

Analyzing "timing" 2

Best Practices in Sociophonetics 2010 Workshop

Malcah Yaeger-Dror
Zsuzsanna Fagyal

Outline

- **How can we acquire appropriate data...?**
 - Problem-causing rhythmic distinctions
 - Possible corpus limitations
 - Interspeaker & low level variation (Klatt 1975, 1976; Arvaniti 2009)
 - Lexical (Phillips 2010, Hirschberg 1993, Sridhar *et al*)
 - Phrasal/Sentential (Klatt 1975, 1976)
 - Genre (Hirschberg..., Jurafsky *et al*, Sridhar *et al*, Strom *et al*, Yuan *et al*)
 - Discourse (Jefferson..., Jurafsky *et al*, Schegloff..., Schegloff *et al*)
 - Conclusion(s)
- ... if we can devise appropriate corpora,
.... they are worth the effort**

An Appropriate Corpus

Ramus

- Pairwise Variability
- Pairwise comparisons of successive vocalic and intervocalic intervals
 - **Vocalic** = nPVI
 - **Intervocalic** = rPVI
- British/Singapore English Lgs with regional or ethnic dialect variation...
- Other socio-examples include:

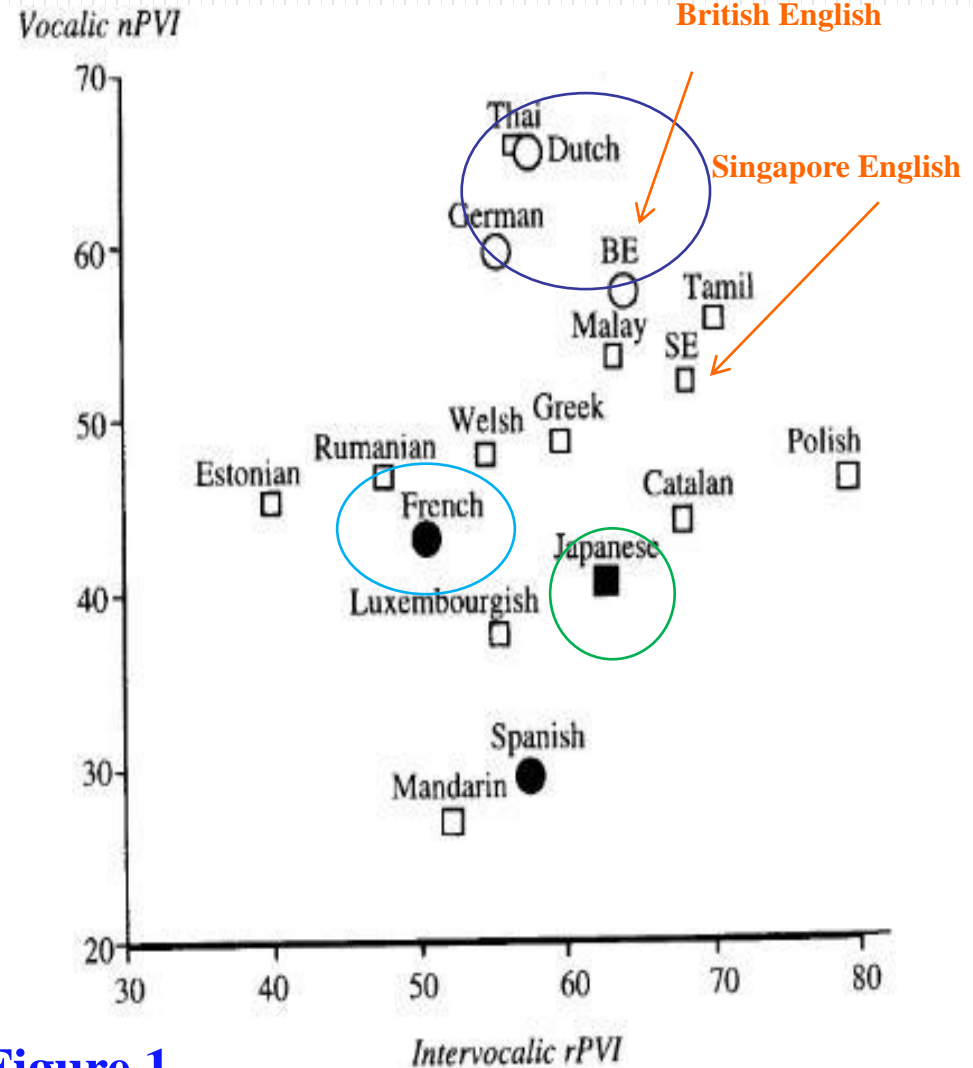


Figure 1.

Figure 2: PVI profiles for data from eighteen languages. Prototypical ○ = stress-timed, ● = syllable-timed, ■ = mora-timed, □ = mixed or unclassified

results.

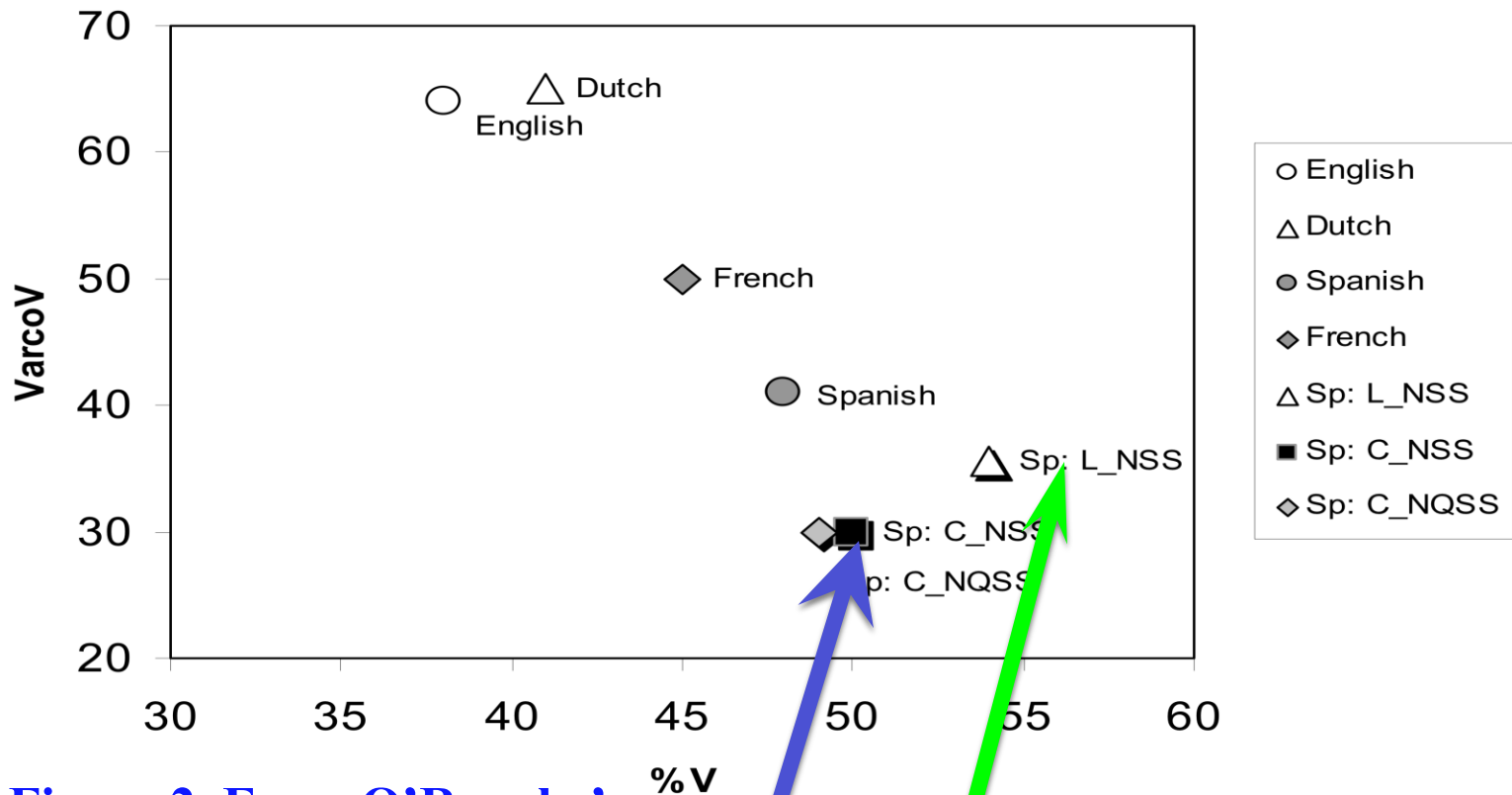


Figure 2. From O'Rourke's

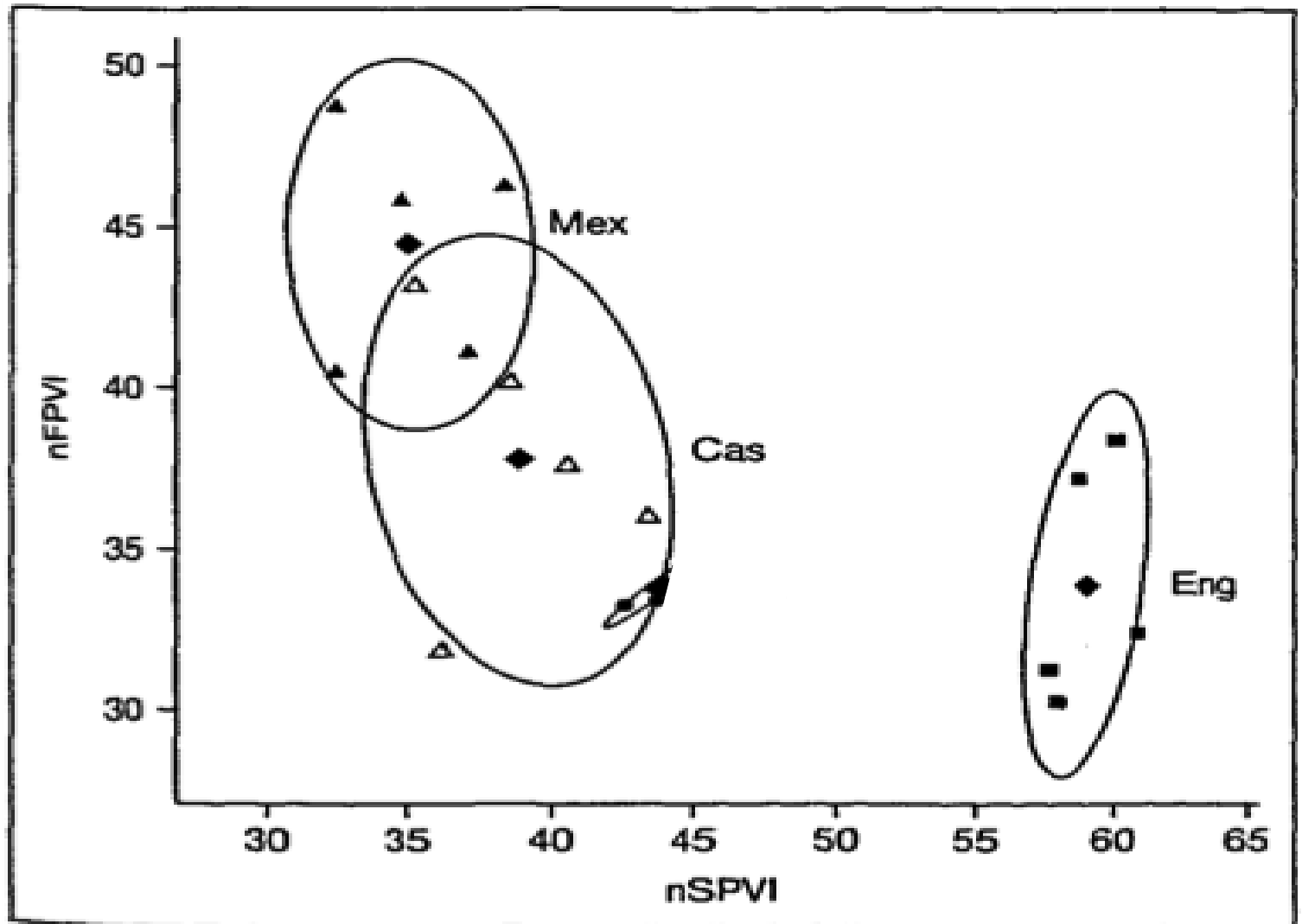
Figure 6: *Peruvian Spanish Varco Δ V vs. %V compared to White and Mattys [13]*

Note that even the monolingual **Cuzco** speakers, with no Quechua contact, have a PVI closer to the bilinguals' than the **Limeño** speakers'.

Nolan & Asu(2009) Data

Figure 3. Comparison of results for 5 women for each variety, each reading a version of the Cinderella story: 16-19yrs (UK), and 22-40 (Spanish).

syllable-
timed



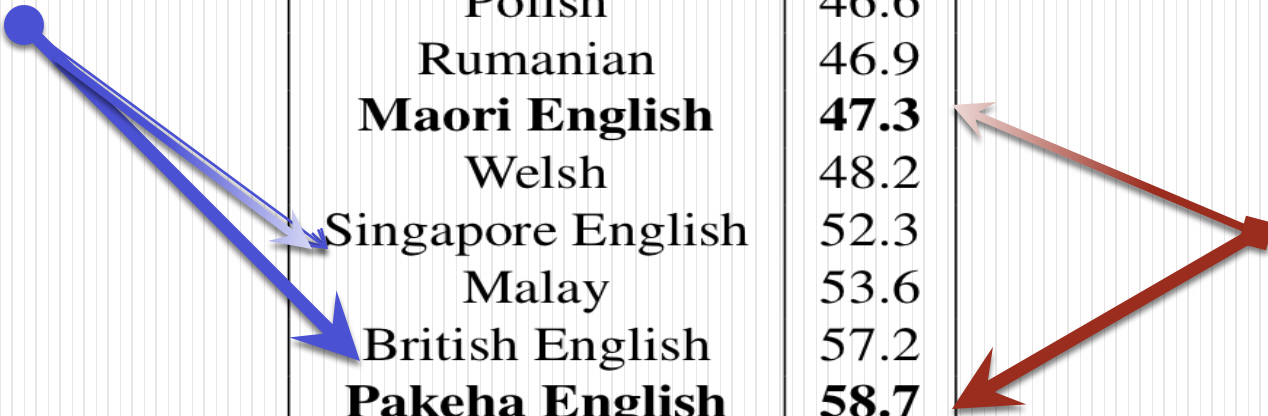
stress-timed

Data

Table 1 Table 4: *Rhythm values for some languages (selected data taken from Grabe and Low (2002)) with PVI included for Maori English and Pakeha English*

Language	PVI
Mandarin	27.0
Spanish	29.7
Luxembourg	37.7
Japanese	40.9
French	43.5
Polish	46.6
Rumanian	46.9
Maori English	47.3
Welsh	48.2
Singapore English	52.3
Malay	53.6
British English	57.2
Pakeha English	58.7
German	59.7
Dutch	65.5
Thai	65.8

More syllable-timed



More stress-timed

Appropriate for study

- *Rhythm is the ordered repetition of contrasting elements in speech*
- [S]peakers [may be] recorded individually
- And instructed to read **the** text “in a natural fashion”...
- *[so the same conditions obtain]...*
- They could study the text...to minimize
 - **Hesitations &**
 - **False starts**
 - *That would[... make] it impossible to obtain continuous speech.*
(Fagyal 2010: 101)
- & measured with the help of the LDC inspired forced-alignment program.

Corpus Limitations

LOW LEVEL factors & durations

- Vowel-duration variation
- Gemination, affrication, clusters...
 - (*e.g.*, Fagyal 2010; Arvaniti 2009)
- Devoicing or loss in specific environments
 - (*e.g.*, Fagyal 2010)
- Stress in the word
 - (*e.g.*, Klatt 1975-76; Arvaniti 2009; Turk/Shattuck Hufnagel)

Arvaniti's Low Level manipulation

Table 2. Manipulation of phonotactic variables.

Hypothetical influences	Arvaniti (2009:10) sample sentence
Stress-timing	<i>The production increased by 3/5s in the last quarter of 2007.</i>
Syllable-timing	<i>Lara saw Bobby when she was on the way to the photocopy room.</i>
Random	<i>I called Gatsby's house a few minutes later, but the line was busy.</i>

(r)hythm metrics can at best provide crude measures of speech timing & variability; but they cannot reflect the origins of the variation they measure and thus they cannot convey an overall rhythmic impression...(Arvaniti 2009:53)

She used ONE language, ONE set of talkers...and the Sentence choices influenced rhythm significantly, while adding speakers from different L1 groups showed the between group results were insignificant.

Arvaniti's (2009) study

- Read sentences, as in Ramus *et al.* [1999],
 - 5 Ss favoring 'stress-timed'
 - 5 Ss favoring 'syllable-timed'
 - 5 other (literary) sentences
- Read running text (the story of 'The North Wind and the Sun'), as in Grabe and Low [2002], and
- Spontaneous speech.
- This study showed that **even low-level manipulation can skew the results significantly, as can individual speaker variation.**

LEXICAL Factors & durations

- Number of syllables (Lehiste 1970, White/Turk 2010)
- Position relative to the edges of a word (Klatt 1976, Umeda 1975)
- Word Frequency (Hay *et al* 1999, Jurafsky *et al* 2007, Phillips 2010)
 - Closed/open class (Hirschberg 1993, Jurafsky *et al* 2009, Tauberer/Evanini)
- Given *vs.* new in a specific conversation (Goldwater *et al* 2010)
- ‘Semantic novelty’ for the conversation (Umeda 1975, Strom *et al*)
- Actually, it may well be that since ‘stress-timed’ languages have a ‘steeper’ prominence gradient for ‘new’ information, emphasis on ‘new’ words, or clausal information may actually differentiate between stress- vs syllable-timed lgs. **more clearly**. (Nolan & Asu 2009)

Other Durational Factors

- Position relative to the edges of a
 - Clause
 - Sentence
 - ‘Paragraph’ or unit of thought (Lehiste 1970; Klatt 1976)
- Speech rate variations also influence PVI (Klatt 1976)
 - Because vowels are more compressible in English (Klatt 1976)
- Interspeaker variables (Biadsky *et al* 2008, Jurafsky *et al* 2009, Klatt 1976)
- Intraspeaker variation { style genre } (Biadsky *et al* 2008, Hirschberg 2000, Jurafsky *et al* 2009, Nakamura *et al* 2008, Strom *et al* 2008, Szakay 2008, Tan 2010, Yaeger *et al* 2003, Yuan *et al* 2004)

Reading Style –

Consider read genres

See your handout.

The WBUR-NPR News Reading (LDC)

- Repeated by a radio announcer, from a WBUR News Broadcast
- *In 1976, Democratic Governor Michael Dukakis fulfilled a campaign promise to de-politicize judicial appointments. inbreath He named Republican Edward Hennessy to head the State Supreme Judicial Court. inbreath For Hennessy, it was another step along a distinguished career inbreath that began as a trial lawyer and led to an appointment as associate Supreme Court Justice in 1971. inbreath That year Thomas Maffy, now president of the Mass. Bar Assn, inbreath was Hennessy's law clerk. inbreath The author of more than 800 State Supreme Court opinions, Hennessy is widely respected for his legal scholarship and his administrative abilities. inbreath Admirers give Hennessy much of the credit for sweeping court reform that began a decade ago, inbreath and for last year's legislative approval of 35 new judgeships inbreath and \$300 million to restore crumbling court houses. inbreath Despite the state's massive budget deficit, inbreath Hennessy recently urged colleagues in the bar association not to retreat from these hard won gains....*
- ldc/pubs/1996/S/36/published_cds/bu_radio_1/m1b/labnews/j/radio [full txt on request] --Ostendorf, Price, Shattuck-Hufnagel, (1990)

text

From the 2007 *Boston Globe*: ‘How to Survive a New England Winter’

- *People who are new to New England often worry about how to get through New England’s fierce winters. Although our winters might appear to be unpleasant, New Englanders have many ways of keeping warm. When asked the question, “How do you make it through the winter up there?” many natives assure newcomers not to fear that they will be cold or bored. In fact, snow is part of the allure of New England, and many of us enjoy skiing and participating in other winter sports and outdoor rituals. Most tourists only come to the northeast in the summer or the fall – often for weddings, since couples like to get married near the beach or in the fall foliage (and this commerce helps our economy very much). But New England does not shut down in the wintertime! But every few years, a blizzard takes over. The worst storm in recent history is the “Blizzard of ’78,” a snowstorm which brought in three to four feet of snow.....*

Phoneticians' Reading: The North Wind & the Sun

- Many of these readings can be found on the handout.

- **The North Wind and the Sun**

- *The North Wind and the Sun were arguing one day about which of them was stronger, when a traveler came along wrapped up in an overcoat. They agreed that the one who could make the traveler take his coat off would be considered stronger than the other one. Then the North Wind blew as hard as he could, but the harder he blew, the tighter the traveler wrapped his coat around him; and at last the North Wind gave up trying. Then the Sun began to shine hot, and right away the traveler took his coat off. And so the North Wind had to admit that the Sun was stronger than he was. (used by Grabe & Low)*

- Such readings can be useful because **many dialects have been collected over many years, with high-quality recordings.**

Rat.

• Once there was a young rat named **Arthur**, who could never make up his mind. Whenever his friends asked him if **he** would like to go out with them, **he** would only answer, "I don't know." **He** wouldn't say "yes" or "no" either. **He** would always shirk making a choice. **His** aunt **Helen** said to **him**, "Now look **here**. No one is going to care for you if you carry on like this. You have no more mind than a blade of grass." One rainy day, the rats **heard** a great noise in the loft. The pine rafters were all rotten, so that the barn was rather unsafe. At last the joists gave way and fell to the ground. The walls shook and all the rats' **hair** stood on end with fear and **horror**. "This won't do," said the captain. "I'll send out scouts to search for a new home. Within five hours the ten scouts came back and said, "We found a stone house where there is room and board for us all. There is a kindly horse named Nelly, a cow, a calf, and a garden with an elm tree." The rats crawled out of their little **houses** and stood on the floor in a long line. Just then the old one saw Arthur. "Stop," he ordered coarsely. "You are coming, of course?" "I'm not certain," said Arthur, undaunted. "The roof may not come down yet." "Well," said the angry old rat, "we can't wait for you to join us. Right about face. March!" Arthur stood and watched them hurry away. "I think I'll go tomorrow," **he** calmly said to **himself**, but then again "I don't know; it's so nice and snug **here**." That night there was a big crash. In the morning some men—with some boys and girls—rode up and looked at the barn. One of them moved a board and he saw a young rat, quite dead, **half** in and **half** out of his **hole**. Thus the shirker got his due.

Fagyal's Reading

*C'est une histoire incroyable. Notre prof d'anglais a **disparu**. Il n'est jamais arrivé à l'école, alors qu'un élève l'a **vu** descendre **du** RER le matin. Il aurait **disparu** sans laisser de traces. Il n'est plus jamais **revenu**. Sur le chemin de la gare, **plusieurs** l'avaient **reconnu**, mais personne ne sait ce qu'il est **devenu**. En tous cas, c'est sûr qu'on ne l'a **plus** jamais **revu**. Et toi, qu'est-ce que tu en penses ? Qu'est-ce qui lui est arrivé ? Invente la suite de l'histoire, imagine que tu es le principal ou l'inspecteur de police. Qu'est-ce que tu ferais ?*

2x

- *Speakers*
- 3 groups of 3 male college students
- Monolingual Lima
- Monolingual Cuzco
- Bilingual Quechua-Spanish Cuzco
- Sentences based on Ramus' corpus

SENTENCES

Amalia podaba los árboles

Su madre admira la lana.

Su hermana retirará la demanda

El niño añade los rábanos

Su familia mandará los violines.

Bernardo venderá los mangos.

Yolanda domina el castellano.

El criminal llevaba el ídolo.

El albañil moverá los barriles.

El vándalo agarra los baldes.

El águila guardaba el nido.

La víbora devoraba los

animales.

Data

- 24 Maori & 12 Pakeha speakers
- Reading from *Le Petit Prince*, by St. Exupéry
- *“And now of course six years have already passed. I have never told this story before. The friends who saw me again on my return were very happy to see me alive. I seemed sad but I said to them: ‘It’s exhaustion’. Now I have got over my loss a little, which is to say not entirely. But at least I know that he returned safely to his planet because I couldn’t find his body in the morning.”*
- And then telling a personal narrative

o .

Arvaniti's Low Level manipulation?

Table 3. Manipulation of phonotactic and *genre* variables.

Hypothetical influence	Arvaniti (2009:10) sample sentence
5 Stress-timed	<i>The production increased by 3/5s in the last quarter of 2007.</i>
5 Syllable-timed	<i>Lara saw Bobby when she was on the way to the photocopy room.</i>
5 Random	<i>I called Gatsby's house a few minutes later, but the line was busy.</i>
Read text	<i>The North Wind and the Sun</i>
Conversation	

Arvaniti (2009) also found that PVI measures for literary readings differed significantly from the hand-picked sentence-reading PVI for each individual speaker.

Study of Mandarin Rhythm

(Tan)

- 20 poems (4 examples of 5 poetry genres)
- 30 Sung dynasty ‘lyrics’
- 20 (250 syllable) segments from novels
- 20 (250 syllable) segments from other prose
- 10 news reports.
- Also: Hirschberg 2000, Ostendorf *et al*, Zue, *et al*[sundry]...
- ***So even the genre being read, or the ‘style’ of news, can alter the PVI choices available.***

genres

- News: Actually contain several *genres*
- Phoneticians: Speakers may vary specific features
- Each *genre* has limitations/conventions
- **Literary genres** differ in their reading conventions
- *So*
 - *Even when identical features are present*
 - *The specific genre being read can alter speakers' available PVI choices.*

As Fagyal already said:

- **Strict isochrony of stressed-, syllable-, and mora-timed intervals could never be measured,**
- even if individual speakers use the same reading passages.
- When readers use different passages, it is *impossible* to guarantee isochrony.

Discourse Effects

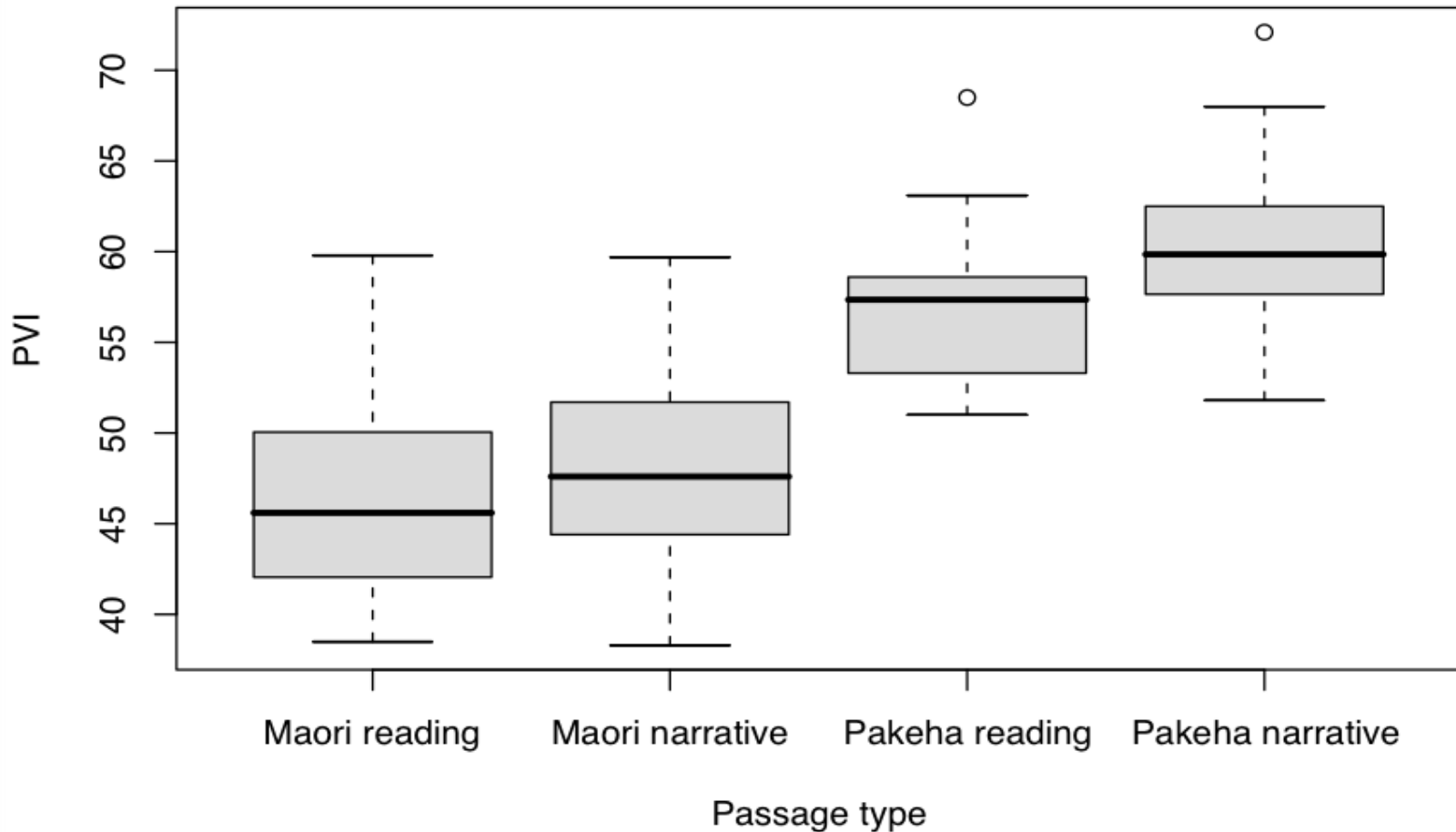
Consider

"Sociolinguistic Corpora"

Construct using interview data

- Hesitations
- False Starts
- Filled and unfilled pauses for restructuring
 - to signal word searches, or ‘try markers’ (Sacks, Jefferson, Schegloff)
 - to signal ‘asides’, or ‘side sequences’ (Jefferson, Yaeger-Dror)
 - to trigger ‘continuers’ (Amiridse *et al* 2010, Benus *et al* 2007, Ward 1996, Jefferson..., Schegloff...)
- Correlated durational variation
 - for emphatic stress [lx variable: *e.g.*, French vs. English]
 - to signal word searches, or ‘try markers’ (Sacks, Jefferson, Schegloff)
 - to signal ‘asides’, or ‘side sequences’ (Jefferson, Yaeger-Dror)
 - to trigger ‘continuers’ (Amiridse *et al* 2010, Benus *et al* 2007, Ward 1996, Jefferson..., Schegloff...)

Szakay (2008a) Data



And yet....Note that despite my projections, while [for each group of speakers] the PVI means for 'story telling' differ from those for the read data, the *genre* differences **may not differ significantly** for a given group of speakers.

Consider conversational data

- **Speech rate influences PVI, in English, because vowels are more compressible than consonants** (Klatt 1976)
- Speakers manipulate their speech rate,
 - To display disagreement (Schegloff, Jefferson, *etc*)
 - To prepare to express it (Schegloff, Jefferson, *etc*)
 - To flag their need for a continuer
 - Or help with a missing word (Schegloff, Jefferson, *etc*)
- Variability in speech rate is one of the factors influencing perception of a speaker's 'charisma' (Biadys *et al* 2008)
- ...and honesty (Enos *et al* 2007)

Consider conversational data

- Intraturn durational variation:
- Can be caused by turn-taking signals too
- *E.g.*, speakers slo:w: do:w:n to maintain the floor or if it looks like they need to clarify (Schegloff, Jefferson, *etc*)
- *E.g.*, speakers slo:w: do:w:n to maintain the floor if /when they're in overlap with another speaker (Schegloff, Jefferson, *etc*)
- *E.g.*, speakers *speed up* to maintain the floor (Schegloff, Jefferson, *etc*) – altering end of turn rules
- Obviously, we don't want to use conversational corpora which are also prone to turn-taking perturbations.

Conclusions

The isolation of different types of rhythm from

- **Language-specific phonological phenomena**
 - Vowel and consonant increments/reductions
 - Syllable, word & sentence structure
- **Lexical** factors
- **Style/genre** factors
- **Social situation & Conversational dynamics**
- **Results may not be comparable if your corpus differs from those used in earlier studies:**
- **So if data from different corpora are posted on the same figure, clarifications are needed.**

- 1. Devising a corpus which will permit comparison of prosodic *timing* factors is definitely of interest to the sociophonetician [but]
- 2. Determining how to **create** and **analyze** such a corpus requires careful attention to factors which could vitiate conclusions abt *rhythm*! [so,] use Yuan's LDC inspired [http://www.ling.upenn.edu/phonetics/p2fa/.](http://www.ling.upenn.edu/phonetics/p2fa/)]
- 3. Then: Methodology and results sections should be unambiguous & clearly state possible sources of variability, and resultant conclusions should isolate *timing* from *rhythm*.



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