INTERRUPTIONS AND INTONATION

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ABSTRACT

In this paper we examine how interruptions are manifested in the intonational structure of a discourse. Such interactions come about because of the mutual negotiating to satisfy the differing needs, interests and knowledge states of participants in a conversation. The specific pitch height of an interruption is found to be determined jointly by the need to attract attention, the intensity of the emotion present, and the strength of signal needed to overcome the attention and focus on the current topic.

1. INTRODUCTION

Recent research has shown that interruptions are an important element in the interactive character of discourse (Grosz and Sidner, 1986). In discourse, the expression of cognitive state and the co-occurring representation of topic hierarchy are accomplished simultaneously with the mutual and cooperative negotiating of the discourse process by participants. When participants encounter an asymmetry in their respective informational or expressive needs, it is often through the use of interruptions that these needs are satisfied. Thus, while interruptions can be locally disruptive to discourse flow, they play a significant role in the overall global flow of discourse by bringing about a mutual accommodation of the interests and knowledge states of each participant.

2. RESEARCH PROCEDURES

In this study, we investigate the intonational characteristics of interruptions in spontaneous discourse based on two dialogues recorded in home settings. The conversations were recorded on high quality Maxwell XL cassette tapes using a Marantz 430 professional tape recorder with a Sony ECM-909 directional microphone attached. Each conversation typically lasted about 3 hours, and altogether the corpus consists of about 6 hours of speech. The speech data were digitized and analyzed using the ESPS Waves+ speech software at the Phonetics Lab of Stanford University. Peak pitch plots were also constructed to capture the dynamic interactional characteristics of discourse and topic organization continuity (See Yang, 1995b).

3. INTERRUPTIONS

What constitutes an interruption? Interruptions can be seen as situations in which one person intends to continue speaking, but is forced by the other person to stop speaking, at least temporarily, or the continuity or regularity of that person's speech is disrupted. Interruptions, therefore, can be seen as consisting of three essential ingredients: intention of the main speaker to continue, entrance of the other person into the conversation, and disruption or stopping of the main speaker, at least temporarily.

In general, interruptions can be of two types: competitive vs. cooperative (cf. French & Local, 1986). Competitive interruptions occur when one speaker attempts to take the floor by making his or her own remarks a higher priority over the main speaker's speech when the main speaker intends to continue. Cooperative interruptions occur when one speaker wants to support or reinforce the main speaker's point without disrupting the main speaker's continuation. These types of supportive remarks are often in the form of short commentaries or clarifying questions.

4. INTONATION AND INTERRUPTIONS

4.1. Competitive Interruptions

Analysis of our discourse corpus shows that competitive interruptions are typically high in pitch and amplitude. In spontaneous discourse, speakers often compete to gain control and dominance in the conversation. In competitive situations participants need a strong immediate signal to attract the attention away from the ongoing speech. In general, the more audible the signal is, the more forceful and effective it will be in overcoming the current focus and successfully taking the floor. Prosodically, this competitiveness and need for a strong signal are iconically reflected in the vocal cues of high pitch and high amplitude.

Competitive interruptions are often closely tied to relevance, urgency, degree of importance, and interest in the current topic. In conversation, speakers often feel the need to express something which is emotionally significant to them. Speakers often encounter moments of uncertainty and have an urgent demand for information and immediate attention at a critical moment. This urgency and immediacy are a key characteristic of interruptions and are directly related to the relevance of the current topic. Speakers often grab the opportunity while the current topic is hot to clarify something, add a pertinent fact, or express an immediate opinion. And often the high pitch and loud amplitude in competitive interruptions are caused by the emotions motivating these situations.

Consider the following examples (interruptions are marked by → in the discourse texts):

(1)
149 A: It's just - hmmm
150 It's just to say that the one who speaks
151 it's just that you - you -
→ B: But you have to speak very slowly, right?
152 A: Be | It has to be very clear.
| cause every -

153 A: Right.
154 Because everyone's pronunciation is different
B: Umhum Right

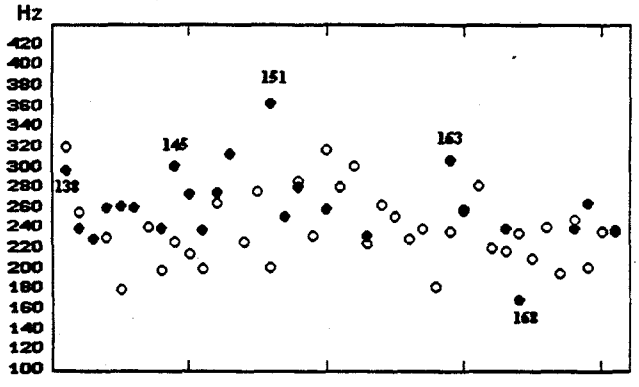

Figure 1: A case of a competitive interruption at U151

In the beginning section of this fragment, the main speaker (speaker A) is talking and speaker B mainly provides feedback. Speaker B's interruption at U151 occurs at a point where the main speaker is hesitant and pausing. Anticipating the main speaker's point, speaker B takes this opportunity to express her strong opinion on that point, and the forcefulness of her disagreement is reflected in the high amplitude and high pitch of the interruption as seen in Figure 1. Comparing with the peak points for the utterances in this section, from U138 - U168, we can clearly see that this interruption has a sudden pitch jump to 360Hz, and is an abrupt isolated point by comparison to the rest of the pitch points in this area, about 50Hz higher than the other points in this region.

(2)
294 A: It's just - it's just teamwork.
B: Umhum.
295 A: It also needs to be done like this,
B: Umhum.
A: | in order to do a good job.
296 → B: | Then then then the one at Central Research Institute, was that one good?
A: Cen - tral - Re - search - Insti - tute -
B: Umhum.
297 A: Be | cause that -
→ B: | Do you remember? M.

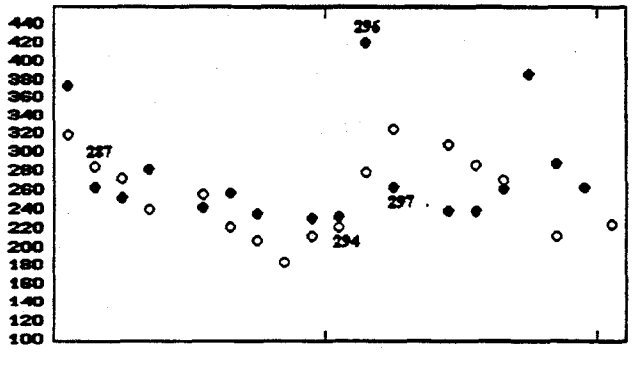

Figure 2: A case of a very high-pitched interruption at U296 to shift topic

In this example, the main speaker (speaker A) is finishing up her topic, and her pitch level is getting low. Anticipating speaker A's completion, speaker B comes in to shift the topic back to a previous topic. Her pitch level for this utterance (U296) is very high at 420Hz as seen in Figure 2. We can see that there is a dramatic and abrupt rise in pitch level. This is clearly indicated by the sharp increase of approximately 190Hz from speaker B's previous utterance at 230Hz. Her amplitude is also loud and forceful. This interruption is followed by another lower-pitched (260Hz) and soft prompting question `Do you remember?' to reinforce the intended turn in topic direction.

4.2. Cooperative Interruptions

In the above section we have shown that in general, competitive interruptions are marked by a high pitch level, and often by a loud amplitude, expressing the participants' competition for the focus of attention. By contrast, cooperative interruptions are more supportive of the main speaker's floor rights, and the intention is usually to keep the attention on the main speaker's point. This difference in cooperativeness has a corresponding influence on the intonational patterns of such supportive interruptions. Because of their non-disruptive nature, they often occur at low or medium pitch levels, and even when they are high for emotional involvement, they are generally lower in pitch than competitive interruptions. The amplitude of cooperative interruptions can vary. In our data, the amplitude is generally low in cases of acknowledging and prompting, but often high when an interruption is used to express strong opinion or emphasis.

(3)
405 A: So I looked at them and say ....(laugh)
406 these graduate students at Taiwan
407 they are pretty good
at this International Conference | they still -
408 → B: | Performed very well
409 A: Emm

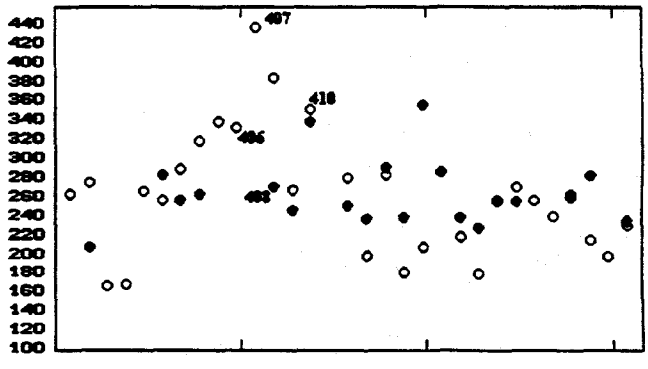

Figure 3: A case of a low-pitched supportive interruption at U408

The non-disruptive nature of cooperative interruption can be seen in this example. From the pitch plot (Figure 3) we can see that speaker A is very excited in this segment, and is speaking at a very high pitch in her range. This excited state is indicated by the abrupt 105Hz pitch elevation from her previous utterance in U406 at 325Hz. By contrast, speaker B's supportive and agreeing comment `performed very well' is said at a relatively low pitch level of about 260Hz and at a moderately low amplitude.

5. PITCH HEIGHT AND INTERRUPTIONS

Our data from spontaneous discourse show that discourse often has a mix of cooperative and competitive interruptions, and that the complexity of interruptions often increases with the complexity of the discourse relationships. The specific nature of each interruption is a reflection of the underlying motivation of the interrupter. The content and timing of interruptions are directly linked to the interrupter's urgent and intense emotional need for an immediate resolution. That is, it is the urgency of the emotion that is causing the interrupter to express the need to address a particular salient topic immediately at this particular time.

Another factor that contributes to this complexity is that competitiveness and cooperativeness are not polar opposite characteristics of interruptions, but occur as a gradient process. Analysis of the data shows that the degree of competitiveness often arises from the intensity of the emotions underlying the interruption. The forcefulness of the expression affects how the main speaker responds, as well. An intense expression often creates a critical need for an immediate response, and speakers are more prone to stop and address the issue raised by the interrupter, hence such interruptions are more competitive.

The degree of competitiveness or cooperativeness is also influenced by how related the interruption is to the ongoing topic, and by how long the interrupter intends to take the floor for. The specific strength of signal needed to adequately overcome the ongoing topic may vary by the changing interruptability or resistance level of the topic. Because of the intentions of participants, in spontaneous discourse interruptions occur to varying degrees of intensity and varying degrees of competitiveness and cooperativeness.

The following extended section of the discourse illustrates these points ('f' means 'fast' in the transcript):

(4)
90 A: Because this time when I went back to Taiwan,
91 I went to attend that.....
B: Uhuh uhhuh
A: International Conference - |
92 → B: |Oh, really?
A: on Chi| nese - processing
93 → B: |Oh, you went there?!
A: m |
94 → B: Umhum | How was it? (fast tempo)
A: |I went there. | It's really good.
95 → B: |Yeah yeah, I | know about that.
96 A: I saw one - | that
→ B: Umhum | It was in August, wasn't it?
97 A: in - Au - gust ... right.
98 → in mid| - August...
B: | Oh, yeah yeah yeah yeah yeah
99 B: Was it at Kengding National Park?
100 A: N |o.
B: |No.?
101 B: There was one at Keng| ding National Park,
→ A: | The one at Kengding
National Park was ROCLING, m
102 B: Uhhuh
A: That one was on computa | tional linguistics...
103 → B: | that's also -
104 Was it computational?
105 You didn't go?
A: (f) I went to both of them.
106 B: You went to both.
107 Umhum.
A: Yeah.
108 A: (f) That, that International Conference,
B:| Umhum.
109 A:| that one was at that -
110 Central | Research Institute
111 → B: | The one at Central Research Institute
A: Right.
112 B: Oh, you went to that one?
A: I went there.
114 I went to both.
115 After I went to the one at CRI
B: Umhum
116 A: I found out that there is another one at Kengding -
117 | that one's on computational linguistics
→ B: M. | Oh... there's another one afterwards,
A:| - that conference
118 B:| right right right right right
119 right right right
120 → B:| Hey, tell us about it! Yeah.
A:| So I just went on to the other one.

The intonational patterns for this fragment (see Figure 4) are very revealing of the complex emotional and discourse forces at work. The intensity of interest that speaker B has in the current topic is evident from the text and from the repeated rapid prompting questions that she poses. Speaker B's first interruption at the beginning of this topic is a more usual expression of interest and surprise 'Oh, really', and her pitch level for this interruption is high at 320Hz. As speaker A goes on to identify the specific conference she attended, speaker B's interest and astonishment heighten greatly, and this is clearly shown by the immediate interruptive response 'Oh, you went there!?' of U93, which follows instantly upon the receipt of this information. The striking pitch elevation in this phrase directly reflects the intensity of the expression of astonishment. As compared with speaker B's previous interruption in U92, there is a dramatic abrupt 100Hz liftup in pitch, and it is by far the highest pitch point, 420Hz, in the discourse so far. At U94, speaker B immediately follows up with an acknowledgement and a short prompt question to indicate her interest and to strongly encourage speaker A to continue. The fast tempo of this phrase 'Umhum, how was it?' signals speaker B's urgent need for more information on this topic. The pitch level of her acknowledgement is high at 355Hz because of the strong interest involved, and this pitch level is very high for general short feedback utterances.

In U95 'yeah yeah I know about that', speaker B expresses her strong opinion and indicates her interest and her pitch level is slightly raised in pitch. At U96, because the topic information is not yet completely settled, speaker B interrupts again to try to pin down the point 'It was in August, wasn't it?'. The doubt and the need to reconfirm are expressed intonationally in the high local peak at U96. At U98, speaker B interrupts to show support 'Oh, yeah yeah yeah yeah yeah' and her pitch is high at 340Hz, but is down from the high expression of doubt in the previous phrase. This pattern of alternating doubt and certainty continues as speaker B tries to pin down the key identifying elements of the central topic: a specific conference. The doubt and need for clarification again give rise to a local peak at U99. In this section, speaker B's overall certainty level is increasing as the information becomes more complete, and this causes a gradually descending pattern of the local peaks.

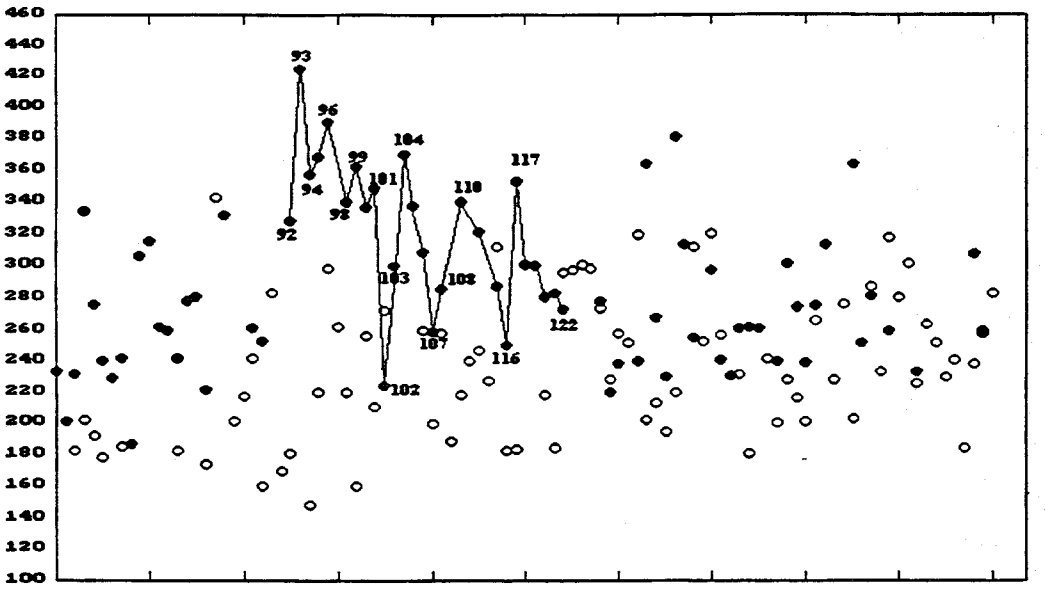

Figure 4: Pitch peaks with a series of interruptions at different heights in the U92-U122 section

This example shows not only the complexity of interruptions but also the systematic nature of intonation in expressing that complexity. As clearly seen from the peak pitch plot in Figure 4, all of the interruptions in this section are signalled by high pitch, but the high pitch levels vary, according to their discourse function and the cognitive state of the interrupter. Interruptions occur for a reason, and not simply to overcome the speech of the other person, so the particular reason for the interruption forms part of the intonational signal of the interruption. The cognitive and emotional reason underlying the interruption is inseparable from the need to attract attention and the degree of competitiveness, and this gives rise to the differences in height seen in this example.

Thus, this example shows the fundamental importance of emotion to interruptions and intonation. The general cognitive pattern seen here is that the interrupter encounters an initial high unsettled state of uncertainty and gradually progresses to a more settled and certain state. This is clearly expressed in the overall downward trend in the pitch level for these utterances in the peak pitch chart. Local pitch step movements of the interruptions tend to be associated with the degree of certainty and uncertainty and with the expression of emotions. The association of uncertainty with an elevation in pitch and certainty with a decrease in pitch which was seen for topic development is also apparent here (Yang, 1995b). The overall intonational structure of this example is a vivid illustration of the importance of the process of intensification and normalization frequently at work in discourse. The very high pitch at U93 reflects the abrupt climax of emotional intensity and uncertainty, and as this emotional uncertainty is expressed and cognitively resolved through the sequence of interruptions, normalization in the intensity of the cognitive state and the intonation level is then achieved.

6. CONCLUSION

Results of this study demonstrate that interruptions are a complex combination of expressions of emotion, signals of attention-getting and signals of competitiveness, and their intonational manifestations are directly linked to these motivations. The pitch levels of interruptions occur at varying heights; the higher the intensity, the higher the pitch level. The specific pitch height of an interruption is found to be determined jointly by the need to attract attention, the intensity of the emotion present, and the strength of signal needed to overcome the attention and focus on the current topic.

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