The mental lexicon across the lifespan

Word associations from L1 and L2 speakers of Norwegian with and without dementia

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Word association tests

Word association data differ from other types of linguistic data. No restrictions are imposed on the participants, and no contexts for the cue words are given. Thus, word association tests may give “rise to distinct mental properties that go beyond the information captured in written or spoken text” (De Deyne and Storms 2016: 470). Patterns in associations may shed light on how the mental lexicon is organised. Taking a usage-based view, we expect associations based on perceived similarities in form or meaning, as well as associations based in patterns of use.

Influence of age, language background and cognitive decline

While the lexicon expands throughout the lifespan (Jarema and Liitzen 2007), lexical processing slows down with age (Kempler & Zechal 2004). For L2 learners, barely known cues elicit phonological associations, partially cues known may elicit syntactic associations, and well-known words elicit semantic associations (Namul 2004).

Persons with Alzheimer’s disease (AD) show a marked increase in multi-word responses and a decrease in semantic associations (Santa Pietro & Gullotta, 1985).

Methods

Stage 1
Participants: 122 younger (aged 20-30) and 51 older (>60 years) L1 Norwegian speakers, all neurologically healthy.

Norwegian 100-word test based on Fitzpatrick et al. (2015):
- Nouns, verbs and adjectives randomly selected from the 2k and 3k lemma frequency bands of NoWaC (Guevara 2010). No homographs or proper names.
- Administered in written form, with cue words in alphabetical order.
- Responses divided into four broad categories (meaning-based, position-based, form-based, seemingly unrelated) and 14 subcategories (cf. Fitzpatrick et al. 2015).

Stage 2
Participants: Healthy L1 or L2 speakers of Norwegian, and L1 or L2 speakers with AD (see table).

30-word version (nouns and verbs), based on stage 1:
- 20 cues primarily evoking semantic associations, 10 cues balanced between syntactic and semantic.
- Administered orally, with a written list for support.
- Two frequent words added as warm-up.
- Revised scoring system: added a meaning-based subcategory (description).

Results

Stage 1
Significant differences between the groups were found within:
- meaning-based
- position-based
- form-based

The majority of responses were meaning-based:
- Synonyms were common for the older participants
  - serve → gi
  - ‘serve’ → ‘give’
  - tempo → fart
  - ‘pace’ → ‘speed’
- The younger participants primarily provided other conceptual associations
  - planlegge → kalender
  - (‘to plan’ → ‘calendar’)
  - kjærlighet → hjerte
  - ‘love’ → ‘heart’

Stage 2
Older L2 were more similar to younger than to older L1

Between older healthy L1 and L2 speakers, significant differences were found within:
- more meaning-based
- seemingly unrelated

The majority of responses were meaning-based (but not in the AD L2 group).
- Many multi-word utterances among speakers with AD
  - drama → tanken du får når du sover
  - ‘the thought you get when you fall asleep’
  - virksomhet → gjerne preve
  - ‘good idea’
  - men orker ikke ‘can’t bear’

Conclusions

Similar response patterns among healthy L1 speakers in the two stages:
- Older L1 provided almost exclusively meaning-based associations.
- Predominantly these were synonyms.
- Younger L1 gave fewer synonyms than the older L1.
- Older L2 also leaned towards meaning-related associations, but gave more seemingly unrelated responses than the other healthy participants.
- Similar to the healthy older L2 speakers, L1 speakers with AD gave fewer meaning-related and more seemingly unrelated responses than the healthy L1 speakers.
- L2 speakers with AD gave markedly fewer meaning-related and more seemingly unrelated responses than any other group.
- Both AD groups gave many multi-word responses, in spite of instructions.

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References


Scoring system

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<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning</td>
<td>Synonym</td>
<td>quickly→fast</td>
</tr>
<tr>
<td></td>
<td>Lexical set</td>
<td>mom→dad</td>
</tr>
<tr>
<td></td>
<td>Other conceptual</td>
<td>love→marriage</td>
</tr>
<tr>
<td>Position</td>
<td>Cue-response</td>
<td>weather→God</td>
</tr>
<tr>
<td></td>
<td>Response-cue</td>
<td>spring→hot</td>
</tr>
<tr>
<td></td>
<td>Both</td>
<td>hard→rock</td>
</tr>
<tr>
<td>Form</td>
<td>Affix manipulation</td>
<td>baker→bake</td>
</tr>
<tr>
<td></td>
<td>Similar in form only</td>
<td>sit→pit</td>
</tr>
<tr>
<td></td>
<td>Two-step</td>
<td>fit→feet→nails</td>
</tr>
<tr>
<td>Seemingly unrelated</td>
<td>Single- or multi-word response with no clear connection</td>
<td>enterprise→would like to try, but can't</td>
</tr>
</tbody>
</table>

Note: Responses that might be related to the cue in both meaning and position were rated as members of both categories (and the relevant subcategories).