INTRODUCTION
A facilitatory effect of rich stem allomorphy on single-word recognition

- The activation of multiple stem allomorphs (e.g., foot ~ feet) at the lemma level appears to facilitate lexical access from form to meaning as multiple allomorphs result in multiple routes to get to the lexeme. Words with stem allomorphy are recognized more easily than words with no stem allomorphy (e.g., table) from a productive inflectional class (Nikolaev et al., 2014).
- Nikolaev et al. (submitted) provide support for the claim that words with greater stem allomorphy, rather than productivity of the inflectional class, facilitate word recognition.
- We know little about what makes lexemes easier or harder for individuals with Mild Cognitive Impairment (MCI) or Alzheimer’s disease (AD) to recognize (e.g., Cuetos et al., 2013). Since ease of recognition typically correlates with shorter reaction times, in fixed part of the face-name reaction times of a similar set of lexical variables including stem allomorphy as well as by variables characterizing individuals, as Age and Years of education.

Research Questions
1) Do elderly controls show the same pattern in recognizing words with greater stem allomorphy found in young adults by Nikolaev et al. (submitted)? Does the pattern change in MCI or in AD?
2) What other lexical or individual variables distinguish healthy older adults from individuals with MCI or AD?
3) Vonk et al. (in prep.) claim that education modifies our language reserve. Are thus elderly controls with more years of education faster in recognizing words than those with less years of education? Is this language reserve deteriorated by the disease and thus absent in MCI or AD?

METHODS

Stimuli:
- We included 3 classes of Finnish nominal base forms that differ in their paradigmatic complexity (stem allomorphy).

The three i-parameters we used

A partial number and case matrix of a subset of Finnish i-final noun paradigms:

<table>
<thead>
<tr>
<th>Singular</th>
<th>Plural</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ja</td>
<td>ja</td>
<td>John</td>
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<td>Ja</td>
<td>ja</td>
<td>John</td>
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</tbody>
</table>

Number of trials:
99 (final words: vase, savu, isä) 99 allomorphs 78 all-final words (filari) 78 all-final pseudo-words (filari)

Task:
- Single word lexical decision task of base forms
- Participants: 17 elderly adults (control) and 24 individuals with MCI

Data analysis with mixed effect models
- Dependent variable: Reaction time (log-transformed)
- Explanatory variables:
  - from collected from 16 individuals with MCI and elderly controls

How were the AD and MCI groups diagnosed?
AD: The AD patients were diagnosed using the NINCDS-ADRDA criteria (which included an evaluation of medical history, physical and neurological examinations performed by a physician, and a detailed neuropsychological evaluation. Furthermore, other possible pathologies to account for the symptoms were excluded by MRI assessment, cerebrospinal fluid (CSF) analysis, electrocardiograph, chest radiography, screening for hypertension and depression, and blood tests.)

The MCI patients were diagnosed using the original criteria of the Mayo Clinic Alzheimer’s Disease Research Center (< 1 memory complaint by patient, family, or physician; 2) normal activities of daily living; 3) normal global cognitive function; 4) objective impairment in memory or in one other area of cognitive function as evident by scores > 1.5 S.D. below the age appropriate mean; 5) CDR score of 0.5 or 1.0; and 6) absence of dementia). All procedures were performed in the Neurological department of University Hospital of Kuopio or at the Brain Research Unit of the University of Eastern Finland.

RESULTS

Significant Effect of Allo morphology
- 84% in words with greater number of stem allomorphs (vesi type) were faster than words with lower stem allomorphs (ja and savu type) in all three groups (AD, MCI, control)

Effect of Productivity
- no effect of productivity
trend was found. The two unproductive classes (ja and savu) did not pattern together.

Effect of Disease
- No effect of disease (AD or MCI) was found regarding the processing of words with different number of stem allomorphs vs different productivity.

DISCUSSION

We observed a facilitation effect only for unproductive words (vesi-type) with three or more stem allomorphs in all “elderly groups”, suggesting that unproductivity as such (type) is not enough to obtain a facilitation effect. Thus, (un)productivity of the inflectional type is not driving the facilitation of word recognition, instead, a higher number of stem allomorphs results in greater facilitation.

Even though their word recognition speed was slower, individuals with AD showed the same pattern of facilitation effect on word recognition with greater stem allomorphy as individuals with MCI and elderly controls.

Morphological family is a facilitating variable, although the significance of exact measure (derived words, compounds, pseudo-compounds) is different for each group. Individuals with AD rely on the surface frequency in recognition of words, whereas elderly controls rely on its subjective frequency. Individuals with MCI rely on both, surface and subjective frequencies.

According to Vonk et al. (in prep), education modifies our language reserve. This claim gets support from our results with elderly controls and individuals with MCI, whose speed of word recognition correlated with a number of years of education.

Regardless of age and presence of disease, the facilitation effect of high stem allomorphy on word recognition was evident in our groups. In conjunction with the usual frequency effect on word recognition, we propose a framework that stem allomorphs are represented in our mental lexicon and frequent exposure enhances the access to the representation.

REFERENCES

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