Asymmetric processing of word accents in Norwegian

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Introduction

Most dialects of Norwegian and Swedish have tonal word accent opposition, i.e. words can differ by means of tonal melody alone. These two tonal melodies are referred to as *acute/grave* or Accent 1 (A1) / Accent 2 (A2). The actual melodies of the word accents differ from dialect to dialect.

There is a longstanding theoretical debate about the lexical representation of these word accents. Current prevailing hypotheses assume that native speakers have a privative opposition, i.e. one accent is stored in the mental lexicon and the other follows by rules (Lexical Accent 1, e.g., Lahiri et al. 2005, Kristoffersen 2006, Wetterlin 2010, Wetterlin & Lahiri 2012; Lexical Accent 2, e.g., Rischel 1963, Riad 1998, 2009).

However, there are also claims that the word accent opposition is equipollent, i.e. both accents are lexically specified (e.g., Withgott & Halvorsen 1984) and even that there is no prosodic word accent at all (Morén-Duollјá 2013). This paper reports on three experimental studies exploring the question of the representation and processing of lexical word accent in North Germanic using speakers of the Trondheim dialect of Norwegian.

Research Question I

Will priming studies provide us with evidence for processing and representational differences of the tonal accents in North Germanic?

Experimental Design

Cross-modal priming experiments with lexical decision tasks

Accent 1			
Condition	Auditory Prime	Ex1 Visual Target	Ex2 Visual Target
A1 identity (word)	villa$_1$	HUS 'house'	VILLA
Same prime (opposite accent)	*villa$_2$		
A1 unrelated control	mango$_1$		
Same control (opposite accent)	*mango$_2$		
Accent 2			
Condition	Prime	Ex1 Target	Ex2 Target
A2 identity (word)	humle$_2$	BIE 'bee'	HUMLE
Same prime (opposite accent)	*humle$_1$		
Controls as above			

Experiment 1
Semantic priming

- 72 real-word targets with 72 semantically related primes
- 36 A1 prime pairs
- 36 A2 prime pairs
- control prime pairs matching in accent

Experiment 2
Phonological priming

- 72 real-word targets with 72 phonologically related primes
- 36 A1 prime pairs
- 36 A2 prime pairs
- matching accent control pairs

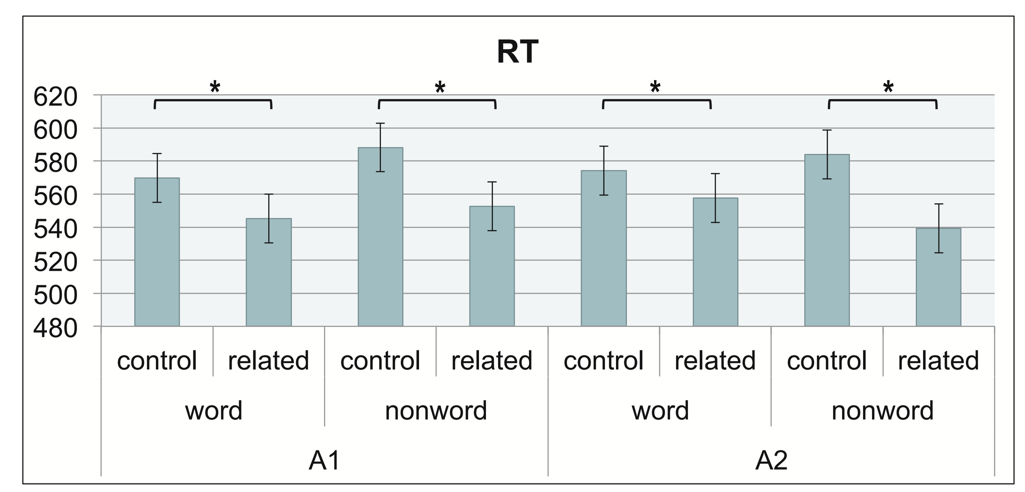
Hypotheses and Predictions

- If tone is as important as segments - nonwords should have slower RTs.
- Asymmetry – hearing the lexically specified accent should influence RTs, making RTs for lexically specified words faster than for non-specified words.
- In form priming we expect less asymmetry because of matching segments.

Priming results

Experiment 1
(semantic priming)

RT stats were calculated using a LMM design (subjects & items random)



Experiment 2
(phonological priming)

key: nonwords = words with incorrect, i.e. opposite accent; asterisk = significance (p < 0.05); vertical lines = standard error of means of condition

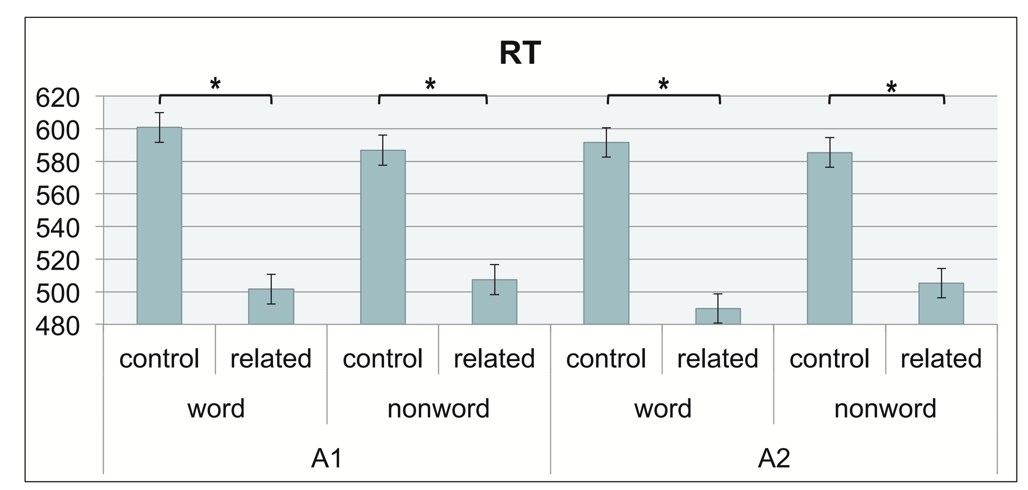


Figure 1 & 2 *Reaction times: (mean RTs in milliseconds) for semantic & phonological priming*

Experiment 1
(semantic priming)

Error analysis used a logit generalised linear model with a binomial distribution

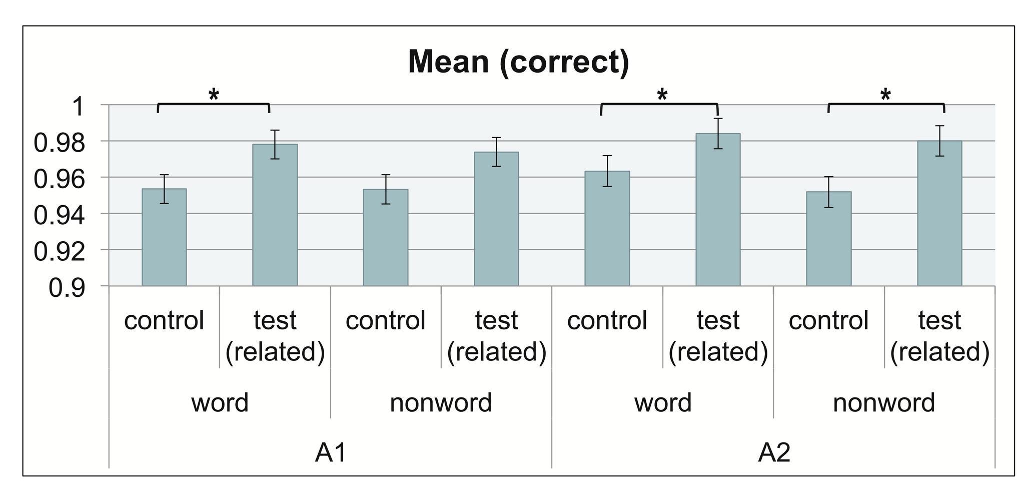


Figure 3 *Error analysis data for semantic priming experiment*

➔ both related words & nonwords primed equally well
➔ In error rate data, A1 nonwords show the same % of errors as control items while all other related primes resulted in significantly lower error rates

Research Question II

Since behavioural studies show that a segmental match suffices and that tone is not as important, can we find evidence for the representation of the tonal accents early in processing using an MMN study that taps into automatic processing?

Hypotheses and Predictions

- MMNs for both accents since change is equal - comparing A1/A2 and A2/A1
- Differences in amplitude and/or latency for the predicted lexical asymmetry

Experimental design

- Two real-word minimal pairs matched for frequency, e.g., *banken$_1$ tanken$_2$* both higher frequency than *banken$_2$* & *tanken$_1$* and one nonword minimal pair

- standard-deviant reverse paradigm
- 25 native speakers of Trondheim dialect

Accent 1	Accent 2	Glosses
bank=en	banke=n	bank$_{DEF}$; sand bank$_{DEF}$
tank=en	tanke=n	tank$_{DEF}$; thought$_{DEF}$
*janken	*janken	

- SOA varying randomly between 350ms-650ms
- 600 trials per experiment

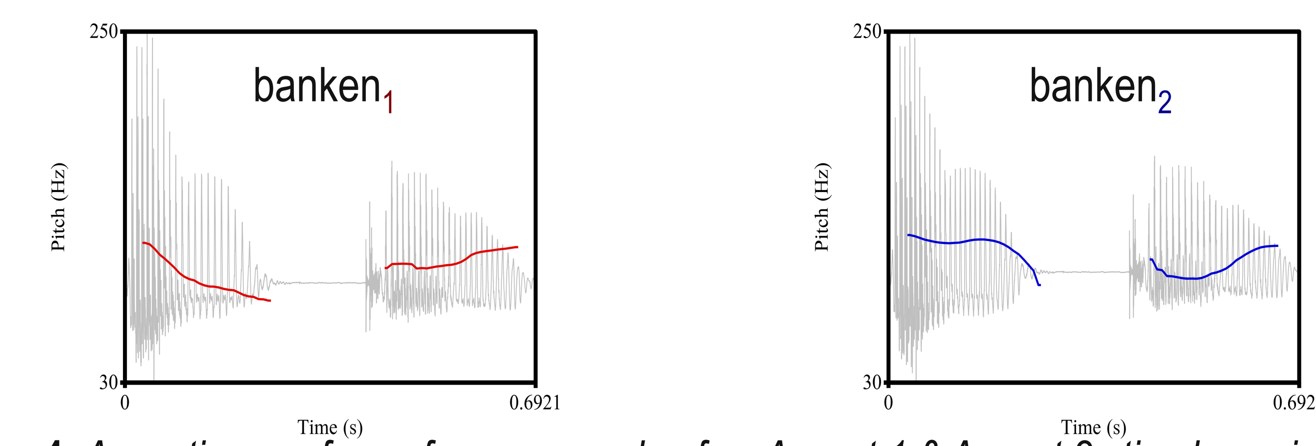


Figure 4 *Acoustic waveforms for an example of an Accent 1 & Accent 2 stimulus pair*

MMN results

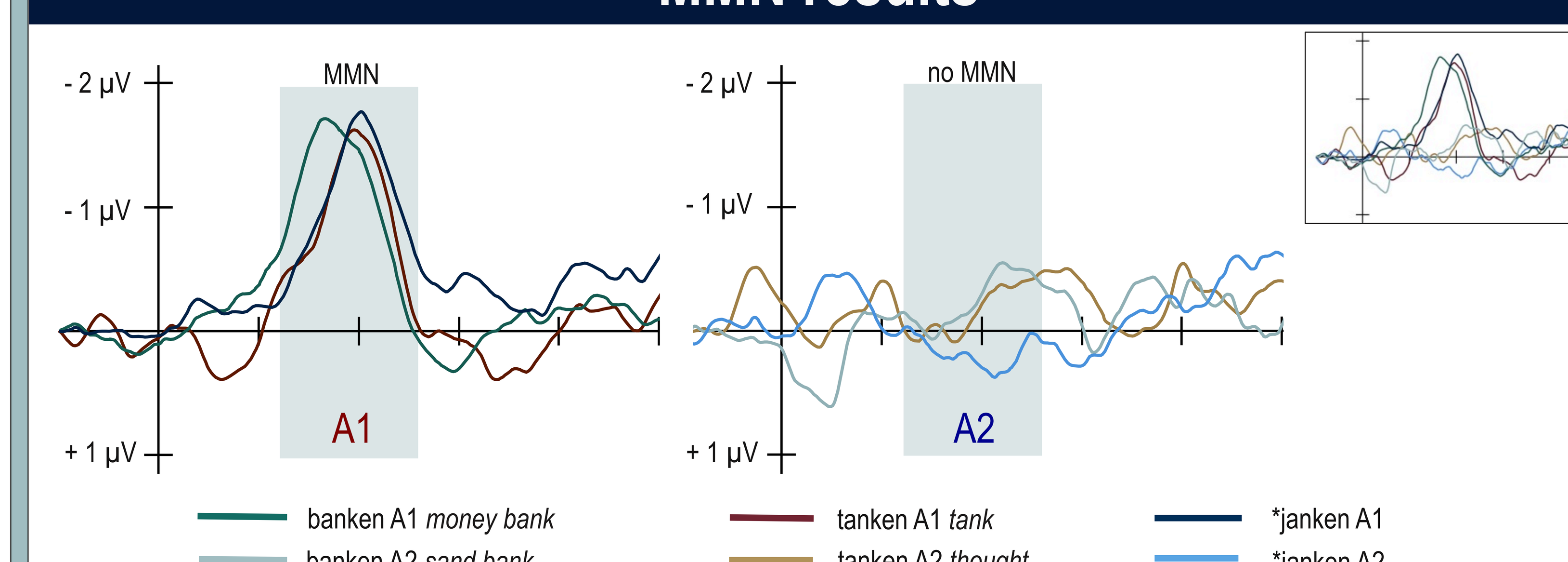


Figure 3 MMN waveforms from deviation point with 100ms baseline measured at Fz

Discussion

- Active perception RT experiments show that speakers compensate for dialect differences and tonal information is not as important as segments
- MMN results: MMN component for all A1 tokens, No MMN for any A2 tokens

Possible explanations:

- Similar to regular (no MMN) & irregular stress (MMN) results from Hungarian disyllabic words (Honbolygó & Csépe 2013)?
- Asymmetric saliency of A1 & A2? Yet very similar falling contours T2 & T3 in Chinese produce MMNs (Chandrasekaran et al. 2007).

Contact

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Selected References

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