Overview

- Intonational characteristics of a group of Australian indigenous languages (mainly Northern Australian languages)

Nita, Nancy, and Ruth, Goulburn Island, NT
Why study intonation in Australian languages?

• Many phonetic and phonological models of intonation are based on handful of well-studied languages – English, German, Japanese etc.
• Need more work on less-well described languages to refine existing prosodic typologies
• Until relatively recently, poorly understood and under-researched area of phonetics and phonology in the Australian context compared to “segmental” phonetics and phonology, word stress
And because of intonational phenomena like this...

- Dalabon, Eastern Arnhem Land
- Bininj Gun-wok (Kundedjnjenghmi variety), Eastern Arnhem Land
- Mawng, Goulburn Island
Bininj Gun-Wok (Non Pama-Nyungan, Gunwinyguan)

> 2000 speakers (dialect chain)

Dalabon
Non Pama-Nyungan
Gunwinyguan

Severely endangered < 10 speakers

Pitjantjatjara (Pama-nyungan fam.)
Western Desert language

Around 3000 speakers

Adapted from: Stoakes et al. (2007); Evans, N. (1995)
**Location:**
Goulburn Island, 
Northern Territory 
Australia  
300 speakers

**Iwaidjan family**
**non-Pama-Nyungan,**

**Typological profile:**
Mildly polysynthetic 
vs BGW & Dalabon 
which are highly 
polysynthetic -

All languages have relatively free word 
order compared to English, for 
example.
It is a major goal of intonational research on any language to sort out what tunes occur in a language and “to be able to make explicit predictions of how a given tune will be realized when it is applied to different texts”. (Ladd 2008; 201)
A classic view: What does intonation contribute to spoken communication?

- Sentence Modality
- Phrasing, discourse segmentation
- Grammar of Focus marking; pragmatics
- Speaker attitude, emotion, etc. (paralinguistic functions)
What do we know about intonation in Australian Languages?

- Most traditional descriptive grammars of languages include statements about the segmental phonology of the language, phonotactic variation, word stress.
- Increased interest in the relevance of intonation:
  - Information and discourse structure: topic, focus
  - Grammatical organization, clause relations – languages are mostly non-configurational (i.e. word order gives no clues to syntax)
  - Morphological complexity, stress; grammatical word – prosodic word mismatch
- Multilingualism
Why is Intonation hard?

• F0 is hard to interpret or even analyse (particularly if you are dealing with an elderly group of speakers, and languages that none of us have as L1); speaker-specific variation
• Other phonetic parameters; voice quality, duration, intensity..
• Gradient rather than discrete
• Difficult to sort out what is paralinguistic from linguistic - slippery form/function relationship “a slippery beast” (Gussenhoven 2004)
• Symbolic representation not like IPA transcription of phonemes/ lexical tones
Universalist vs Linguistic Typological approaches (after Fitzpatrick 2000)

- Completion, finality, declaratives: **low/falling pitch**
- Incompleteness, non-finality, questions: **high/rising pitch**
- New/salient information: **local pitch peaks** on some kind of constituent, often a word
- **Pitch declination** across intonational phrases & **pitch range or register reset** at the beginning of intonational phrases; topic shift
- Separate phonological component from phonetic implementation
- **F0 contour** is analysed as series of **High** and **Low** Tone targets that align with the **text** in particular ways.
Questions we can ask using this approach (After Beckman 2006)

- **Tone inventory**: What are the tones that make up the “tune” of an utterance, and where do they come from?

  Do they come from the lexicon? Intonational morphemes that are post-lexical, i.e. Syntax, Pragmatics, Discourse

  **Tone alignment**: How is the “tone” anchored to the “text”?

  **word or phrase** edge, i.e demarcative? e.g French, Korean

  **rhythmic prominence or “stress”** i.e. prominence lending (e.g. German)?

  Rhythmically-undifferentiated syllable i.e. Japanese?

  **Boundary tones, Phrase tones?**

  **Pitch accents**

  **Phonetic realization of the tones**
What do we know so far about Australian languages?

- Australian languages have definable and recognizable “falling” and “rising” tunes that delimit chunks of speech i.e. intonational phrases
- Prominence-lending post-lexical pitch-accents that also combine with boundary tones to delimit the edges of these chunks.
- No lexical tone; almost all have been analysed as having lexical stress, but phonetic analyses of “stress” realization – equivocal results – variable stress placement

King 1998; Fletcher & Evans 2000, Fletcher, Evans & Round 2002; Birch 2002, Bishop 2003; Bishop and Fletcher 2005, Round 2010; Ross 2011, Fletcher in press; also Simard 2010 for Jaminjung
4 important parameters

- Accentual prominence
- Tune - source of F0 variation
- Phrasing – “chunking”
- Pitch range – “graph paper” on which tones are realized
What are we trying to find out?

• Challenge 1: What are the characteristic tones and “tunes” of Australian languages?
• Challenge 2: How does the tune align to the “text”?  
  – e.g. do tones line up with “rhythmically” prominent syllables in the word as well as demarcating the edges of phrases?
• Challenge 3: What are these tunes used for?
• Challenge 4: How do we model variation among languages?
• Typical and (atypical) tunes‘

• Each intonational phrase provides an opportunity for a new choice of tune... (Pierrehumbert and Hirschberg1990: 272).
Falling tunes

**Kundjedjedmi (BGW)**

Tones

<table>
<thead>
<tr>
<th>Words</th>
<th>H*</th>
<th>L+H*</th>
<th>L%</th>
<th>H*</th>
<th>H*</th>
<th>L+H*</th>
<th>L%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ngale</td>
<td>ngurrudu</td>
<td>djang</td>
<td>ka-yo</td>
<td>djung</td>
<td>-nj</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Kunwinjku (BGW)**

Tones

<table>
<thead>
<tr>
<th>Words</th>
<th>L+H*</th>
<th>H*</th>
<th>L%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ku-warrde</td>
<td>bo-yoy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ngale ngurrudu djang ka-yo djang-kurrme-rr-inj

“That emu of ours is a dreaming, she put herself in the landscape as a dreaming”

**Dalabon**

Tones

<table>
<thead>
<tr>
<th>Words</th>
<th>H*</th>
<th>L+H*</th>
<th>L%</th>
<th>H*</th>
<th>H*</th>
<th>L+H*</th>
<th>L%</th>
</tr>
</thead>
<tbody>
<tr>
<td>mah-njing</td>
<td>kardv-kah-bi-dorrungh</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“What about you? Maybe you have got someone with you?”

**Pitjantjatjara (read speech)**

Tones

<table>
<thead>
<tr>
<th>Words</th>
<th>-H</th>
<th>H-*</th>
<th>IH-</th>
<th>H</th>
<th>IH-</th>
<th>H</th>
<th>L%</th>
</tr>
</thead>
<tbody>
<tr>
<td>wallpa</td>
<td>ulpariranya</td>
<td>pula</td>
<td>tjintunya</td>
<td>pikaringangi</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wind south they two sun got angry.
Rising & high level (non-falling) tunes

Dalabon

"(we make a windbreak), over there"

Dalabon

"Stylized" high sustained contour

"They went along......"
Tune distribution

Dalabon Narratives (Fletcher 2007, in press)

Dalabon Narratives (Ross 2011)

Bininj Gun-wok Narratives (Fletcher & Evans 2002)

Pitjantjatjara (read speech) (Tabain and Fletcher 2012)

See also Bishop (2003)
### Intonational phrase

<table>
<thead>
<tr>
<th>Pitch accents</th>
<th>Left-edge boundary tones</th>
<th>Right-edge boundary tones</th>
<th>Right edge minor phrase tones</th>
<th>Pitch Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H^*$</td>
<td>(%L)</td>
<td>L%</td>
<td>(Lp)</td>
<td>HiF0</td>
</tr>
<tr>
<td>$!H^<em>$ $^H^</em>$</td>
<td>(%H)</td>
<td>H%</td>
<td>(Hp)</td>
<td>Final_Lo</td>
</tr>
<tr>
<td>L+H*</td>
<td></td>
<td>LH%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$^H%$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$H::$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Local pitch range variation

- 90%

Dutch Pitch accents $H^*$L L*H H* L* ...
Prosodic Hierarchy (after Selkirk 1979; Nespor and Vogel 1984)

Intonational Phrase (IP)  
|  
Phonological Phrase / Accentual Phrase  
|  
Prosodic Word (PW)  
|  
Foot  
|  
Syllable  

Boundary Tones (preboundary lengthening, pause glottalization)  

Pitch accents
- **Pitch accents** - first or second syllable of the word, often on the stem morpheme, also some prefixes, “stressed” syllable...

- Antepenultimate, penultimate or final syllable of a phrase-final word

- Variation in the Northern Languages, variable accent placement (often due to syllable deletion), delayed peaks, but usually first or last foot of word

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Fletcher & Evans 2002, Bishop 2003, Fletcher in press
Fletcher et al. 2007, 2010

Accentual prominence in Kunwinjku

6 speakers

Minimal accentual lengthening in vowels

Accented vowels less variable in quality

Longer sonorants – post-tonic vowel
Boundary tones mark the right edge - additional cue of final lengthening, not as pronounced as in European languages – with the exception of the stylized rises (King 1998, Fletcher and Evans 2002, Bishop 2003, Pentland 2004, Round 2010, Simard 2010)

Kundjedjedmi (BGW)

Downstep
Final Lowering
Pitch range reset

“That emu of ours is a dreaming, she put herself in the landscape as a dreaming”
• Tune and sentence modality
Falling tunes

Kundjedjedmi (BGW)

Ngale ngurrurdu djang ka-yo djang-kurrme-rr-inj

“That emu of ours is a dreaming, she put herself in the landscape as a dreaming”

Kunwinjku (BGW)

Ku-warrde bo-yoy ‘Water lay in the cave’

Pitjantjatjara (read speech)

Walpa ulparirranya pula tjintunya pikaringangi.

Wind south they two sun got angry.
Dalabon – interrogative intonation (WH-question)

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"Where are you going" [repeated – afterthought]
```

Accent scaled higher

Downstep, pitch range compression
Interrogative intonation in Mawng

- Analysis of the QUIS - Question and information structure corpus - Mawng
- Question word is often but not always first in the utterance and often is the location of the strongest /highest pitch peak, pitch downdrift or downstep through rest of the phrase
- Similar pattern is realised without question word
**Polar questions & Interrogative markers - Mawng**

No Question word

"Is a woman carrying the pot?"

With a Question word

“Is a man hitting a man?”
Questions – expanded pitch range

“Who is the one that she sent first?”

Similar pattern noted for imperatives...
• Falling tunes – declaratives, but also questions, imperatives….
• Non-falling tunes, continuitive, listing, non-finality…
• No high rising question tunes in our narrative corpora but not a lot of questions are asked!!
• Is possible to turn a declarative into a question with a final rise? Yes (e.g. Ngalagkan, Mawng, Warlpiri), just not that common!
• Upwards re-setting of pitch range topline, register, but not necessarily a H% final rising boundary tone
• Phrasing and Discourse segmentation
General patterns

- **Intonational Phrases** often align with grammatical words (mildly – highly polysynthetic languages)
- **Bininj Gun-wok** \(1.9 \text{ grammatical words/IP}\) (Bishop 2003; Bishop and Fletcher 2005)

Kayardild 2.3 words/IP

Dalabon 2.4 words/IP

Ross 2011
### Tones

<table>
<thead>
<tr>
<th>Nords</th>
<th>Tones</th>
<th>Break</th>
</tr>
</thead>
<tbody>
<tr>
<td>ka-lng</td>
<td>H*</td>
<td>3</td>
</tr>
<tr>
<td>-yurd-mi-nj</td>
<td>L+H*</td>
<td>1</td>
</tr>
<tr>
<td>bulu</td>
<td>Ha</td>
<td>1</td>
</tr>
<tr>
<td>kah-yelûng</td>
<td>H*</td>
<td>1</td>
</tr>
<tr>
<td>-berrû-</td>
<td>H*</td>
<td></td>
</tr>
<tr>
<td>bawo-nj</td>
<td>L+H*</td>
<td>4</td>
</tr>
</tbody>
</table>

*Final Lo*

**Break**

3
1
1
4

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12% of IPs

“Semantic cohesion” of events

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*ka-lng-yurdmi-nj bulu ka-h-yelûng-berrû-bawo-nj...
3SG-SEQ-run-PP them 3SG-R-SEQ-many-leave-PP*

‘He ran away then and left them all.’

(Fletcher in press, Ross 2011)
Majority of intonational phrases consist of one or two prosodic words (carrier of a pitch peak but no boundary tone) (Fletcher in press)
Global pitch range reset

Tracking Pitch Topline (HiF0) across successive IPs in 4 BGW narratives

Topic shift

(Fletcher & Evans 2000)

“Paragraph” intonation – Global pitch range manipulation

Similar patterns across a range of other languages Kayardild, Iwaidja, Dalabon

Final lowering
Typical intonational devices cross-linguistically

- **Prominence-lending pitch movement** on **focal constituent** or absence thereof (de-accentuation)

- **Flexibility of nuclear accent placement** (e.g. English, German)

- **Phrasing or de-phrasing**, i.e. putting a word into its own separate intonational unit

- **Special pitch accent shape**, e.g. L*+H in Bengali

- Manipulation of local and global pitch range
• Australian - ‘free word order’, “non-configurational” (Hale 1983)

• Word order contributes to information structure categories such as given-new status, topic and focus.

• Initial position - focus (or discourse prominence) in a large number of Australian languages (Baker and Mushin 2008)
• Intonation also plays an important role in marking focus in languages with more flexible word order, such as Hungarian (Zimmerman and Onea 2011) and Georgian (Skopoteas et al. 2009).

• pitch range expansion on the focused word (e.g. Fletcher and Evans 2000, Bishop 2003, Simard 2010)

• rising pitch accent shape L+H* anchored to the focused word may also be used (e.g. Bininj Gun-wok; Bishop 2003, Bishop and Fletcher 2005)

• Intonational phrasing – focused element is also often realized as its own IP separated by a pause from following material in the same “clause” (e.g. Bishop 2003, Simard 2010, Fletcher in press, Ross 2011).
• Experiment was conducted to elicit contrastive or “corrective” focus through a scripted interaction

• Interaction between word order: local and phrasal pitch range, pitch accent location & realization, and intonational phrasing.
“Broad” focus

- “Statement style” intonation, limited affect, narrow pitch range “We call it puffer fish.”
“Correction” context a. Major pitch movement on “call” - target word (object) is realized in reduced range.

Unaccented
Typical Pattern - Corrective focus

- “Correction” context b. Focus word **fronted**, also receives highest pitch peak, and/or realized as a separate IP

Fronted (object) target word

Good example of Word-initial accentual prominence

Pitch range compression of following material
Neutral context - “broad focus”

Typical phrasal, declarative intonation

Nouns & VP “tokens” utterance final – attract a penultimate pitch accent.

Often realized as separate minor intonational phrase.

Clear differences between VP and Nouns
“We don’t CALL it stonefish.”

Suppressed pitch topline – HiF0

Target word

<table>
<thead>
<tr>
<th>Same IP</th>
<th>Separate IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accent -HiF0</td>
<td>ip +HiF0</td>
</tr>
<tr>
<td>ip - HiF0</td>
<td>IP -HiF0</td>
</tr>
<tr>
<td>IP +HiF0</td>
<td></td>
</tr>
</tbody>
</table>

Corrective Context B = Nouns

Corrective Context B = Verbs

***(p<0.001)**

ns

<table>
<thead>
<tr>
<th>B-NP</th>
<th>B-VP</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Graph 1]</td>
<td>![Graph 2]</td>
</tr>
</tbody>
</table>
"We call it PUFFER FISH."

Fronted verbs and nouns in their own IP, realised in expanded pitch range "prosodic dislocation"

Same IP
Separate IP

Pitch range suppression of following IP, also in verbs
Implications

• Similar strategies to those employed in other “free” word order languages
• Syntactic fronting - intonational phrasing, possible variable pitch accent realization (LH* vs H*)
• **Consistent** pitch range / register manipulation, not unlike the register manipulations that are observed in radically different languages e.g. tone languages
• Similar to polar/”Wh” – questions, imperatives etc minus prosodic dislocation
• Nouns are special – often missing in conversational discourse
• Fewer “tones” i.e. fewer intonational pitch accent shapes compared to Germanic languages, e.g. German, Dutch, English but there is intonational variation!

• Distinctive plateau and “stylized” high tunes in narrative discourse (also Round 2010, Kayardild, Simard 2010, Jaminjung)

• Importance of phrasing, and pitch range manipulation

• Traditional intonational functions: modality, phrasing and discourse segmentation, and focus marking
• Pitch register shifts, story telling, reported speech
• Use of other features besides F0, particularly in story telling, narrative discourse
• Voice quality modification
• …but that’s another story
The challenges..

- On-going challenge of teasing apart word-level and phrase-level stress
- Variability - some Australian languages are probably more “phrasal”, some more “accentual”
- Varying evidence that there are consistent cues to accentual prominence beyond pitch – implications for lexical prosody
- AM framework can accommodate variation (e.g. Hualde 2006, Ladd 2008, Beckman and Venditti 2010)
- Look beyond F0
The challenges..

- Importance of analysing different genres, including interactive discourse as well as narratives, controlled elicited materials etc.
- What about perception and processing?
- To be continued…
• Our language consultants
• Nick Evans, Ruth Singer, Marija Tabain, Andy Butcher, Debbie Loakes, Hywel Stoakes, Simone Graetzer, Anna Parsons
• Australian Research Council and University of Melbourne


• Bishop, J. 2003. Aspects of prosody and intonation in Bininj Gun-wok. PhD thesis (available online through the University of Melbourne e-prints repository)


• Ross, B., Fletcher, J. & Nordlinger (in prep.). Intonation and grammatical structure in Dalabon.


• Simard, Candide (2010). *The Prosodic Contours of Jaminjung, a Language of Northern Australia*. Manchester: University of Manchester PhD.
