Vocalic Length and Metrical Strength in the Verse of *King Lear*

Tae Okada

Introduction

Much of contemporary discussion by linguists on poetic meter has been inspired by Otto Jespersen's "Notes on Metre." From today's perspective, this insightful treatise can be modified and refined in a number of ways. The present paper is another such attempt. The topic here is the relationship between vowel length and metrical rhythm. The question of length in terms of metrical system was casually thrown aside by Jespersen as not primary and perhaps for that reason, contemporary linguistic treatment also ignores this aspect of poetic meter.

Jespersen states that, within a single line consisting of three to five strong syllables of blank verse, "there are many possible harmonious and easy-flowing verses," and this is because the metric system "allows an abundance of variety;" (p. 655) but that variety, according to Jespersen, is "based primarily not on length (duration), but on stress (intensity)" (p. 650), and more specifically "infinite gradations of stress"

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(p. 651).[1] Later in the same discussion, however, he makes use of such notions as "strong and long syllables" and "heavy" syllables (pp. 654f.) proving that length was still on his mind as an element to be considered.

Whether Jespersen might have approved or not, length is an important phonetic factor in the structure of the English language and as such, it cannot but play a role in the metrical system. The question is just what role it plays.

On the other hand, when literary criticism deals with the topic of length in verse, the length analysis is presented practically with no concrete explanation as to how such analysis has been reached but rather, the length differences of syllables are presented as givens on which literary remarks are to be based. This, no doubt, stems from the difference in the focus of attention. But from a linguistic point of view, if, for instance, many English speakers agree on a length analysis such as:

then, there has to be some structural reason behind such agreement. There can be many different approaches to the topic. What follows is a possible beginning.

Long and Short Vowels in English

Vowels differ in duration not only among themselves, but also each one varies in phonetic length in its numerous occurrences so that the

vocalic duration can only be stated as a range of values rather than a single specific value, however approximate that may be.[3] The clearest schematic presentation of vocalic values available to us is the figure reproduced here by A. House.[4] Figure 1 shows that the four out of 12 American vocalic elements, namely / ɪ, ɛ, ʌ, ʊ/, have a range of duration shorter than the rest of the 12, though the longer end of the "short" ones overlaps with the shorter end of the "long" ones in value.

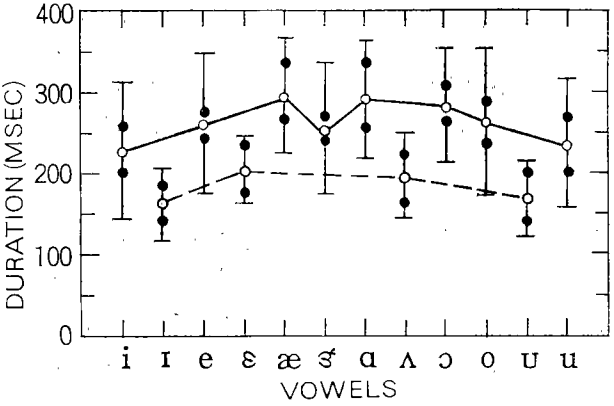

Fig. 1. Vowel duration data arranged to demonstrate various contextual effects. The large unfilled circles are means for each vowel in 14 contexts spoken by three subjects. The upper terminus of each vertical bar shows the average vowel duration in voiced contexts; the lower terminus is for voiceless contexts. The filled circle on each vertical bar shows the average vowel duration in fricative environments; the small unfilled circle is for stop environments. The broken line connects lax vowels; the solid line connects tense vowels.

Peterson and Lehiste's data entirely agree with this classification of vocalic nuclei.[5] They studied 13 "vocalic syllable nuclei", as they call them, and conclude:

> It appears rather clear that the vocalic syllable nuclei may be subdivided into classes according to their durations. As a first approximation, the syllable nuclei may be considered as consisting of four short nuclei, [ɪ], [ɛ], [ʊ] and [ə], and nine long syllable nuclei.[5]

I would like to utilize this classification of vocalic nuclei into long and short as the first basis for approaching the metrical analysis of blank verse. I take all my examples from Shakespeare's *King Lear*.

In *King Lear*, there are many lines such as the following:

(1) *Who* with best ***mean***ing have in***cur***red the ***worst***. Viii4
(2) Tell ***me***—but ***tru***ly—but then ***speak*** the ***truth***— Vi8
(3) With the hell-***hat***ed ***lie*** *o'er*whelm *thy* ***heart***, Viii146

These lines are quite representative in terms of metrical structure. In each of these lines, three of the five metrical positions of strenth are occupied by syllables with long nuclei (marked by boldface). This is a high frequency of long nuclei already, but there are also lines like the following in the same play:

(4) That ***we*** the ***pain*** of death would ***hour***ly ***die***, Viii184
(5) Bids the wind ***blow*** the ***earth*** in***to*** the ***sea***, IIIi5
(6) And the king ***gone*** to-***night***? Pre***scrib***ed his ***power***? Iii25
(7) Let ***me*** still ***take*** a***way*** the ***harms*** *I* ***fear***, Iiv330
(8) That ***these*** hot ***tears***, which ***break*** from ***me*** per***force***, Iiv299

In these lines, four or even all five positions of metrical strength are occupied by syllables with long nuclei.

The weak metrical positions are more often occupied by syllables with short nuclei. In the eight sample lines above, unmistakably short

nuclei occur at least in three out of five weak positions (in examples (4), (6), and (8), or in four metrically weak positions (in (1), (2), and (7)), and in examples (3) and (5), in all five positions defined as metrically weak. In short, we observe a high frequency of long nuclei in positions of metrical strength, and short nuclei in a majority of metrical positions of weakness.

In his *Anatomy of Criticism*, Northrop Frye makes the following comment on iambic pentameters:

> If we read many iambic pentameters "naturally," giving the important words the heavy accent that they do have in spoken English, the old four-stress line stands out in clear relief against its metrical background. Thus:
>
> To bé, or nót to be: thát is the quéstion.
> Whéther 'tis nóbler in the mínd to súffer
> The slíngs and árrows of outrágeous fórtune,
> Or táke up árms against a séa of tróubles . . .
> Of mán's fírst disobédience, and the frúit
> Of that forbídden trée, whose mórtal táste
> Brought déath into the wórld and áll our wóe,
> With lóss of Éden, till one gréater Mán
> Restóre us, and regáin the blíssful séat. . . [6]

If, instead of our five-stress analysis, we take Frye's four-stress interpretation of the above lines, what would result is: (1) a slight increase in the ratio of long nuclei coinciding with a strong syllable (for Frye's nine-line example above, 68.9% of the strong positions of the five-stress analysis are occupied by syllables with a long nucleus as opposed to 69.4% in the four-stress analysis), and (2) an increase in the ratio of long nuclei coinciding with less strong positions (24.4%

in the five-stress analysis and 47.2% in the four-stress). If the four-stress structure of a line is in "clear relief" as Frye puts it, "its metrical background" may be supported, at least partly, by the presence of a long nucleus in what might be a strong syllable of a five-beat structure. Since Frye offers no technically concrete explanation on how or why a line emerges "naturally" as four-stress or how "its metrical background" is still to be viewed as five-stress, these two questions are left wide open for substantiation.

Intuitively it might be thought that the words which tend to occupy weak metric positions such as prepositions and articles are more likely to contain short vowels, thus raising the ratio of long nuclei among other word categories such as nouns and adjectives, and that these tend to be placed in the metrical positions of strength. However, if we take a look at the linguistic facts, we are surprised to find that more than a half of the "function words" do contain long nuclei. In the data collected by Fries,[7] out of the ten most frequent prepositions — *at, by, for,* from, in, in*to*, of, *on, to,* and with—six italicized ones contain long nuclei. If we go down the frequency list of prepositions, among some twenty fairly frequent ones there are 13—be*hind,* be*low*, bes*ide*, bet*ween,* a*round, through, out* of, to*ward,* a*way* from, *down,* be*fore,* du*r*ing, and *like* —that contain long nuclei. The situation is much the same for conjunctions: seven out of 12 most frequent conjunctions, and nine out of 16 relativety frequent ones contain long nuclei. Out of 22 personal pronouns, fourteen have long nuclei in them.[8] It is true that the articles, *the, a,* and *an* are short—except that these can also be pronounced[ði:, ei, æn] for emphasis—but there are words with a long nucleus in related categories of words such as *each, all,* and *few.* In brief, we can

safely assume that long nuclei are fairly evenly distributed on the phonemic level among "function words" as well as among "content words."

Vowel Frequencies in Running Texts

These observations are more clearly understood when placed against the backdrop of linguistic facts concerning vowel frequency in everyday language. The first such study I would like to review is the one by Delattre (1965).

In his comparative study of English, German, Spanish and French,[9] Delattre presents his "preliminary comparison of vowel phoneme frequency based on short samplings of combined narrative and spoken material."(p.61) In English, "among the six most frequent vowels are / ə, ɪ, æ, i, ɛ / . . . . The diphthongs have rather low frequency . . . and their frequency order is . . . / ai, au, oi /." (p. 61) Table 1. shows his frequency figures in percentage for the 15 vowels and diphthongs.

When we add his frequency figures for four short vowels (asterisked in Table 1) and put the rest of the frequency figures together, the result is that in the material he studied, short vowels appeared 46.28% of the time, and long nuclei including diphthongs, 53.72 % of the time. This is fairly close to fifty-fifty, i. e., in Delattre's material, almost as many long nuclei occur as short ones.

This means that, if long and short nuclei are just randomly arranged in poetic lines, we might find no more than three long nuclei in positions of strength and no more than three short nuclei in positions of weakness. But, as illustrated by examples (1) through (8), long nuclei appear more frequently than just randomly in positions of

1. *ə	22.99%
2. *ɪ	14.44
3. æ	9.44
4. i	8.49
5. a	6.99
6. *ɛ	6.85
7. u	5.60
8. ai	5.50
9. o	4.95
10. ɚ	4.40
11. e	3.95
12. au	2.20
13. ɔ	2.00
14. *U	2.00
15. oi	0.20
Total	100.00
Total for short (asterisked) vowels:	46.28%
Total for long vocalic syllable nuclei:	53.72%

Table 1. Frequency of vowels and diphthongs in "short samplings" of English prose. From Delattre (1965), p. 62.

strength, and short nuclei in positions of weakness.

The most serious drawback of Delattre's study is that it is based only on "short samplings" as he stated.[10] Dewey's much earlier work is a better one in that sense because his phoneme frequency count is based on 200,000 words of texts drawn from diverse sources such as news, editorials, advertizing, scientific articles, fiction, public speeches, personal correspondence, etc. 200,000 words is by far the largest sampling of "connected matter" that has been analyzed in terms of phonemic composition. The result of his study is shown in Table 2.

Of the eighteen vocalic elements in his study, the short ones (asterrisked in Table 2) occupy six of the seven highest ranks of frequency,

1. *ɪ	8.12%	10. o	1.66%
2. æ	4.04	11. u	1.63
3. *ə	3.52	12. ai	1.61
4. *ɛ	3.50	13. ɔ:	1.29
5. *ɔ	2.86	14. *ʊ	0.70
6. *ʌ	2.38	15. au	0.61
7. *ɪ(of *the*)	2.00	16. a	0.50
8. i	1.96	17. ju:	0.31
9. e	1.88	18. ɔi	0.09

Total for short (asterisked) vocalic syllable nuclei: 23.08%
Total for the rest of the vocalic syllable nuclei: 15.58%
Total for all the vocalic syllable nuclei: 38.66%
The ratio between short and long vocalic syllable nuclei:

Short nuclei:	59.70%
Long nuclei:	40.30
Total:	100.00

Table 2. Frequency of vowels and diphthongs in running texts of 200,000 words. From Dewey (1923), p. 128.

i.e., vowels 1 through 7 are all in our short subcategory except /æ/. The six short vowels together occupy 23.08% of all phoneme occurrences in his material, while all the rest of the vowels and diphthongs put together occur 15.58% of the time. Put in a different frame, short vowels occupy 59.70% of occurrences of vowels and diphthongs, while the rest 40.30% are accounted for by long nuclei. It can be seen that in this much larger body of running texts, short vowels have a higher frequency of occurrence than long nuclei. If these percentage figures are closer to reality than Delattre's, then they make us wonder about the way long and short nuclei appear in the lines of *King Lear*, specially about the high frequency of long nuclei in metrical positions of strength, if not about the predominance of short ones in positions of weakness.

Dewey purposely selected his texts with "the omission of Shakespere (sic.), and the literary classics of the 17th, 18th, and early 19th centuries," because these, "however widely red (sic.), do not represent the *usage* of today." (p. 8) This is a conscientious and sound linguistic consideration on his part. However, despite his claim that his material is "adequately representativ (sic.) of good English as used—written, spoken, and printed—today," (p. 8) the spoken language is not adequately represented in his samplings.

Shakespeare's lines are written for the purpose of spoken delivery, and for that reason, we would like to have for comparison an analysis of everyday speech as it is actually delivered orally. I know of no such study at the phonemic level. What is available at this point is Thompson's analysis of syllable length for a spoken narrative text of some 330 words or 130.20 seconds long. Although the sampling is limited and individual phonemes are not analyzed in terms of duration, Thompson's data are of help because every single syllable and pause is measured with care, and the entire material is a good example of casually spoken narrative on an everyday topic. Of the 403 syllables in his analysis, 389 can serve our purpose here, the rest being "hesitation" syllables often spelled *um*, *uh*, and the like. Table 3 presents his data in a re-arranged form. In his material are found 153 syllables containing long nuclei and 236 containing short vowels. Once again, we notice that in connected everyday prose, there are more short nuclei than long ones: the ratio in this material is 60.67% against 39.33%.

Table 3. shows how these are distributed among actual durational brackets of up to 10 milliseconds long, between 11 and 15 milliseconds long, etc. We can see instantly that the syllables with long nuclei

Duration of syllables	Long Nuclei		Short Nuclei	
	number of occurrence	%	number of occurrence	%
1. up to 10 msecs	17	11.11	73	30.93
2. 11-15	33	21.57	61	25.85
3. 16-20	42	27.45	37	15.68
4. 21-25	21	13.73	23	9.75
5. 26-30	20	13.07	18	7.63
6. 31-35	11	7.19	9	3.81
7. 36-40	4	2.61	3	1.27
8. 41-50	5	3.27	5	2.12
9. 51 and above	0	0	7[11]	2.97
Total	153	100.00	236	100.01
Average duration	20.68 msecs		15.78 msecs	
Ratio between long and short nuclei:	39.33%		60.67%	

Table 3. Thompson's durational analysis of syllables (1980) rearranged for our purpose. 389 syllables are divided into nine brackets of duration. The vocalic syllable nuclei are subcategorized into long and short, and occurrences are counted and computed in percentage for each bracket.

may be quite short in some instances of actual delivery and syllables with short vowels may be as long as over 50 milliseconds.[11] These extreme cases seem to have some contextual reason: for instance, for the long ones, unusually emphatic stress and intonation, conjunctions serving as hesitation signals as to what to say next, etc., and for the short ones, a word may be in an idiomatic expression or otherwise obvious from the context so that it is just a matter of mumbling through a part of a sentence to deliver a meaning. These extreme cases apart, we notice that more syllables with long nuclei are in the brackets around 20 milliseconds long, and syllables with short nuclei are more typically in the brackets under 15 milliseconds in duration. The

average duration for the long ones is about 21 msecs, while for the short ones, it is approximately 16 msecs. It may not be very wise to draw too many conclusions from this limited material, but it might be reasonably safe to say that, on the one hand, there is a difference between syllables with a long nucleus and a short nucleus in their distributional characteristics among durational brackets, and more specifically in their average duration.

To summarize the discussion on the three sets of vowel frequency data, Table 4. shows the ratio of occurrence between the long and short subcategories of vocalic syllable nuclei for the three separate sets of running texts. In general, we may assume that short vowels appear a little more frequently than long nuclei in prose discourse.

Material analyzed by	Long Nuclei	Short Nuclei	Total
Delattre	53.72%	46.28%	100.00
Thompson (2) [11]	42.67	57.33	100.00
Dewey	40.30	59.70	100.00
Thompson (1)	39.33	60.67	100.00

Table 4. Four computations of the ratio between long and short vocalic syllable nuclei as they occur in running texts representative of English prose.

Categories of Feet

If we accept the linguistic view that the English language has four distinct stress levels from the strongest 1 through the weakest 4, a two-syllable poetic foot can have one of the 16 stress shapes as listed below:

A. 1) 4 + one of the four
2) 3 + one of the four
3) 2 + one of the four
4) 1 + one of the four

The first group begins with the weakest stress 4 followed by one of the four stresses; the second group is different from the first group only in that the first syllable is of second weakest stress 3, and so forth. Whether all these 16 stress shapes actually appear in iambic verse or how they are mapped into the iambic metrical frame is not our concern here, but it must be pointed out that a "normal" iambic foot has a weaker stress followed by a stronger stress and the reverse cases are "inverted" feet.

For convenience, I would like to divide the 16 stress shapes into the following three categories. The first category has four possible shapes: 4-4, 4-3, 3-3, and the inverted 3-4, all of which are "weak feet." The second category is made up of three "normal" shapes, 4-2, 4-1, and 3-1, and the inverted counterparts of these, 2-4, 1-4, and 1-3; all the six members in this category are characterized by the fact that the stress difference between the two syllables within the foot is 2 or larger, thus forming an "unambiguous" group. All the rest of the possible stress shapes are in the third category of "strong" feet: four normal ones, 3-2, 2-2, 2-1, and 1-1, and two inverted patterns 2-3, and 1-2.

In summary, the 16 possible disyllabic stress shapes in A are categorized as in Table B.

In the rest of the present paper, I would like to concentrate my attention on the third category, i.e., the "strong feet" and discuss the vocalic length structure of these feet in relation to their stress shapes.

	Normal Feet	Inverted Feet
1. Weak Feet	4-4, 4-3 3-3	 3-4
2. Unambiguous Feet	4-2, 4-1 3-1	2-4, 1-4 1-3
3. Strong Feet	3-2 2-2, 2-1 1-1	2-3 1-2

Table B: The stress patterns for the three subcategories of disyllabic feet.

Strong LL Feet

We have already seen earlier that in *King Lear*, long vocalic syllable nuclei have a strong tendency to appear in the second rather than in the first syllable of each foot, and it was then argued that by this tendency the iambic meter is reinforced. If we take a special look at strong feet alone, we notice once again a remarkable predominance of long nuclei, but this time not only in the second syllable but in both syllables as seen in the following examples:

(9) Who re*deems na*ture from the general curse IVvi204
(10) When I *do stare*, see how the subject quakes. IVvi108
(11) His grief *grew pui*ssant and the strings of life Viii215
(12) 'Tis the *time's plague* when madmen lead the blind. IVi46
(13) Cure this *great breach* in his abused nature! IVvii15
(14) In his *own grace* he doth exalt himself Viii68
(15) Let's follow the *old earl*, and get the bedlam IIIvii102
(16) If there be more, *more woe*ful, hold it in; Viii201
(17) Rule in this realm, and the *gored state* sustain. Viii320

(18) Nor are those empty-hearted whose *low sounds* Ii152
(19) Wisdom and goodness to the vile *seem vile*; IVii38
(20) Who were the opposites of this *day's strife*: Viii43
(21) In the *good man's* distress!—*Seek, seek* for him, IViv18
(22) If wolves had at *thy gate* howled that *dearn time*, IIIvii62
(23) And my *poor fool* is hanged! *No, no, no life*! Viii305

In all the italicized feet above, both first and second syllables carry relatively strong linguistic stress either at the word level, phrase level syntactic level, or any combination of these.[12] The strong foot where both syllables contain long nuclei is henceforth called the LL (L for long) foot. In view of the fact that in normal non-poetic text, long nuclei are less frequent than short nuclei, the predominance of long nuclei in both syllables is obviously a remarkable phenomenon.

In these cases where long nuclei carry strong stress, the length of the nucleus can only be considered as a reinforcing factor for the stress, for, it has been established in experimental phonetics that length and stress are in a "trading relationship," i.e., the duration of a vowel —presumably beyond its intrinsic duration[13]—is perceived as stress when other conditions including intensity are held constant.[14] In all the LL feet in the sample lines (9) through (23), except in "Seek, seek" and "No, no" where the two syllables fail to be in a direct syntactic relationship to each other such as Adjective-Noun, Verb-Object, etc., the second syllable carries an even stronger stress than the first, so that, though both syllables are strong and long, the iambic meter is in no way made ambiguous.

An additional fact of interest is that a majority of these strong feet are in what is called a "dipodic structure," that is, a strong foot pre-

ceded by a weak foot, or a "higher-level pattern . . . super-imposed on the pattern of alternating syllable strength,"[15] for example:

C. (12′) 'Tis the / time's plague
(14′) In his / own grace
(20′) of this / day's strife
(21′) In the / good man's

D. (9′) Who re- / deems na- / (ture)
(10′) When I / do stare
(18′) (heart-) / ed whose / low sounds
(23′) And my / poor fool

In C, the first foot is made up of two short vowels and in D, either one syllable or both syllables contain long nuclei, but in all the eight cases the first foot is in the category of "weak feet" as defined above and listed in Table B 1, thus, iambic dipods are unambiguously formed in all of these.

Above all, the most striking fact about the LL foot is its overwhelming numerousness among the strong feet. When a large number of strong feet are examined, an approximately equal number of LL feet are found in *King Lear* as the three other types of strong feet combined, namely, SL (S for short), LS, and SS. This fact almost by itself suggests that the vocalic length and metrical strength form a natural prosodic partnership in verse.

Strong SL Feet

Based on the view just mentioned, the SL structure is most readily expected in the iambic metrical frame, either the foot is strong or weak, or unambiguous. We have already seen earlier in examples (1)

through (8) how numerous the SL feet are in *King Lear*. But when our focus of attention is on the strong feet alone, the number is somewhat reduced: of these eight lines, (1), (3), and (5) through (8), or six lines contain an SL foot each, namely the second. A dipodic tendency is, again, rather clear.[16] However, the strong SL does not always appear in the second foot of a line, as we can see in the following examples:

(24) *Death, trai*tor! Nothing could have subdued nature IIIiv69
(25) From the *fixed place*, drew from my heart all love, Iiv270
(26) Were two *full moons*; he had a thousand noses, IVvi70
(27) As mad as the *vexed sea*, singing aloud, IViv2
(28) Hang fated o'er *men's faults* light on thy daughters! IIIiv67
(29) In cunning I *must draw* my sword upon you. IIi30
(30) Of differences, which I *best thought* it fit IIi123
(31) Yet have I ventured to *come seek* you out IIIiv152
(32) To have his ear abused, wisdom *bids fear*. IIiv303
(33) And now and then an ample tear *trilled down* IViii13

The first foot of (24) may be considered an inverted foot, and as such, may be orally delivered with a prolonged /ɛ/, although /ɛ/ itself is not normally a long vowel. The syntactic relationship between the two words, *death* and *traitor*, also permit such a delivery. In the rest of the lines, the italicized strong foot is syntactically structured in such a way that the second syllable is more strongly stressed than the first. Thus, the shortness of the first vowel emphasizes the fact that the stress is less strong on that syllable, and the length of the second vocalic syllable nucleus reinforces the stronger stress. The effect of this is obviously a reinforcement of the iambic structure, so

much so in fact that an impression is created that these feet are more like 3+1 in their stress pattern rather than 3+2 or 2+1, which in reality these are. The metrical structure is thereby reinforced and stabilized.

Strong LS Feet

Next comes the LS foot, which is about as frequent in *King Lear* as the SL form. Examples:

(34)	*Pierce ev*ery sense about thee! Old fond eyes,	Iiv302
(35)	*Each buzz*, each fancy, each complaint, dislike,	Iiv326
(36)	*Horns whelked* and waved like the enridged sea.	IVvi71
(37)	Told the *most pit*eous tale of Lear and him	Viii213
(38)	Who a*lone suf*fers, suffers most i' th' mind,	IIIvi103
(39)	Leaving *free things* and happy shows behind.	IIIvi104
(40)	Stewed in his haste, *half breath*less, panting forth	IIiv30
(41)	Natures of such *deep trust* we shall much need;	IIi115
(42)	But since thy out*side looks* so fair and warlike,	Viii141
(43)	Nor tell tales of thee to *high-judg*ing Jove.	IIiv224
(44)	Here is the guess of their *true strength* and forces,	Vi52
(45)	Most choice, forsaken; and *most loved*, despised;	Ii250
(46)	The King is mad; *how stiff* is my *vile sense*	IVvi276
(47)	That eyeless head of thine was first *framed flesh*	IVvi226
(48)	Who loses and *who wins, who's in*, who's out—	Viii15

The stress pattern of the italicized strong LS feet above is normal except in (34), (42), and (43), where the first syllable carries a stronger stress. If the SL structure reinforces the iambic stress pattern, the LS form must be favorable for the inverted feet. Although our present topic is the strong foot, not the inverted foot, it is interesting to notice

that all the three instances of structurally inverted feet in the sample lines above might, in actual delivery, be "tilted"—that is, the underlying stress pattern can be altered at the performance level in favor of the metric frame—for such reasons as emphasis.

With or without tilting, what maintains the normal metric structure in the LS foot is stress. In other words, the vocalic length does not contribute to the maintenance of the normal foot. Instead, the LS structure creates *tension* between the stress pattern and the vowel composition of the foot. And this tension may be left as such in the oral performance : longer but weaker-stressed first syllable followed by a shorter but stronger second syllable. That is the simplest interpretation of the foot, and it creates one of the varieties of the foot structure. But if some adjustment is to be made, the tension might be relieved in various ways.

First of all, in oral delivery, the second syllable can be prolonged not only in the vocalic nucleus but also in the consonant(s) : the /v/ sound in *Pierce every*, the /z/ in *buzz*, /s/ and /f/ in *suffer*, etc. The metrical structure of these lines, as well as the fact that the second syllable only has a short vowel in it encourages a "clear" pronunciation of consonants so that the entire foot might emerge as two syllables of more equal length.

In a majority of cases above, the second syllable contains a greater number of consonants than the first syllable: *free* has two consonant phonemes while *things* has three, *deep* has two against four in *trust*, and so on. Although we only have Thompson's data on syllable length to base our argument, it seems reasonably safe to assume that syllables with more phonemes are longer than those with fewer.[17] In other

words, the lines above are mostly written in such a way that when the second syllable has a short vowel, that vowel is surrounded by more consonants than the first vocalic nucleus which is long. The result is that the second syllable as a whole is more likely to have a longer duration, partly because of the stronger stress it carries and partly because of the larger number of consonants than the first.

In two of the cases above, the first and the second syllables have an equal number of consonant phonemes: a*lone suf*fers, and *most loved.* In four others, the first syllable has a larger number of consonant phonemes than the second: *Pierce ev*ery, *most pit*eous, *framed flesh,* and *who's in.* These are the cases where the consonants may be more readily pronounced with special clarity or force or prolongation, if the metric regularity were to be maintained. Interestingly enough, the consonants involved here all have phonetic potentiality of such "forceful" pronunciation.

In addition, in actual speech, Thompson discovered that phrase-final syllables are much longer than others in duration; in fact, that is a major contention of his dissertation.[17] If this is true, the second syllable of *most loved, framed flesh,* and *who's in* are just naturally long, since these are phrase-final. That leaves us with a*lone suf*fers, *pierce ev*ery, and *most pit*eous, where, aiding and aided by the strong stress on the vocalic nucleus, an emphatic pronunciation of the consonants can contribute to the maintenance of the metric structure of the foot.

The Strong SS Feet

The last group of strong feet have two syllables with short vowels, the SS foot. Among the strong feet, the SS structure is rare. Since

this is not essentially a statistical research, the rarity itself should not be glossed over, but it is so remarkably obvious that not to mention it at all is unnatural. The scarcity of the SS composition is in sharp contrast with the numerousness of LL among the strong feet. Before further comment, here are some examples:

(49) *Put strength* enough to 't. Wherefore, bold peasant, IVvi229
(50) *Vex not* his ghost: O, let him pass; he hates him, Viii313
(51) *What com*fort to this great decay may come Viii297
(52) Give thee *quick con*duct. Oppressed nature sleeps. IIIvi96
(53) Let shame *come when* it will, I do not call it; IIiv222
(54) Freedom *lives hence* and banishment is here. Ii180
(55) From the *dread sum*mit of this chalky bourn. IVvi57
(56) Stand in hard cure. *Come, help* to bear thy master; IIIvi99
(57) But then the mind *much suf*ferance doth o'erskip IIIvi105
(58) This sword, this arm, and my *best spi*rits are bent Viiil38
(59) Whilst thou, a moral fool, *sits still* and cries IVii58
(60) Must be their schoolmasters. *Shut up* your doors; IIiv300
(61) The sea, with such a storm as his *loved head* IIIvii58
(62) To his dog-hearted daughters—these things sting IViii46

There are practically no inverted feet among the SS. In the examples above, only (53) is underlyingly inverted, and (56) is ambiguous or flexible. All the rest are syntactically regular, i.e., the second syllable carries a stronger stress. The same comment as was made for the stressed second syllable of the LS type might apply here as well.

There are relatively few SS feet that form a dipodic structure; out of the sample lines above, there are three such instances: (55), (58), and (61). It is perhaps the kind of rhythm carried by the SS foot that fails to be conducive to the dipodic structure. Somewhat related

to this is the tendency for an SS foot to appear in lines where sentences are shorter than one full line. In fact, in selecting the examples above, I had to look for the lines where the ten or so syllables constitute reasonably coherent units. Even so, as we see in these examples, many of the lines contain two or more semantically and syntactically distinct segments. There is a rhythmic characteristic in the short and strong foot that makes it compatible with a short sentence, or conversely, where there is a succession of short sentences, there emerges a short, strong, and rapid rhythm more characteristic of SS rather than LL or SL:

A: Help, help! O help!
B: What kind of help?
C: Speak, man!
B: What means this bloody knife?
A: 'Tis hot, it smokes;
It came even from the heart of—O, she's dead!
C: Who dead? Speak, man! Viii221-224

In this exchange of short sentences, the SS type rhythm predominates, and it is broken only by the sentence, "O, she's dead!" where three long vocalic nuclei appear in a row, spoken more to the self than to any interlocutor and reflexive and reminiscing in content.

We might consider the SS structure to be in a maximally *tense* relationship with the strongness of the foot: the strong stress is more easily delivered and perceived when the nucleus is long, but when it is short, part of the strength of the syllable may have to be transmitted through a consonant or consonants of that syllable if such is available, or the entire intensity of the syllable must be concentrated within the

nucleus of short duration.

It is noteworthy that among the strong feet, there are a great number of LL's, radically smaller numbers of LS's and SL's and a small minority of SS's. The dipodic structure likewise is more typically a weak SS followed by a strong LL.

Degrees of Vocalic Tension

To conclude, the length of the vocalic syllable nuclei does seem to have a role to play in the poetic language of *King Lear*. It interacts with the metrical frame to create a variety of rhythms. Long nuclei occur more frequently in positions of metrical strength and thereby reinforce the metrical stress. In a smaller number of cases where short vowels occur in metrically stressed positions, the shortness of the vowel creates tension, forcing the stress to be carried within the limited durational bounds of the vowel and possibly causing consonants to be pronounced with extra force.

The most readily acceptable vocalic composition for an iambic foot is a syllable with a short vocalic nucleus followed by one with a long nucleus. Other combinations of vocalic nuclei within a foot can be considered to vary in "tension" in relation to the metrical frame. The degrees of tension may be formulated in the following fashion. If a short vowel is metrically weak, the tension is zero just as in the cases where a long vocalic nucleus is in a metrically strong position. But if a short vowel occupies a metrical position of strength, or if a long vocalic nucleus is in a position of metrical weakness, there is tension of degree 1. These notions can be shown in a matrix as follows:

Metrical Position / Durational Characteristic of Vocalic Syllable Nucleus	Weak	Strong
Short	0	1
Long	1	0

Table C: Matrix of Degrees of Vocalic Tension

In normal iambic feet as defined above and summarized in Table B, the four combinations of short and long vocalic nuclei create varied degrees of tension which may be computed as follows:

Combinations of Vocalic Syllable Nuclei	Computation of the Degrees of Vocalic Tension	Total degree of Vocalic Tension Within the Foot
Short + Long	0 + 0	0
Short + Short	0 + 1	1
Long + Long	1 + 0	1
Long + Short	1 + 1	2

Table D: The Degree of Vocalic Tension for the Normal Feet

A similar computation yields a symmetrical result for the inverted feet:

Combinations of Vocalic Syllable Nuclei	Computation of the Degrees of Vocalic Tension	Total Degree of Vocalic Tension Within the Foot
Short + Long	1 + 1	2
Short + Short	1 + 0	1
Long + Long	0 + 1	1
Long + Short	0 + 0	0

Table E: Degree of Vocalic Tension for the Inverted Feet

For the strong foot in a dipodic structure, the normal metrical pattern may be considered a strong syllable followed by an extra-strong. A long vocalic nucleus occupying an extra-strong metrical position creates no particular tension, but a short vowel creates more tension than it does in a normally stressed metrical position. To reflect this in our computation, the notion degree 2 is utilized and in consequence, Table C is expanded as follows:

Metrical Position / Durational Characteristic of Vocalic Syllable Nucleus	Extra-Weak	Weak	Strong	Extra-Strong
Short	0	0	1	2
Long	2	1	0	0

Table C': Expanded Matrix of Degrees of Vocalic Tension

On the basis of this, the four combinations of long and short vocalic syllable nuclei appearing in a strong normal foot are computed to have the degrees of tension as tabulated below:

Combinations of Vocalic Syllable Nuclei	Computation of the Degrees of Vocalic Tension	Total Degree of Vocalic Tension Within the Foot
Long + Long	0 + 0	0
Short + Long	1 + 0	1
Long + Short	0 + 2	2
Short + Short	1 + 2	3

Table F: Degree of Vocalic Tension for the Strong Normal Feet

If a strong foot has an inverted pattern, the vocalic composition of the foot creates tension in the following fashion:

Combination of Vocalic Syllable Nuclei	Computation of the Degrees of Vocalic Tension	Total Degree of Vocalic Tension Within the Foot
Long + Long	0 + 0	0
Long + Short	0 + 1	1
Short + Long	2 + 0	2
Short + Short	2 + 1	3

Table G: Degree of Vocalic Tension for the Strong Inverted Feet

Similarly for the weak foot in a dipodic structure, the degree of vocalic tension can be computed as follows:

	Combination of Vocalic Syllable Nuclei	Computation of the Degrees of Vocalic Tension	Total Degree of Vocalic Tension Within the Foot
Normal Feet	Short + Short	0 + 0	0
	Short + Long	0 + 1	1
	Long + Short	2 + 0	2
	Long + Long	2 + 1	3
Inverted Feet	Short + Short	0 + 0	0
	Long + Short	1 + 0	1
	Short + Long	0 + 2	2
	Long + Long	1 + 2	3

Table H: Degree of Vocalic Tension for the Weak Feet

The computational scheme of this type is a useful clarification device for what we sense as "rhythmic variety" in the poetic language. And that variety can be interpreted in terms of degrees of tension between the metrical frame and the durational characteristics of the vocalic syllable nuclei, the major agents of the metrical stress.

In all cases, "the vocalic tension," that is, the tension created by the vocalic composition of the foot must be added on to the already existing "metrical tension," which is the tension between the four-stress

structure of English phonology and the two-degree metrical frame of English verse.[18] The sum of the two is to be considered as the total tension of the foot. (March 1982)

Notes

1 "The fallacy of two grades" in relation to the "infinite gradations of stress" is the most thoroughly treated topic in the recent linguistic discussion of meter: Halle and Keyser (1971), and Kiparsky (1975), for instance. See Okada (1977) for further reference.

2 Frye (1957), p. 254.

3 See Okada (1969) for discussion and references.

4 House (1961), Figure 3, p. 1175.

5 Peterson and Lehiste (1960); the quotation is from p. 702. /ə/ in their paper represents the same phoneme as /ʌ/ in House's figure.

In the present paper, the somewhat cumbersome term "the vocalic syllable nucleus" or just "nucleus" for short is employed to cover single vowels, diphthongs and other vowel-glide combinations that form a syllable nucleus. The four "short" vocalic syllable nuclei are single vowels, so that the term "short vowel" is also used. What House calls "vowels" include those that some phonemic analyses consider as vowel-glide combinations. Also in the present paper, the adjective "vocalic" refers to the vocalic syllable nuclei and not just single vowels.

6 Frye (1957), pp. 251f.

7 Fries (1945), pp. 43ff.

8 Conjunctions with long nuclei are: *and, that, so, who, while, what, where; after, before, for, because, in order that, so that, than, although,* and *therefore.* Personal pronouns with long vowels are: *I, me, you, he, she, they, my, our, your, their, mine, ours, yours,* and *theirs.*

9 Delattre (1965), pp. 61ff.

10 The specific samplings are not explained in detail; even the actual quantity is not clear. Also, a more thorough study promised by him was never achieved.

11 A comment is necessary regarding the seven instances of syllables with short

vowels that exceed 51 milliseconds in duration, since these are longer than any of the instances of the syllables with long vowels. Six out of these seven instances are accounted for by the sentence-initial *and*, presumably used both as a continuation marker and a hesitation signal. The remaining one is the word *then* also used in the same manner. The word *then* may have been prolonged without much changing the basic quality of the vowel involved. However, the word *and* in those prolonged instances are probably pronounced not only in an extra-lengthened manner but with a qualitatively different vowel from that used in a rapidly uttered *and*.

In Thompson's data, there are 17 instances of sentence-initial *and*, and their duration varies from 11 msecs to 88 msecs as shown below:

1. 11	7. 29	13. 52
2. 18	8. 31	14. 59
3. 19	9. 35	15. 72
4. 20	10. 37	16. 79
5. 24	11. 48	17. 88
6. 26	12. 51	

Notice that only the four shortest ones are below the avarage duration of the syllables with long vowels, and that there is a lone case of 11 msecs which is below the average duration for the syllables with short vowels. If the long instances of the word *and* have the quality of a long vowel as we might reasonably assume, they should be included as long vowels. But we did not do so for the figures in Thompson (1), since there is no clear evidence presented by Thompson to that effect.

But we might as well see what happens if we did classify longer cases of *and* as long. Suppose, for instance, that we kept the four shortest instnces of *and* under the category "short" (since these are shorter than the average for the long syllables) and that all the 13 longer cases of *and* were placed under our "long" category. This would increase the average duration of our "long" ones by 2.18 msecs and reduce that of our "short" ones by 1.91 msecs. The total number of syllables with long and short vowels change by 13, thus altering the ratio between the two to 42.67% against 57.33%.

This comment on *and* may become relevant, if we need to consider emphatic uses of any of the function words which contain potentially long vowels, such

as *can* and *that*. Since it is more usual to look at the qualitative change of vowels as reduction of full vowels into a neutral vowel rather than vice versa, I have treated all the "potentially long" vowels in whatever category of words as long in the present reading of *King Lear*.

12 On this issue, see Okada (1977)

13 This is one of the observations made in Okada (1971b).

14 Lehiste-Peterson (1959); Fry (1955) and (1958); Lehiste (1970), pp. 125ff.

15 Kiparksky (1975), p. 594.

16 Kiparsky says that, in Shakespeare's dipodic structure, "the second and fourth feet are strong—as opposed to the first, third and fifth, which are weak." (*Loc. cit.*) This may be because his focus of attention is the trochaic or inverted strong foot. In the present study of *King Lear*, I have found quite a few dipodic structures in which the strong foot is an odd-numbered foot, but then none of these are inverted feet. See for example (15), (18), (20), and (27) through (29).

17 In Thompson's data on syllable length, an overwhelming majority of syllables longer than 20 msecs contain long nuclei, proving the fact that the vowel is the major carrier of syllable length. There are only a limited number of syllables with short vowels that exceed 20 msecs; the following is the entire list of such instances:

20–25 msecs:	him	wake *up*	spe*cial*	(ve*ry*)
	went	san*dy*	grandpa*rents*	(things)
	tra*vel*	some	(pa*rents*)	
	just	vi*sit*	(*dif*ferent)	
26–30 msecs:	*vi*sils*	took	morn*ing*	(ve*ry*)
	o*pened*	gifts	vaca*tions*	(*ve*ry)
	comes	guess	wonder*fully*	(in)
	a*rid*	things	(expecta*tion*)	(filled)
31–35 msecs:	*was	trip	things	
	*in	well	(spread)	
36–40 msecs:	*lived	(trips)		
41–45 msecs:	*was	things	(lived)	

Some of these (the asterisked ones) are followed by a hesitation syllable, *um* or *uh*, and a majority (non-parenthesized ones) are in a phrase- or sentence-

final position. The phrase-final position is the most important factor of syllable prolongation, according to Thompson (1980); Delattre (1965) also presents a similar finding (pp. 34ff.).

Notice, also, that the long instances of syllables with a short vowel tend to have more consonants than just one: the sheer number of phonemes may contribute to the length of the syllable. Moreover, the intrinsic length of consonants themselves must also add to the duration of the syllable as a whole: the long syllables tend to have fricatives, nasals, liquids, or combinations of these. For the phonetic characteristics of these consonants, see Okada (1971a).

18 For some discussion and references on the metrical tension, see Okada (1977).

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