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 clausalae** 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

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.
  - 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.
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 regarded 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 performed 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

\[
\begin{align*}
v & \quad v & \quad v & \quad v & \quad v \\
\text{lamb} & \quad \text{lamb} & \quad \text{lamb} & \quad \text{lamb} & \\
\text{Hemi} & \quad \text{Hemi} & \\
\text{Line} & \\
\end{align*}
\]
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.


- Aliyu Namangi writes *imfiraji* with this grid:

```
  x  x  x  x  x  x  x  x  x  x  
  v  v  v  v  v  v  v  v  v  v  
```

- Fauziyya Sarki Abubakar sings it with this grid:

```
  x  x  x  x  x  x  x  x  x  x  
  v  v  v  v  v  v  v  v  v  v  
```

- 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.

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⁴ Russ disagrees sharply! We can discuss at length provided we cancel course evaluations. :(
24. **Deep three-levelism**

- This would be spectacular if true: Dan 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**

\[
\begin{array}{cccccccccccc}
\times & & & & & & & & & & & & \\
\times & & & & & & & & & & & & \\
\times & x & x & x & x & x & x & x & x & x & x & x \\
\times & x & x & x & x & x & x & x & x & x & x & x \\
\end{array}
\]

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**

\[
\begin{array}{cccccccccccc}
\times & & & & & & & & & & & & \\
\times & & & & & & & & & & & & \\
\times & x & x & x & x & x & x & x & x & x & x & x \\
\times & x & x & x & x & x & x & x & x & x & x & x \\
\end{array}
\]

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*
  *Fearless 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*” meter 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
    - syncopated mutadarik
    - anti-mutadarik
    - rajaz
    - meter of imfiraji
    - kamil
    - waafir
    - ramal
    - 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