

# What Factors Determine the Tonality of a Parenthetical Clause?\*

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## I Introduction

It is well known that a grammatical structure, such as a phrase or a clause, often coincides with a tone group. A parenthetical clause, conveying a speaker's idea or comment relevant to the topic, naturally tends to have its own tonal chunking. In other words, the clause inserted into the middle of the sentence stands out as a separate tone group.

In fact, quite a few scholars have pointed out the types of phonetic correlates a parenthetical clause may exhibit:

1. The overall pitch height of a parenthetical clause is lower than that of the main sentence. (Bolinger 1989, Cruttenden 1997<sup>2</sup>)
2. The overall intensity of a parenthetical clause is weaker than that of the main sentence. (Crystal 1969, Cruttenden *ibid.*)
3. The beginning and the end of a parenthetical clause are indicated with a pause. (Cruttenden *ibid.*, Crystal *ibid.*)
4. The tone of a parenthetical clause is a rising tone. (Bolinger *ibid.*, Crystal *ibid.*)
5. The end of a parenthetical clause is at times indicated with a creak. (Laver 1980, Crystal *ibid.*)
6. The start of a new tone group is indicated with a higher pitch than that reached at the end of the preceding tone group. (Cruttenden *ibid.*)
7. The end of a tone group is indicated by slowing down in speed. (Pike 1945, Cruttenden *ibid.*, Crystal *ibid.*)

The purpose of this paper is to examine if there is priority among the criteria. For the purposes of the current study, the criteria listed in 1 and 2 above will be excluded, since these criteria apply to a genuine comment

clause. The sentences A-D, that are dealt with in the present paper, are not categorized as such.

## II Experiment Procedure

The sentences to be analyzed are composed of 'Subject NP + Parenthetical Clause + VP', as follows:

A: One of you, she suggests, should write a report for the local paper.

B: That man, whose name could I ask you again, looks exactly like my uncle.

C: Henry, who hasn't even read the report, insists that it was an accident.

D: That man over there, who let me ask if you've ever seen before, is our chief suspect.

In other words, each sentence has three tone groups respectively, and the middle of which is filled with a parenthetical clause.

5 British speakers were recruited as subjects; Speaker 1: male 20ys, Speaker 2: female 19ys, Speaker 3: female 47ys, Speaker 4: female 23ys, Speaker 5: male, 64ys. All the speakers, roughly speaking, use the Southern British accent. They were paid for their contributions.

The recordings took place in a sound-proof room located in University College London on March 8, 2008. The speakers were asked to read 33 different sentences, including the sentences A-D above, at a speed with which they felt comfortable. The recorded WAV files were downsized to a 11025 sampling rate for the pitch analysis. The WASP (Version 1.45) and The Acoustic Core (Version 7) were used for the acoustic measurements.

## III Observations

Since each sentence has two tone-group boundaries,

there should be two possible slots for a pause to be inserted. This means that there are 40 possible slots for a pause to be inserted in the present corpus (4 sentences x 2 slots x 5 speakers), but the renditions by Speaker 2 and 3 of the Sentence D were discarded from the analysis because there were obvious errors in the reading. It follows from this that there are 36 possible slots to be examined acoustically in the present paper.

i) Pause Insertion and the Types of Tones

The present data analysis revealed that one of the most obvious parenthesis-indicator was the presence of a pause. Out of 36 slots, 29 slots were filled with a pause; 7 slots were without a pause (81% pause presence).

The interesting observation made here is that the tonal type a parenthetical clause bears might depend upon the presence/absence of a pause. When there were pauses, falling-rising tones are dominant (18 out 29, see the details in Table 1 below); whereas, when there were no pauses, falling-rising tones are scarce (only 1 out of 7). Though there were only 7 slots where there were no pauses, the falling tone seems to be preferred. As an

overall tendency, the simple rising tone is scarce (4 out of 36), which contradicts the criterion 4.

ii) Creakiness

Crystal (*ibid.*) suggests the possibility of creakiness at the end of a tone group that “there is [also] a significant patterning with creak”. The present data shows a slight tendency toward creakiness: at the slots with a pause, a creak appeared 12 times out of 29, whereas at the slots without a pause, it appeared 2 times out of 7 (14 times out 36 altogether). As far as the frequency is concerned in the present data, creakiness is rather a weak tone group indicator.

iii) Pitch Level Changes at Tone Group Boundaries

Cruttenden (*ibid.*) asserts that the change of pitch level (and/or pitch direction) among unaccented syllables is an indicator of a tone group boundary; he says that “... low unaccented syllables at the beginning of an intonation-group (= a tone group in this paper) are generally at a higher level than low unaccented syllables at the end of an intonation-group.”

This criterion quite coincides with the present data.

	TG1								TG2							
	A		B		C		D		A		B		C		D	
	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
S1	✓	FR	✓	FR	✓	FR	✓	FR	✓	FR	✓	FR	✓	F	✓	FR
S2	✓	FR	✓	FR	✓	FR	-	-	✓	FR	✓	R		R	-	-
S3	✓	F		F	✓	FR	-	-		L		F		F	-	-
S4	✓	F		R	✓	FR	✓	F	✓	F	✓	F	✓	F	✓	F
S5	✓	FR	✓	FR	✓	FR	✓	FR	✓	L		FR	✓	R	✓	FR

Table 1: Presence of a pause and tonal type in each tone group

“P” and “T” in the table denote the pause and the tonal type.

“✓”=presence of a pause, “-”=irrelevant to analysis, “F”=falling tone, “FR”=falling-rising tone, “R”=rising tone, “L”=level tone.

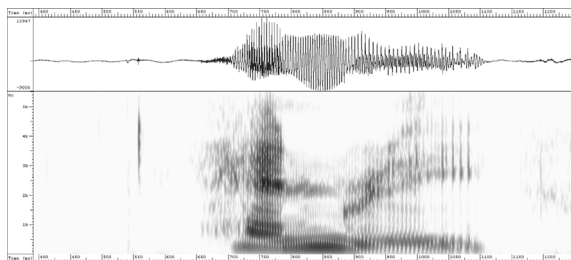


Figure 1a: A creak at the end of TG1 of Sentence C by Speaker 3.

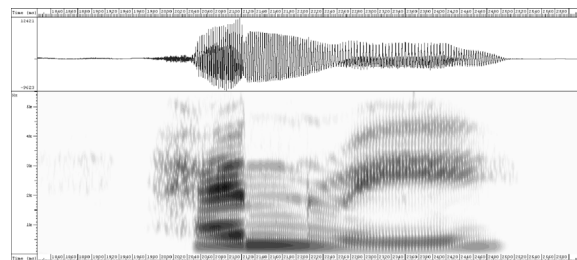


Figure 1b: Without a Creak at the end of TG1 of Sentence C by Speaker 2.

	A				B				C				D			
	E1	B2	E2	B3	E1	B2	E2	B3	E1	B2	E2	B3	E1	B2	E2	B3
S1	112	104	98	117	106	114	108	88	98	115	91	119	106	119	106	126
S2	280	235	236	256	242	244	238	265	293	280	106	169	-	-	-	-
S3	95	219	174	244	184	213	176	189	108	258	127	213	-	-	-	-
S4	169	193	109	223	280	273	57	82	231	313	62	240	78	223	74	181
S5	196	169	117	168	162	153	153	136	173	142	122	149	165	134	131	140

Table 2: Pitch in hertz at the end and the beginning of each tone group

“E1”=pitch at the end of Tone Group1, “B2”=pitch at the beginning of Tone Group 2, “E2”=pitch at the end of Tone Group 2, “B3”=pitch at the beginning of Tone Group 3.

	TG1								TG2							
	A		B		C		D		A		B		C		D	
	pen	ult	pen	ult	pen	ult	pen	ult	pen	ult	pen	ult	pen	ult	pen	ult
S1	100	282	171	375	159	207	246	246	139	344	179	330	144	349	62	339
S2	160	209	192	438	214	292	-	-	208	235	117	212	192	270	-	-
S3	111	234	58	250	217	223	-	-	200	336	107	267	173	262	-	-
S4	118	313	235	300	220	256	101	212	139	318	123	161	100	309	64	301
S5	113	210	171	422	145	254	97	305	224	490	144	338	34	416	85	448

Table 3: Durations of the penultimate and the final syllables in each tone group

“pen” and “ult” in the table denotes the penultimate and the final syllables respectively. The values are in milliseconds.

At the tone group boundaries with a pause, 21 out of 29 following tone groups begin with a higher pitch; at the boundaries without a pause, 5 out of 7 tone groups begin with a higher pitch. In total, at 36 tone group boundaries, there happened a step-up in pitch level 26 times (72%). We could safely say that pitch level changes at tone group boundaries are a good indicator of parenthetical clauses.

iv) Slowing Down at the End of a Tone Group

Apart from declination in pitch, Cruttenden (*ibid.*) points out that “the final syllable in an intonation-group will often be lengthened.” And he also says that this lengthening “may act as a sort of pause-substitute.” Pike (*ibid.*) holds the same point of view on the lengthening effect. He says that “instead of a gap in the speech, there

may be a lengthening of the last sound or two of the preceding word,” and he calls this type of lengthening as the *tentative pause*. Although I have no elaborate means or method to examine the elongation, I compared the durations of the final syllables with those of the penultimate syllables to see if a slowing down took place. The measurement is given in Table 3.

Almost all the durations of the final syllables in tone groups are longer than the penultimate syllables (34 out of 36 cases). The lengthening does seem to happen as was suggested by Cruttenden and Pike. However, the point to be noticed is that the lengthening effect is not simply a matter of deceleration; it rather affects the pitch contour. On the pitch contour of the final syllable of a tone group, there is a flat portion rather than a clear curving. The flat portion seems to be realized as some-

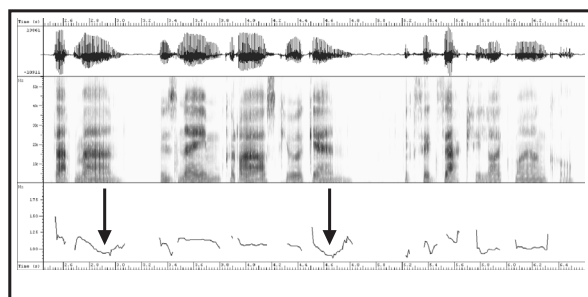


Figure 1a: Sentence B by Speaker 1

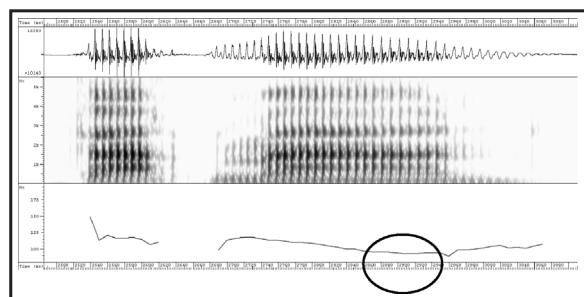


Figure 1b: Sentence B, TG1 by Speaker 1

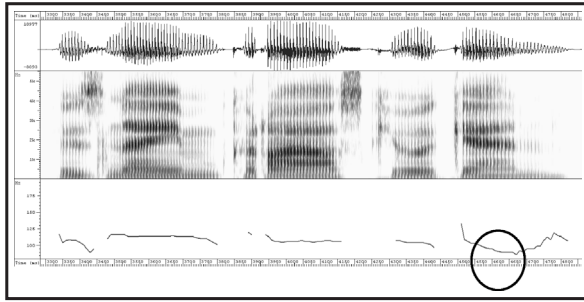


Figure 1c: Sentence B, TG2 by Speaker 1

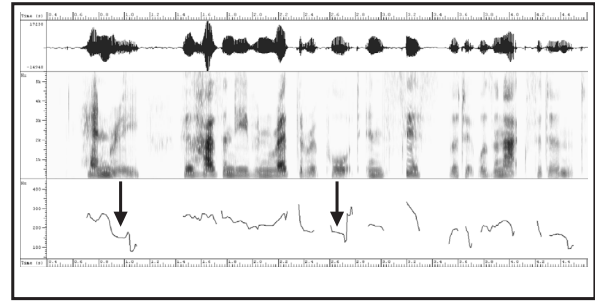


Figure 2a: Sentence C by Speaker 3

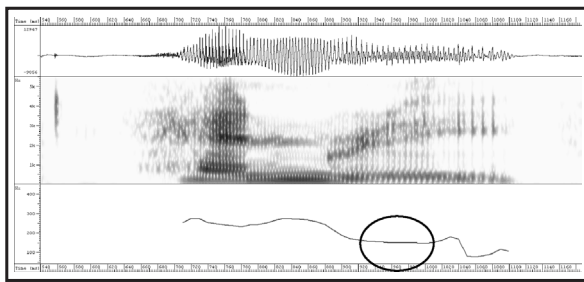


Figure 2b: Sentence C, TG1 by Speaker 3

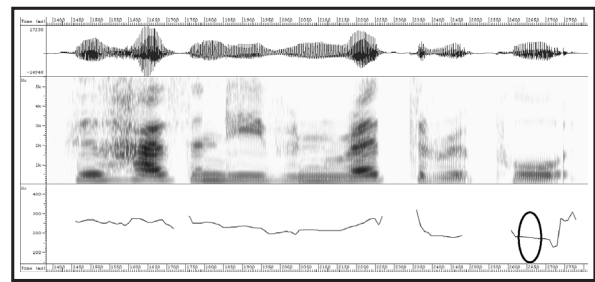


Figure 2c: Sentence C, TG2 by Speaker 3

	TG 1				TG 2			
	A	B	C	D	A	B	C	D
S1	52	50	30	46	22	45	56	24
S2	71	19	21	-	28	62	43	-
S3	20	24	34	-	43	30	36	-
S4	28	32	0	21	14	66	34	15
S5	39	19	39	31	30	40	25	19

Table 4: Percentage of flat portion to the last syllable in tone group

thing like a plateau or a concave form on the contour.

Take a look at the parts indicated by arrows in Figures 1a and 2a; they are the last syllables in tone groups 1 and 2 respectively. As are shown in Figures 1b-c and 2b-c (which are the enlarged versions of each tone group), the contours of these portions look flat, which means that their pitch values are maintained at the same levels. I would suggest that these portions are the realization of lengthening. As is mentioned by Pike (ibid.) himself that “the tentative pause tends to sustain the height of the final pitch of the contour,” the sustained pitch level shall naturally be realized as a flat portion in the contour. This flattening effect, large or small, seems to take place in the last syllable in each tone group.

Following the method adopted in Knight (2004), I tentatively measured the duration of pitch peak or bottom

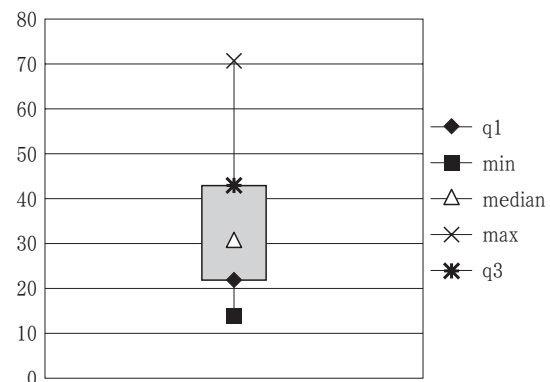


Figure 3: Distribution of flat portion percentage in the final syllables of tone groups

(the flat portion) that fell within 10% range, and calculated the percentage of that portion in relation to the whole last syllable, the result of which is given in Table 4 and Figure 3.<sup>1)</sup>

Table 4 shows that all the final syllables of each tone group (except the Tone Group 1 in Speaker 4’s rendition; this is discarded in the figure) have the flat portion on the pitch contour, and Figure 3 shows that the 50% quartile falls within approximately 20 to 40%. In other words, half of all the last syllables in the tone groups have the flat portion that occupies 20 to 40% duration of the last syllable.

#### IV Final Remarks

The present paper attempts to examine what phonetic correlates indicate the boundary between tone groups. The data examined in this paper suggests two factors seem to function as strong indicators of a tone group boundary among the seven criteria mentioned in Section I; namely, the pause insertion and the lengthening of the final syllable in a tone group.

A pause insertion is an easy thing for a speaker to carry out while speaking and it is also easy for a hearer to detect it. At the obvious syntactic breaks in this paper's corpus (36 slots altogether), 29 pauses are actually inserted. Although the frequency of a pause is quite high, it might be due to the reading style. Tench (1995) refers to the difference in fluency between the rendition with a manuscript and the spontaneous speech. Reading a manuscript that clearly indicates syntactic breaks, namely commas, speakers are more inclined to insert pauses. In this sense, we should not conclude that a pause insertion is the best means to indicate a tone group boundary. Aside from this, however, there is one thing to be noted. That is, when there is a pause inserted between tone groups, the tone at the end of the tone group is frequently a falling-rising tone. I would like to deal the relationship between a pause insertion and the type of tone elsewhere.

The lengthening effect at the end of a tone group could be the strongest indicator of a tone group boundary. Through the present paper's analysis, it is suggested that the lengthening does not necessarily cause speeding down over the whole last syllable of a tone group; the target of lengthening is to maintain a certain stretch within the last syllables at the same pitch level, causing a somewhat flat contour. As is summarized in Knight (*ibid.*), there are scholars who point out the presence of plateaux rather than sharp peaks and troughs on the pitch contour of nuclear tones. On the other hand, Cruttenden (*ibid.*) points out that there are characteris-

tic plateau portions in the tail of a tone group, depending upon the regional accent a speaker uses. The plateau forming in the tail shall be examined as well, irrespective of regional accents.

Lastly, I should admit that the method of limiting the flat portion within the range of 10% deviation from the peak or the bottom pitch is a tentative one. To get an insight into the relationship between the lengthening and the plateau forming on the pitch contour, designing suitable perception tests is a pressing need.

#### Notes

\* The present paper is an extended version of the paper I read at the workshop of Konan English Literary Society, held on 27th of June, 2009, under the title of "Sounyu-ku no onkyou tokusei to kessokusei." ("Acoustic Correlates of Parenthetical Clauses and Their Cohesion"), paying attention in particular to the lengthening effect toward the end of a tone group. The research is partly supported by the Grant-in-Aid of Japan Society for the Promotion of Science (No. 19320071).

1) Knight (2004) in fact uses the 4%-range algorithm to limit the range of a plateau on the pitch contour, adopting the method used in Rosen and Fourcin (1986) "Frequency selectivity and the perception of speech".

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