Class 18, 6/1/15: Course Summary

THEORETICAL IDEAS

1. Correspondence

- Meter involves an **abstract rhythmic pattern**, rendered concrete by the arrangement of phonological material.
- Said arrangement is regulated by **correspondence constraints**.

2. What can be a rhythmic pattern?

- We followed Lerdahl and Jackendoff (1983):
  - **Grid** ("hierarchy of intersecting periodicities")
  - **Nested domains** (MP, foot, hemistich, line, couplet, …)
  - **Culminativity**: each grid mark is the unique strongest mark of a unique domain

3. Principles defining the rhythmic pattern

- **Counting**: only 2, and secondarily 3, for daughter nodes
- **Parallelism**: expand daughters identically
  - occasional exceptions: 2 + 3 + 2 + 2 + 2 Tennyson's Phalacian decasyllable; Hausa *imfiraji* ((0) below)
- Deviations from parallelism often respect **Long is Last** principle.
  - English pentameters as 2 + 3 — ditto for Spanish, Serbo-Croatian folk epic
  - English 3 3 4 3 quatrains
  - elaborate bulked-up stanzas in English
  - problems; e.g. Hausa catalectic feet; Bulgarian caesura division at 5+3

4. The characteristic correspondence constraints

- **Prominence alignment to the grid** (Prince and Smolensky 1993) — stronger phonological material manifests stronger grid columns
  - **Weight** (Strong is long, long is strong) — including gradient Ryanian weight, English syllable duration, STRETCH and SQUEEZE in Hausa
  - **Stress**
- **Bracketing agreement**
  - ALIGN constraints at all levels of both the phonological hierarchy and the metrical hierarchy (again, a Prince-Smolenskian prominence-alignment family)
  - These are essential in proving the **existence** of lines and **establishing the line edges** in unwritten verse traditions
  - Use of **unfilled positions**, to demarcate higher-level structure. Ends in most of the Burling languages; beginnings in Bengkulu and Hausa

5. A widespread pattern of correspondence: "Beginnings free, endings strict"

- **Cases**:
  - **Stress profiles** of English verse
  - The **quantitative clausulae** of Hausa and other verse — shown by Russ to be used in delineating the ends of *stanzas* as well as lines.
  - **Final bridges** in Hausa, Finnish, Serbo-Croatian.
  - **Quantitative freedom in the initial position** (Hausa, Persian)
  - **Quantitative freedom throughout the first part of the line** (other Hausa, Sanskrit)
- **Exceptions** (notably anceps) need special pleading[1]

6. A formal framework for deploying the constraints into grammars: unconditional random fields in maxent

- Assume a very large **GEN** of formal representations
  - In practice: trimmed back to something manageable with constraints assumed undominated.
- Constraints are **weighted** and deployed in the maxent framework
- **Metricality = probability**
- We went through plausibility arguments for why the **math of maxent is intuitive** for doing what we would want a model to do
  - no commitments without evidence!
  - weight addition = probability multiplication
- **Training**: poets listen to verse in childhood and weight their constraints; modifying them in adulthood through taste or genius.[2]
  - We can approximate learning fairly well (perhaps), because human learning is pretty good and **maxent weighting is provably optimal**.
  - Learning is feasible because the Halle-Keyser **Frequency Hypothesis** is true — poets deploy line types in inverse proportion to complexity.

7. Justifying the framework

- Doing our job: there are traditions like English iambic pentameter where **there are no inviolable metrical constraints**. These need analysis too!
- **Analysis in depth and detail**:
  - The linguistics of the future will have *superb* grammars, which match all the nuances felt by native speakers.
  - Let's get started now with metrics, the simplest of all areas of linguistics.

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[1] We dealt with anceps (and other things) in the Hausa rajaz with an "as if" system, whose status is very open…

[2] I acknowledge here a strange glitch: Stochastic OT outperforms maxent in the Hayes/MacEachern factorial typology of quatrain structure, perhaps due to odd application of methods. Elsewhere, maxent won as usual.

METHODOLOGICAL IDEAS

8. Before you start: know your phonology!

- Russ's guide to Hausa phonology
- Bruce's manual of transcription for English, catalog of syllable-weight-based phenomena
  - based on traditional generative phonology; cf. also ToBIology
- The phonology you need to know is mostly prosodic: weight, stress, breaks
- Knowing the real-life phonology will help you with the **paraphonology** (verse-specific phonology)
- We can use metrical evidence to help **support our theories of phonology** (Ryan on weight, testing *SPE* phrasal stress rules with metrical evidence)

9. Collect corpus data and graph them

- Stress profiles
- Juncture profiles

10. Quick tests for meaningfulness of observed disparities

- **Chi-square**
- **Fisher's exact test**
  - I think full-scale modeling with maxent (below) is probably more meaningful than these — takes extraneous factors into account.

11. Model evaluation and significance testing

- For us, "**models**" are **grammars**, scaled up to the point that quantitative testing becomes possible.
- **Model evaluation** is nothing new to science in general but fairly new to linguistics.
- **Plog** is a quick measure of model fit
- We can do better, controlling for model complexity, with the **Akaike Information Criterion**
- For comparing nested models, we can use the **Likelihood Ratio Test**.

12. Intuitive model-evaluation through scattergrams

- We love snakes and revile sheep.
- Find **outlier forms** on the *x* and *y* axes: these are the cases of generative-grammar style **overgeneration** and **undergeneration**
  - Use the **outliers** to think about and improve your model.
- You can **calculate overall model fit**, e.g. with r^2

13. The Russian method — comparison with prose samples

- This was essential in our Hausa discussion: the existence of line-final bridges
  - Russ was rightly skeptical, as he is aware of Hausa syntax and word structure.
  - Only the Russian method could reveal the bridge generalization as valid.
- **Disparities**: Bruce continues to be puzzled at how the maxent method (assign probabilities to the real lines against a GEN backdrop) outperforms the Russian method as an account of iambic pentameter.

14. A useful approximation: study textsetting instead of the full grammar

- Instead of examining all text-meter pairs (unconditional random fields), examine **all grid alignments for a given text** (conditional random fields).
- This saves a huge amount of computation[3] and makes projects feasible:
  - Hayes/Kaun textsetting data
  - Hayes/Moore-Cantwell project on Gerard Manley Hopkins (metrics approximated as textsetting)
- It should be regards as an **approximation**, though, for it says nothing about texts for which there is no particularly-good setting.
  - folksong line "*Pa* ---------- *me* ---------- *la!* ----------
  - **Final inversion** in English folk song: "As I walked out one May morning"

15. Don't overemphasize the language-particular !

- Asserting diachronic or borrowed origins for metrical properties (e.g. Greenberg on Hausa, various Indo-Europeanists) is foolish when said properties reflect globally-valid tendencies.

THE ROLE OF BREAKS

16. List of phenomena

- **Line division** — universally
- Echoing **line-internal constituency** — bridges and caesuras
  - We were pleased when Russ discovered both a **bridge** and (tentatively) a **caesura** in his Hausa data
- **Inversion sites** in English pentameter
- **Extrametricals** in English pentameter and sprung rhythm
- **Upbeat syllables**, particularly in Hausa but also English, seem to have the mirror image distribution
- The special role of **lexical stresses** in English pentameter and folk song

[3] Recall Pascal's Triangle for textsetting — not *that* big!

THE TWO-LEVEL VS. THREE-LEVEL PROBLEM

17. Defined

- Is the rhythm of singing ("Level III") influenced in some way by the metrical rhythm of the poetry that is being sung ("Level II", I being phonology)?

18. Russ's point about two and three levels

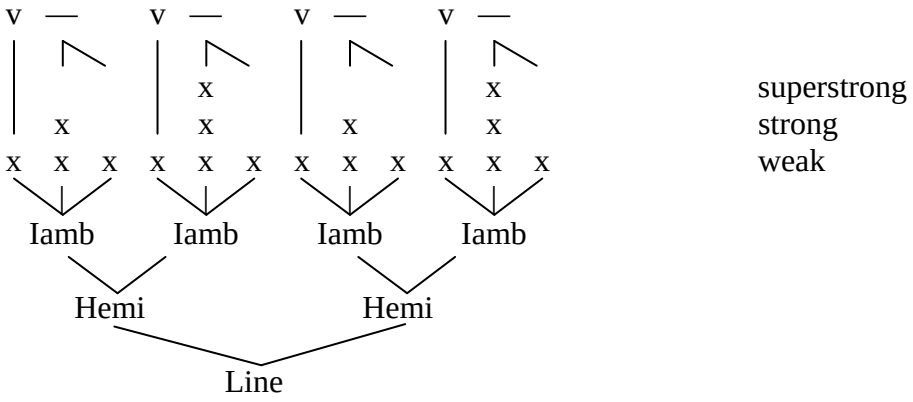
- Russ has a huge trove of data that can help define this issue.
- Key point: *the same meter has multiple ways of singing.*
  - Hausa marriage songs in syncopated mutadarik: performed either "straight" in 4/4, or in 6/8
  - Bulgarian: 8-syllable lines performced to a 2/4 meter with 5-bar phrases, or to 9/8 meter with 2+2+2+3 musical grouping.

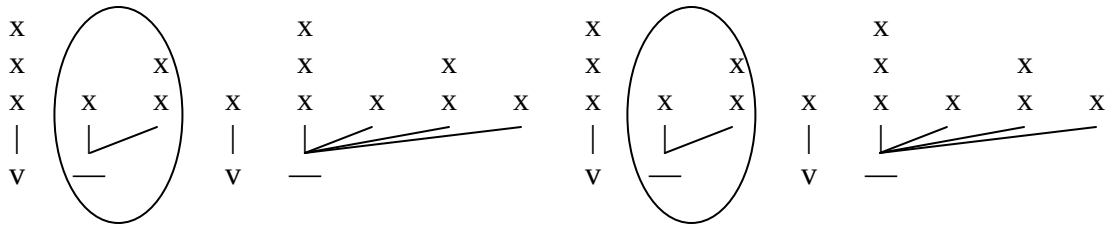
19. A methodological point

- We got far enough to make a firm methodological point: *do **not** try to study sung verse without first studying the text separately!*

20. Why?

- **Neglected regularities** (patterns present in text, neutralized in song)
  - Example: the Queen of the Night's aria is in iambic pentameter; obliterated in Mozart's setting.
- **Lost explanations**
  - Why does Abubakar Ladan's rendition of rajaz song come out *systematically* syncopated? Because it is a grid-shifted rendition of a fundamentally iambic meter





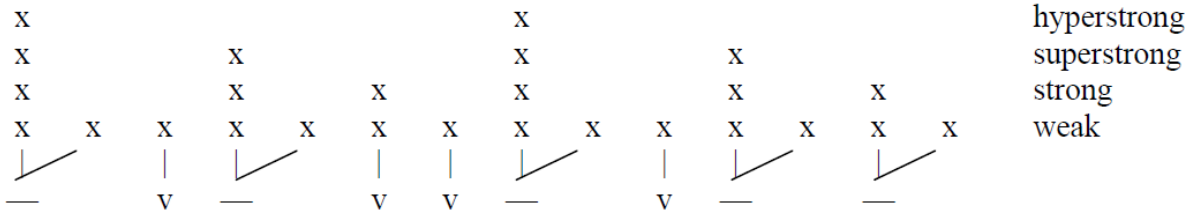
21. Virtues of cheating

- You have our permission to "peek" at the sung rhythm, which might give you helpful ideas — but don't neglect the text outright.

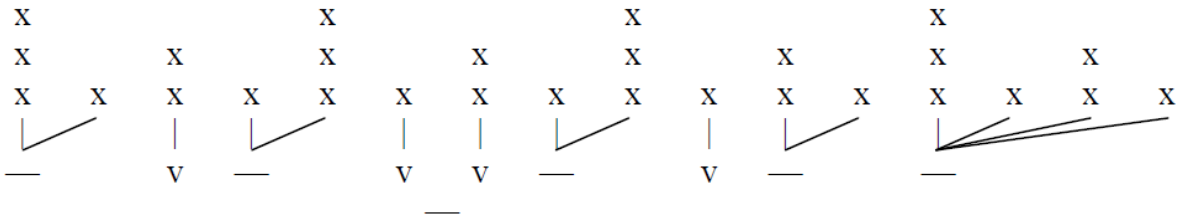
FLAVORS OF THREE-LEVELISM

22. "Throwaway" three-level ism.

- Aliyu Namangi writes *imfiraji* with this grid:



- Fauziyya Sarki Abubakar sings it with this grid:



- There is no justification for thinking that Fauziyya has Namangi's grid in mind when singing.[4]

23. *Trivial* three-levelism

- Much English folk song
- Various Hausa cases as well
- You can analyze the text and the sung material in parallel and get the same answer.

[4] Russ disagrees sharply! We can discuss at length provided we cancel course evaluations. :=)

24. *Deep* three-levelism

- This would be spectacular if true: Ɗan Maraya Jos sings “Jawabin Aure” in a ternary grid, using settings that depend on the alignments of a metrical setting that uses a binary grid — *correspondence to a correspondence!*

Text scansion

```
                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   x
001     Shin    naa     san     Al-     lah     maa-    ga- nii
002             Man-    zon     Al-     lah     maa-    ga- nii
003     Shin    zan-    cen     au-     ree     zaa     mu  yi
004         Da  far-    koo     Al-     lah     nee     ga- ba
005     San-    nan     ku-  ma au-     ree     naa     bi- ye
006         U-  waa     da   u- baa     ko  su- naa     bi- ye
007     Kaa ga  Man-    zon     Al-     lah     haa     bi-ye
```

Performance scansion

```
             | x                              | x
             | x              x               | x              x
        x    | x    x    x    x    x    x    | x    x    x    x    x
001     Shin | naa  san            Al-  lah  | maa- ga-  nii
002          | Man- zon       Al-       lah  | maa- ga-  nii
003     Shin | zan- cen       au-       ree  | zaa  mu   yi
004     Da   | far- koo            Al-  lah  | nee  ga=  ba
005     San- | nan  ku-  ma   au-  ree       | naa  bi-  ye
006     U-   | waa  da   u-   baa  ko   su-  | naa  bi-  ye,       Kaa
007     ga   | Man- zon       Al-       lah  | naa  bi-  ye
008     Ha-  | kin   koo-     mee     in     | kun  tu-  naa
010     Too  | Al-  lah       naa  ma-  ka   | laa- mu-   nii,     Kaa
011     ga   | ban  da   ha-  kin  au-       | ree  ku-   wa
```

- Bruce and Russ are embroiled in a scholarly dispute about the weight of this evidence — how many unmetrical lines are there, and do they affect the results?
  - ➢ I think we need to maxent this to get a more solid argument.

25. Is English hymnody a case of deep three-levelism?

- We saw strange cases like

Though Jordan’s waves around me roll
Fearléss I’d launch away ∅

- These seem uncompelling as deep three-levelism, for they are more likely the result of **interstanzaic correspondence**.
- Inter-stanzaic correspondence is needed anyway: it seems to be our only hope of a sensible account for the “**Rudolf-the-red-nosed-reindeer” me**ter and similar cases.

26. Level IV: phonetics of singing

- We put forth a very tentative account of Abubakar Ladan's rendition of Tutocin Shehu, using Flemmingian generative phonetics and maxent learning.
- "**Pervasive compromise**" between conflicting goals, derived with maxent, is the bottom line here.

DATA AND ANALYSES

27. Traditions mentioned, at least in passing

EUROPE

- English
  - Old English (Beowulf)
  - English iambic pentameter
  - English folk songs
  - English hymnody
  - English pop culture ("Rudolf the Red-Nose Reindeer", rap)
- Continental pentameters: Spanish, German, Russian
- Bulgarian folk song
- Serbo-Croatian folk epic
- Finnish Kalevala
- Ancient Greek and Latin

AFRICA

- Hausa
  - various meters
    - — mutadarik v v - v v - v v - v v -
    - — syncopated mutadarik v v - v v - v v - v -
    - — anti-mutadarik - v v - v v - v v - -
    - — rajaz v - v - v - v - and variants
    - — meter of imfiraji - v - v v - v - -
    - — kamil v v - v - v v - v -
    - — waafir v - v v - v - v v - v - v v -
    - — ramal - v - - - v - -, v v - - v - - v - -, - v - v - v - -
  - written tradition (often Arabic influence)
  - the oral tradition
- Bole, Ngizim
- Berber

ASIA

- Sanskrit quantitative verse
- Japanese children's songs
- Benkulu "backwards" quatrains

- Chinese nursery rhymes
- Chinese regulated verse

28. This field needs a huge amount of research!

- No language can be done properly without the input of someone who is an **expert**.
- These expert-created analyses must be compared and unified as we work toward the right universal theory.

29. Course evaluations

30. First presentation