
On Scales of Contrast in Connected English Speech

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If we were to ask a group of native English speakers whether

(a) Throw it into the garden

was more like

(b) Throw it from the garden

or more like

(c) Throw it in the garden

we can assume that more would equate (a) and (c) than (a) and (b), and that this would constitute evidence that there was a scale of importance within the differences between 'different' prepositions. Whatever difference there may be between *into* and *in*, we could say, there are environments in which they come together in contrast with *from*, and we might postulate within the 'system' of prepositions such a 'subsystem' as

from :: in(to)
 in : into

In an attempt to see whether there was a scale of importance for some of the many possible types of difference manifest in the prosodic features of connected speech, we recorded the utterance:

A few minutes later, the fellow came; he walked up slowly,
and said 'Oh, it wasn't you that I wanted.'

A transcription of this recording, narrow enough to register all the features relevant to the experiment, is given in line II of Table 1. Forty-six native English informants in turn heard the recording twice, first as a whole and then in two parts; they were asked simply to repeat it in the same two parts, the break being at point 5 (Table 1, line I). Their versions were recorded and transcribed in the same type of notation, and these were then scrutinized for the various kinds and

TABLE 1

Showing the distinctions relevant to the experiment and the extent to which the 46 informants observed them

		A few minutes later, the fellow came; he walked up slowly and said 'Oh, it wasn't you that I wanted'.															
		I	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Model		II	.	.	.	✓	.	.	✓	✓	.	.	✓	✓	.	✓	
		III	/	'		/ #	/	:	#	.	/	'	✓ #	/ #	/	✓ #	
	Tone Unit	IV				34	4	n.a.			41			42	1	n.a.	
	Tonicity	V	2		33	16	34	(+4S)			41			42	40	38	
	Onset	VI	46			34	4	46	(+4S)				32	9	43	1	
		VII	1\		28	3\	14\	2\			17		10	29(+)	29(+)	(+)	29
	Nucleus		1\(+)		2\	2\(+3S\)	1S-				12\		29\	2\(+)	9\	(+)\	2
											12\		2\	1\			6\
																	(+5S\)
	Stress	VIII	15								5						
	Stress replacing nucleus	IX														3	
	Stress plus nucleus	X						1						19	2		
	Booster	XI				5(✓ or \)	21					11			23	1(\)	
	Booster replacing onset	XII				10								33			
Pause	XIII				1		n.a.				3			26			
Range	XIV				15		28				29		38	39	30		
					17 N\		4 N\				2 N\		2 N\	1 N\	7 N\		
					1 N\		2 N\				7 N\		1 N\		1 N\		
											3 N\		1 N\				

Notes: The italicised numbers show agreement with features in the model; unitalicised numbers are deviations.

n.a. = 'not applicable', since informants reacted to a recording of the model in two parts bounded at these points.

S = 'subordinate', on which see p. 364 below and note 6.

Range in line XIV refers only to a contrast between 'not narrow' and 'narrow' (N); that is, a range equal to or greater than that of the model is here regarded as agreement and distinguished from instances of narrowed range in (non-subordinate) nuclei.

degrees of similarity and dissimilarity to the original version (hereafter referred to as the 'model') in terms of the following key features:¹

Points 3, 5, 9, 10, 13, 14 as 'nuclei', similarity being noted in terms of occurrence, location, pitch height at beginning of nucleus, pitch range, and direction of pitch movement;

Points 1, 4, 7, 10, 12 as the first points of pitch prominence ('onset') after beginning of utterance and after each nucleus, points 13 and 14 being considered correlative and interdependent, forming a complex without the possibility of an intervening onset;

Points 2, 8 as points of syllabic prominence without a step-up in pitch ('stress');

Points 6, 11 as pauses, similarity noted simply in terms of 'pause' or 'no pause', regardless of precise duration.

For example, the following is a selection of agreements over a stretch of the utterance up to the first nucleus, 'A few minutes later':

1(a) 3 out of 46 informants had: onset on *few*; stress on first syllable of *minutes*; rising nucleus (with same range as model) on *later*.

(b) 11/46: onset on *few*; rising nucleus (with same range as model) on *later*.

(c) 28/46: onset on *few*; rising nucleus on *later*.

(d) 33/46: onset on *few*; nucleus on *later*.

(e) 34/46: onset on *few*; nucleus within the stretch.

To illustrate the fact that the two conditions remaining in 1(e) are not universally liable to equal agreement, we may give the comparable points in the selection for another stretch, admittedly least typical in the amount of disagreement over the placing of the onset, 'and said "Oh"':

2(d) 7/46: onset on *oh*, nucleus on *oh*.

(e) 42/46: nucleus on *oh*.

Applying such tests of agreement throughout the material, it was found, as we see in Table 1, first that different substantial criteria produced sharply different amounts of agreement, and secondly that the same substantial feature produced differing amounts of agreement at different points in the utterance. These two factors taken together suggested that we were dealing with different systems and not merely expansions of a single system. It was further found that the series (a)-(e) given for one particular stretch above had regularity and con-

sistence in the correspondence of agreement to substantial features when compared with the series set up for the other stretches. Since, therefore, there was non-randomness in the kind of feature noted and the agreement observed, it is possible to re-state generalized forms of these series, accounting for all the data in the test material, as inverse hierarchies of systems.

The systemic statement which accounts for the highest level of agreement concerns what is common to 1(e), 2(e) above: the occurrence of an unstipulated nucleus at an unstipulated point within a stretch of speech. That is, the barely delimited 'tone unit'² or what Trim has called 'tone cum rhythm group'.³ There was 84.8 per cent agreement in this respect, though such a level was not evenly spread over all tone units, yielding a point of subsidiary interest to which we shall return.

The next highest level of agreement, 81.6 per cent, was to be found in 'tonicity', the abstraction that relates to the location of the nucleus, without regard to the range or direction of the pitch movement.

The third highest level of agreement, 77.3 per cent, concerned the onset location—the first point of pitch prominence in the tone unit.

When we come to the exponent of nucleus, we find more difficulty in deciding what we should regard as agreement. In terms of a widespread typology that is based on direction of pitch movement alone, we have in the model five types of nucleus: rise (at Point 3), fall (5), fall-rise (9), rise-fall (10), and fall-plus-rise (13, 14). Examined in the light of this typology, the data of the experiment yield 61.6 per cent agreement. This is a sharp drop from the agreement reached in respect of the previous feature considered, and probably most speakers would agree that they are intuitively aware of less randomness in nucleus selection than this figure would imply. Our uneasiness is confirmed when we examine the grossly uneven way in which agreement is registered in the test material by means of this typology. At one extreme, in the tone unit 'the fellow came', we find (with tonicity at *fellow* or *came*) that there is 95 per cent agreement on the nucleus type 'fall'. At the other extreme, in the tone unit 'and said "oh"', we find only 22 per cent agreement on a rise-fall nucleus. But scrutiny of the area of disagreement in the latter case reveals significant regularities. Where the model had a rise-fall on *oh*, 39/46 informants registered a step-up in pitch at this point, and of the 32/46 who did not repeat the rise-fall, no fewer than 29 made a fall nucleus here, 26 of them with a 'high' step-up in pitch (that is, to a point higher than the level of the previous pitch-prominent syllable), followed by a wide-range fall. It

would seem, therefore, that an essential feature of a rise-fall is the attainment of a high pitch level (not at all necessarily by means of a pitch glide), and that even conservatively we can equate a high step-up plus wide fall with a rise-fall nucleus. Thus:

model: ôh informants: ôh 10× !òh 26×

If we now bracket ! with ^ as variant exponents of the 'same' nucleus, we find we have an agreement figure of 74.4 per cent for nucleus types.

Agreement levels of the four types so far noted may now be summarized as follows:

(a) Tone Units:

.....#.....#.....#.....#.....# 84.8%

(b) Tonicity:

...Ton..(#)...Ton..(#)...Ton..(#)...Ton..(#)...Ton..(#) 81.6%

(c) Onset:

./.(Ton..#)./(Ton..#)./(Ton..#)./(Ton..#)./(Ton..#) 77.3%

(d) Exponence of Nucleus:


.(/)Nuc(#).(/)Nuc(#).(/)Nuc(#).(/)Nuc(#).(/)Nuc(#) 74.4%

Since a high starting point plus wide range would seem to be significant features capable of distinguishing between a fall and a rise-fall, it is worth looking at the distribution of range characteristics elsewhere in the material. It is possible that we should associate range with the relatively low agreement found at another nuclear point, the fall-rise in 'he walked up slowly'. The fall-rise is repeated here by only 17/46 informants, while 12/46 had a rise and a further 12/46 a fall. But this scatter of results is perhaps not as random as such figures might suggest. Of the 24/46 repeating a nucleus but not a fall-rise, 10 had narrow range and 7 of these had the narrow range with a rise. Although the evidence from this particular experiment is slight, it seems possible that in a given grammatical environment a narrow-range unidirectional nuclear tone—especially a rise—may operate in a system of variants of fall-rise; further investigation may be expected to reveal the terms of such a subsystem and the conditions under which they are selected.⁴



The part played by range is seen less equivocally in the data for the

first tone unit in the experimental material, 'a few minutes later'. In the first place, it is to be noted that while the model had a full-range rise on *later*, 12/46 informants did not observe a tone unit at all in this instance. This is perhaps not surprising in view of the relatively low predictability that a front-placed verbless adjunct (as opposed to a finite or non-finite verb adjunct) should constitute a tone unit.⁵ More importantly, while 28/46 not merely observed a tone unit but repeated a rise on *later*, 17 of these informants gave the rise a narrow range. In view of what was said in the previous paragraph, it is worth adding that a further three informants gave a fall-rise on *later*. Even if this constitutes little additional evidence on the relation of \vee and N' , it surely indicates that N' has a place in a subsystem of nuclei, grammatically conditioned: that, in other words, the rise of yes-no questions is characteristically different from the rise of front-placed adjunct exponents.

Range has an evident relevance to the phenomenon of tonal subordination.⁶ In the experimental material, subordination chiefly occurred when informants moved a nucleus forward from its place in the model; for example, from *came* to *fellow* in 'the fellow came'. A quarter of those who thus moved the nucleus retained a nuclear tone on *came* but gave it a narrower range than that of the fall on *fellow*. For example:

•  transcribed as $\vee[\]\#$

In one case, the exponent of the subordinate nucleus was level,⁷ and interestingly enough it was an instance when the superordinate nucleus was itself narrow. Thus we might postulate a parallel series

•  = $\vee N\vee$ systematized as $\vee[\]\#$
 •  = $N\vee$ systematized as $N\vee[\]\#$

where the final pair of transcriptions has reduced the substantial differences to a single determining distinction. It is clear that we might further generalize to the point of equating these as both

$\vee[\]$ in contrast with \vee

or, at a still higher level of abstraction, as both

\vee in contrast with \vee , $\vee[\]$, $[\]\vee$, etc.

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Finally, a narrowed range seems to be commoner than merely random in the second nucleus of the correlative pair in the sequence

it wasn't yòu that I wànted #

where 7 of the 29 informants who repeated a rise on *wanted* made it narrow.⁸ This may indeed suggest an affinity between the sets of 'correlative nuclei' (rise-plus-fall as in 'he walked áll the way hòme', fall-plus-rise as in 'the òld men trïed') and the phenomenon of 'subordination'.

The area of minority disagreements is, in its own way, as informative as that of majority agreements. Thus in the tone unit 'the fellow came', the fall nucleus of the model is repeated by 44/46 informants, while 2 substitute a rise. In the unit 'a few minutes later', 28/46 repeat a rise and three substitute a fall, while a further three substitute a fall-rise. In the unit with correlative nuclei, 'it wasn't you that I wanted', a fall on *you* is repeated 38 times and the only alternative nucleus type that occurs is a rise-fall in two cases, and these—as we have seen—should be treated as variants of a fall. The correlative rise on *wanted* presents a very different picture. While 32 repeat a rise (31 completing the fall-plus-rise correlation), no fewer than 11 informants substitute a fall. These 11 fall into two important groups. The first, numbering five, make the fall subordinate to that on *you*:

. . . yòu that I [wànted] #

The other six make the fall the primary nucleus, usually of the whole original unit ('. . . you that I wànted#'), but in one case with the formation of a new unit ('. . . yòu# that I/wànted#'). In the unit 'he walked up slowly', as we have already noted, the fall-rise is twelve times replaced by a rise and twelve times by a fall. Finally, we have the unit, 'and said "Oh"', in which—again as already noted—the principal disagreement is a majority one: 29/46 informants substitute a fall for the rise-fall; the minority disagreements here are a fall-rise twice and a rise once.

It is clear from the previous paragraph that the polarity is most extreme between fall and rise: the distinction between these two has clearest phonological status, with a contrastiveness most resembling that between, let us say, voiced and voiceless consonants in English phonology or between singular and plural in English grammar. A fall may be replaced by a rise-fall or it may even be ignored occasionally (at any rate in the correlative fall-plus-rise sequences); but it is very

unusual to find it replaced by a rise. The other pole, the rise, has slightly less stability, and it can be replaced by a fall fairly readily as the second part of a correlative sequence, though such replacement seems rare elsewhere.⁹

By contrast, the fall-rise admits replacement by both fall and rise quite frequently, and we find it three times replacing a rise, twice replacing even a rise-fall,¹⁰ and being introduced a further twice where there was no nucleus in the model:

the /fěllow# /càme#

Its phonological status seems to be indicated most by its apparently strong tendency to co-occurrence with 'contingency' or close grammatical relationship with what follows.¹¹ Contingency is even more obvious, of course, in the correlative nuclei of fall-plus-rise units in contrast (not infrequently neutralized) with fall units.

Further study is required to validate the hypotheses suggested by the present material, but it would seem that systems of nuclei operate in a set of relationships somewhat in the manner postulated for the present limited material in the two-dimensional model represented in Table 2.

TABLE 2

	← POLARITY greatest → →least←
CONDITIONING ←greatest → least→	

A brief comment may be of interest on some further disagreements relating to tone-unit limits, tonicity, and onset location. Four informants make a new tone unit begin with *came* (Table 1, line IV), thus tonally separating subject and verb, three making the exponent of

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subject alone ('the fellow') constitute a unit. The rarity of this type of break in clause structure (where the subject is a simple nominal group) is to be contrasted with the situation in which 42 informants follow the model in tonally interrupting the exponent of complement in 'and said . . .' where, however, the complement itself has clause structure in which the tonal interruption is between adjunct and SVC. As to tonicity, it was noted in *Proceedings*, p. 683, that a nucleus fell only rarely on an element preceding the head in group structure. In the present material, it is noteworthy that there are only two disagreements with the model in this respect: the placing of a falling nucleus on the premodifying *few* in the adverbial group 'a few minutes later' (Table 1, line V), and one of these appears less exceptional when it is pointed out that the fall is correlative to a rise on *later* (Table 1, line VII). Disagreements on onsets are in some cases unimportant: thus the relatively low agreement figure at *fellow* is a simple consequence of the relatively low level of agreement on the first tone unit's limits (Table 1, line IV). The shift of onset from *oh* to *said*, however, is very striking. In the model, it happened that the onset fell in four cases on the verb exponent or on the first lexical item in group structure (alternatively, but doubtless trivially, on the second syllable of each tone unit). The one exception was, so to say, 'regularized' by many informants:

and said /oh 9× but and /said oh 32×

The experimental material yielded little information on other aspects of agreement and disagreement. The pause at point 11 was repeated 56.6 per cent of cases, the booster¹² at point 5 in 45.6 per cent, and the stresses (prominence without step-up in pitch) at points 2 and 8 in 21.7 per cent. The chief interest that these features presented was their co-occurrence with others. Thus new pauses were introduced in several cases but only at tone unit limits. New boosters were introduced liberally. Apart from those already mentioned which co-occurred with a fall replacing (and thus jointly representing) a rise-fall, forty were introduced before falls and fall-rises and it would seem that : or ! plus \ or √ can be regarded as variants of \ or √ respectively with a distinctiveness of an utterly different (and 'lower') order from the distinctiveness of \ and /, \ and √, √ and /, or even / and N/. On stress there is very little to say: in a few cases it was found replacing a nucleus at *you*, and in a few it was itself replaced by a booster at *up*; extra stress (11) co-occurred with nuclei on a few occasions: *came* 1×, *you* 2×, *oh* 19×.

To conclude, it is clear that there is high predictability as to what will constitute a tone unit. This will be grammatically determined in two ways—internal structure, and the external relations of this structure. There is a comparably high predictability in tonicity, but this is not directly related to the predictability of tone unit. Tonicity is again grammatically determined primarily, but probably chiefly in respect of the internal grammatical structure of the tone unit. There is rather less predictability over the selection of nucleus type, but it is still high. The selection seems to be determined primarily by the external relations of the tone unit,¹³ but certain subsystems seem conversely to be determined primarily by internal relations.

Notes

¹ The recordings of the model and of the informants' versions are filed in the Survey of English Usage and may be heard at University College, London. The technical terms and the type of transcription used in this paper are explained in the paper by Quirk and others, 'Studies in the Correspondence of Prosodic to Grammatical Features in English', *Proceedings of the Ninth International Congress of Linguists* (The Hague, 1964) (hereafter referred to as '*Proceedings*'), pp. 679 ff., and with more detail in Crystal and Quirk, *Systems of Prosodic and Paralinguistic Features in English* (The Hague, 1964).

² See *Proceedings*, pp. 680–681. Cf. also M. A. K. Halliday, 'The Tones of English', *ArchL* 15 (1963).

³ *MPhon* 112, July–Dec. (1959), p. 27.

⁴ In one of the unscripted texts in the Survey of English Usage collection (5b.51), for example, we find several examples like the following:

- (a) the Advisory Council to which you referred # expressed an opinion #
- (b) and indeed # flies # in the face # of the very considerable body of factual evidence that exists #
- (c) have any crimes # in practice # been punishable by judicial beating #
- (d) in nineteen forty eight # judicial beating was abolished #

In each of these, the italicized syllable bears a narrow range rising nucleus (N∧). The first terminates a postmodified nominal group operating as subject, the other three a preverbal adjunct, that in (b) being followed by a similar one uttered by the same speaker a few seconds later, 'in actual fact', with a nucleus ∨ on fact. It is probable that if informants were asked to repeat these utterances (a)–(d), they would frequently replace N∧ by ∨.

⁵ See Table I in *Proceedings*, p. 689.

⁶ See further, Crystal and Quirk, *Systems of Prosodic and Paralinguistic Features in English*, pp. 52ff.

⁷ But this is not to say that a 'level' nucleus is to be related solely to 'fall' in systemic description. Although our present materials offer much evidence for linking level with fall, an alternative link with rise is also suggested. Levels seem undoubtedly to have a place in a subsystem of rising nuclei, though perhaps rather

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in prosodic co-ordination than subordination. To illustrate again from the text referred to in footnote 4:

- (a) with having their trousers taken dōwn # and their backsides bīrched #
- (b) between eighteen ninety # and nineteen thirty four #
- (c) it is subject to the final prerōgative # of mērcy # of the Home Sēcretary # who may recommend a reprieve #

In these instances, the level nuclei seem more readily replaceable by rising nuclei than anything else and might ultimately be best viewed as exponents of narrow terms in a subsystem of rise relatable to a particular rhetorical register of speech.

⁸ It is worth mentioning that in the first tone unit one informant gave such a correlative pair on *few* and *later*, making the rise of narrow range. There are several examples of \ + N/ in the Survey text 5b.51 from which other supplementary materials have already been quoted. For example:

- (a) if they did these dreadful *N* things # they might . . .
- (b) the plāin fact of the matter *N* is # they have not . . .
- (c) the vast majōrity of *N* mūrderers # are . . .

⁹ Compare the table given in *Proceedings*, p. 691, which shows that falls are not only twice as common as rises but that they frequently occur in similar environments, presumably indicating an area in which the contrast between fall and rise is neutralized.

¹⁰ Both irregularities, however, occur with informants who seem to be unusual and unreliable in some of their other responses as well, ignoring or replacing the nuclei on *slowly*, *you*, and *wanted*.

¹¹ Cf. *Proceedings*, pp. 684 f., 690 f.

¹² A booster is a step-up in pitch; see further, *Systems of Prosodic and Paralinguistic Features in English*, p. 46.

¹³ This is a matter that is developed further in a forthcoming University of London thesis by David Crystal. Survey of English Usage materials show several kinds of pattern in tone-unit sequences. For example, there is a high expectation that a tone unit with fall-rise nucleus will be followed by one with a high boosted fall nucleus, and that tone units of the latter type are equally expected after sequences of tone units with rising nuclei. Similarly, a rise-fall tone unit is more frequently than random followed by a fall unit, while a rise-plus-fall unit is more frequently than random followed by a fall-plus-rise unit and almost never by a fall-rise unit.