Inner-speech slips exhibit lexical bias, but not the phonemic similarity effect

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Research question: How abstract is inner speech?

Inner speech refers to the paired phenomena of speech without articulation and our conscious access to this imagery. In the vernacular, inner speech is often termed, "saying something in one’s head," and in some working memory theories, inner speech is referred to as the "articulatory loop." According to some theories of speech production, speech without articulation is due to the interaction of lexical and phoneme levels, and that the representation is not a necessary component of inner speech.

Background

This research uses the elicitation of phonological speech errors to determine whether inner speech involves articulatory or phonological features beyond the phoneme level.

Two speech error effects are:
- **Lexical bias:** Errors that produce words (e.g. barn door → dam bore) are more likely than those that do not (e.g. back dip → dack bip)
- **Phonemic similarity effect:** Phonemes that are more similar are articulated (e.g. /b/ and /d/) are more likely to interfere in speech errors than those that are less similarly articulated (e.g. /b/ and /t/)

Model

Spreading activation models of speech production suggest that lexical bias is due to the interaction of lexical and phoneme levels, and that the phonemic similarity effect is due to the interaction of phoneme and feature levels.

Manipulations

Orthogonal manipulation of outcome lexicality and onset phoneme similarity within matched item sets and within subjects

<table>
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<th>Manipulations</th>
<th>Orthogonal manipulation of outcome lexicality and onset phoneme similarity within matched item sets and within subjects</th>
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<tbody>
<tr>
<td>Similar creates</td>
<td>Dissimilar creates</td>
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<tr>
<td>Word outcome</td>
<td>ear lead</td>
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<tr>
<td>Nonword outcome</td>
<td>ear lead</td>
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<td>Critical words were controlled for log</td>
<td>Word- and nonword-outcome pairs differed by a single feature in the coda of the first word Only onsets were exchanged analyzed</td>
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<td>Behavioral results:</td>
<td>Summary of effects</td>
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Computational model:

Modeling results:

Experiment 1: Demonstrating lexical bias and phonemic similarity effects in overt speech errors

Procedure

48 participants

Baars and Motley (1974)-style SLIP procedure

Word pairs briefly displayed on a monitor

Participants named the last-seen word pair following irregularly-placed prompts

Presentation sequence:

Phonemic similarity effects:

Summary of effects

- More word than nonword slips in both inner (p=.0008) and overt (p<.0000) speech
- More slips of similar phonomes in overt speech only (p=.01), with no such effect in inner speech (p=.44)
- Significant overtness by similarity interaction (p=.008)

Future work

- Compare effects in silently articulated (mouthed) speech with those in inner speech
- Compare effects of articulatory versus acoustic similarity
- Vary the speed of production to establish whether phonemic similarity effects in inner and overt speech may be modulated by the time allowed for feedback effects to build up

References


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