibly complete. In their account of turn-taking in conversation, Sacks, Schegloff and Jefferson (1974) claim a connection between the phonetic design of talk and the management of turn-taking. While this claim was not given any significant, direct treatment by Sacks, Schegloff and Jefferson (1974), since the publishing of their article a considerable amount of work in interactional phonetics has been dedicated to studying the role of phonetic detail in the management of turn-taking: see e.g. Auer, Couper-Kuhlen, and Müller (1999); Couper-Kuhlen (1993); Ford and Thompson (1996); Fox (2001); Local, Kelly, and Wells (1986); Local, Wells, and Sebba (1985); Obeng (1991); Ogden (2001); Selting (2000) and Wells and Peppé (1996). Although there is variation in the precise analytic focus of these studies, they routinely find that phonetic characteristics contribute to the status of an utterance as transition relevant, or not. Features described include prosodic (pitch, loudness, rhythm) and 'non-prosodic' (articulatory, phonatory) features. The most detailed parametric-phonetic study of turn-taking to date is provided by Local, Kelly and Wells (1986). They argue that in a particular variety of English (Tyneside English) two clusters of phonetic features routinely mark transition relevance, including (i) a slowing down in tempo, (ii) a loudness 'swell' on the last accented syllable, (iii) centralized vowel qualities in the last foot, (iv) marked aspirated release of plosives in final position, and (v) either a pitch step up or dropping pitch at the end of the turn.

Studies of turn-taking in Englishes spoken in the UK and the US are the most

numerous. One thing which has become clear from this work on turn delimitation is that the phonetic details which mark transition relevance differ across UK varieties: in addition to Local, Kelly, and Wells (1986) on Tyneside English, see e.g. Local, Wells, and Sebba (1985) on London Jamaican, Wells and Peppé (1996) on Ulster English and Wells and Macfarlane (1998) on a variety spoken in the West Midlands. Work has also shown that phonetic detail has a role to play in the management of turn-taking across languages. On the basis of recordings of naturally occurring conversations, Obeng (1991) argues that speakers of Akan (a language of Ghana) can mark out talk as transition relevant by producing it with *diminuendo* (decreasing), *piano* (soft) or *pianissimo* (very soft) loudness accompanied by low or falling pitch at its end. Crucially, Obeng shows that co-participants orient to these features as marking talk as transition relevant, principally by starting up their talk soon after the occurrence of talk exhibiting these prosodic features.

Working on turn-taking in another non-Indo-European language, Ogden (2001, 2004) shows how creak phonation and glottal stops figure in the management of turn-taking in Finnish (for accounts of different phonation types, see Catford 1977: 93–116, Laver 1994: 184–201). Working with a corpus of Finnish radio phone-in programs, Ogden argues that creak is associated with turn-yielding, and glottal stops with turn-holding. Fragment 3 is taken from Ogden (2004: 38). The incidence of creak phonation, along with other prosodic characteristics, is marked with C above the line of transcription; braces and dashes indicate the temporal extent of the relevant feature.

(3) Ogden (2004: 38)

```
21  P:                  {all - - - - - - - - -}
            ↑v:oitteko   {kertoa   mikä teidäm:} (0.5)
            can-2PL-QCLI tell-1INF what 2PL-GEN
            can you tell us what your
22                    {C,p - - - }
            toivek:app{aleenne on}=
            request-2PLPOS     is
            request is
23  C:                   {flll- - - }
            =öö se ofi: .hh {nimenomaan} hö Viljo (.) Westerisen
                it is       especially     Name      Name-GEN
            it is in fact "Two Guitars"
24                                {H,l- }
            (.) soittama .hh kaksi ki{taraa}
                play-3INF    two   guitar-PAR
            played by Viljo Westerinen
```

The talk produced by the presenter of the radio phone-in (P in the transcription) in lines 21–22 is a possibly complete TCU. This talk is syntactically possibly complete, and it implements a recognizable action: it is a 'yes-no' interrogative. Furthermore – and this point is central to Ogden's argument – line 22 ends with creak phonation which also contributes to the status of this talk as transition relevant. Note also that the end of this turn is delivered with *piano* loudness characteristics, symbolised by p: cf. the observations made by Obeng 1991 described above and the discussion of the English example in Fragment 2. As was shown for Fragment 2, the claim that this talk is transition relevant gains support from what the co-participant does next. In Fragment 3 the caller (C) starts up talk without delay (symbolised by the equals signs, =, joining these two turns at talk), and in doing so displays an orientation to the talk in lines 21–22 as transition relevant.

While creak phonation can mark talk out as transition relevant in Finnish, a glottal

stop at the end of an otherwise possibly complete TCU marks that there is more to come from that speaker (cf. observations on the turn-holding function of glottal stops in English made by Local and Kelly 1986; Local and Walker 2005). Fragment 4 is taken from Ogden (2001: 147). The glottal stop of interest occurs in line 53, and is transcribed using symbols drawn from the International Phonetic Alphabet: ʔ’.

(4) Ogden (2001: 147)

```
50   P:    ja mä    sain        sillo l:ahjaks semmosen    levyn
           and  1SG get-PST-1SG then  gift-TRA kind-of-GEN record-GEN
           and then as a gift they gave me a record
51         {C - - - - -}                          {l - -{C - -}
           {joss    oli}p¬ (0.4) portugalilaisen {runoi{lijan}.
            REL-INE be-PST       portugese-GEN    poet-GEN
           with poems by a Portuguese poet
52         (.) .hhh
53                                                      {C - -}
           runoja?¬ (.) ʔəfiə ʔAmalian   yhtyeen (.) sävelt{äminä}.
           poem-PPL-PAR       Amalia-GEN group-GEN   play-INF3-PL-ESS
           poet on played by Amalia's group
```

Ogden (2001) argues that the presence of the unreleased glottal stop, along with the absence of creak phonation and other intonational cues to transition relevance, which mark out this stretch of talk as incomplete. That this talk is not transition relevant, even though it is complete in other ways (including it being syntactically possibly complete) is supported by P continuing talk following the glottal stop, and by the absence of any incoming talk from a co-participant which might suggest a treatment of the talk as transition relevant.

By working on a non-Indo-European language, Ogden’s work on phonetics and the management of turn-taking in Finnish has widened the scope of interactional phonetics. Furthermore, while it is often features of intonation and rhythm which are inspected for their role in the marking of transition relevance, Ogden’s work shows how phonatory and articulatory details can be significant too. This is an important methodological point: that it is not only prosodic features which merit study. By taking a more rounded view of the speech signal it becomes possible to uncover regularities which would otherwise pass the analyst by (see also Local 2003; Local and Kelly 1986; Local and Walker 2005).

In the preceding discussion the point has been made that participants can show their own orientation to features which mark transition relevance. So far the main form of evidence for such an orientation has come from the occurrence of smooth turn-transition occurring ‘in the clear’ (i.e. without simultaneous talk) after the occurrence of the relevant features. Evidence for an orientation to phonetic markers of transition relevance can also be sought in materials where talk occurs in *overlap* i.e. where more than one participant talks at once. Overlap has received considerable attention in CA, e.g. Jefferson (1973, 1986); Schegloff (2000), and the phonetic design of talk in overlap has been the object of study in interactional phonetics, too (French and Local 1983; Wells and Macfarlane 1998; Wells and Corrin 2004). The remarks which follow can only serve as the briefest of introductions to some of the relevant issues.

Fragment 5 is taken from a telephone conversation involving the same participants as Fragment 2. The fragment comes from near the end of the call. They are making arrangements to meet up later in the day.

(5) NB.II.5, 6:32

```
1   Emm:   WELL AH'LL ↑SEE YUH LAYDER.
2                  (0.5)
3   Lot:   Oh u-okay ah'll be do:wn I gotta wash out ↓my clo:thes
4          ['n ah'll] be down] in a li'l w]hile
5   Emm:   [  I  :  ]  know: ] y i h  d*o ]
```

At first glance, the generally smooth organisation of turn-taking appears to have broken down: in lines 4 and 5 the participants appear to be talking over one another. One possibility is that Emma has already got the gist of what Lottie is saying in line 3, and decides to start up talk in line 5 without regard for how turn-taking is usually organised. Another possibility is that Emma has simply stopped listening to Lottie (though there is no evidence for this in Emma's subsequent talk, which is fitted to the account Lottie has just given for the timing of her visit). A third possibility – which turns out to be correct – is that there is something in the way Lottie designs her talk in line 3 which makes Emma's incoming talk at line 5 entirely legitimate. Notice that Emma's incoming talk at line 5 is timed to begin just after a point of possible syntactic and pragmatic completion in Lottie's talk: "I gotta wash out ↓my clo:thes" (line 3). Furthermore, the phonetic design of Lottie's talk up to this point incorporates exactly those kinds of features associated with other designed-to-be- and treated-as-complete utterances. Lottie's talk in line 3 is produced as a complete intonation phrase, with an overall declination of pitch and loudness which is characteristic of other possibly complete, transition relevant utterances. In addition, Lottie's "clo:thes" exhibits falling pitch, with a fall of 3.8 ST. It is also elongated: a slowing down is a regular characteristic of other transition relevance places. Emma's incoming at line 5, then, can be understood as entirely legitimate and a by-product not of failing to attend to Lottie's talk at line 3, but of very close monitoring of its design.

Overlapping talk following a point of transition relevance is quite common in naturally occurring conversation. However, overlapping talk may occur at other points relative to the ongoing talk. Fragment 6 – taken from a recording of an academic seminar – shows a case from French and Local (1983) where current speaker, N, is clearly in the middle of a TCU at line 8, when a co-participant (K) starts up talk.

(6) French and Local (1983: 19)

```
1   K:     I was- I was gonna ask about those (0.5) cos (.) in terms of your
2          stuff about hints in the first thing because it seems to me that
3          something like .hhhhh Fionna's not letting me have the scissors
4          .hhhh is as much a threat to Fionna (0.7) as it is a heh hint h
5          to-is a- is a hint to her father
6                   (1.6)
7   F:     m::
                            {dim,acc - - - - -}
8   N:     oh yeah I mean it[{'s some sort  of }]
                            {h,f - - - - - - -}
9   K:                      [{y'know and I mean}] this is your thing
10         ab[out the] two edged (0.4) way that these things work=
11  N:       [ yeah  ]
12  K:     =nyeah (0.4) nyeah
```

K's incoming talk at line 16 occurs at a point of non-completion in the ongoing talk and is hearable as *competitive*. That is, it directly challenges the ongoing speaker seeking sole turn

occupancy at that point. This kind of competitive, in-overlap talk routinely exhibits certain phonetic features, most notably that it is higher and louder than usual for that speaker's turn beginnings, higher and louder than the remaining unmarked portion of the talk, and loud relative to the ongoing talk. In the transcription, `h` and `f` mark out talk as high and loud respectively. These features of turn-competition are not always present in overlapping talk. For instance, Emma's incoming talk in line 4 of Fragment 5 is designedly non-competitive: it is neither high pitched nor loud relative to her usual mode of speaking (in fact it is rather quiet and low pitched) and is both quieter and lower in pitch than the talk which Lottie produces simultaneously with it. It seems logical that things should be this way: that a speaker competing for the floor, and therefore talking at the same time as at least one other participant, would produce their talk which is high pitched and loud. Conversely, producing talk in overlap which is low pitched and quiet would seem unsuited to the task of turn-competition.

Incoming talk produced in overlap reveals connections between the design of the talk and the interactional goals which it seeks to accomplish. Furthermore, the co-participants orient to these two designs – competitive on the one hand, and non-competitive on the other – rather differently in these cases. In Fragment 5 both speakers bring their turns to completion, whereas in Fragment 6 current speaker (N) drops out (line 8) in the face of K's competitive incoming. More generally, these cases of talk produced in overlap reveal particular, and perhaps unexpected, orientations to indicators of transition relevance and the management of turn-taking. In addition to the placement of her incoming talk just after a point of possible turn completion, the design of Emma's talk in line 4 of Fragment 5 as non-competitive embodies a claim as to the legitimacy of her (Emma) starting up at just that point: she need not do anything special to secure rights to the turn other than try to get in there first (Sacks, Schegloff and Jefferson 1974). On the other hand, in designing the talk in line 9 of Fragment 6 as turn-competitive, K is displaying an understanding that this incoming occurs at a point where a start-up is something other than legitimate or otherwise usual. Rather than undermining the case for the role of phonetic detail in the management of turn-taking in talk-in-interaction, the occurrence of talk in overlap – and the design features of that talk – strengthens it.

4. Relationships between turns

An important function of the phonetic design of talk is to mark out how the current turn relates to preceding talk. In other words, the phonetic design of talk can mark out the syntagmatic relationships which occurs between turns. This typically involves marking out how what is being said now relates to what has come just before. On the basis of question-answer and telephone-call closing sequences, Goldberg (1978, 2004) argues that one way such relationships between utterances can be expressed is through shifts in amplitude, and by extension in perceived loudness. She argues that a downward shift (decrease) in the amplitude of successive utterances by the same speaker may *affiliate* the current utterance to a prior, and that an upward shift (increase) *disaffiliates* the current utterance from a prior. Sequence initiation, she argues, is accompanied by raised amplitude, and that there is a tendency for the peak amplitude of utterances to descend over the course of a sequence. Goldberg is not the only analyst to describe ways in which the phonetic design of talk can mark sequential (dis)affiliation between successive utterances. Couper-Kuhlen (2004b) argues that increases in pitch and loudness are among the prosodic features which can mark out the current turn not as a continuation of the action which went before, but rather as the

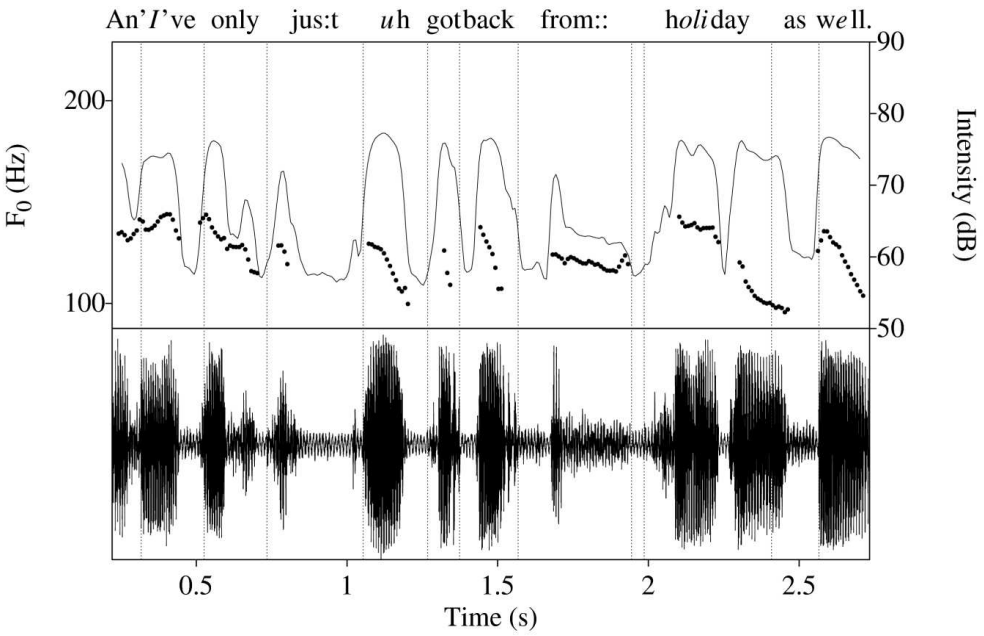
beginning of a new course of action. Exploring articulatory and phonatory aspects of speech as well as prosodic features, Local (2004) argues that a particular phonetic design of "and-uh(m)" marks out what follows not as connected to the immediate prior (cf. other uses of conjunctions in talk-in-interaction) but as a resumption of something occurring earlier in the interaction. These design features include the production of "and-uh(m)" with creaky voice and/or glottal stop at the start of "and", a full (non-reduced) vowel quality in "and", the production of the whole token with roughly level pitch in the middle of the speaker's pitch range, a relatively slow rate, and no break between the two syllables.

The phonetic design of talk can also be used to show syntagmatic relationships between utterances which are more complex than straightforward disjuncture. Consider Fragment 7, taken from a telephone call between Leslie and Ed, a music teacher. Ed has been telling Leslie about his having started rehearsals that day for a musical production at the end of the month.

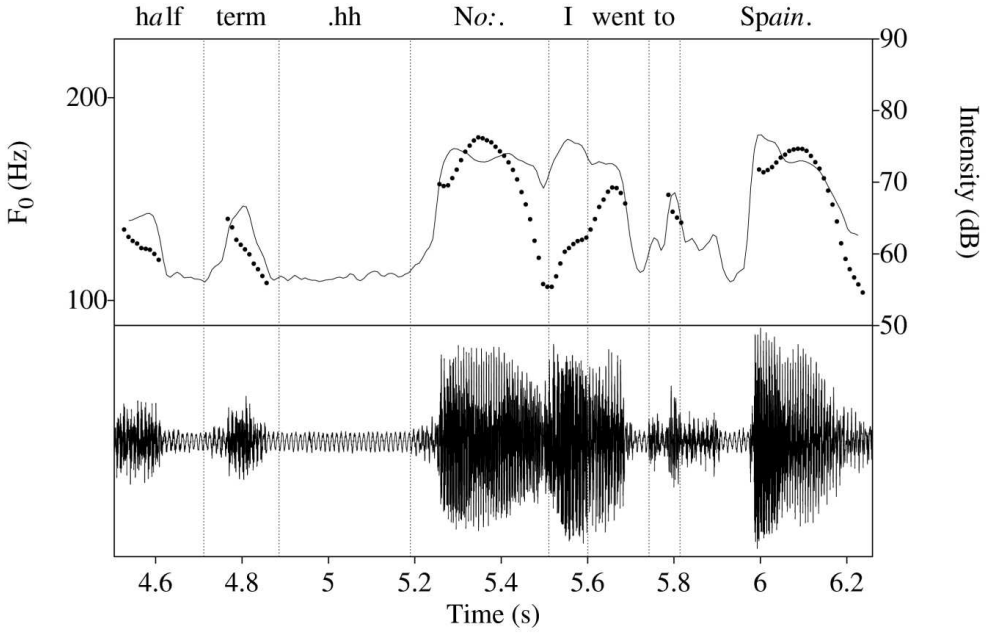
(7) Holt.O88.1.9, 3:28

```
1   Ed:    An' I've only jus:t uh got back from:: holiday as well.
2                  (.)
3   Les:   aOh yes did you go [to Irela[nd,
4   Ed:                       [(      )[half term .hh No:. I went
5          to Spain.
6                  (0.2)
7   Les:   Ah- I'm ↑sorry t'hear about your father by the way,
```

At line 3 Leslie produces a first pair part to an adjacency pair (Schegloff 2007; Schegloff and Sacks 1973). In so doing, she makes a response from Ed expectable, or *relevant*. However, rather than provide the response Leslie's first pair part made relevant, Ed continues his own previous line. Although timed to coincide with the end of Leslie's first pair part, Ed's "half term" (line 4) is clearly not the response which Leslie's first pair part enquiry made relevant. Ed's talk is hearable not as the expected second pair part response but as something related to – to use the locution of Golberg (1978), as an affiliate of – his own earlier project. On completion of this talk which postpones the response made relevant by the first pair part, Ed produces the expected second pair part: "No:. I went to Spain." (lines 4–5). Two features of the talk produced by Ed at the start of line 4 make it hearable as a postponement rather than the expected second pair part. First, Ed's "half term" (line 4) is an account for why it is that he has just returned from holiday. In that respect, Ed's talk connects his own prior talk at line 1 rather than to Leslie's first pair part at line 3. Second, the phonetic design of Ed's "half term" – particularly in terms of pitch and loudness characteristics – marks this out as a continuation of his previous project. In addition, the phonetic design of the talk which follows, along with its lexical content, (".hh No:. I went to Spain.", lines 4–5) mark out that talk as connecting not to Ed's own first TCU, but to the sequence initiated by Leslie with her first pair part at line 3. Figure 2 provides a visual representation of aspects of Ed's turn at (a) line 1 and (b) lines 4–5.



(a) Line 1



(b) Lines 4–5

Figure 2. A visual representation of parts of Fragment 7.

It can be seen from the intensity trace (solid line, upper parts of the figures) that the postponing talk – Ed's "half term" – has lower overall intensity (is quieter) than his talk in line 1. Table 2 presents certain measures of frequency and intensity.

Table 2. Frequency and intensity measures for parts of Fragment 7.

		line 1	line 4: postponing talk	lines 4–5 postponed talk
F_0 (Hz)	min	97	106	103
	max	136	132	175
	mean	119	119	143
range (ST)		5.9	3.8	9.2
intensity (dB)		74.9	66.3	73.9

The mean peak intensity for the syllables in line 1 is 74.9 dB while the mean peak intensity for the syllables in "half term" is 66.3 dB. This is in line with the findings of Goldberg (1978, 2004): that broadly speaking, successive utterances in sequences have a lower amplitude than preceding ones. In addition to this decrease in loudness, Ed's "half term" is produced with low pitch and a relatively narrow range of 3.8 ST (cf. Couper-Kuhlen 2004b's reports of turns which continue sequences as having low pitch and being quiet relative to immediately prior talk from the same speaker). In contrast to the low pitched, quiet postponing talk, the postponed talk which follows in the same turn, "No:. I went to Spain." (lines 4–5), is 'stepped up' in pitch and loudness. This part of the turn is produced with a much bigger pitch range than the postponing talk: 9.2 ST as opposed to 3.8 ST for the postponing talk. While each part of the turn has a similar lowest pitch, the postponed talk reaches much higher into the speaker's pitch range. With respect to loudness, the mean peak intensity for syllables in this part of the turn is 73.9 dB: it is audibly considerably louder than the postponing talk.

What we are seeing in Fragment 7, then, is pitch and loudness being used to mark out syntagmatic relationships between utterances and parts of utterances. Features of pitch and loudness are being used to mark out the talk which immediately follows the second pair part as a continuation of a preceding sequence, rather than as the second pair part. The phonetic design of what follows in the same turn, now stepped up in pitch and in loudness, makes that talk hearable as a response – albeit a postponed one – to the first pair part. This consideration of syntagmatic relationships across speaking turns brings the discussion to the final task for phonetic design to be dealt with here: how the phonetic design of talk can signal relationships within turns.

5. Relationships within turns

Line 1 of Fragment 2, "Whurdju gi:t th'turkey." was described above as a turn consisting of a single TCU; it is grammatically complete, it implements a recognizable action and phonetically it is hearable as complete. One task handled by the phonetic design of that unit is marking it out as just that: a single, internally coherent unit. This internal coherence comes about as a result of a number of features of phonetic design. (A visual representation of aspects of this TCU is presented in Figure 1 above.) So, for instance, while there is an

overall declination in loudness across the speaking turn, there are no disjunctive step-ups (or step-downs) in pitch or loudness (cf. the design of the multi-unit turn in Fragment 7; see also those multi-unit, multi-action turns involving an *abrupt-join* described in Local and Walker 2004). There are also no disjuntive changes in articulation rate; there is no dramatic speeding-up or slowing-down (again, cf. the abrupt-joins, and so-called *rush-throughs* whereby a speaker speeds up as s/he approaches a point of possible completion). In articulatory terms, there are none of the kinds of oral or glottal cut-offs which can mark the occurrence of self-repair and the potential aborting of one TCU in favour of another (Jasperson 2002). In other words, this single unit is hearable as just that: a single unit.

However, turns may have more complex internal structures than being composed of a single TCU. Speakers may draw upon phonetic resources to show how the various parts of such turns are related to one another. So, for instance, in Fragment 7, the increases in pitch and loudness on the postponed second pair part set that part of the turn apart from the postponing talk which preceded it. Another more complex turn-type is shown in lines 13–14 of Fragment 8, taken from a telephone conversation between Emma and Lottie; talk has been about dresses Lottie and Emma saw on a recent shopping trip.

(8) NB.IV.3, 2:45

```
 1   Lot:   I:- (0.2) I ↑HAVen't seen'm the:re<
 2                  (0.8)
 3   Emm:   I haven' b'n in there fer- in (.) a ↓lo::ng lahng u-↑Wah:
 4          ah wz in there with you th'↓las'time I thi:nk,
 5                  (0.7)
 6   Lot:   (.t) Yeah b't I haven'seen'em there I don't (.) I never
 7          noticed um befo:re I'D noticed that FA:N thing befo:re,
 8   Emm:   Yeh I didn'like tha:↓*:t.
 9                  (.)
10   Lot:   No:.
11                  (0.4)
12   Lot:   [A n y]
13   Emm:   [B't I] dLO:VE the b:one w'z s:O:: beautif eh w' the ↑PINK wz
14          ex↓quisite.
15                  (0.3)
16   Lot:   Ye:ah?
17   Emm:   J's looks like you:.
```

Emma's turn in lines 13–14 reaches possible grammatical and pragmatic completion at the end of "B't I dLO:VE the b:one"; it is a complete sentence, and gives an assessment of one of the dresses they saw ("bone" refers to the colour of a dress). However rather than yield her turn at this point Emma continues her talk, using "the b:one" as the grammatical beginning of what follows: "the b:one w'z s:O::…". This shared element – the *pivot* – can therefore be interpreted as both the possible end of one grammatical unit, and the beginning of another (Walker 2007; see Scheutz 2005 and Norén 2007 for studies of related constructions in German and Swedish respectively). The pivot gains this possible and simultaneous leftwards and rightwards interpretation through a combination of its grammatical structure and its phonetic design. Figure 3 provides a visual representation of part of the turn in lines 13–14 of Fragment 8.

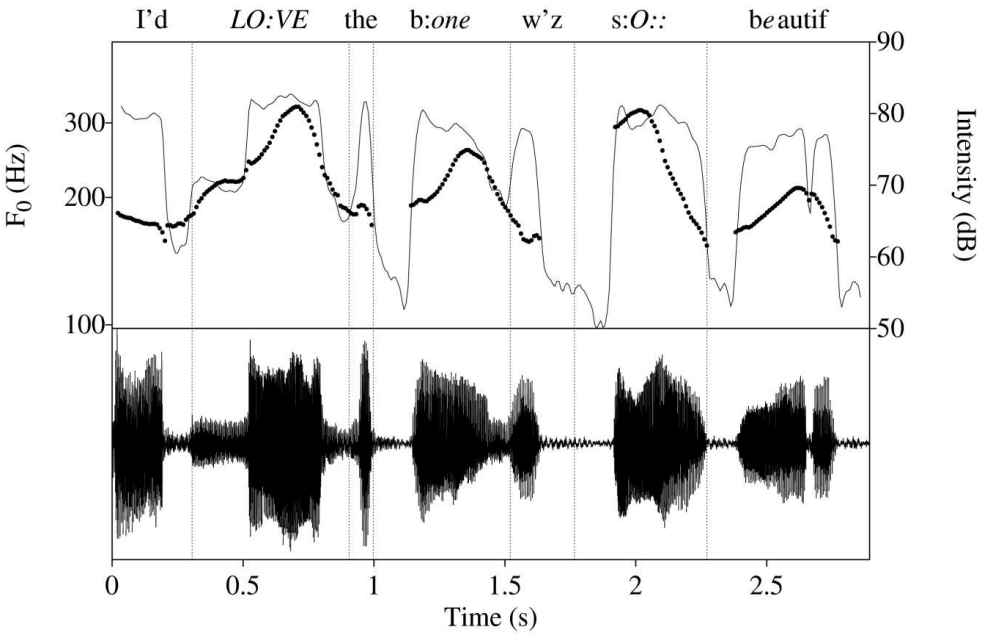


Figure 3. A visual representation of part of Fragment 8.

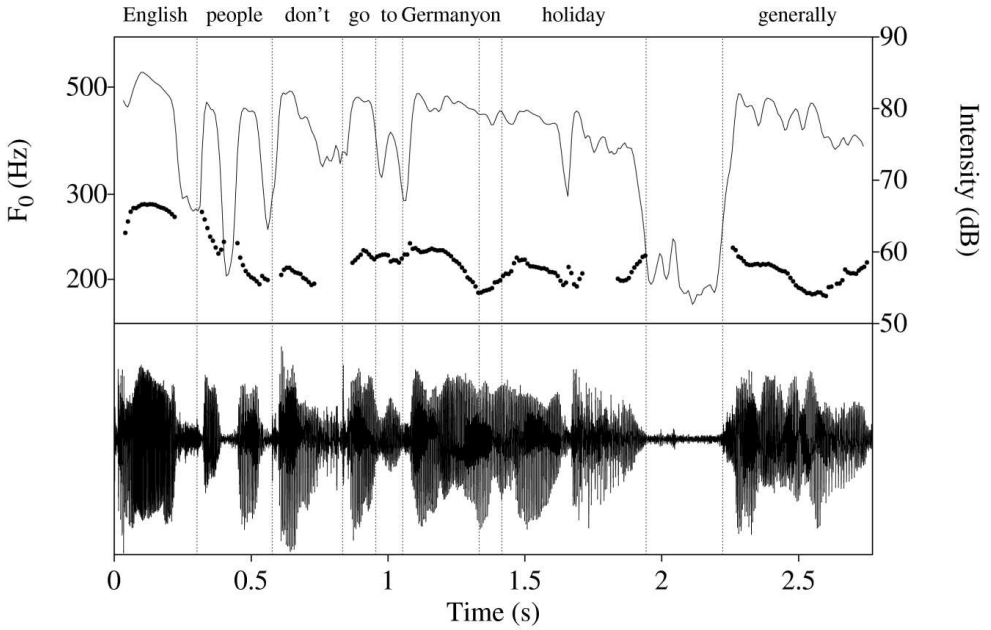
A range of phonetic features bind the pivot to the pre-pivot which precedes it (allowing for leftwards interpretation of the pivot) and bind the post-pivot which follows to the pivot (allowing for rightwards interpretation of the pivot). For instance there are no disjunctive changes in pitch between the three components (pre-pivot, pivot, post-pivot). Instead, the pivot-initial "the" is produced within the (falling) pitch trajectory of final word of the pre-pivot ("LO:VE"); the first word of the post-pivot ("w'z") is produced in the (falling) pitch trajectory of the pivot-final "b:one". As well as an absence of pitch discontinuities, there are also no disjunctive changes in loudness: the mean peak intensity for syllables in the pre-pivot, pivot and post-pivot are 81.4 dB, 81.2 dB and 77 dB respectively. (In this case, then, the loudness characteristics are much the same as those for the single-TCU turn in line 1 of Fragment 2). There are no disjunctive changes of articulation rate within this part of the turn, and there is close temporal proximity of all components. In this particular case, the close temporal proximity manifests itself through continued phonation between the pre-pivot and the pivot, and between the pivot and the post-pivot. This is evidenced in the figure by periodicity in the waveform around these points, and the phonetic analysis software being able to find voiced frames across these 'joins'. These features of pitch, loudness, articulation rate and temporal proximity all give this part of Emma's turn a sense of coherence; of being produced as a single, albeit complex, unit.

(9) Walker (2004: 161)

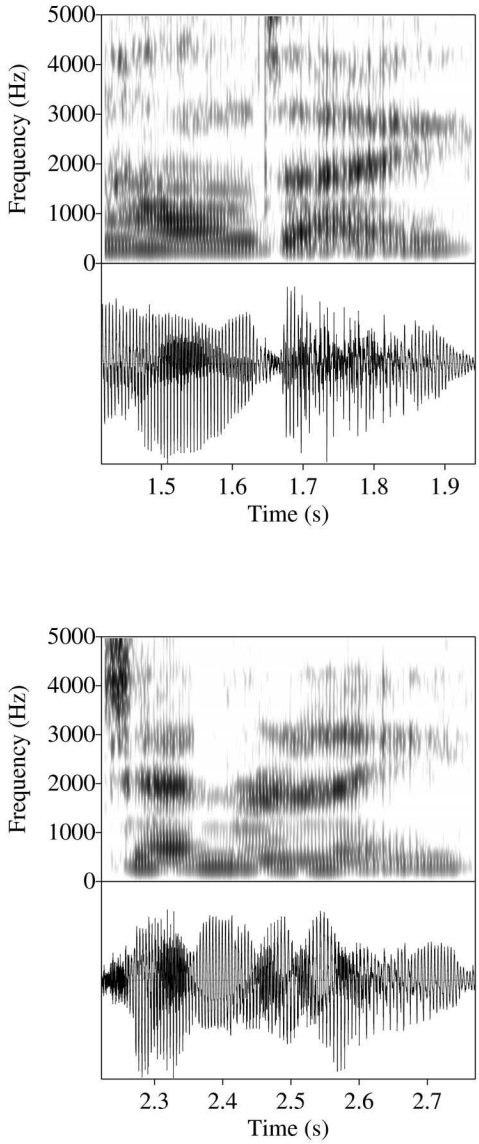
```
 1   H:     it's really [beautiful
 2   G:                 [Germany and stuff was my parents' favourite country
 3          when they were [here
 4   H:                    [yeah .hh cos people don't go to Germany or least-
 5          English people don't go to Germany on holiday
 6                    (0.3)
 7   H:     gener[ally
 8   G:          [(mm hm)
 9                (0.2)
10   G:     they go to like they go to Fra:nce and they go to Italy:
```

There is also a routine absence of phonetic discontinuity where a speaker produces an addition to a possibly complete turn. Fragment 9 is taken from a recording of two student friends engaged in a face-to-face interaction at a UK university; speaker G is British, speaker H, American.

In line 5 H brings her talk to possible completion: "English people don't go to Germany on holiday". In the absence of any uptake following her bringing talk to possible completion (line 12), H extends her talk by producing a grammatically fitted continuation of it at line 7: "generally". Such grammatically fitted continuations – *increments* (Ford, Fox, and Thompson 2002; Schegloff 1996) – routinely exhibit a range of phonetic features which mark out the increment as a recompletion of its host TCU.[4] In this case, a range of phonetic features mark out "generally" (line 7) as fitted to "English people don't go to Germany on holiday" (line 10). Figure 4 provides visual representations of the increment and its host.



(a) Labelled F0 trace, intensity trace (upper part) and waveform (lower part)



(b) Spectrogram (upper part) and waveform (lower part) of "holiday" (left) and "generally" (right)

Figure 4: Visual representations of parts of Fragment 9.

It can be seen from Figure 4 that the articulation rate of the increment is very similar to that of the end of the host; the host-final "holiday" measures 527 ms while "generally" (the increment) measures 548 ms. There is no disjunctive speeding up or slowing down, which can accompany some turn continuations (see e.g. Local and Walker 2004). The increment is produced in the same part of the speaker's pitch range as the end of the host. The pitch contours are also the same in each case; they show low, falling-rising pitch. There are no disjunctive changes in loudness; the increment is neither significantly quieter, nor significantly louder, than the end of the host; "holiday" has a mean intensity of 75.8 dB while "generally" has a mean intensity of 76.9 dB. In this particular case there are also interesting similarities in the phonation types evident at the end of the host and at the end of the increment. The final syllable of the host ("day") is produced with creaky voice, beginning at

about 1.7 s and lasting for around 150 ms. This change in phonation type is evident in Figure 4(b), in both the waveform (where there is aperiodicity) and the spectrogram (the vertical striations which correspond to the vibrations of the vocal folds have become irregular). Note also the inability of the computer software to reliably detect periodicity in the waveform in Figure 4(a): there is a 'gap' in the F0 trace. This creaky voice is followed by a short period of breathy voice. The same changes in phonation are evident in the final syllable of the increment; creaky voice begins at around 2.6 s and last for approximately 85 ms, before a portion of breathy voice. These phonetic features of pitch, loudness, articulation rate and in some cases phonation and articulation all contribute to marking out the increment as fitted to its host, just as its syntactic make-up does. In other words, features of phonetic design and syntax mark out cohesive syntagmatic relationships between the different parts of the turn.

The converse of the features observed in pivot constructions and increments to TCUs – disjunctive changes in pitch, loudness, articulation rate, 'cut-offs' and silences – are all features which can mark out that some new line is being taken (Couper-Kuhlen 2004b; Goldberg 1978, 2004; Jasperson 2002; Local 1992; Local and Walker 2004). In addition, in other sequential environments some of these features can mark out that a previous line is being resumed. Consider Fragment 10, taken from a broadcast radio interview between interviewer James Naughtie (JN) and Lord Falconer (Fal), then Secretary of State for Justice in the British Government; questions have been about the government's immigration policy and comments made by Alan Duncan MP, then Shadow Secretary of State for Constitutional Affairs.

(10) Today 05/04/2004, 6:20

```
1   Fal:   it's positive and it's got to be (.) positive we should not .h be
2          ashamed of saying it
3                  (.)
4   JN:    .mthhh (0.8) do we need just to pick up another of:: Mister
5          Duncan's questions befo- before I move on .hhh (.) do we need to
6          have a policy in this country which says that all those who are
7          .hhh uh-m likely to persecuted in their home countries (.) must
8          be given refuge here
```

In line 4 JN makes a start on his next question with "do we need", before breaking off and producing talk which is not a straightforward continuation of his "do we need", but on a rather different line. His "do we need" is then recycled in line 5 and his question brought to completion. Embedded within the bounds of JN's TCU, then, is talk (marked in the transcription with dashed underlining) which is inserted into, or *parenthetical* to, his question. Local (1992) deals with a number of similar sequences and shows among other things that parenthetical talk is regularly faster in rate, lower in pitch and greater in loudness than (i) the talk which immediately precedes and (ii) the talk which follows it. Mazeland (2007) deals with aspects of parenthetical sequences in Dutch, and reports similar findings concerning their phonetic design. And it is in part the phonetic design of JN's turn in Fragment 10 which marks out this insertion as parenthetical to the main question. First, the phonetic design of the talk marks out where the parenthetical begins i.e. where JN begins to take a different line from that projected by his turn initial "do we need". One audible change beginning with "just" is in terms of articulation rate: JN's parenthetical talk is noticeably faster than the talk which precedes it or which follows it. His turn-initial "do we need" is produced at a rate of 5.4 syllables per second, his parenthetical talk is produced at a faster rate of 6.2 syllables per second, and his post-parenthetical talk up to the end of his turn is produced at a rate of 5.1 syllables per second. As well as overall speeding up relative to the surrounding talk, the production of this talk low in the speaker's range also signals that the

speaker is in the midst of a parenthetical. Fundamental frequency minimums, maximums, means and ranges for the talk preceding the parenthetical, the parenthetical and the remainder of the turn are shown in Table 3. Figure 5 provides a visual representation of parts of JN's turn.

Table 3. Frequency measures for parts of Fragment 10.

		line 4: pre-parenthetical	lines 4–5: parenthetical	lines 5–8: post-parenthetical
F_0	min (Hz)	111	72	59
	max (Hz)	207	136	231
	mean (Hz)	160	98	106
range (ST)		10.7	10.9	23.8

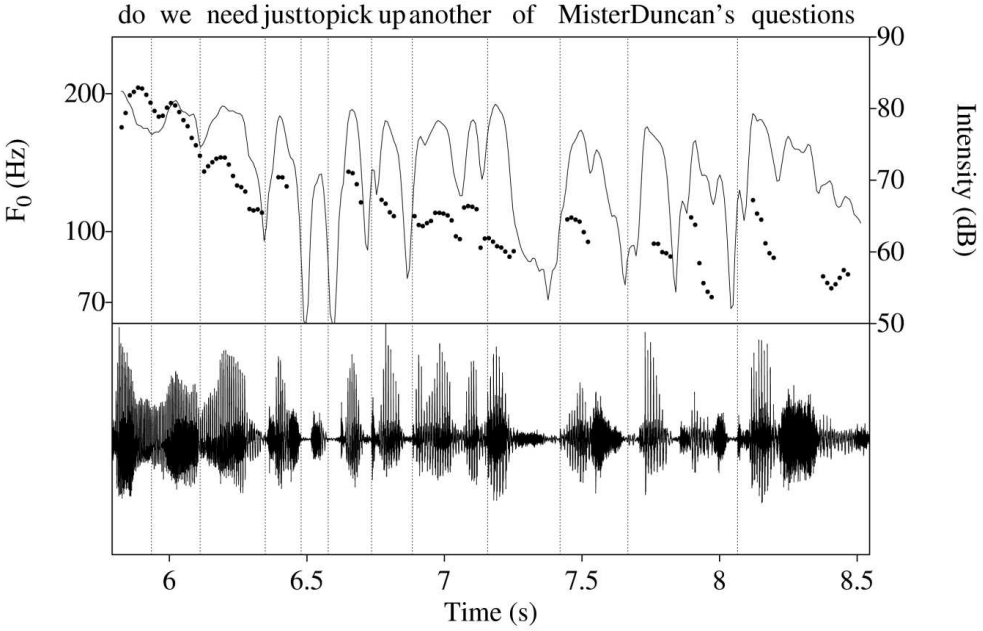
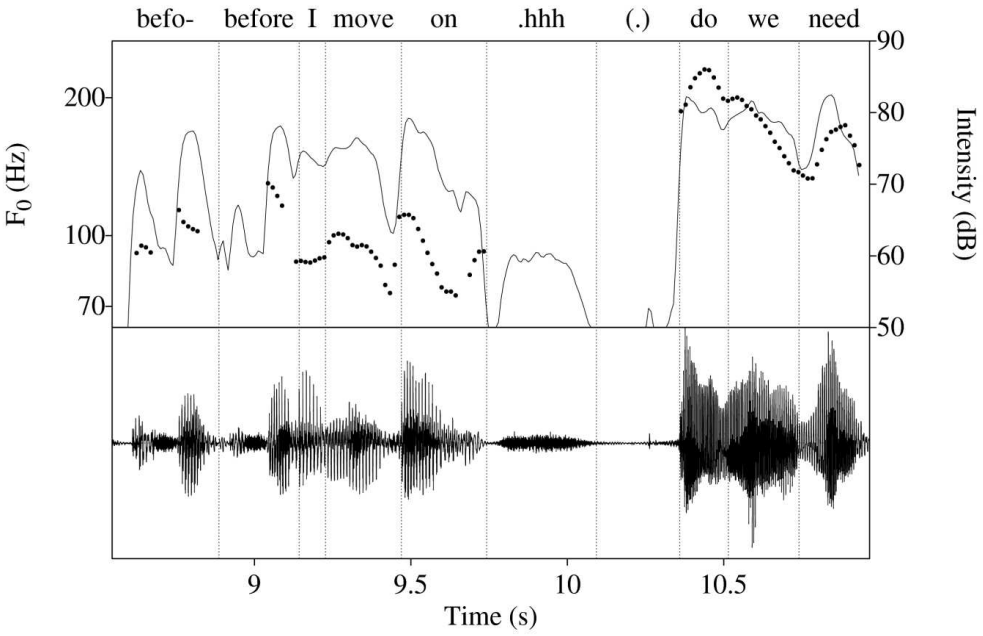


Figure 5. A visual representation of part of Fragment 10.



A second task handled by the phonetic design of the talk, with regard to the structuring of the turn, is to mark out where the parenthetical talk ends. There are at least two relevant phonetic features which mark out that the parenthetical is coming to an end. The first is that the "on" of JN's "before I move on" (line 10) is produced with falling-rising pitch. Local (1992: 278) reports that what he labels *self-interrupting talk* – of which that in Fragment 10 is one kind – is routinely characterised by rising pitch at its end. The second relevant feature is the inbreath which JN produces immediately after "on". While an inbreath does not mark the end of a parenthetical *per se*, this particular inbreath has that sort of quality (including a noticeably high rate of ingressive airflow when compared with other inbreaths from JN, such as that later in this same turn at line 12) which is "characteristic of some disjunctive next move" (Drew and Holt 1998: 507–8). These features – final rising pitch and an 'emphatic' inbreath – coupled with the arrival at a point of possible syntactic completion for the parenthetical, project most strongly that the parenthetical has ended and the line taken earlier is about to be resumed.

A third task for the phonetic design of the talk to handle is to mark out the talk which follows the parenthetical not as further parenthetical talk, but as a return to the talk begun earlier. As Table 4 shows, JN's second, resumptive "do we need" is produced with markedly higher pitch than the end of parenthetical talk ("before I move on"), is louder and has a lower articulation rate i.e. is produced more slowly. Importantly, the pitch, loudness and articulation rate characteristics also mark out this resumptive "do we need" as picking up the earlier line

started at the beginning of JN's turn then postponed.

Table 4. Frequency, intensity and articulation rate measures for parts of Fragment 10.

		line 5: "before I move on"	line 5: "do we need"
F_0	min (Hz)	73	110
	max (Hz)	129	231
	mean (Hz)	93	173
range (ST)		9.8	12.9
intensity (dB)		74.7	82.1
articulation rate (syllables per second)		6.1	4.5

In Fragment 10 and other cases like it there is first a break, then some talk on a slightly different line, and there is later a resumption. This break-and-resumption organisation is signalled by the phonetic design of the talk in concert with the lexis. There is one further point to note about this fragment, which speaks to the more general issue of relationship between phonetic design and the lexical-grammatical format of talk. The point at which the parenthetical begins in Fragment 10 is not simply marked out by a break in the unfolding grammatical structure of the turn in progress, with phonetic design in some kind of supporting role. In fact, in Fragment 10 the lexical choices JN makes does not make an understanding of the parenthetical as a parenthetical necessary at all. He could be asking Lord Falconer the question "do we need just to pick up on another of Mr Duncan's questions before I move on?" This is not the case, and Lord Falconer does not treat JN's talk as such a question. However, it is only clear that this is not the case when phonetic design is considered, as it would be by the participants themselves, as an integral part of the unfolding turn and not as some sort of 'optional extra' to be drawn upon by the participants where necessary.

6. Future directions

One aim in this article has been to show some of the ways in which the phonetic design of talk figures in the management of talk-in-interaction. It is important to note that the tasks described here – the management of turn-taking and overlap, the marking of relationships between turns, and the marking of relationships within turns – are not the only ways in which the phonetic design of talk figures in the management of talk-in-interaction. They are not necessarily even the most basic tasks for the phonetic design of talk to handle. One basic function of phonetic detail not discussed here is the preserving the recognisability of lexical items, which must be done irrespective of other tasks which the phonetic design of talk is handling at any given point. Furthermore, empirical work has shown that there are other areas not discussed here where the phonetic design of talk makes a contribution, such as

the marking of stance and affect (Couper-Kuhlen 2004a; Local and Walker 2008), as contributing to the particular action being performed in a turn (Couper-Kuhlen 2001; Ogden 2006; Ogden, Hakulinen, and Tainio 2004; Selting 1996), and the assignation of blame for problems of understanding (Curl 2005). The three tasks described in detail here are however the tasks which at the time of writing we know most about, particularly in terms of their management across languages.

Part of the enterprise of interactional phonetics to date has been to identify techniques of sequential and phonetic analysis and representation which provide for exploring the function of phonetic detail in the management of talk-in-interaction. There are therefore many possible future directions. Most obviously, attempts can be made to refine our understandings of how phonetic detail functions in the management of the three tasks outlined here. There are also more specialised research contexts where techniques of interactional phonetics could yield significant insights, and where promising starts have been made: see, for instance, work in interactional phonetics on the talk of young children (e.g. Corrin, Tarplee, and Wells 2001; Tarplee 1996; Wells and Corrin 2004). Clinical and other practical applications are also under-explored from the perspective of interactional phonetics (but cf. Auer and Rönfeldt 2004; Local and Wootton 1995; Wells and Local 1993 for promising starts on interactional phonetics in clinical contexts). Work by Goodwin and colleagues on interactions involving a man suffering post-stroke aphasia emphasises how a limited set of lexical items can be used with different phonetic designs in the co-construction of meaning; cf. e.g. Goodwin (1995); Goodwin, Goodwin, and Olsher (2002). Goodwin's work also draws attention to perhaps the most significant gap in our understanding of talk-in-interaction: how phonetic resources mesh with the visual.

Interactional phonetics continues to develop. Over the last 20 years there has been a steady increase in the number of analysts working from the perspective of interactional phonetics, and consequently a steady growth in the amount of published empirical research. While the future looks very bright, there are a number of challenges which will need to be met as interactional phonetics diversifies and attracts new practitioners. First, as technological developments make increasingly large databases of audio-visual material available, it will be important not to lose sight of one of the core characteristics of interactional phonetics: that any analysis arises out of, and accounts for, the details of single episodes of interaction. Second, relatively inexpensive but very powerful computers and software (which in some cases can be downloaded free of charge) makes available a range of different kinds of acoustic analyses. However, one challenge is ensuring that those analyses are informed by a working knowledge of (at least basic) speech production and perception. In the context of interactional phonetics, acoustic analysis (such as that made possible by Praat and other acoustic analysis software), should not be seen as a substitute for careful auditory parametric analysis, but rather as its computer-based counterpart. A third challenge is for those working in, or close to, interactional phonetics, to look at the speech signal in its entirety, encompassing and attending equally to features at quality, duration, pitch and loudness (Laver 1994: 27). If these challenges can be met, interactional phonetics will surely continue to provide insights into the ways in which phonetic detail figures in the management of talk-in-interaction.

Notes

1 With the exception of minor typographical changes, transcriptions are included as

they appeared either in transcriptions prepared by Gail Jefferson or in original publications (in which case citations are given in the fragment label). Whatever their source, all transcriptions broadly follow those conventions set out in Jefferson (2004). Any further relevant conventions are explained in the discussion. Audio samples to accompany this article are available via http://gareth-walker.staff.shef.ac.uk/.

2 Ladefoged (2003) provides a useful introduction to the acoustic properties of speech and their analysis. All acoustic analyses reported in this article were performed using the Praat analysis software: http://www.fon.hum.uva.nl/praat/. Praat was also used in the preparation of all figures.

3 For technical reasons, underlined text in the transcriptions appears as italicized text in the figure labels.

4 (For accounts of comparable continuations in German with consideration of phonetic aspects, see Auer 1996; for consideration of increments in other languages, see the papers in Couper-Kuhlen and Ono 2007).

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