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# Speech Timing & Tonal Alignment in Nonfluent Aphasia

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# Aphasias

fluent      nonfluent

jargon speech      absence of jargon

no self-monitoring      high awareness of errors

Agrammatism – impaired morpho-syntax

Anomia – impaired word access

Dysprosodia – impaired prosody

## **Concomittant motor-speech impairments:**

Dyspraxia of speech – impaired motor-planning

Dysarthrias – impaired muscle activation



Language processing:

How do the modules of the language faculty work together?


How are intonation and prosody affected by issues in other areas of language?

Conduction of case studies where individual language and speech profiles are linked to effects on intonation and prosody.

Right now: Timing issues in the phonetics and phonology of intonation and prosody



Goodglass & Kaplan (1983)  
Speakers with Broca's aphasia  
are dysprosodic.



General  
temporal  
control  
disorder?

Gandour et al. (2000)  
"Thai-speaking nonfluent  
aphasics exhibit a speech  
timing deficit regardless of  
the linguistic level of  
representation" (p.286)

Gandour & Dardarananda (1984)  
deficiencies in articulatory timing  
(voice onset timing) in Broca's  
aphasia

# What do we actually mean by “speech timing”?

Laver (1994)

- Nonfluent speech shows signs of hesitation. “Hesitation is the outcome of a speaker's indecision about what to say next.” (p. 536)
- Speaking rate is a measure of tempo that includes pauses, while articulation rate measures the tempo of production of speech material.





# !!! Fluency ≠ Prosody ≠ Articulatory Implementation !!!

## Fluency

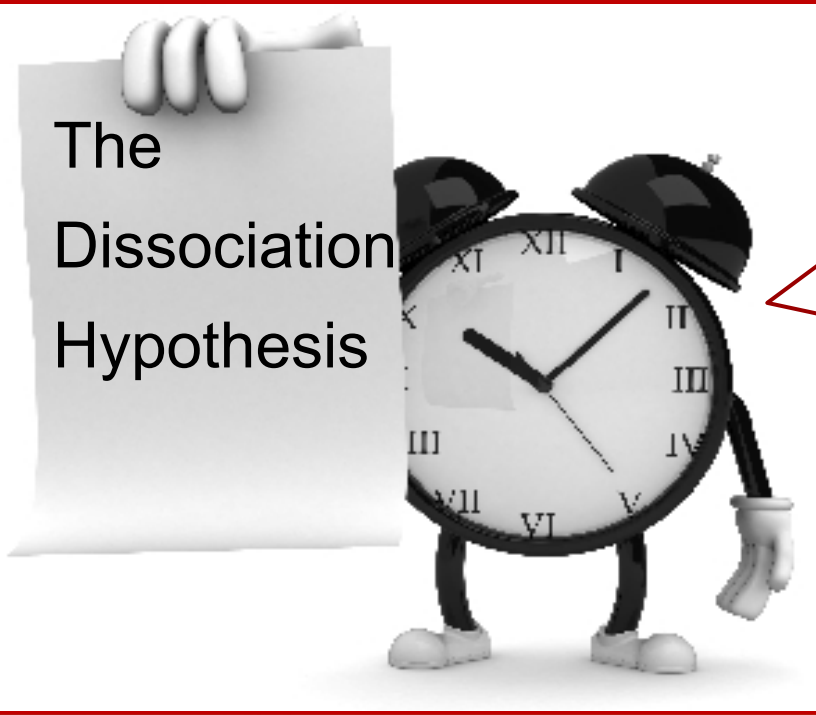
- words/min, CIU/min, %CIU (Nicholas & Brookshire, 1993),  
syll/sec (speaking rate)

## Prosody

- vocalic nPVI  
(Grabe & Low, 2002)

## Articulatory Implementation

- syll/sec (articulation rate, excluding pauses), VOT



The  
Dissociation  
Hypothesis

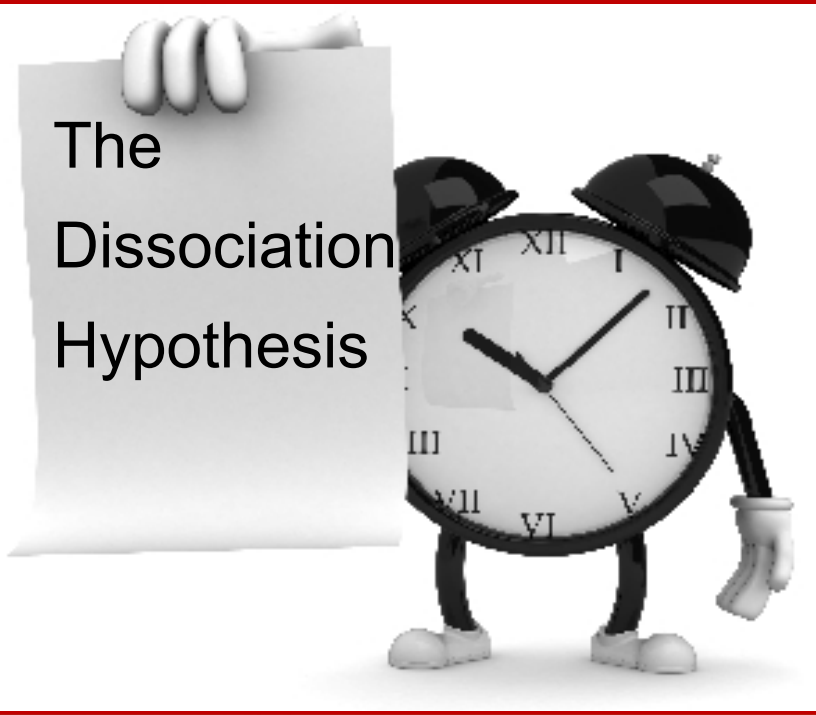
Danly & Shapiro  
(1982)

“F0 seems to be less  
disrupted than  
speech timing in  
Broca's aphasia”  
(p.179)

Seddoh (2004)

“these data suggest that there might be a dissociation  
between speech timing and the production of aspects of  
F0 associated with intonation” (p. 34)





The  
Dissociation  
Hypothesis

## **Tenets of the DH for nonfluent aphasia**

- Speech timing is disturbed
- Intonation is unaffected
- Intonational events are timed with reference to one-another

.

## **Autosegmental Phonology**

pitch accents to prominent positions

boundary tones at phrase edges

## **Tonal Alignment**

=> realization of phonological association

boundary tone on prominent final syllable

may limit space for pitch accent, esp. in short vowels

=> phonetic integration

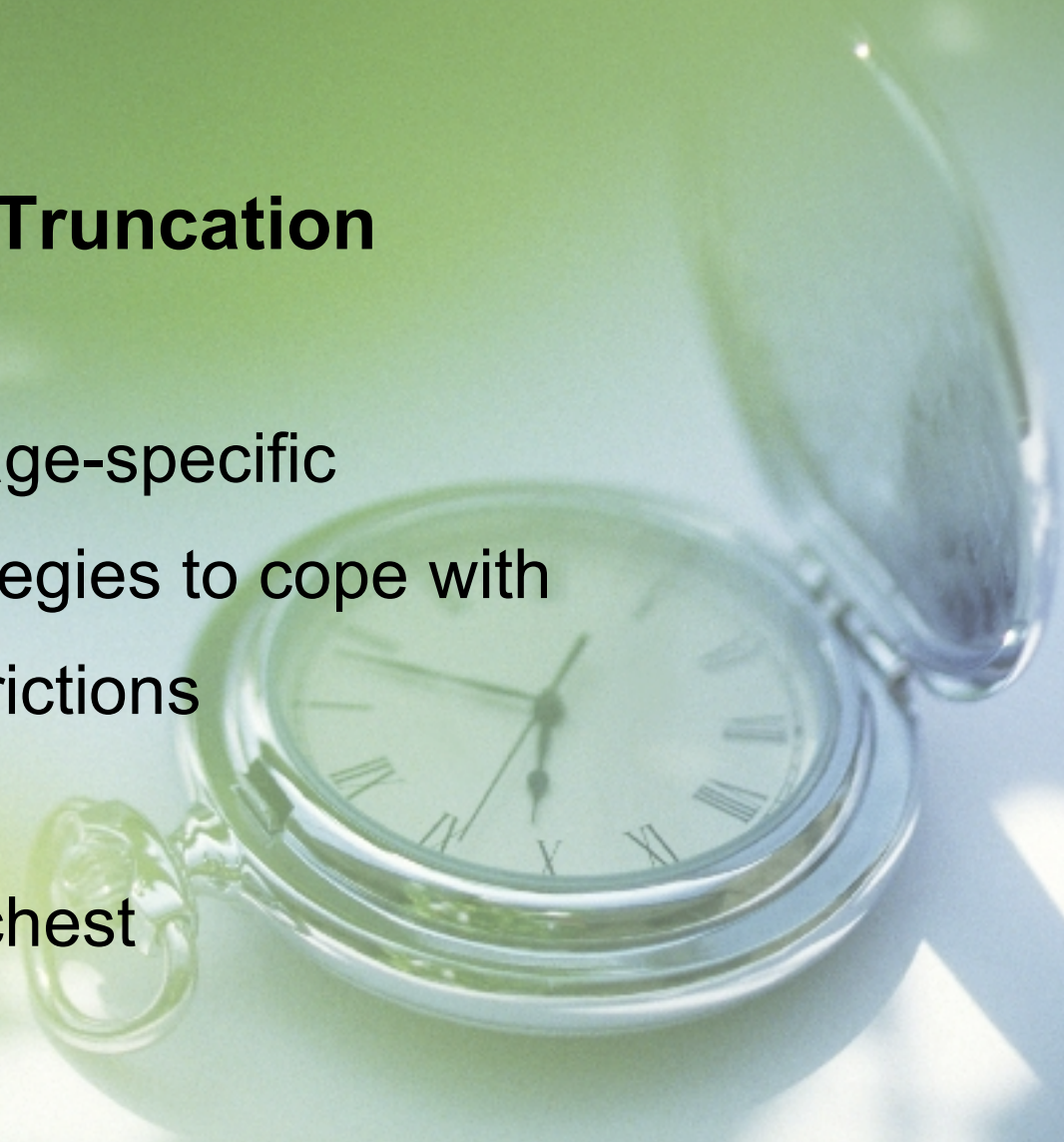




## Compression vs. Truncation

Grabe, 1998: language-specific implementation strategies to cope with sonorant space restrictions


English: cheese vs chest





**Is it cheese or yoghurt?**





Even though the association of tones may be appropriate at the phonological level and the correct language-specific strategy might have been chosen for the realization of an intonational event, things may go wrong during the actual articulatory implementation, just as well as for segmental implementation.

**Intonation is speech timed.**



**Thank you!!**

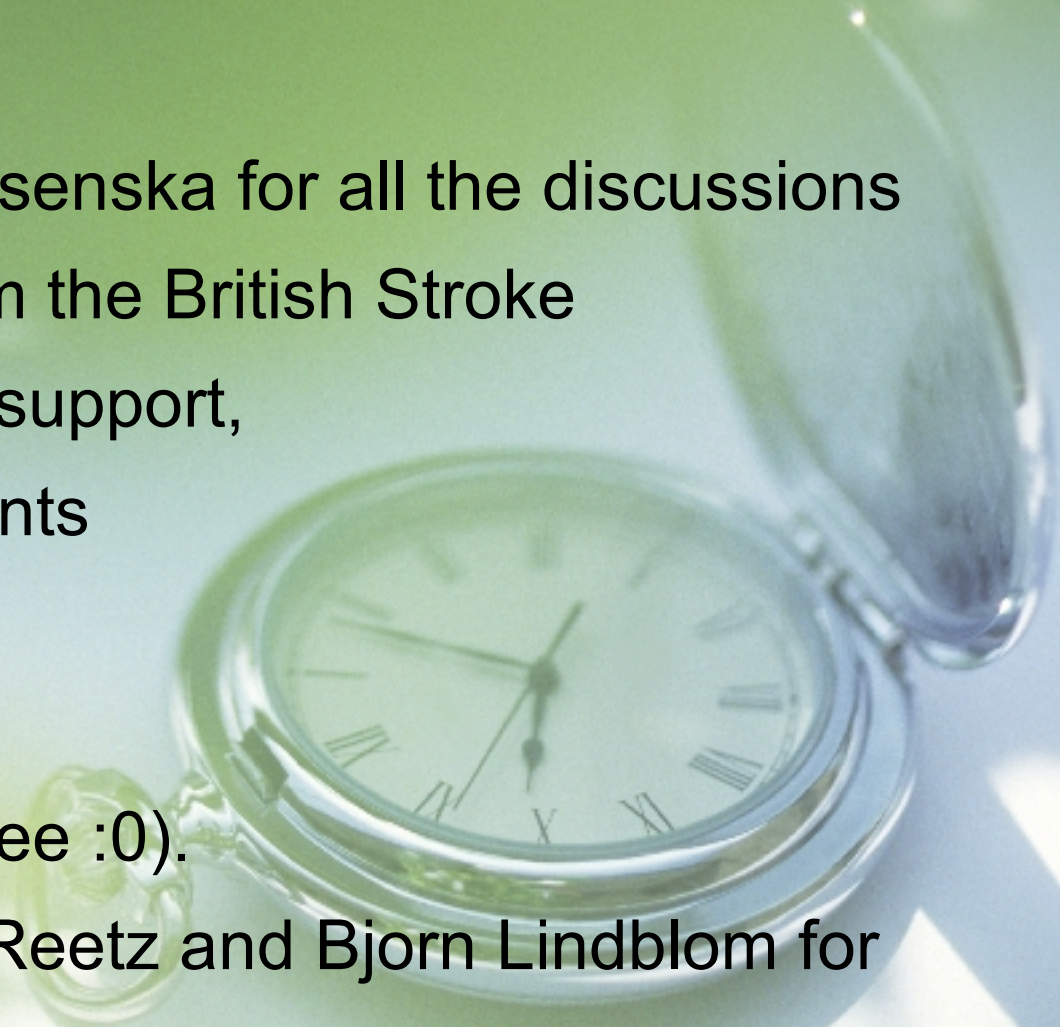




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