FURTHER EXPERIMENTS IN THE "SEARCH FOR TONICS"*

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The experiments reported in the present paper were set up in order to restrict some of the syntactic and semantic criteria involved in the task of tonic identification. Experiment 2 examines tonic identification in a particular type of contrastive sentence and in cleft sentences. Experiments 3-5 examine the effect of the discourse on tonic identification. The results indicate that when the information focus is a contrasted element that contradicts a previous element, the information focus is identified consistently as tonic. When the information focus is a "new" element realized as the leftmost lexical item in a sentence, it is normally identified as the tonic, but if judges are asked to identify tonics in utterances that do not have a clear "given/new" structure, then several tonics are identified. The results indicate, therefore, that the tone group in its unmarked form will contain several peaks of prominence.

INTRODUCTION

A series of pilot experiments was set up to examine the notion of "tonic" as proposed by Crystal (1969), and Halliday (1963, 1970). The initial experiment of the series is discussed in detail in Currie (1978, 1980). The experiment investigated the notion, supported by Crystal (1969), Halliday (1963, 1970), Pike (1965), Svetozarova (1975) and others, that the *tonic* of an utterance is realized as the most "prominent" syllable of that utterance, prominence being realized by F_0 height, F_0 movement and intensity. Experiment 1 tested the ability of judges, who were familiar with the notion "tonic," to identify the tonic of an utterance.

Sentences of various lengths were read aloud out of context by naïve native speakers, and 20 of the readings were chosen on the basis of the various combinations of physical maxima. The physical parameters investigated were maximum F_0 height (A), maximum F_0 movement (B) and maximum intensity (C). The results of this experiment showed that a cumulation of these three physical maxima (ABC) realized on one syllable, was not necessarily identified 100% of the time as the tonic of an utterance. This cumulation was merely one of several cues for tonic identification. Other equally strong cues were rightmost lexical item, maximum F_0 height alone, and maximum F_0 movement alone. When two of these cues combined on one element, i.e., when maximum F_0 movement co-occurred with the rightmost lexical item, Halliday would predict that this element should be identified as the neutral unmarked tonic; however, every judge does *not* select this element as the tonic element. All of these cues do not combine in every utterance,

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nor does the presence of one of these cues – in the absence of the others – automatically determine the tonic element. All of these cues may compete within a single utterance, and each of these cues may be overridden depending on, for example, the information structure of a sentence – where a potential "tonic" may be treated as "given" in Halliday's sense – or the composition of the utterance itself; e.g., if the sentence contains only one open class substantive, that element will tend to be chosen as "tonic" even if it is in competition with another element containing the cumulation (ABC). Tonic is therefore seen to be a complex phenomenon which cannot be simply defined in physical terms.

The following experiments were set up in order to restrict some of the syntactic and semantic criteria involved in the task of tonic identification.

Hypotheses

Halliday (1967) maintains that the clause is the domain for various systems: the system of "information," the system of "thematization," and the system of "identification." The system of "information" is realized by phonological features of intonation; the system of "thematization" is realized by the sequence of elements in the clause; and the system of "identification" is realized by specific patterns of clause structure.

In Halliday's terms, one information unit is realized as one tone group. Each information unit has either one primary point of information focus or one primary followed by one secondary which is realized by tones 13 or 53. The focal element or the focus of information will occur on "new" information, or information that is not recoverable from the discourse. In the unmarked case, the focus of information falls on the final element of the information unit.

Contrastive sentences are treated by Chafe (1976) as a "special case" of new information. Chafe states (p. 35) that contrastiveness is realized by "the placement of higher pitch and stronger stress on the focus of contrast. Thus it is often difficult or impossible to tell the difference between contrast and new information on a phonetic basis alone." But Chafe continues (p. 36), "On the other hand it is also true that the high pitch on a contrastive focus is often higher than that on a simple new information focus." Sentences that contain an element that specifically contradicts a previous element will be said to contain an element in *lexical contrast* where one lexical item can be seen to contradict another, e.g., given the conversation between A and B as follows.

A: Did John wash the car?

B: No

C: Did Merlin wash it then?

Merlin is a realization of lexical contrast.

Hypothesis. The element in lexical contrast will be identified consistently as the tonic element when the utterance containing lexical contrast is presented out of context.

Halliday (1967) states that the clause in his system of thematization is organized into the structure "theme" and "rheme." Initial position in the clause is assigned the status

of theme, and the rheme is all that follows. The theme may be isolated as a separate information unit especially if the clause is structured in the identifying equative form, i.e., if the clause is a cleft structure. Thus Halliday (1967, p. 226) notes that both the identifier and the identified can carry information focus, or the identifying clause may be realized as a single information unit with only one of the two elements focal. If this is the case, then the single focus normally falls on the identifier irrespective of sequence. Thus, in the following example cited in Halliday (1967, p. 226), the underlined elements could carry the information focus.

a) //the one who painted the shed last week//was John//

b) //John// was the one who painted the shed last week//

c) //the one who painted the shed last week was John//

d) //John was the one who painted the shed last week//

Examples (a) and (b) above are sentences in which both the identifier and the identified are realized with information focus; examples (c) and (d), however, carry only one information focus which in each case is realized on the identifier *John.*

Jespersen (1961) notes that "A cleaving of a sentence by means of *it is* (often followed by a relative pronoun or connective) serves to single out one particular element of the sentence and very often, by directing attention to it and bringing it, as it were, into focus, to mark a contrast" (pp. 147-8). Chafe (1976, p. 37) agrees with this view of cleft sentences: "An additional way in which contrastiveness may be expressed is with the use of a so-called cleft sentence, as in *It was Ronald who made the hamburgers.*"

Cleft sentences were also included in experiment 2 since they also express contrastiveness (or focus of contrast) but they do so by means of word order.

Hypothesis. The identifier of a cleft construction will be selected consistently as the tonic element. The identifier may be realized as the single tonic of the cleft construction, or it may be one of two, the second tonic occurring on the identified element of the construction.

EXPERIMENT 2

Method

In order to obtain cleft sentences and contrastive sentences, a game was set up involving two players (P1 and P2). P1 was given a story to read (see Appendix 1) prior to recording, and P2 was given a sheet of paper containing a list of characters and a list of actions (see Appendix 2). P2 was then asked to match up the characters and the actions, and to attempt to retell the story, which by then was familiar to P1. P2 was only permitted to ask "yes/no" questions; P1 was asked to answer "yes" or "no." If P2 were desperately in need of help, more clues could be given. It was thought that in this situation we would obtain several types of questions, including cleft questions, and that

contrastives would also be produced in this test since it involved "filling-in-the-slot" procedures. In other words, since P2 was forced into producing "yes/no" questions, he would have to specify both the character and the action that he was attempting to match; he would thus be forced into either constructions of the type "Did X do Y," or constructions of the type "Was it X that did Y." If the attempted matching failed, he might then produce a contrastive construction such as "Did X do Y," "no," "Well did Z do Y." These constructions were in fact obtained as shown below:

R2/2 A: Was it the rich farmer who had three sons . . .
(an example of a cleft sentence)

L1/1 A: Well did the old man have three sons?

B: mm, no.

A: Did the *rich farmer* have three sons . . .
(where the italicized element is in lexical contrast)

Twenty sentences were selected from three sets of games. Eighteen of the sentences were taken from the recordings of two male Scots speakers, and two of the sentences were taken from one female English speaker. Of these 20 sentences, 11 are examples of cleft sentences. In all 11 sentences the clefted element is the identifier of the sentence. Three of these clefted sentences contain a clefted element which is also in lexical contrast. Seven sentences are non-cleft contrastive sentences, and two are non-cleft non-contrastive sentences. Judges were asked to identify the "tonic of the sentence." If they felt there was more than one tonic, they were asked, if possible, to rank them in order of importance.

Results: sentences containing the cumulation (ABC)

In this experiment 17 out of the 20 sentences contained an element with the cumulation (ABC) (see Appendix 3 for full details of the results). These sentences included all seven contrastive sentences in which the cumulation (ABC) was realized on the contrasted element; eight cleft sentences in which the cumulation (ABC) was realized on the clefted element, i.e., the identifier; and the two simple declarative sentences in which the cumulation was realized on the leftmost lexical item. Of the 17 elements containing the cumulation (ABC), only 12 are judged to be the tonic element by more than 20 out of the 25 judges who took part in the experiment (five of the 11 clefted elements, and all seven contrasted elements).

All of the sentences with elements in lexical contrast had the cumulation of physical maxima realized on the contrasted element. All contrasted elements were judged to be the tonics of the sentences involved by at least 23 out of 25 judges. A contrasted focus of information, therefore, seems to be identified consistently as the tonic element. These sentences are given below, with the contrasted element italicized.

1. THE *PONY*(ABC) RUNS AWAY
25

6. DID THE *RICH FARMER*(ABC) HAVE THREE SONS
23 0
(2) (2)

8. THE *DOG*(ABC) RUNS AWAY
23 2

16. IS IT THE *MILLER'S*(ABC) DOG
25

3. PRESUMABLY IT WAS THE *ELDEST*(ABC) SON
25

11. IT WAS THE *ELDEST*(ABC) SON
25

20. SO THEY *GOT*(ABC) MARRIED
1 24

The two simple declarative sentences below contain the cumulation (ABC) which is not identified consistently as the tonic.

4. THE SECOND(ABC) SON MARRIED THE MILLER'S DAUGHTER(AB)
2 12
(11) (11)

17. WELL DID THE OLD MAN(ABC) HAVE THREE SONS(AB)
0 5 7
(2) (11) (11)

In sentence 4 the cumulation of physical maxima falls on *second son,* but there is also maximum F_0 movement and maximum F_0 height on *miller's daughter.* The physical maxima are therefore spread over both elements. If we examine the preceding lexis, we find that both elements are being introduced for the first time in this utterance, thus both elements are "new." Eleven out of the 25 judges select both elements as tonic, thus electing to assign a unit of information to each "new" element as predicted by Halliday. Fourteen judges select only one tonic element in sentence 4; 12 chose the element that is the rightmost lexical item realized with maximum F_0 movement; the remaining two chose the cumulation (ABC) as tonic. The same confusion of cues which was noted in the initial tonic experiment (Currie, 1978, 1980) applies to the above sentences. In sentence 17, the cumulation (ABC) falls on *old man,* but there is also maximum F_0 movement and maximum F_0 height on *three sons.* Each of these constituents is being mentioned for the second or third time; therefore both constituents are treated by the speaker as "given." In sentences 4 and 17, therefore, there is the same confusion of cues

in operation that was mentioned as applying to tonic – experiment 1. Both elements within the sentence have the same status on the given/new dimension, and the physical cues are ambiguous as to which of the two should be preferred. The logical answer then should be for the judges to select both elements consistently as two realizations of tonic. Eleven out of 25 judges do exactly this in both sentences. Even more judges, however, select only one tonic in the above sentences, and they are divided between the two elements that are "marked" by various cues as potential tonics. There is, therefore, substantial disagreement between the judges as to whether these sentences contain a single tonic or two tonics. There is also disagreement as to where the single tonic occurs.

Let us now examine the cleft sentences. Only five out of eight sentences that contained the cumulation (ABC) on the clefted element had the clefted element chosen as the tonic. Three of the five are those cleft sentences whose clefted element is also an element in lexical contrast. These sentences, in 10, 13 and 15 below, support the conclusion that contrastive focus is consistently identified as tonic.

10. WAS IT THE *RICH FARMER'S* ELDEST SON(ABC) WHO MARRIED
23
(2)
THE GENTLEMAN'S DAUGHTER
0
(2)

13. WAS IT THE *MILLER'S DAUGHTER*(ABC) WHO WAS VERY
23
(2)
BEAUTIFUL THEN
0
(2)

15. WAS IT THE *BAD-NATURED DAUGHTER*(ABC) WHO RAN AWAY
21 2
(2) (2)

(The element in lexical contrast is italicized.)

The remaining sentences, which had the cumulation (ABC) on the clefted element, contain "new" identifiers which are not recoverable from the preceding discourse; the identified element of these sentences was "given" immediately previously. Thus, since the identified element has been repeated in these sentences after having been mentioned immediately previously, there is an unequivocal information focus on the "new" identifier or clefted element. This element is judged to be the tonic element by more than 80% of the judges, i.e., more than 20 out of 25. These sentences appear in 9 and 12 below.

9. WAS IT ONE OF THE SONS(ABC) WHO WAS VERY WELL OFF
23 0
(2) (2)

12. WAS IT THE YOUNGEST(ABC) SON THAT MARRIED THE
20 0
(5) (1)
BEAUTIFUL MILLER'S DAUGHTER
0
(4)

Therefore, if contrastive sentences are seen to be a special case of information focus as suggested above, then it is clearly the case that an unequivocal information focus is identified consistently as the tonic element.

Let us now examine the remaining cleft sentences. Three of the cleft sentences (2, 5, and 19 below) contain the cumulation (ABC) on the clefted element which is not identified consistently as the tonic element.

2. WAS IT THE MILLER'S DAUGHTER(ABC) WHO RETURNS HOME
9 0
(7) (3)
ON THE BACK OF THE PONY
9
(7)

5. WAS IT THE YOUNGEST SON(ABC) WHO TELLS HIS WIFE TO
8
(11)
CARRY THE SADDLE
6
(11)

19. IS IT THE PONY(ABC) WHO* REFUSES TO CROSS A STREAM
11 0
(8) (3)
AND IS SHOT(AB)
5
(8)

These sentences are spoken by the same speaker, and are very similar in length and in number of constituents. In sentence 2, *miller's daughter* has just been mentioned in the previous sentence; the remaining constituents are mentioned for the first time. In sentence 5, *youngest son* has been mentioned only two sentences previously; the remaining constituents again are being mentioned for the first time. In sentence 19, *pony* has been

mentioned previously (about 17 sentences before), and again the remaining constituents are being mentioned for the first time. Therefore, in all of the above sentences, the clefted element or identifier is "given," and the identified element is "new." According to Halliday (1967), when there is one focus of information in a cleft construction, the focus will be realized on the identifier (in these sentences the clefted elements). However, the focus of information is also said to be realized on the "new" element of an utterance; in the above sentences, it is on the "identified element" which is realized on the last lexical item. There is, therefore, a conflict here which is reflected by the tonic judgments. Let us examine the acoustic records of elements that are chosen as tonic elements.

In sentence 2, the F_0 realization of the entire constituent *miller's daughter* measures 150–220–130 Hz from beginning point to highest point to end point; the F_0 realization of the constituent *pony* measures 200–140 Hz. In sentence 5, *youngest son* measures 140–210–140 Hz, whereas *saddle* measures 190–130 Hz. In sentence 18, *pony* measures 210–135 Hz; *stream* measures 185–145 Hz, and *shot* measures 200–130 Hz. The maximum intensity occurs on the clefted element in all three sentences, and it decreases considerably towards the end of the sentence. The conflict in the information structure is, therefore, reflected in the physical signal.

If each element that has been judged as a tonic in these sentences was the focus of information of separate information units, then each judge should have chosen all of the elements as realizations of tonic, but this was not the case. In sentence 2, 18 judges decided that there was only one element functioning as the tonic of this sentence; nine out of 18 chose *miller's daughter* which is the identifier and contains all three maximum physical values, and nine out of 18 chose *pony* as the tonic element. *Pony* is also the "new" element in the information structure and is the rightmost lexical item in the sentence. The remaining seven judges chose both of these elements as equivalent tonics. These results do not suggest that there are two units of information; they suggest rather that there is a conflict of cues for tonic identification which is not resolved by the sentence structure.

The three remaining cleft sentences (in 7, 14 and 19, below) do not contain the cumulation of physical maxima on the clefted element.

7. WAS IT THE SECOND SON(AC) WHO MARRIED THE MILLER'S
12
(7)
DAUGHTER(B)
6
(7)

14. WAS IT THE WIFE(AC) OF THE NEWLY-MARRIED COUPLE(B)
6 5
(12) (13)
WHO WAS IMPRESSED(B) BY PREVIOUS EVENTS(A) AND
0 0
(3) (4)

BECAME A VERY OBEDIENT WIFE
0
(1)

19. WAS IT THE RICH FARMER(BC) WHO HAD THREE SONS(A)
10 8
(7) (7)

Sentence 19 is very similar to the sentences we have just been discussing. The clefted element has just been mentioned previously, and the remaining elements are being introduced for the first time. The only difference between sentence 19 and the previous group of sentences is that the clefted element in 19 is not realized on the cumulation (ABC). The physical maxima are divided between two elements, with maximal intensity and movement realized on the clefted element, and maximum F_0 height on the "new" element. Sentence 7 also has a spread of physical maxima, and all of the elements are being introduced for the first time. There is no unequivocal instance of "new" versus "given." Sentence 14 is very long and was introduced to see whether the clefted element would be preferred as the tonic when there was such a variety of physical cues. The clefted element is in fact "preferred," although the judges are undecided as to which part of the clefted element should be the tonic. All of the elements containing any physical maxima are chosen as tonics by various judges.

Sentences 1, 5, 7, 14, 18, and 19 do not contain an unequivocal instance of information focus either according to the information structure of the preceding discourse or according to the placement of "tonics" in these sentences. All of these sentences are cleft sentences in which the clefted element is the identifier. Halliday would predict, therefore, that the clefted element should be chosen as the tonic element if only one tonic is selected; however this is not the case. Even when the identifier is realized on the cumulation of physical maxima, it is not consistently identified as the tonic. The cues of rightmost lexical item conflict with the cues of clause structure and the cues of physical maxima. It is not enough to account for the above results by dividing the sentences into two information units, since if there had been two obvious information units, the majority of the judges should have chosen two information foci, but they did not. Some judges chose tonic according to rightmost lexical item, others according to cumulation of physical maxima, and still others according to clause structure. Judges were not always consistent in their choice of cues.

Conclusion

This experiment tried to control the sentences so that the focus of information would be predictable; the results appear below.

1) Where the information focus is realized on a contrasted element, or a "new" element that is not recoverable from the preceding discourse, the information focus is consistently identified as the tonic of the utterance.

2) Where there are two or more elements within an utterance that have the same status according to the preceding discourse (i.e., both elements are "new" or both elements are "given"), both or all of these elements will compete as tonics of the utterance. The physical cues and the cues of clause structure that act as cues for tonic identification, conflict so that either of two elements or all elements may be identified as tonic.

Experiments 3, 4 and 5 were set up in order to examine the effect of the discourse on tonic identification.

EXPERIMENTS 3, 4 AND 5

Method

Previous experiments in the "search for tonics" consisted almost entirely of Scots data, apart from two sentences in experiment 2 which were taken from the recording of an English speaker. Experiments 3, 4 and 5 contain only RP data to see whether Halliday's predictions about tonic identification would be more consistent for RP data than for Scots. The data for these experiments were again taken from recordings of the game situation outlined in the method for Experiment 2.

Experiment 3 consisted of 40 sentences taken out of context and presented to the judges on tape. The judges also had a written transcription of the sentences in front of them. Experiment 4 consisted of 17 of the 40 sentences presented in the context of the surrounding discourse in written form only. Experiment 5 consisted of exactly the same material as experiment 4, but the material was presented on tape together with the written transcription.

Different numbers of judges took part in each experiment. The number of judges depended on their availability. Since this series of experiments took place over several months, a consistent "core group" was aimed for rather than a consistent total. Since this series of experiments was regarded primarily as a pilot study, I hope readers will bear with me when I choose to present the different total numbers of judges rather than merely the core group of 10 judges. Ten judges took part in all three experiments which were presented in the order of 3–4–5, with several weeks between the experiments. The total number of judges taking part in each experiment were: 22 in experiment 3, 10 in experiment 4, and 16 in experiment 5.

All of the judges were familiar with Halliday's notion of tonic; the judges ranged from professional phoneticians who had taught phonetics for several years to postgraduate students who had been introduced to the notion of tonic only recently. The 10 judges who took part in experiments 3, 4 and 5 had also taken part in experiments 1 and 2; therefore, there was a consistent core of judges throughout the series of experiments. The judges were again asked to select a single tonic if possible and if they wished to identify two or more tonics to try to rank them in order of importance.

Hypothesis

Experiment 2 had suggested that the preceding discourse structure affected tonic identification so that a "contrasted" element was chosen consistently as tonic despite the fact that the judges did not have access to the preceding discourse. Experiments 3, 4 and 5 were therefore set up with the hypothesis that "tonic" would be identified as occurring on the same element(s) when judges were presented with the same utterance (a) out of context with physical cues, (b) in context without physical cues and (c) in context with physical cues.

Results

Seventeen out of the 40 sentences presented in experiment 3 together with the surrounding discourse constituted experiments 4 and 5. The sentence numbers of experiment 3 are kept for the purposes of discussion. Experiment 4 was presented to judges in the form of the text only (see Appendix 4); experiment 5 presented the text together with a tape. Thus experiment 3 presented the data out of context in both written and aural form; experiment 4 presented the data in context in written form only; and experiment 5 presented the data in context in both the written form and the aural form. The results of the 17 sentences that the three experiments had in common can be compared in the light of the different kinds of information available to the judges.

The sentences in experiments 3, 4 and 5 can be divided into the following groups: Group A – sentences containing elements in lexical contrast; Group B (i) – sentences containing a new element realized as the leftmost lexical item; Group B (ii) – sentences containing a new element realized as the rightmost lexical item; and Group C – sentences containing elements of equal status according to the "given" and "new" structure. Let us examine each of these groups of sentences.

Group A

The element in lexical contrast is italicized.

Exp. 3. 3.	ITS	NOT	THE	*YOUNGEST*(ABC)		SON	WHO	DOES	IT	
		0		19						
		(3)		(3)						
Exp. 4.				3		7				
Exp. 5.				17						
Exp. 3. 5.	IS	IT	THE	*MILLER'S*(ABC)		DAUGHTER	WHO	IS	VERY	
				15				0	0	
				(7)				(1)	(2)	
Exp. 4.				10						
Exp. 5.				17						
Exp. 3.	BEAUTIFUL									
	0									
	(4)									

Exp. 3.23.	THE	*DOG*(ABC)	RUNS	AWAY		
		22				
Exp. 4.		**10**				
Exp. 5.		17				

All of the above sentences contain one element in lexical contrast and that element is identified as the tonic element by every judge. When a judge selects more than one element as tonic (which happens only in experiment 3), the word which is in lexical contrast is chosen as the "primary" or most important tonic. These experiments show that when the surrounding information structure is available to the judges, the results are absolutely consistent.

An element that contradicts an element in the previous utterance is said to be in a situation of lexical contrast. This element is realized on the cumulation of physical maxima (ABC) and is identified consistently as the tonic element. In sentence 3 in experiment 4 (the reading experiment), not enough context has been provided for the judges to identify *youngest* as the element in lexical contrast; since the various *sons* have been discussed previously, the judges select part of the whole constituent *youngest son.* This is, however, the only variation in tonic identification for these three sentences in experiments 4 and 5 which present the context surrounding an utterance containing a contrasted element.

Group B (i)

In each sentence, a new element appears as leftmost lexical item, the new element is italicized.

Exp. 3.15.	WAS(C)	IT	THE	*BAD*(B)	*NATURED*(B)	*DAUGHTER*(ABC)		
				0	0	17		
				(2)	(1)	(5)		
Exp. 4.						**9**		
						(1)		
Exp. 5.						**12**		
						(5)		
Exp. 3.	WHO	RAN	AWAY					
			0					
			(4)					
Exp. 4.			0					
			(1)					
Exp. 5.			0					
			(5)					

Exp. 3.17. THE *HORSE*(ABC) REFUSES(BC) TO CROSS A STREAM
15 0 0
(5) (1) (2)

Exp. 4. 3 1 0
(3) (1)

Exp. 5. 13
(4)

Exp. 3. AND IS SHOT(B)
2
(5)

Exp. 4. 3
(3)

Exp. 5. 1
(4)

Exp. 3.25. THEREFORE IT MUST BE THE *SECOND*(ABC) SON WHO
0 0 7
(2) (1) (15)

Exp. 4. 0 7
(1) (3)

Exp. 5. 5
(12)

Exp. 3. MARRIES THE MILLER'S DAUGHTER
0 0 0
(8) (4) (2)

Exp. 4. 0
(2)

Exp. 5. 0 0
(3) (11)

Exp. 3.29. WAS IT THE *SECOND*(ABC) SON WHO MARRIED A
11 0 0
(10) (1) (2)

Exp. 4. 7
(3)

Exp. 5. 10
(7)

Exp. 3. MILLER'S DAUGHTER
0 1
(1) (7)

Exp. 4.	**0**	0
	(2)	(1)
Exp. 5.	**0**	0
	(2)	(5)

All of the above sentences contain a new element as leftmost lexical item; these elements are identified as tonics by at least 19 out of 22 judges. When judges select more than one tonic, the new element is judged to be the most important or "primary" tonic. The results for the above group of sentences are not as clear as the results for group A, reflecting the fact that there are "extra" physical signals in the above sentences. In the sentences in group A, there was only one realization of each physical maximum realized as the cumulation (ABC) on the contrasted element. In the sentences in group B(i), there are examples of several physical maxima within one sentence. The spread of physical cues thus partially reflects the spread of judgments. A new element realized as the leftmost lexical item is not identified as the tonic as consistently as a contrasted element.

Group B (ii)

Each sentence contains a new element realized as rightmost lexical item or constituent; the new element is italicized.

Exp. 3.19.	WAS	THE	OLD(A)	MAN(BC)	*VERY*	*WELL*	*OFF*			
			5	3			8			
			(6)	(3)			(5)			
Exp. 4.					1	1	8			
Exp. 5.			1	1			11			
			(2)	(3)			(4)			

Exp. 3.27.	SO	IT	WOULD	BE	THE	RICH	FARMER(ABC)	WHO	HAD	
					0	**0**	7			
					(1)	(5)	(12)			
Exp. 4.						0	5			
						(1)	(4)			
Exp. 5.						**0**	**4**			
						(2)	(13)			

Exp. 3.	*THREE*	*SONS*
	0	0
	(4)	**(6)**
Exp. 4.	**0**	**0**
	(2)	**(10)**

Exp. 3.39.	IS THE	BAD(ABC)	NATURED	DAUGHTER	*VERY*	*BEAUTIFUL*
		1		1		12
		(7)		(3)		(7)
Exp. 4.		0		1		8
		(1)				(1)
Exp. 5.		0	1	2		9
		(3)	(2)	(2)		(5)

The above group of sentences shows interesting results. Sentences 19 and 39 are the most consistent sentences of the group, demonstrating clearly that when the judges only have the written context available, they select an element from the new constituent in the utterance. When the judges are presented with the physical signal of the sentence without the surrounding context, the judgments are evenly spread out between the various stressed syllables in the sentence. But when the physical content of the utterance and the context is available to the judges, the majority (11 out of 16 in both cases) select some element in the new constituent as the tonic despite the fact that the physical signals indicate the rightmost lexical constituent of the sentence as being more prominent. Thus judgments change according to the information available if there are several elements competing as tonic. In the above sentences, the physical maxima would predict that the theme should be the "focus" or tonic of the utterance, whereas the information structure would predict that the rheme should contain the "focus." Predictably, then, the results indicate that when only the physical criteria are available to the judges, there is confusion, but when the context is presented as well, the confusion is partially resolved and the judges tend to select a single tonic in the new constituent of the utterance.

Sentence 39 conforms to the above conclusion, although one judge chose *bad-natured* as the tonic in the reading experiment. This choice might be supported since in fact it is the *parent of the bad-natured daughter* that is given in the preceding discourse and not the *bad-natured daughter* itself. Thus, the constituent *bad-natured daughter* may well be treated as "new" acording to the preceding discourse structure.

Sentence 27 is a little different from the other sentences in this group. Although *rich farmer* has been mentioned in the preceding discourse, the constituent is being introduced into a new relationship, i.e., with *three sons.* Since the relationship between the two constituents is new, perhaps both constituents have "equal status" in some sense. This is certainly reflected in the results in which the majority of judges select both elements as equal tonics, especially when the context is available. Thus, although *rich farmer* might be analysed as "given" in that it is recoverable from the preceding discourse, the speaker treats the constituent as "new" since it occurs in a new relationship.

In summary, when a "new" element occurs in an utterance, judges tend to select that element as the tonic of the utterance. If the new element occurs as the leftmost lexical constituent of the sentence, the new element is chosen as tonic with or without context. If the new element occurs as the rightmost lexical constituent of the sentence, the context is necessary for the new element to be identified as the tonic.

Group C

Each sentence contains elements that are equal in status according to the preceding discourse structure.

Exp. 3. 2.	THE	DOG(ABC)	RUNS	AWAY(B)					
		5		1					
		(16)		(16)					
Exp. 4.		3		5					
		(2)		(2)					
Exp. 5.		0		0					
		(17)		(17)					

Exp. 3. 11.	IS	IT(AB)	THE	RICH	FARMER(BC)	WHO	HAD	THREE	SONS(B)
	0		0	1			0	3	
	(1)		(3)	(14)			(3)	(15)	
Exp. 4.				1			1	4	
				(4)				(4)	
Exp. 5.				2			0	2	
				(13)			(1)	(12)	

Exp. 3. 12.	ALL(AC)	THE	SONS(BC)	MENTIONED	ARE	SONS(BC)	OF		
	3		0	0	0	0			
	(11)		(1)	(6)	(2)	(10)			
Exp. 4.	1			0		0			
	(2)			(2)		(1)			
Exp. 5.	1		0	0		0			
	(12)		(1)	(6)		(5)			

Exp. 3.	THE	SAME	FATHER						
			1						
			(11)						
Exp. 4.		0	4						
		(1)	(4)						
Exp. 5.			1						
			(12)						

Exp. 3. 14.	WAS	THE	OLD(AB)	MAN(ABC)	VERY	WELL	OFF		
			5	3	0		4		
			(5)	(7)	(1)		(7)		
Exp. 4.			0	0	2	0	4		
			(1)	(2)		(1)	(2)		

Exp. 5.			0	4			2	
			(2)	(10)			(11)	
Exp. 3.28.	IS	IT	THE	DOG(ABC)	THAT	RUNS	AWAY(AB)	
				4		0	7	
				(11)		(1)	(11)	
Exp. 4.				9			1	
Exp. 5.				1			5	
				(11)			(11)	
Exp. 3.30.	THE	YOUNGEST(ABC)		SON	DECIDED	TO	GET	MARRIED
		4		2	0			0
		(10)		(6)	(8)			**(8)**
Exp. 4.		2		1				5
		(1)		(2)				**(1)**
Exp. 5.		1		0	1			1
		(13)		(3)	(11)			**(3)**

The above sentences all contain elements that are equal in status according to the preceding discourse structure. All of the sentences contain a spread of physical maxima realized on the various stressed items in each sentence; each stressed item is chosen on at least one occasion as a tonic. The results within each sentence correspond very closely across experiments, i.e., the majority of judges select the same items as tonic. For example, in sentence 2, 17 out of 22 judges in experiment 3 decided that there are two equal tonics on *dog* and *away,* each realized on physical maxima. In experiment 4, in which there are no physical cues, the judges choose one tonic, selecting either of these two elements. In experiment 5, the judges have access to both the physical information and the preceding discourse; all of the judges select both elements as tonic. The trend visible in experiments 3 and 4 therefore seems to culminate in experiment 5. But, although a distinct trend is discernable in experiments 3 and 4, judges tend to make different kinds of decisions depending on the information available to them, and if there is a conflict between the kinds of decisions being made in the two experiments, the physical signals outweigh the contextual signals, thus reflecting the kinds of decisions the *speaker* has made about the utterance. For example, in sentence 2 mentioned above, judges in experiment 3 tend to select two tonics, but in experiment 4, they tend only to select one tonic. In experiment 5, in which all of the information is available, all of the judges select two tonics, reflecting the decision taken when only physical information was available.

There is perhaps more obvious conflict in sentence 28. The results of experiment 3 indicate that the majority of judges, 12 out of 22, select two tonics, the majority of the remainder who select only one tonic select the rightmost lexical item. In experiment 4, nine out of 10 judges select the leftmost lexical item which is the identifier of a cleft sentence with *runs away* given immediately previously. According to the preceding

discourse, therefore, *dog* is chosen as the tonic element. When all of the information is available to the judges in experiment 5, 11 out of 17 decide there are two equal tonics; the majority of the remainder (five out of six) select the rightmost lexical item as the single tonic. The conflict is therefore resolved in favour of the physical signal.

CONCLUSIONS

Halliday's position that tonic is the realization of information focus seems to be too strong. When the information focus is a contrasted element that contradicts a previous element, the information focus is identified consistently as tonic. When the information focus is a "new" element realized as the leftmost lexical item, it is normally identified as tonic. When the information focus is a "new" element realized as the rightmost lexical item in a sentence, more than one tonic is chosen if the sentence is presented out of context; one tonic is chosen on the given element in leftmost position, and one tonic is chosen on the new element in rightmost position. If a new element in rightmost position is presented in context, the new element will tend to be identified as tonic. Thus, different decisions are taken when a sentence is presented out of context and when a sentence is presented in context. If judges are asked to identify tonics in utterances that do not have a clear "given/new" structure, several tonics are identified.

These results create problems for Halliday's proposal that an unmarked tone group contains a single tonic which in its unmarked form will occur on the rightmost lexical item of a clause. Of the sentences listed under Group C, at least five out of the six would be regarded as one clause by Halliday (i.e., excluding sentence 12), since Halliday (1967) refers to *It was John that painted the wall* as a single clause, yet all of these six sentences contain at least two tonics according to the judges (note: these tonics are not realized as 13 or 53 as Halliday would predict, but as consecutive falls). Sentence structure does not affect tonic identification since all of the above groups, which display consistent results within the groupings, have contained a variety of sentence types including declaratives, cleft sentences and questions of various kinds. All seven sentences that do contain only one tonic in experiments 3, 4 and 5 (as identified by a majority of judges) have the leftmost lexical item chosen as the tonic element, again contradicting Halliday's hypothesis. I would like to propose that those utterances that are identified as containing a single tonic in the series of experiments are "marked" in that the "tonic" is a boosted peak of prominence – boosted to add emphasis to that particular element (e.g., in a contrastive situation, or on a "new" element). A normal, unmarked utterance will contain several peaks of prominence realized on the stressed elements of the utterance.

In order to preserve the notion of one "tonic" per unit, I would like to propose that there is an abstract unit called a *tone unit* which contains only one stressed syllable and any following unstressed syllables. The tone unit will normally be co-terminous with the foot (cf. Abercrombie, 1967). Indeed it may be unnecessary to differentiate between the two. Tone units may then combine to form *tone groups*. The stressed syllables of the tone group will interact according to the context of the utterance, the information structure of the surrounding discourse, the information structure of the utterance itself

and the speaker's intent. For example, in a contrastive utterance, the peak on the contrasted element will be boosted and the remaining peaks will be suppressed so that there may only be one "perceived" peak of prominence; a tone group may therefore contain several perceived peaks of prominence or a single perceived peak of prominence. The tone group in its unmarked form will contain several peaks of prominence (cf. Currie, 1979a, 1979b).

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APPENDIX 1

Below is a short story. Read it through and try to remember it. Your partner will ask you questions about the events and characters in the story, but you should only answer "yes" or "no." While you are being asked questions, you may refer back to this typed copy.

HOW A BAD DAUGHTER WAS MADE A GOOD WIFE

Once there was a rich farmer who had three sons.

The eldest of them married a gentleman's daughter, who was very well off; and the second married a miller's daughter who was very beautiful. And the youngest of them, who was a carpenter, was then the only one left unmarried. He decided to marry.

"I'll marry the daughter of a bad mother, as bad as I can find."

He took his pony and his dog, and went away, not knowing how far he would go. The day was bad, and snow was falling. What did he see on his way but an old man at work ploughing in a field. He went over to him, and said:

"Oh, ho! you've got a bad day for ploughing!"

"Well," said the old fellow, "indeed, it isn't good!"

"Why do you have to work outside on a day like this?"

"If there was a way I could stay at home, I wouldn't come out myself; but I'd rather be outside, than indoors with the womenfolk. If her mother is bad, my daughter is seven times worse."

"May I marry her?" asked the young man.

"I never saw anyone on whom I'd wish her, but if you think you can bring her to heel, I'll not keep her from you."

"Oh, I'll take her right enough, if you'll give her to me."

"That's just what I'll do," said the old man.

So they agreed to get married; and the daughter of the old man became the wife of the farmer's youngest son. Then they left for his home. The pony was their only conveyance, and the girl was put behind him on the pony's back.

They left, and they hadn't gone far before the young husband's dog ran away. He shouted at the dog, but the dog paid no heed. When the dog did come back, he took a revolver out of his pocket and shot the dog and killed it.

"Goodness," said his wife, "why did you kill the dog?"

"Why should I let him live, a worthless creature that wouldn't listen to me?"

When they were getting near to his home, they came to a river which ran between them and the home. He put the pony at the worst bit of the stream, and began to lash the pony to make it go across the river. The pony only backed and would not go near it. He asked his wife to dismount, and he got off the pony himself, and took out his revolver, and put it to the pony, and killed it.

"My God, why did you kill the pony?" she said.

"Why should I let it live, a worthless creature that wouldn't do what I told it?"

He went and took the saddle off the pony.

"Here," he said. "You carry that."

"Indeed I'll not carry it; you might have let the beast that was carrying it live; the saddle would be fitter on it than on me."

"Are you saying that you won't carry it?" he said.

"Oh, of course I'll carry it, but you really might have let the pony live, it would have been more suitable on her."

"Well, if the pony had done what I told her, I wouldn't have killed her."

They came home, he and she, and she was the best wife there had ever been! There was nothing he asked her to do that she wouldn't do!

APPENDIX 2

This is a game of cooperation. Your partner has been given a story to read and remember. Below is a list of characters from the story (*List A*) and a list of actions or events from the story (*List B*). Your task is to match up List A and List B and reconstruct the story.

Your partner has already read the story. You may ask him/her questions about the story, but your partner may only answer "yes" or "no." So, you will not be able to ask questions like: "who had three sons?" You may ask as many questions as you like until you think you know *which* characters perform *which* actions and in what order, that is, until you think you can tell the story. (Note: One character may perform *more* than one of the actions in List B).

When you feel you are able, tell the whole story to your partner.

If you wish, you can make notes, draw connecting lines, or number actions on this sheet of paper.

List A (Characters)	*List B* (Actions/Attributes)
1. eldest son	a) ____ has a bad-natured wife and a daughter who is worse.
2. youngest son	b) ____ does not obey command to return and is shot.
3. old man	c) ____ had three sons.
4. miller's daughter	d) ____ is impressed by previous events and becomes a very obedient wife.
5. bad-natured daughter	e) ____ returns home on the back of a pony.
6. dog	f) ____ asks to marry bad-natured daughter.
7. pony	g) ____ was very beautiful.
8. newly-married couple	h) ____ went off with his pony and dog to look for bad-natured daughter of a bad-natured mother.
9. rich farmer	i) ____ refuses to cross a stream and is shot.
10. second son	j) ____ was very well off.
11. gentleman's daughter	k) ____ runs away.
	l) ____ married a gentleman's daughter.
	m) ____ decided to get married.

n)_____tells his wife to carry the saddle.

o)_____ meets _____ ploughing a field in the snow.

p)_____ married a miller's daughter.

APPENDIX 3

Experiment 2: results

1. THE PONY(ABC) RUNS AWAY
   25

2. WAS IT THE MILLER'S DAUGHTER(ABC) WHO RETURNS HOME ON
   9 0
   (7) (3)
   THE BACK OF THE PONY
   9
   (7)

3. PRESUMABLY IT WAS THE ELDEST SON
   25

4. THE SECOND SON(ABC) WHO MARRIED THE MILLER'S DAUGHTER(AB)
   2 12
   (11) (11)

5. WAS IT THE YOUNGEST SON(ABC) WHO TELLS HIS WIFE TO
   8
   (11)
   CARRY THE SADDLE
   6
   (11)

6. DID THE RICH FARMER(ABC) HAVE THREE SONS
   23 0
   (2) (2)

7. WAS IT THE SECOND(AC) SON WHO MARRIED THE MILLER'S
   12
   (7)
   DAUGHTER(B)
   6
   (7)

8. THE DOG(ABC) RUNS AWAY
23 2

9. WAS IT ONE OF THE SONS(ABC) WHO WAS VERY WELL OFF
23 0
(2) (2)

10. WAS IT THE RICH FARMER'S ELDEST SON(ABC) WHO MARRIED
23
(2)
THE GENTLEMAN'S DAUGHTER
0
(2)

11. IT WAS THE ELDEST(ABC) SON
25

12. WAS IT THE YOUNGEST(ABC) SON THAT MARRIED THE VERY
20 0
(5) (1)
BEAUTIFUL MILLER'S DAUGHTER
0
(4)

13. WAS IT THE MILLER'S(ABC) DAUGHTER WHO WAS VERY
23
(2)
BEAUTIFUL THEN
0
(2)

14. WAS IT THE WIFE(AC) OF THE NEWLY-MARRIED COUPLE(B) WHO
6 5
(12) (13)
WAS VERY IMPRESSED(B) BY PREVIOUS EVENTS AND BECAME A
0 0
(3) (4)
VERY OBEDIENT WIFE
0
(1)

15. WAS IT THE BAD-NATURED DAUGHTER(ABC) WHO RAN AWAY
21 2
(2) (2)

16. IS IT THE MILLER'S(ABC) DOG
25

17. WELL DID THE OLD MAN(ABC) HAVE THREE SONS(AB)
0 5 7
(2) **(11)** **(11)**

18. IS IT THE PONY(ABC) WHO REFUSES TO CROSS A STREAM AND
11 **0**
(8) **(3)**
IS SHOT(AB)
5
(8)

19. WAS IT THE RICH FARMER(AB) WHO HAD THREE SONS(AB)
10 8
(7) (7)

20. SO THEY GOT MARRIED
1 24

APPENDIX 4

Experiments 4 and 5

You will find below 17 excerpts from a "game" situation. Each except contains one sentence which has been underlined.

You are asked to decide which word in the underlined sentence *you* would classify as the tonic of the sentence. Please encircle the word you choose.

(1) 1 No the eldest son marries a gentleman's daughter. Youngest son marries the bad-natured one therefore it must be the um the second son who marries the miller's daughter

2 Yes

1 But the question is whose second son

(2) 1 Is it the gentleman's daughter who was very beautiful

2 Um No

1 Is it the miller's daughter who is very beautiful

2 Yes

(3) 1 Well then at this point we're going to have to have the dog does not obey the command to return and is shot. Sounds totally implausible

2 Well he runs away first

1 The dog runs away. Is that the next thing he does?

2 Yes

1 Extraordinary story – twelve – then he does not obey the return and is shot

2 Yes

1 It does seem harsh

2 Well yes

1 Which really frightens the girl. He then at this point tells his wife to carry the saddle

2 No

1 The horse refuses to cross a stream and is shot

2 Yes

1 I see

(4) 1 The father or the parent of the bad-natured daughter is presumably very well off

2 Is that a question

1 Yes. Is the the parent of the bad-natured daughter very well off

2 No

1 No. Is the bad-natured daughter very beautiful

2 No. At least we're not told that

1 Well then it has to be a gentleman's daughter who is very beautiful

(5) 1 Who meets somebody ploughing a field in the snow. Is it the newly-married couple who meet somebody ploughing a field in the snow

2 No

1 No. Its not the youngest son who does it

2 Yes

1 The youngest son who does it

(6) 1 Is it the rich farmer who has a bad-natured wife and a daughter who is worse

2 No

1 Is it the old man who had a bad-natured wife and a daughter who is worse

2 Yes

1 (Whispers . . . had three sons . . . bad-natured wife . . .)
Is it the rich farmer who had three sons

2 Yes

(7) 1 Did the old man have a bad-natured wife and a daughter who is worse

2 No. Oh yes. Yes he did

1 Right. So there's an old man who has a bad-natured wife and a daughter who is worse. Um. Does the old man have sons as well

2 No

1 He doesn't

(8) 1 The newly-married couple return home on the back of a pony. The dog runs away. It doesn't obey the command to return and is shot.

(9) 1 Somebody ran away. Was it the bad-natured daughter who ran away

2 No

(10) 1 Did the miller have a bad-natured wife and a daughter who was worse

2 No

1 Did the old man have a bad-natured wife and a daughter who is worse

2 Yes

1 Was the old man very well off

2 No

1 Was the miller very well off

2 No

(11) 1 Well. You tell me the next thing she said firmly

2 Well. Right. The next thing he does it is that he not only I mean he goes off to look for a bad-natured daughter. He for some reason decides to marry a bad-natured daughter

1 Oh I see. Well that's very curious

2 Yes

1 So O.K. So that's going to be the youngest son decided to get married

2 uh huh

1 and seven then went off with his pony and dog to look for the bad-natured daughter of a bad-natured mother

2 uh huh

1 It does seem a curious desire to have in life

(12) 1 Refuses to cross a stream and is shot. Its gonna have to be that. How extraordinary. How about the miller's eh the bad-natured daughter refuses to cross a stream and is shot. It can't possibly be

2 No

1 They're going to have to do something like to go market and I can't find anything saying going to market. How about the horse runs away

2 No

1 The dog runs away

2 Yes

1 Is than ten eleven

2 No

1 But it is going to be the dog who runs away sooner or later. Well that's something isn't it

(13) 1 But was it the eldest son who decided to get married

2 No

1 Was it the second son who decided to get married

2 No

1 Then it was the youngest son who decided to get married

2 Yes

1 Married a miller's daughter. Now who was it who had three sons. The rich farmer had three sons. Was it the second son who married a miller's daughter

2 Yes

(14) 1 Is the person who has a bad-natured wife and daughter who is worse the rich farmer

2 No

1 Is it the old man

2 Yes

1 So it would be the rich farmer who had three sons

2 Yes

(15) 1 Is that the do- pony which does not obey the command to return and is shot

2 No

1 Is it the dog that does not obey the command to return that is shot

2 Yes

1 O.K. Runs away. Then it's it must be is it the dog that runs away

2 Yes

1 How shall I ever unravel this set of railway lines. That's the dog

(16) 1 Does the youngest son go off with his pony and dog to look for the bad-natured daughter of a bad-natured mother

2 Yes

1 Eh where are we. Eh youngest son two Um Was the old man very well off

2 No

1 Was the rich well was the rich farmer very well off

2 Um No

(17) 1 Now who on earth married the miller's son. That was the other daugh- uh son that's the um eldest son isn't it. Uh No the eldest son marries a gentleman's daughter. The youngest son marries the bad-natured one therefore it must be the um the second son who marries the miller's daughter

2 Yes

1 But the question is whose second son. Um. The second son. Now the Oh I see all the sons mentioned are sons of the same father

2 Yes

1 Right. I get it. Yes.