Norwegian word accents & the mental lexicon: 2 psycholinguistic experiments

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Introduction

Amongst the North Germanic languages most dialects have tonal word accent opposition, i.e. words can differ by means oftonal melody alone, e.g. akse1, shoulder akse1, akse2. There are two tonal melodies referred to as acute/prave or Accent 1 (A1)/Accent 2 (A2). Dialects differ in their manifestation of the tonal accents and some in fact have no tonal opposition at all. However, dialects are in general mutually intelligible, thus these prosodic differences do not seem to present large barriers for understanding. Are they indeed at all important for word research?

Research questions:
1. Is tonal information important for word recognition or does it only function as a segmental cue?
2. If lexical specification of tone be reflected in word retrieval, i.e. in response accuracy and speed?

Lexical specification:

There are two privative hypotheses assuming that one accent is lexically specified and the other is a default or follows rules: lexical Accent 1 hypothesis (e.g. Lahri, Wetterlin & Jönsson-Steiner 2005, Kristoffersen 2006, 2007; Wetterlin 2010) and lexical Accent 2 hypothesis (e.g. Rischel 1963, Riad 1998, 2009).

Predictions:

If tonal information is just as important as segments, words with the wrong accent should not prime. If tonal information is stored in the mental lexicon, lexical accent should assist in word retrieval. We predict faster reaction times and greater precision for one accent (lexical) as opposed to the other accent (default).

Methods

Stimuli & Experimental Design

2 cross-modal priming experiments using auditory primes & visual targets

Experiment 1: Semantic priming with lexical decision task

72 real-word targets with 72 semantically related primes (36 Accent-1 prime pairs: correct & incorrect accent; 36 Accent-2 prime pairs: correct & incorrect accent) with matching-accent control prime pairs (correct & incorrect accent). 72 nonword targets with same numbers and patterns of words as for real-word targets.

Experiment 2: Form priming with lexical decision task

Same auditory primes used as in Experiment 1 with 72 real-word targets and 72 form related primes (36 Accent-1 prime pairs: correct & incorrect accent; 36 Accent-2 prime pairs: correct & incorrect accent) with matching-accent unrelated prime pairs (correct & incorrect accent). 72 nonword targets with same numbers and patterns of words as for real-word targets.

Experiment 2: real-word target set

<table>
<thead>
<tr>
<th>Accent 1</th>
<th>Condition</th>
<th>Prime</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 identity (word)</td>
<td>vilja</td>
<td>VILLA</td>
<td></td>
</tr>
<tr>
<td>Same prime (opposite accent)</td>
<td>*vilja</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1 unrelated control</td>
<td>mango</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same control (opposite accent)</td>
<td>*mango</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Experiment 2: Form priming target set

<table>
<thead>
<tr>
<th>Accent 2</th>
<th>Condition</th>
<th>Prime</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2 identity (word)</td>
<td>humle</td>
<td>HUMLE</td>
<td></td>
</tr>
<tr>
<td>Same prime (opposite accent)</td>
<td>*humle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2 unrelated control</td>
<td>panne</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same control (opposite accent)</td>
<td>*panne</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All primes are disyllabic Norwegian nouns. Both sets of primes (Accent 1 & Accent 2) were controlled to ensure that they had similar mean frequencies. Targets were also controlled for frequency, number of syllables and letters.

Example of tonal contours of primes:

Accent 1 prime:

(dashed line indicates opposite accent)

Accent 2 prime:

(dashed line indicates opposite accent)

Both experiments were run at the Institutt for språk- og kommunikasjonssstudier at the NTNU, Trondheim Norway.

Participants: 64 native speakers of the Trondheim or of a similar dialect from a nearby community (Average age: 25).

Results

Reaction times (mean RTs in milliseconds)

Experiment 1 (semantic priming)

Experiment 2 (form priming)

Error analysis

Discussion

Tonal and segmental information

The semantic and tonal information is a different context for the word priming experiments both show that segmental information is active for the semantic (Ex1) and the phonology (Ex2) of the targets. Changing the accent did not affect the participants. Words with the wrong/opposite accent still activate the semantic or form-related primes — matching segments suffice. This comes as no surprise since there are dialects that have both the tonal contrast entirely and speakers of dialects with opposite tonal manifestation for the accents still understand each other. The significant difference in priming found for A2 primes and A1 NW error rates hint at the representation of tonal information. Both the fact that A2 primes word better than A1 NWs and that A1 NWs are similar to controls in their error rates, indicate that tonal information is stored for A1 but not for A2. It was easier to accept a different tonal contour for A2 words since no tonal information is stored — RTs were thus faster. For error rates, controls had overall more errors than related primes, and wrong tonal information when accessing A1 words throws the listener off and they made just as many errors as with controls.

Selected References


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