

## Class 13, 5/13/15: Final Inversion in Textsetting; Bigger Textsetting Grammars in Maxent and Stochastic OT

### 1. Assignments and readings

- We now have the rest of the course re-planned, cut back in response to our verbosity!
- See course web site.

### *Class 14, 5/13/15*

\*\* Final-foot inversion in folk verse as *faute de mieux*; testing maxent vs. Stochastic OT for textsetting (Bruce) handout

\*\* Stanzas in Hausa poetry (Russ)

Read in preparation for next week: Edward Flemming (2001) [Scalar and categorical phenomena in a unified model of phonetics and phonology](#). *Phonology* 18:7:44

### Week 8

#### *Class 15, 5/18/15*

\*\* The phonetics of singing in Hausa: the principle of compromise and an analysis in maxent phonetics (Bruce)

\*\* The relation of tone and tune in Hausa song (Russ)

Read in preparation for next week: Bruce Hayes and Claire Moore-Cantwell. [Gerard Manley Hopkins's sprung rhythm: corpus study and stochastic grammar](#). *Phonology* 28:235-282

#### *Class 16, 5/20/15*

\*\* The metrics of Bulgarian song (Russ)

### Week 9

No class Monday, Memorial Day

#### *Class 17, 5/27/15*

\*\* Syllable quantity in English: folksong, ternary meters (Hanson), Gerard Manley Hopkins. Universal perspectives. (Bruce)

Read: Ryan, Kevin M. (2011). [Gradient syllable weight and weight universals in quantitative metrics](#). *Phonology* 28.3: 413-454.

### Week 10

#### *Class 18, 6/1/15*

\*\* First half: course summary (Bruce)

\*\* Second half: student presentation I

#### *Class 19, 6/3/15*

\*\* First half: student presentation II

\*\* Second half: student presentation III

## 2. Schedule the student presentations

- See above.

### FINAL INVERSION IN TEXTSETTING

## 3. Some characteristic examples of line-final inversion (England, Appalachians)

- |   |                     |
|---|---------------------|
| a. <u>Who</u> should ride <u>by</u> but <u>Knight William</u>                     | Karpeles 1974, 27A  |
| b. I'll <u>bet</u> you <u>twenty</u> pound, <u>master</u>                         | Karpeles 1974, 7F   |
| c. I <u>fear</u> she will be <u>taken</u> by some <u>proud</u> young <u>enemy</u> | Karpeles 1974, 45A  |
| d. There <u>lived</u> an old <u>lady</u> in the <u>north</u> <u>country</u>       | Karpeles 1932, 5B   |
| e. And <u>two</u> of your <u>father's</u> <u>best</u> <u>horses</u>               | Karpeles 1932, 5B   |
| f. But <u>he</u> had more <u>mind</u> of the <u>fair</u> <u>women</u>             | Ritchie 1965, p. 36 |
| g. Lived <u>in</u> the <u>west</u> <u>country</u> Ø                               | Karpeles 1974, 43E  |

## 4. Sources for this section

- The phenomenon is familiar to traditional scholarship.
  - Hendren, J. W. 1936. *A Study of Ballad Rhythm with Special Reference to Ballad Music*. Princeton Studies in English 14. Princeton, NJ: Princeton University Press.
  - Karpeles, Maud. 1973. *An Introduction to English Folk Song*. London: Oxford University Press.
- Stuff by me and friends:
  - Hayes and Kaun (1996), earlier readings.
  - Hayes, Bruce (2009) "Faithfulness and componentiality in metrics". In Sharon Inkelas and Kristin Hanson, eds., *The Nature of the Word*. MIT Press, Cambridge, MA, pp. 113-148.

## 5. Getting started: reviewing the task of textsetting

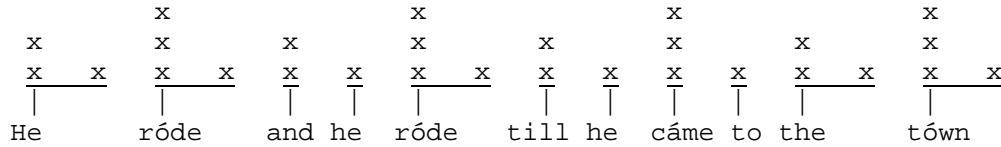
- We seek a constraint based grammar that assigns a high probability to

$\begin{array}{cccccccccccc} & & x & & & & x & & & & x & & & & x \\ & & x & & & & x & & & & x & & & & x \\ x & & x & & x & & x & & x & & x & & x & & x \\ | & & | & & | & & | & & | & & | & & | & & | \\ \hline x & & x & & x & & x & & x & & x & & x & & x \\ | & & | & & | & & | & & | & & | & & | & & | \\ \hline \text{He} & & \text{róde} & & \text{and he} & & \text{róde} & & \text{till he} & & \text{cáme} & & \text{to} & & \text{the tówn} \end{array}$

- a very low probability to:

$\begin{array}{cccccccccccccccc} & & & & x & & & & x & & & & x & & & & x \\ & & & & x & & & & x & & & & x & & & & x \\ x & & x & & x & & x & & x & & x & & x & & x & & x \\ | & & | & & | & & | & & | & & | & & | & & | & & | \\ \hline x & & x & & x & & x & & x & & x & & x & & x & & x \\ | & & | & & | & & | & & | & & | & & | & & | & & | \\ \hline * \text{He} & & \text{róde} & & \text{and he} & & \text{róde} & & \text{till he} & & \text{cáme} & & \text{to} & & \text{the tówn} \end{array}$

➤ something in between for:

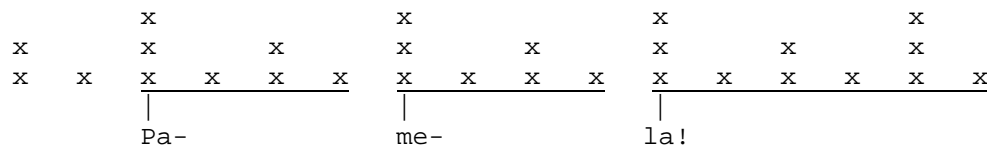


## 6. Metrics vs. textsetting

- The “real” grammar uses a GEN of all possible English phonological representations aligned to the grid in all possible ways.
- We can usefully fake it by doing a comparative grammar; just one representation aligned to grid in all ways.

## 7. “Bad but best”

- We earlier suggested that settings like



are “bad but best” — text is not very good for song, but the setting shown is the best available.

- This may be true for line-final inversions.

## 8. The line-final inversions of English sung folk verse

- Recall the art-verse picture: lexical inversions like to be line-initial, secondarily post-major break:

*Richer than wealth, prouder than garments' cost* (Shakespeare)

- Folk verse likewise *generally* treats lexical stresses with deference. Hayes and Kaun (readings) found:

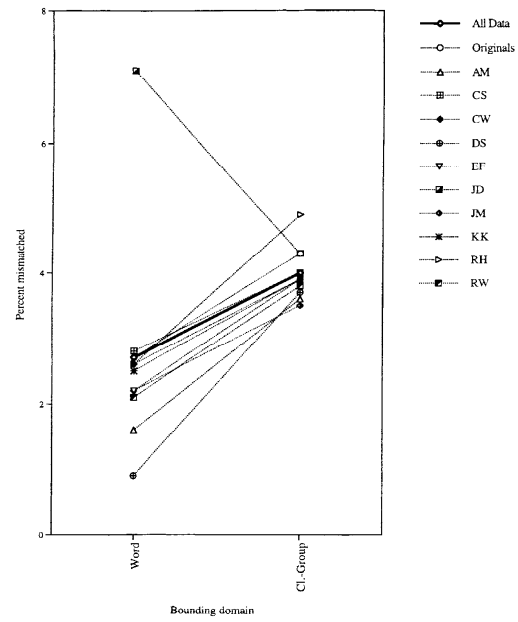


Figure 6. Percentages of sequences mismatched, within Word versus within Clitic Group

- BUT the distribution of mismatched lexical inversions is utterly different!

## 9. Inversion in folk verse don't prefer to come after big breaks

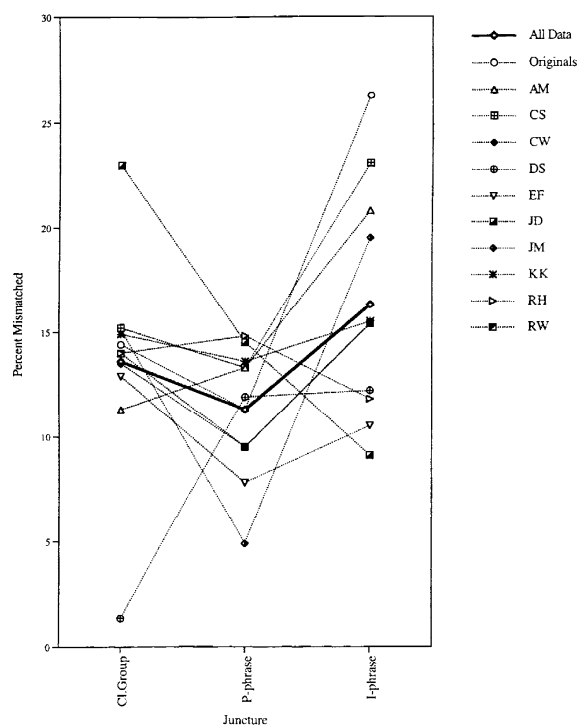


Figure 9. Percentage of stressed + stressless sequences mismatched, at high-ranking left edges of P-structure

## 10. Intuitive comparison

- In pentameter, the mismatched compound seems better when you give it a break:

a.

	x		x		x				x			x
x	x	x	x	x	x				x	x		x
?So	thére	he	láy	a	fùll	[ <sub>CG</sub>	fórtnight	]	of	woe		

b.

	x		x		x				x			x
x	x	x	x	x	x				x	x	x	x
Then	lét	the	séas	rùn	drý,	[ <sub>I</sub>	swéetheàrt	]	of	míne		

- In song, the break doesn't seem to make any difference:

a.

			x				x				x				x
x		x		x		x		x		x		x		x	
So		thére		he		láy		for		a		fùll		fórt-	níght

(Sharp 1916, #84)

b.

x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x	x
Then	lét	the	séas	rùn	drý,	sweet-	heart <sup>1</sup>	

(Sharp and Vaughan Williams 1951b, p. 73)

## 11. The preferred position for sung inversions is LINE-FINAL

- See examples above, and this chart from Hayes and Kaun:

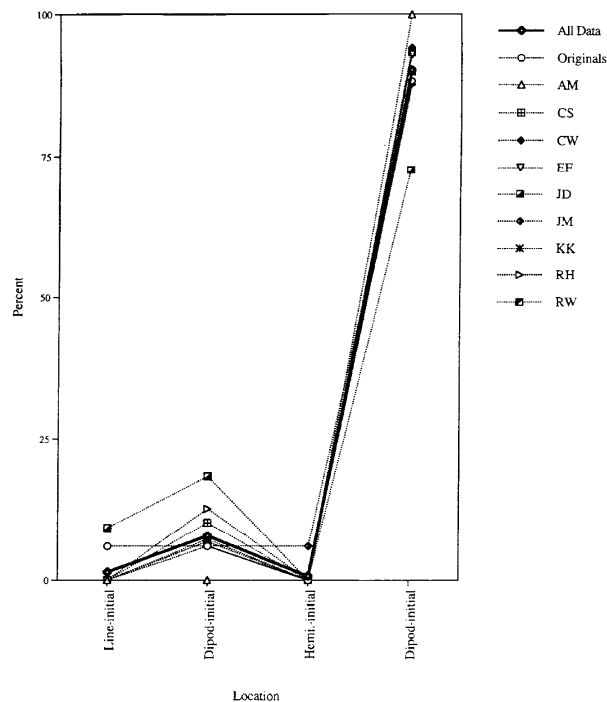


Figure 11. Percentage of total lexical inversions starting in Medium position, by location within the line

## 12. The only attested line-initial inversion in the Hayes/Kaun corpus

x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x	x
Think-	ing	to	gét	sómething	vé-	ry,	vè-	ry níce

(Sharp and Vaughan Williams 1951a, p. 64)

## 13. Analytic task: deduce the distribution from independent principles

- I suggest that these are:

<sup>1</sup> The sequence *séas rùn drý* forms a dotted rhythm in the original; this is adjusted here to make comparison easier.

- The presence of **abundant empty positions**. These allow candidates with “**sliding over**” of the syllables to win, often.
- Position 16 of the standard grid is virtually never filled (various explanation) — ruling out certain “slidings”.
- “**Faute de mieux**”<sup>2</sup>: a candidate with identical text but better setting will eclipse a lexical inversion if it is available.

#### 14. Sliding mitigates the need for non-final inversion

- Here is how the Hayes/Kaun consultants usually dealt with line (12):

a.

		<b>x</b>			
x		x		<b>x</b>	
x	x	x	x	x	x
		Think		-ing	to

(EF, KK, RH, SC)

b.

		<b>x</b>			
x		x		x	
x	x	x	<b>x</b>	x	x
		Thinking	to		

(CW, JM, RW, AM, JD)<sup>3</sup>

### 15. Why no sliding in line final position?

Consider the possibilities:

[illegible]

- a: this is fine, but you can only use Green-O in quatrain positions that allow Green-O
- b: ditto, for 3f
- c: this is bad because it fills position 16 (see (16) for why this might be so).
- d: this is a bad bracketing mismatch; a line boundary not even aligned with a word boundary. See (17) below for a rare violation.

<sup>2</sup> French, ‘for want of a better alternative’

<sup>3</sup> DS provided a textsetting in ternary rhythm, which likewise placed the syllable *think* in strong position.

## 16. Why not fill position 16?

- Two possible explanations:
  - Line marking is insistent that you have at least *some* little space at the end of the line.
  - Duration matching: bad to give so little time to a syllable that would ordinarily get lots of phrase-final lengthening.
- It should be possible to distinguish these with the right data.

## 17. A rare violation of ALIGN(Line, R, Word)

		x			x			x			x			x			x
x		x		x		x		x		x		x		x		x	
Wàke	you	úp,	wàke	you	úp,	you	sèv-	en	sléep-								
		x			x				x					x			
x		x		x		x		x		x		x		x		x	
-ers	/ And	dó	tàke	wárn-	ing	of	me										

(Karpeles 1932, #4E)

## 18. Lack of inversion in Shady Grove grid

- The “Shady Grove” grid can accommodate feminine endings without severe crowding:

				x				x					x				x
x		x		x		x		x		x		x		x		x	
Dance	to	your	Dad-	dy,	my	little	lad-	die									

- and it generally does not have lexical inversions

## 19. More on *faute de mieux*

- I’ve said that textsetting is only a rough approximation of the real metrics: it is selection of high-probability candidates from the subset of GEN having the same text.
- But how can this be compatible with this *faute de mieux* effect?
- My take:
  - Final inversions are possible, but sound odd and are not really abundant — especially when we take lexicalization into account (see (20) below).



- Karpeles (1973)<sup>4</sup> observes that feminine endings are few in English folksongs — which follows from folk poets seeking high-probability lines in general (i.e. they do metrics, not textsetting).

## 20. The possibility of lexicalization

- These phrases are so common in English folk verse that I suspect that they are lexicalized with aberrant stress:

### *pretty Polly*

Pull / off that / silk, my / pretty Pol- / ly  
Come / rise you / up, my / pretty Pol- / ly

### *Scotland*

I'll / take you / to the / North Scot- / land  
For there's / ne'er a / doctor in / old Scot- / land

### *the north country*

There / lived an old / lady in the / north coun- / try  
There / was an old / lady in the / north coun- / try  
There / was an old / man in the / North Coun- / tree  
They sent them a- / way ... to the north coun- / try  
/ There was a / ship in the / north coun- / try

### *fair lady*

Fair / Ellen / was a / fair la- / dy  
Lady / Helen she / was a / fair la- / dy

### *one May morning*

As / I walked / out one / May mor- / ning  
Sweet / William a- / rose one / May mor- / ning  
As / I walked / out one / May mor- / ning

- Evidence: occasionally they get used in line-non-final position.

#### a. Line 1

	x		x		x		x
x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x
As	I	wàlked	oút	one	Mày	mór-	ning

<sup>4</sup> Karpeles, Maud (1973). *An Introduction to English Folk Song*. London: Oxford University Press.

b. Line 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
One		Mày		mór-		ning		so		eár-						ly	

(Karpeles 1974, #174)

- Or even with a stressed syllable in fully-weak position:

		x				x											x
	x		x			x		x		x		x		x			x
x	x		x	x		x	x		x	x		x	x		x		x
O		húsh,		O		húsh,		my		prèt-		ty		Pól-ly			

(Karpeles 1974, #2J)

## MAKING THIS ALL MORE RIGOROUS WITH A GRAMMAR

## 21. A project on the way-back burner

- The textsetting grammar I did for the article in the readings (“Textsetting as constraint conflict”) suffices, I feel, to demonstrate the role of conflicting constraints (refuting Lerdahl and Jackendoff)
- But couldn’t we achieve a really *good* grammar? I.e. one that very accurately models the Hayes/Kaun data?
- I’ve struggled with this for a long time and don’t currently see a plausible publication venue.
- Getting ready for this class I discovered some grammars in progress on my hard disk...

## 22. Goals here

- Demonstrate that such a grammar can generate line-final lexical inversion.
- Check if it works better under maxent.

## 23. Constraints

- taxonomy of grid columns in the Standard Grid:

X			
X		X	
X	X	X	X
M	W	S	W

<i>Constraint</i>	<i>Explanation</i>
Regulate SW	Don't mismatch stress/syllable presence between adjacent Strong and Weak positions of the Standard Grid.
Regulate MW	ditto for Medium and Weak
Regulate SM	ditto for Strong and Medium
Fill Strong	
The Life	stressless-stressed at end of phrase, mismatched (Kiparsky 1977)
Lexical Stress	any lexical mismatch
Rising Lexical Stress	iambic lexical mismatch
Don't Fill 16	
Don't Fill W	
Word Resolution	make syllables of same word fit into adjacent slots ( <i>Oxford city</i> )
CG Resolution	ditto for clitic group
Strong Is Long	Prince Smolenskian prominence-duration alignment
Stressed Is Long	Prince Smolenskian stress-duration alignment
Avoid Lapse	
Don't Fill 1	Encourages short upbeat
*Stress In M	Prince Smolenskian stress-grid-height alignment
*Stress In W	ditto
*Stressless In S	ditto
Fill M	
Weak Resolution	never mind

## 24. Training regime

- Target textsettings were the *most commonly chosen among 10 consultants*.
  - Hence modeling “easy”, cleaned up data.
- “4” lines only were included (364 total) — making LAPSE a powerful constraint.

## 25. GEN

- Slight cheating: FILL STRONG and REGULATE SW are considered undominated; else all logical possibilities for each input.
- Total: 364 inputs, each with one winner; a total of 8362 losing candidates.

## 26. Weights and Stochastic OT Ranking values

	Stochastic OT Ranking Values		Maxent weights
AvoidLapse	116.8	DontFill1	11.38
*StresslessInS	112.3	AvoidLapse	10.58
DontFill16	112.0	DontFill16	7.85
RegulateMW	111.7	DontFillW	7.61
DontFillW	110.9	Fill M	7.61
Fill M	110.9	WordResolution	3.24
*StressInW	109.2	*StresslessInS	2.67
RegulateSM	108.4	*StressInW	2.25
DontFill1	108.0	RegulateSM	1.33
WordResolution	105.8	Weak Resolution	0.91
*StressInM	104.5	RegulateMW	0.77
LexicalStress	103.1	StrongIsLong	0.51
RegulateSW	100.0	LexicalStress	0.42
FillStrong	100.0	StressedIsLong	0.34
TheLife	100.0	*StressInM	0.34
RisingLexicalStress	100.0	RegulateSW <sup>5</sup>	0.00
Weak Resolution	98.5	FillStrong <sup>6</sup>	0.00
StrongIsLong	97.7	TheLife	0.00
StressedIsLong	94.8	RisingLexicalStress	0.00
CGResolution	94.3	CGResolution	0.00

- The rejection of sensible-seeming constraints in a big grammar is characteristic of maxent.

## 27. In both grammars, DON'T FILL 16 is well above LEXICAL STRESS

- So we generally get the right result for the final inversions:
  - Maxent grammar on “I fear you have had some ill sickness”:

[1040113010304010]	1	0.990063
[0140113010304010]	0	0.009936
[1040113001304010]	0	2.64E-07
[0140113001304010]	0	2.65E-09
[1040113010300041]	0	1.58E-10
[0140113010300041]	0	1.59E-12
[1040113130400010]	0	4.85E-13
[1040001131304010]	0	1.89E-13
[1040113013400010]	0	5.53E-14
[0140113130400010]	0	4.87E-15
[0010004011313041]	0	2.38E-15

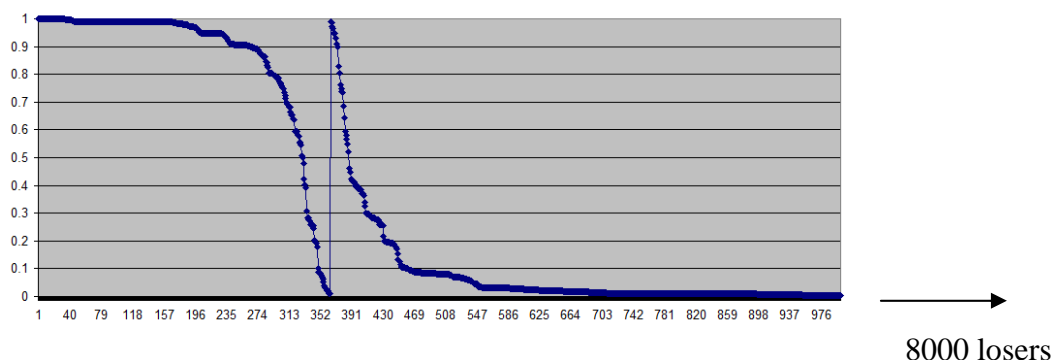
<sup>5</sup> No violations in GEN; see above.

<sup>6</sup> No violations in GEN; see above.

[0140001131304010]	0	1.90E-15
[0140113013400010]	0	5.55E-16
[1040113001300041]	0	4.21E-17
[0140113001300041]	0	4.23E-19
[1040001131300041]	0	3.02E-23
[0140001131300041]	0	3.03E-25

## 28. Performance of both grammars not bad

- This one is maxent; Stochastic OT very similar
- Vertical axis is predicted probability;
- Horizontal axis: sorted Winners before Losers, then by descending predicted probability.



## 29. Maxent works a little better

Average probability assigned to a winner: .861, vs. .846 for Stochastic OT.

## 30. (if time) Harmonically bounded winner in Stochastic OT

And had it not been for your daughter Jane

[1031103011301040]

- So zero probability assigned to the winner.
- due to contradictory treatment of *had it not* and *been for your*
- maxent is much more graceful here, with

[1030113011301040] 0.567407

[1031103011301040] 0.243299

- This is characteristic of cases where the very same constraint can be violated more than one place in the string; a classical problem in OT phonology.