Confusion patterns and response bias in spoken word recognition of German disyllabic words and nonwords

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Perceptual discriminability, morphology, and response bias

- German inflectional suffixes can be used to investigate interactions between word status and nonword status bias due to grammatical and/or statistical properties, as laid out in prediction 5.
- Of the inflectional suffixes in German, -n and -en are highly confusable, yet the -n ending occurs much more frequently.
- In order to investigate a possible interaction between morphology and response bias, a Signal Detection Theory (SDT) analysis was carried out.
- To carry out the SDT analysis, the original confusion matrices for each SNR were transformed into 2x2 submatrices. An SDT analysis was then applied to each submatrix.
- The table below displays the results of the SDT analysis for nonwords, mono- and bimorphemic words.

<table>
<thead>
<tr>
<th>SDT analysis of /m/ and /n/ confusions</th>
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<tbody>
<tr>
<td>d'</td>
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<tr>
<td>0.664</td>
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<tr>
<td>0.743</td>
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</tbody>
</table>

- In the absence of lexical context (nonword condition), /m/ and /n/ are highly confusable, with a small bias towards /n/.
- /m/ and /n/ are perceived as most distinct in the monomorphic condition.
- Bias towards /n/ is greatest in the bimorphemic case.
- The SDT analysis lends greater support to the notion that morphology is encoded in the mental lexicon.

Conclusions

- The j-factor analysis showed that phonemes are perceived roughly independently of one another in nonwords, and that there is a strong bias towards words over nonwords.
- The difference in j between mono- and bimorphemic words suggests that morphological structure is encoded in the lexicon.
- Neighborhood density had a robust effect on word recognition, such that words in sparse neighborhoods showed a strong bias over words in dense neighborhoods. Moreover, a phonetically based measure of neighborhood density accounted for a much larger portion of the variation in the data than a phonologically based measure.
- Finally, an SDT analysis showed that listeners exploit statistical properties of the lexicon when faced with highly confusable phonemes.

References


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