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Pitch Polarity in Praise Singing and Hip-Hop: Evidence for an Underrepresented Poetic Feature

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Pitch Polarity in Praise-Singing and Hip-Hop

William Dula, Clark Atlanta University
Aaron Carter-Enyi, Morehouse College
David Aina, Lagos State University
Nat Condit-Schultz, McGill University
Outside of Q & A

Oration

Ask not what your country can do for you

Ask what you can do for your country
Yorùbá Studies and Pitch Polarity

• Niger-Congo languages, culture and history

• Tonal Counterpoint in Yoruba Poetry (Ọlátunji 1984)
  • NOT TONAL as in DIATONIC
  • NOT COUNTERPOINT as in POLYPHONY
What is a toneme?
The Phoneme

pit v. bit

/p/ v. /b/
The Toneme

In Ìgbò:
íké v. íkè
/HH/ v. /HL/
African Vocal Arts

If tone is highly contrastive in a language then vocal arts have special features.

• Lyrics and melody are more dependent

• Dialogue with speech surrogate instruments

• “Tonal counterpoint” (Ọlátunji 1984)
Tonal Counterpoint (Ọlátunji 1984)

There are three primary categories of tonal counterpoint in Yorùbá oríkì:

• parallelism of similar words (Table 1);

<table>
<thead>
<tr>
<th>Yorùbá</th>
<th>Tone</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ṭabálabá ọ i dórà wọn lè títìti</td>
<td>MMHH / HHHH</td>
<td>It is butterflies that mate by the ear</td>
</tr>
<tr>
<td>Kókóro gidigbá ọ i dórà wọn lórinlórin</td>
<td>LLLLLL / HLHL</td>
<td>It is big insects that mate by the head</td>
</tr>
</tbody>
</table>

• homophone change (Table 2); and

<table>
<thead>
<tr>
<th>Yorùbá</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kini kêtêkê tê lara kêtêkê tê a'gùnfe'sè wọlẹ?</td>
<td>What is the fuss about a donkey which, when ridden, makes one's feet drag?</td>
</tr>
</tbody>
</table>

• non-lexical contrast providing paralinguistic affect (Table 3).

<table>
<thead>
<tr>
<th>Yorùbá</th>
<th>Tone</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ìgì bábaá mi kan laáleá</td>
<td>MM LHL M M HHHH</td>
<td>My father's very ancient tree</td>
</tr>
<tr>
<td>Ìgì bábaá mi kan laáleá</td>
<td>MM HHL M M LLLL</td>
<td>My father's very ancient tree</td>
</tr>
</tbody>
</table>
Tonal Counterpoint (Carter-Ényì 2016)
Tonal Counterpoint (Carter-Ényì 2016)

<table>
<thead>
<tr>
<th>Phr.</th>
<th>Yorùbá</th>
<th>Tones</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ìsàn sàn mó-o-ón kíbúré</td>
<td>LHHHMLHHH</td>
<td>The great harvester</td>
</tr>
<tr>
<td>2</td>
<td>sán sàn mó-o-ón kíbúré</td>
<td>HHHMLHLL</td>
<td>The great harvester</td>
</tr>
</tbody>
</table>

[Diagram showing pitch and time information]
Is there *Tonal Counterpoint* in languages without lexical tone?

No, *Pitch Polarity*: a juxtaposition of phrase-final high (boundary rise) and phrase-final low (boundary fall) in a phrase grouping, may or may not be motivated by lexical tone.
Legend for Examples

Color-coding of phrases:
- Orphan (not part of group)
- High / Rise
- Mid / Unmarked within group
- Low / Fall
- Very Low (Very Final)
Kurian Praise Poetry (Kenya)
Gwendolyn Brooks, “We Real Cool” (1960)
KRS-One, “Sound of Da Police” (1993)
Pitch Polarity

• Exemplified by pair of phrases with phrase-final high/rise then phrase-final low/fall (may be final stressed syllable not final syllable)

• May come in many other forms (e.g. subphrases) but usually builds expectation for a final low/fall in a grouping of multiple phrases

• Prevalent through Africana vocal arts, but is inhibited by tonal harmony conventions (unless voice is semi-periodic as in fújì or rap)
## Manual Encoding (Transcription)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>neutral</td>
</tr>
<tr>
<td>h</td>
<td>high</td>
</tr>
<tr>
<td>l</td>
<td>low</td>
</tr>
<tr>
<td>-</td>
<td>connection (glide)</td>
</tr>
<tr>
<td>r</td>
<td>rise</td>
</tr>
<tr>
<td>f</td>
<td>fall</td>
</tr>
<tr>
<td>CAPS</td>
<td>extreme (e.g. H = extremely high)</td>
</tr>
</tbody>
</table>
Signal Processing Methodology

1. Noise Reduction (*Audacity*)
Signal Processing Methodology

2. Segmentation (*Melodyne*)
3. Analysis and Plotting (*MATLAB*)
Methodological Considerations:

Signal Processing approach is inconsistent using a commercial rap corpus:

• Rap typically has accompaniment
• Audio quality is inconsistent (downloaded from YouTube)
The Corpus! (in progress...)

All I need is a line, then it flow like that

Plant a seed of a rhyme, and watch it grow like that.
Research Questions:

Descriptive:
What are the varieties? How large can a phrase group be?

How prevalent is it? How common are orphans (phrases that don’t clearly belong to a pitch polarity grouping)?

Is it linked to motion? (use VMA)
Research Questions:

Explanatory:
Can pitch polarity be predicted based on text?

Cognitive:
Is it intentional?
Is it a signal (intentional) or cue (unintentional)?

What is the motivation?
Pitch paradigms: HEIGHT (Western)

What goes up must come down
Pitch paradigms:
AGE (Suyá / Amazon Basin)
Pitch paradigms:
TENSION/RELEASE (Yorùbá)
Thank you!

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  - William Dula, Mathematics, Morehouse
  - Zari McFadden, Computer Science, Morehouse