Class 6, 3/15/15: Hierarchy in the Metrical Pattern

1. Starting point: the echoing principle (Hayes/Wilson/Shisko (5))

- Use phonological material to echo the meter.
- So: breaks gravitate to line boundaries, and away from line-medial position.
  - We can do this formally with McCarthy-Prince (1993)-style ALIGN constraints.
- But, what if the meter has more structure than lines?

2. Some hypotheses about metrical patterns in UM

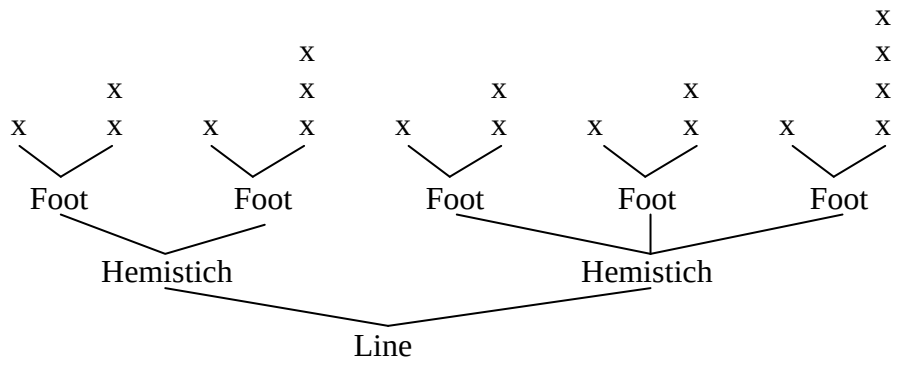
These ideas are "in the air", but seminal work that articulates them is:

- Fred Lerdahl and Ray Jackendoff (1983) *A Generative Theory of Tonal Music*, MIT Press.

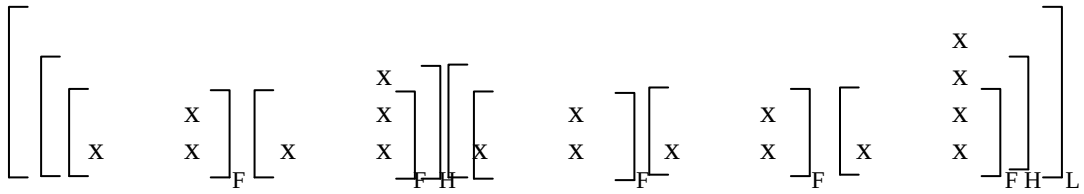
- Metrical patterns are characteristically hierarchical.
- These hierarchical patterns emphasize
  - **symmetry/repetition** = sisters have identical, or near-identical sets of daughter
  - **small numbers of daughter nodes**: usually binary, sometimes ternary, seldom bigger
- Parallel daughters have parallel metrical structures (grids).

3. Notating a metrical pattern all at once: bracketed grids

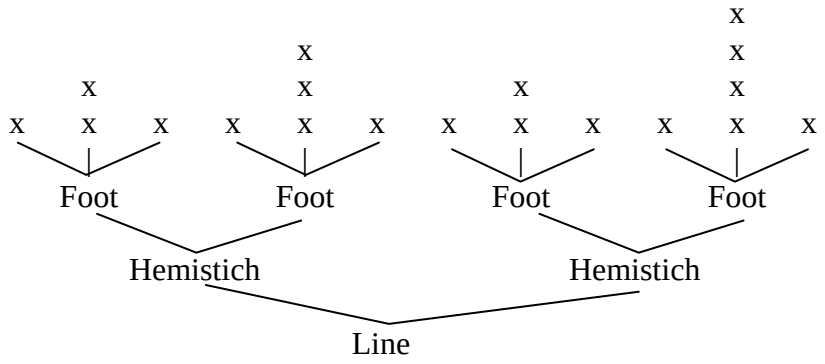
- These are a pain in the neck because you need really big brackets!
- Easier to annotate with trees. Here is a version often suggested for iambic pentameter:



- Or, with brackets:



4. The "Nightingale" meter (amphibrachic tetrameter)



5. Two traditional notions for describing the "echoing" of bracketing within the line

- **Caesura** = a location within the meter that requires alignment with a phonological phrasing break (of some specified degree of strength)
- **Bridge** = a location that must be spanned with two syllables of the same word.

Socrates:

- which kind of Align constraint is used for which?
- Is the ban on "central pauses" more like a bridge or like a caesura?

6. Bridge constraints seem to be weaker

- I don't know any systems in which *every foot* is a bridge.
- Rather, bridges seem to be localized to particular locations.
- In Finnish *Kalevala* meter and Serbo-Croatian folk epic, this is the end of the line.
  - Kiparsky 1968: characteristic for metrical constraints to be strictest here.

7. Excursus: unnatural bridges and caesuras

- Ancient Greek verse is notorious, perhaps quite aberrant, in having bridges and caesuras that don't match the natural bracketing of the meter (feet, hemistichs).
- I find this baffling and think that they were pretty clever to be able to do this.

8. The Metrical Hierarchy is strictly layered just like the Prosodic Hiearchy

ALIGN(Line, Left, Word, Left)
ALIGN(Hemistich, Left, Word, Left)
ALIGN(Foot, Left, Word, Left)

	king]$_{Line}$ [dom	king]$_{H}$ [dom	king]$_{F}$ [dom
ALIGN(Line, L, Word, L)	*		
ALIGN(Hemistich, L, Word, L)	*	*	
ALIGN(Foot, L, Word, L)	*	*	*

- This prevents "crazy" grammars like one that tolerates words crossing foot breaks, but only a line boundaries.

BRIDGES AND CAESURAS IN SERBO-CROATIAN EPIC METER

9. Source for metrics

- Jakobson 1933,1955; English summary in Hayes 1988[1]

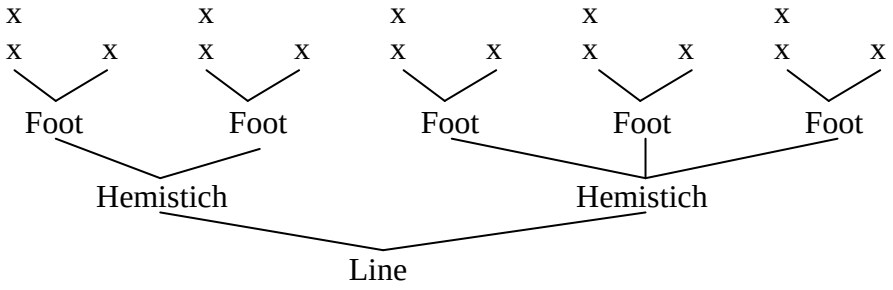
10. Source for singing/ethnographics

- Albert Lord's book *The Singer of Tales*, which in 2nd ed. comes with a CD of bards.

11. Metrical pattern

- Meter is trochaic pentameter, with rather different correspondence rules than in English.

Pattern:



12. Example

Stȅvaːn ùsta / iz šatora svôga	'Stefan rose from his tent'
Pa pȉrfati / žȉcu telefóːna	'gripped the telephone wire'
vîce Stȅvaːn / svôje brigadíːre	'Stevan called his brigadiers'
I nàniže / dȍle oficíːre	'and his junior officers'

[1] "Metrics and phonological theory," in Frederick Newmeyer, ed., *Linguistics: the Cambridge Survey*

(guslar Rodovan Ilić, heroic song on the Battle of Dobrudža (1916))

13. Correspondence rules for Serbo-Croatian folk verse

- Metrical positions and syllables are aligned one to one.
- Every Hemistich break *must* coincide with (at least) a Clitic Group[2] boundary. (caesura)
- Hemistich-final feet *must not* contain a Clitic Group boundary. (bridges)
- The "quantitative clausula":
  - If the ninth position is filled with a stressed syllable, that syllable must be heavy.
  - If the seventh or position is filled with a stressed syllable, that syllable must be heavy.[3]
- Take a peek above and verify.

14. Additional tendencies

- A rough matching of stress to strong and weak positions — probably low weights if we do this in maxent.
- "Syntactic breaks tend to coincide with line boundaries; failing that, they normally coincide with [hemistich] boundaries; failing that, they virtually always coincide with foot boundaries." (Hayes 1983)
- The restrictions of the quantitative clausula are statistically respected even for unaccented syllables.

CASE STUDY: TWO JAPANESE CHILDREN'S SONGS

15. Source

- Hayes, Bruce and Tami Swiger (1995/2008) "Two Japanese children's songs", ms., 12 pages.
- available on course web site

16. Listen

- "Tooryanse"; various versions on YouTube, e.g. https://www.youtube.com/watch?v=vMd4hw4Mnng

[2] Jakobson: "Worteinheit"

[3] The application of this restriction to the seventh position seems "antimetrical" and baffling to me. Explanations sought…

17. Basics

- Rhythmic beats affiliated with moras, not syllables. [to:k^{j}o:] has four moras, [honda] three.
- Japanese has no stress (Beckman 1988)

18. Meter

- Grid is dipodic double-trochaic tetrameter, as in some English songs.
- Binary hierarchy is assumed.

```
 x           x           x           x
 x     x     x     x     x     x     x     x
 x x   x x   x x   x x   x x   x x   x x   x x
[    ][    ][    ][    ][    ][    ][    ][    ]    feet
[          ][          ][          ][          ]    dipods
[                      ][                      ]    hemistichs
[                                              ]    line
```

19. Realization

- is basically isochronic, in this case; i.e. the song rhythm closely reflects the probable verse structure.

20. Notation for juncture used

###	right edge of an Intonational Phrase
##	right edge of a Phonological Phrase
#	right edge of a Clitic Group
=	right edge of a Word

21. Text

-1- Tooryanse ### tooryanse ###
one-may-pass-through one-may-pass-through

-2- koko =wa ## dokono ## hosomichijya ###
here TOPIC which small-path
"What is this small path?"

-3- tenjinsamano # hosomichijya ###
toward-Tenjin small-path
"It is the path to (the god) Tenjin."

-4- chootto # tooshite ## kudashyanse ###
a-little pass please
"Please let me pass through."

-5- goyoononaimono ## tooshyasenu ###
business-POSSESSIVE-not-exist-person pass-not-allowed
"A person who has no business here may not pass."

-6- kono # ko =no ## nanatsu =no ## oiwai =ni ###
this child POSS 7-years-old POSS celebration DATIVE
"For the seventh birthday celebration of this child,"

-7- ofuda =o ## osameni ## mairimasu ###
talisman OBJECTIVE contribute I-am-going
"I am going to contribute a talisman (religious token)."

-8- iki =wa ## yoi # yoi ### kaeri =wa ## kowai ###
going TOPIC good good return TOPIC frightening
"The going is pleasant; the return is frightening."

-9- kowainagaramo ## tooryanse ###
frighten-although one-may-pass-through
"Although it is frightening, one may pass through,

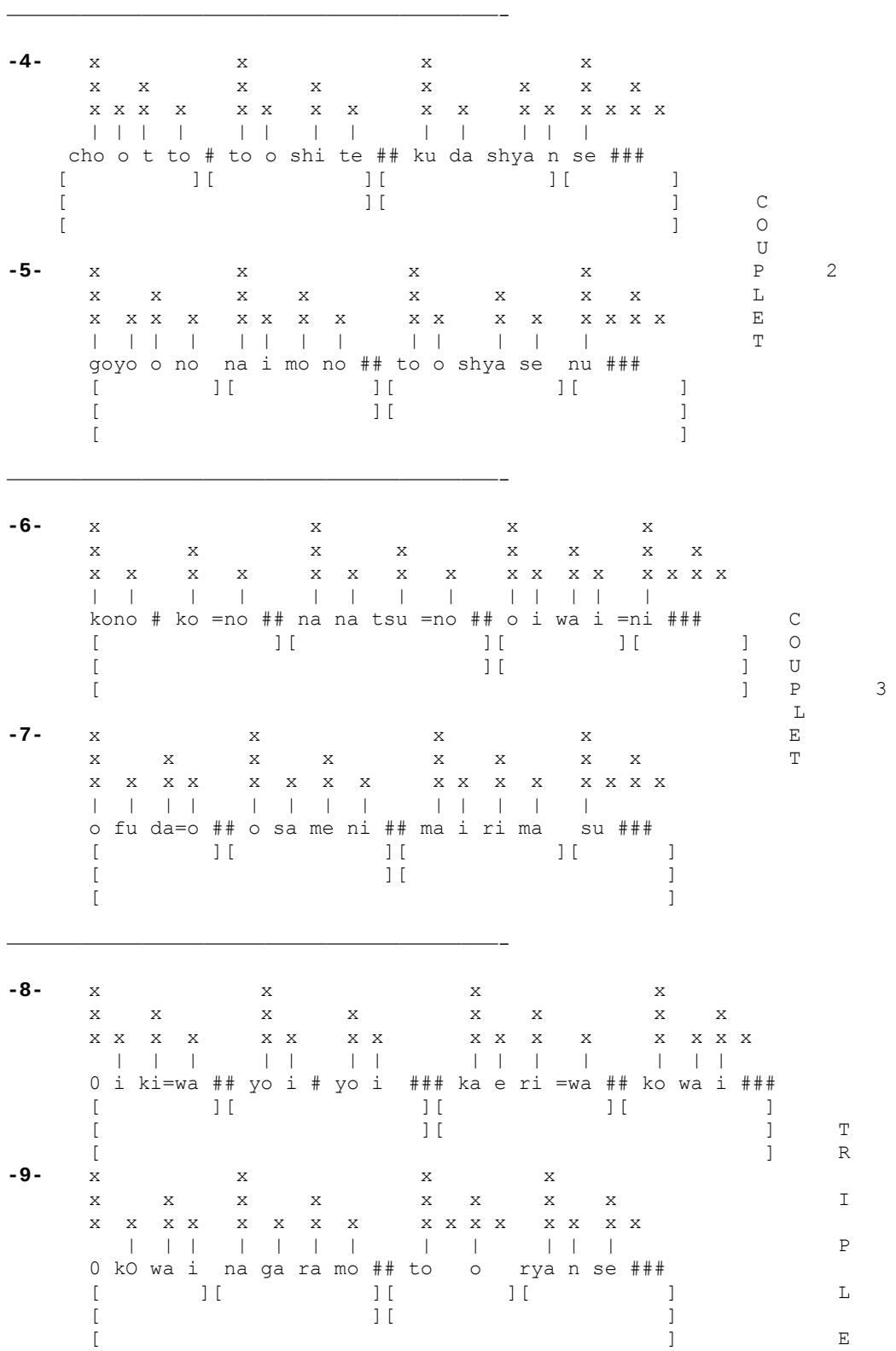
-10- tooryanse ### one-may-pass-through

22. Scansion

-1-
```
x         x           x            x
x   x     x    x      x     x      x   x
x x x x   x x  x x    x x   x x    x x x x
|   |     | |  |      | |   | |    |
To  o   rya n se ### to o rya n   se ###
[      ][          ][            ][     ]
[                  ][                   ]
[                                       ]
```

_____

-2-
```
x            x            x              x
x   x        x   x        x     x        x   x
x x x  x     x x x  x     x  x  x   x    x x x x
|   |  |     |   |  |     |  |  |   |    |
ko ko=wa ## do  ko no ## ho so mi chi  jya ###
[         ][           ][             ][          ]
[                      ][                          ]     C
[                                                  ]     O
                                                         U
```
-3-
```
 x        x             x              x                  P     1
 x    x   x     x       x     x        x   x              L
 x x  x x x  x  x  x    x  x  x   x    x x x x            E
 | |  | |    |  |  |    |  |  |   |    |                 T
te n ji n □ sa ma no # ho so mi chi  jya ###
[        ][          ][            ][        ]
[                    ][                      ]
[                                            ]
```


-4-
cho o t to # to o shi te ## ku da shya n se ###
-5-
goyo o no na i mo no ## to o shya se nu ###
COUPLET 2
-6-
kono # ko =no ## na na tsu =no ## o i wa i =ni ###
-7-
o fu da=o ## o sa me ni ## ma i ri ma su ###
COUPLET 3
-8-
0 i ki=wa ## yo i # yo i ### ka e ri =wa ## ko wa i ###
-9-
0 kO wa i na ga ra mo ## to o rya n se ###
TRIPLET

```
-10-  x           x        x        x                              T
      x     x     x   x    x   x    x   x
      x x   x x   x x x x  x x x x  x x x x
      | |   | |   |        |        |
      to o rya n  se ###   0        0
      [         ][        ][       ][       ]
      [                   ][                ]
      [                                     ]
```

23. Lineup of junctures with line positions

(9)	###	##	#	=	none
Line	**10**	0	0	0	0
Hemistich	**2**	**6**	**3**	0	0
Dipod	0	**5**	**1**	**1**	**11**
Other	0	0	**1**	**6**	**72**
%:					
Line	**100**	0	0	0	0
Hemistich	**18**	**55**	**27**	0	0
Dipod	0	**28**	**6**	**6**	**61**
Other	0	0	**1**	**8**	**91**

24. Statistical testing: chi-square

- Since many "patterns" in life are there by accident, one want to compute the probability that the patterns you really like and want to theorize with could be there by accident.
- The simplest test in the present case is the chi-square, which gives us the probability it could be due to chance.

	###	##	#	=	none
Line	10	0	0	0	0
Hemistich	2	6	3	0	0
Dipod	0	5	1	1	11
Other	0	0	1	6	72

Add up the counts in each boldface region, yielding:

10 0
2 106

	###	##	#	=	none
Line	10	0	0	0	0
Hemistich	2	6	3	0	0
Dipod	0	5	1	1	11
Other	0	0	1	6	72

yielding: 21 0
7 90

	###	##	#	=	none
Line	10	0	0	0	0
Hemistich	2	6	3	0	0
Dipod	0	5	1	1	11
Other	0	0	1	6	72

yielding: 21 0
14 83

- All twelve such divisions, submitted to a 2 x 2 chi-square test, yield highly significant results, with p no higher than 4×10^{-7} in any comparison.[4]

- Another approach would be to work up some kind of GEN and do this in maxent.

JUNCTURE PROFILES: EARLIER WORK

25. History of the method of juncture profiles for detecting weak caesuras

The great pioneer (but with no disciples?) was Ants Oras

- Oras, Ants (1960) *Pause patterns in Elizabethan and Jacobean drama: an experiment in prosody*. Gainesville: University of Florida Press.

26. Oras's Method

First few lines of *Titus Andronicus*, thought by some scholars to be Shakespeare's earliest play.

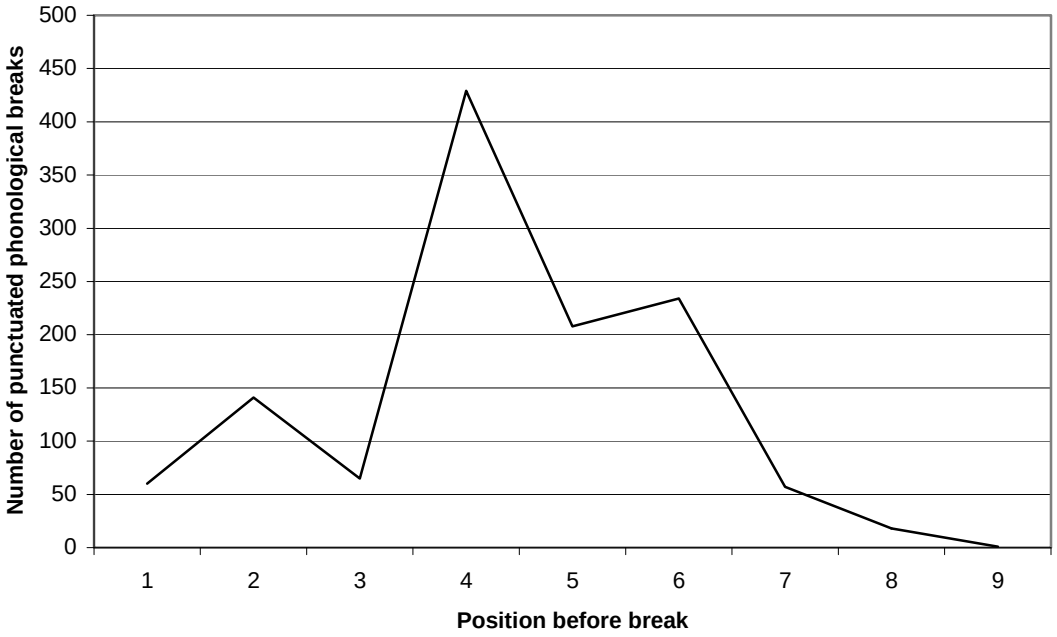
"1" is recorded for a major break.

	1	2	3	4	5	6	7	8	9	10
	x	x x	x	x x	x	x x	x	x x	x	x x
SATURNINUS										
Noble patricians, patrons of my right,					1					
Defend the justice of my cause with arms,										
And, countrymen, my loving followers,	1			1						
Plead my successive title with your swords:										
I am his first-born son, that was the last						1				
That wore the imperial diadem of Rome;										
Then let my father's honours live in me,										
Nor wrong mine age with this indignity.										
BASSIANUS										
Romans, friends, followers, favorers of my right,		1	1		1					
If ever Bassianus, Caesar's son,							1			

[4] Note: these need to be redone with the Yates correction, which will make them slightly higher.

Were gracious in the eyes of royal Rome,										
Keep then this passage to the Capitol										
And suffer not dishonour to approach										
The imperial seat, to virtue consecrate,				1						
To justice, continence and nobility;			1							
But let desert in pure election shine,										
And, Romans, fight for freedom in your choice.	1		1							
total from just this sample:	**2**	**1**	**3**	**2**	**2**	**1**	**1**	**0**	**0**	
add in all the rest, according to Oras:	**60**	**141**	**65**	**429**	**208**	**234**	**57**	**18**	**1**	

Resulting break profile, plotted as graph:

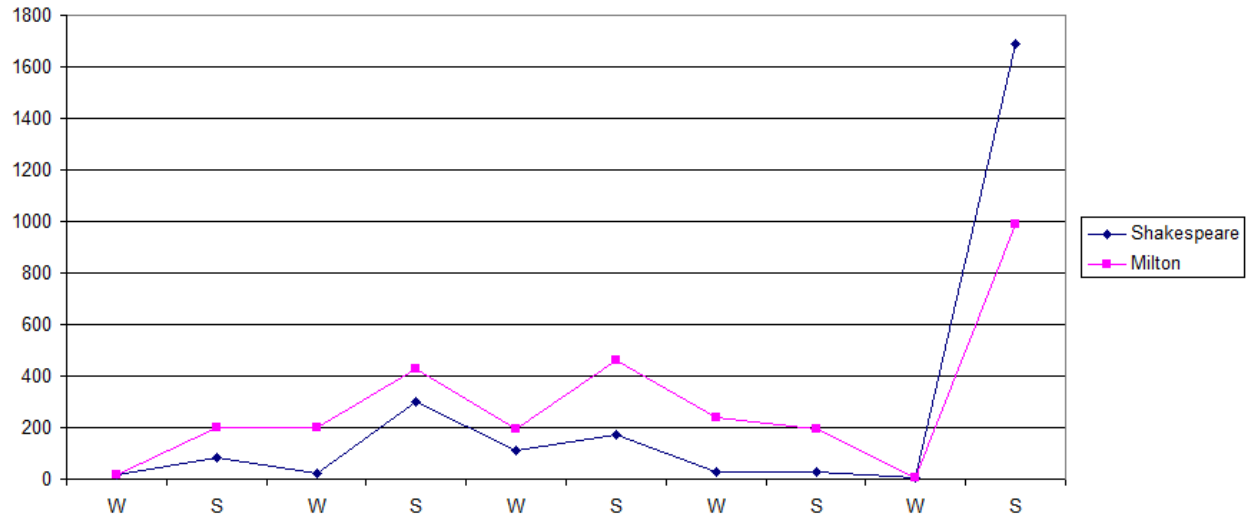


27. Interpretation

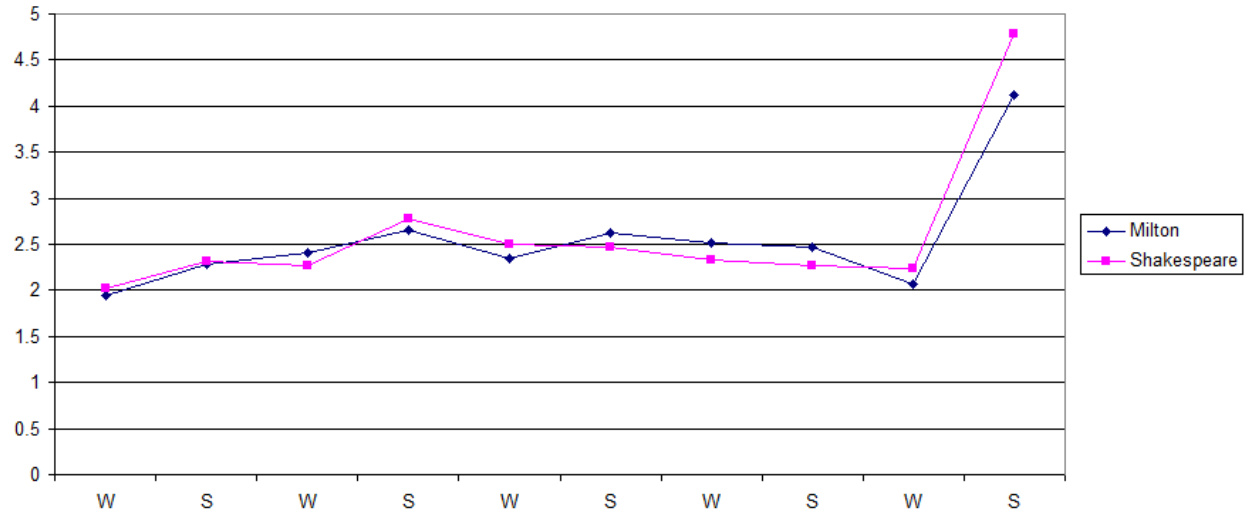
- There is a weak post-4 caesura for early Shakespeare.
- This can be treated with a "Hemistich" level in the metrical pattern—like a weak line (BH draw on board).

28. The juncture profiles for Shakespeare and Milton in the Hayes/Wilson/Shisko samples

- 10-syllable lines only, Intonational Phrase breaks only

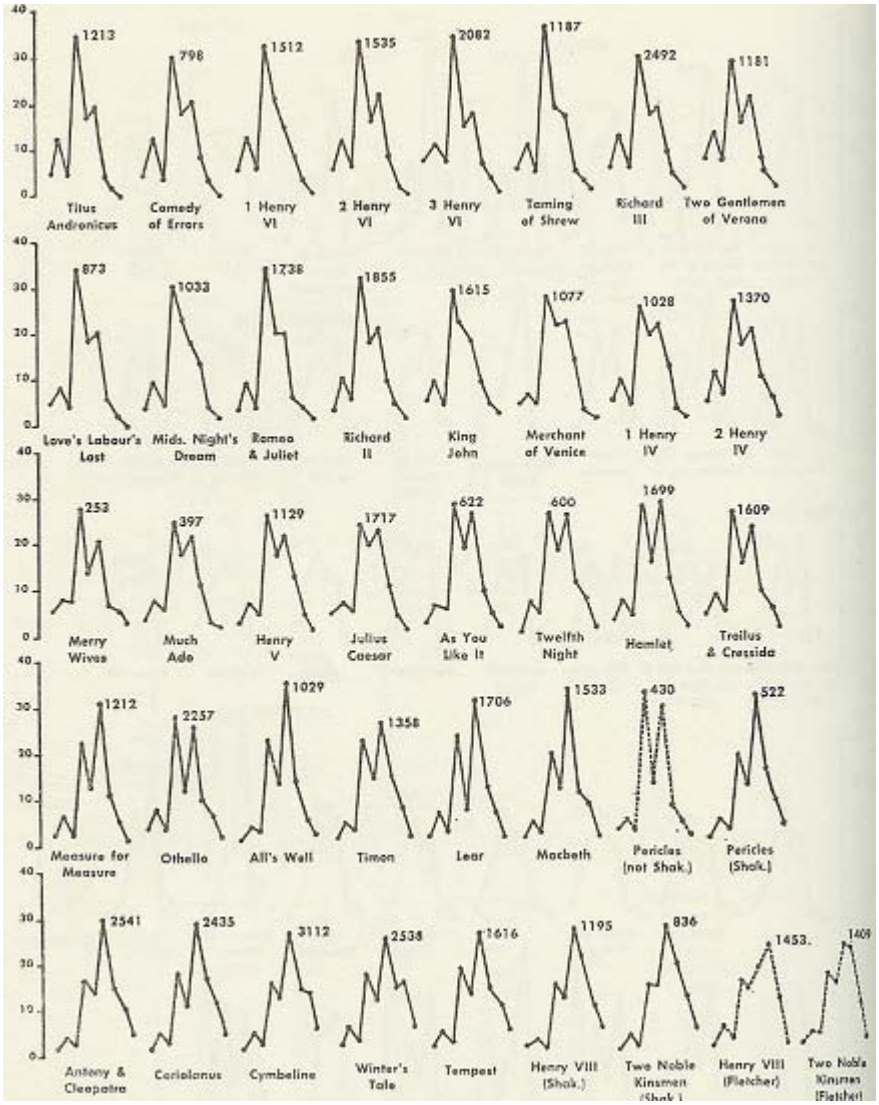


- Average of the transcribed juncture values on a 1-5 scale.



29. Prosodic evolution in Shakespeare

- Later in his career he moves to include a much bigger peak post-6, even higher than the post-4 peak. From Oras:



30. Five is an interesting number for metrics!

- See the basic Lerdahl/Jackendoff desiderata above:
  - two is the best number, three second best, others bad
  - parallelism is important
- Finding the least bad structure
  - five feet as sisters? empirically unlikely, for reasons to be given; five is just a really bad number
  - uneven structure (2+3, 3+2, minimally violating parallelism)
  - empty-beat structure: 5 overt feet plus three silent ones

    "The cur/ few tolls / the knell / of par / ting day / (da duh) / (da duh) / (duh)

    This is said to exist for recitation of the 5-mora lines in Japanese haiku.

31. A really crude example of 2+3

- [Socrates: find the caesura in this poem by George Gascoigne ("The Steel Glass", 1576)

The Nightingale, (whose happy noble hart,
No dole can daunt, nor feareful force affright,
Whose chereful voice, doth comfort saddest wights,
When she hir self, hath little cause to sing.
Whom lovers loue, bicause she plaines their greues,
She wraies their woes, and yet relieues their payne,
Whom worthy mindes, alwayes esteemed much,
And grauest yeares, haue not disdainde hir notes:
(Only that king proud Tereus by his name
With murdring knife, did carue hir pleasant tong,
To couer so, his owne foule filthy fault)
This worthy bird, hath taught my weary Muze,
To sing a song, in spight of their despight,

32. The typology of 2+3, 3+2 pentameters

- Generally (cf. Carlos Piera (*Spanish verse and the theory of meter*, UCLA diss. 1980) Hayes (1988)), pentameters with 2+3 tree structures can be the only kind of pentameter in a tradition, e.g. Gascoigne/Serbocroatian folk epic; Chinese regulated verse.[5]
- 3+2 arises later, as the participants become jaded.
- One is tempted to relate this to "long is last" phenomena elsewhere, e.g. musical phrasing, rhetoric, etc. (Piera 1980)

[5] Chen, Matthew Y. (1979) Metrical structure: evidence from Chinese poetry. *Linguistic Inquiry* vol. 10, no3, pp. 371-420.

Duanmu, San (2004) A corpus study of Chinese regulated verse: phrasal stress and the analysis of variability. *Phonology* 21: 43-89.