Tip-of-the Tongue Elicitation of Homophones: Against Shared Lexeme Frequency Effects

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Background

- A powerful predictor of retrieval success is frequency of use
- The nature of the frequency effect in language production is vigorously debated
- Jescheniak & Levelt (1994) argue (1) that “word frequency is encoded as a lexeme threshold activation” and (2) that homophone share a single lexeme node.

Thicker outline indicates higher frequency

- Together these two claims predict:
  
  **Homophone Frequency Inheritance:**
  
  → A low frequency homophone should be as easy to retrieve as its higher frequency counterpart.

- Jescheniak & Levelt (1994) found this, after subtracting out semantic decision (animacy) latencies:

Figure 7: Difference scores from Experiment 6. LF = low frequency, HF = high frequency.
But Caramazza et al. (2001) didn’t:

Numerous subsequent experiments by these two labs and others have continued to find contradictory results.

The Current Study

- We tested for Homophone Frequency Inheritance by eliciting tip-of-the-tongue (TOT) states
- Why TOTs?
  - Frequency inheritance may be more easily detected among the least frequent words—where small differences in frequency have large effects—or when lexical retrieval actually fails
  - Strongest evidence for inheritance came from bilinguals (Jescheniak & Levelt, 1994), who exhibit stronger frequency effects than monolinguals (Gollan et al., 2008)
  - The TOT elicitation paradigm provides several measures of retrieval difficulty

Participants and Methods

- Participants: 50 English-only speakers
- Materials: 55 triplets of target words:
  1) Low-frequency homophone target (e.g., ewe)
  2) Matched low-frequency (LF) non-homophonic control (e.g., wick)
  3) High-frequency (HF) control, matching the cumulative frequency of the homophone set (e.g., day, where freq(day) ≈ freq(ewe) + freq(you))
- Presentation: Target word production was elicited using a definition, a picture, or both

<table>
<thead>
<tr>
<th>Frequency Source</th>
<th>CELEX (per mil.)</th>
<th>BYU (per mil.)</th>
<th>Ratings (0-8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>HF</td>
<td>4.9-1423</td>
<td>249</td>
<td>2.8-7.8</td>
</tr>
<tr>
<td>LF</td>
<td>0-20.2</td>
<td>5.88</td>
<td>1.1-6.0</td>
</tr>
<tr>
<td>Homophone</td>
<td>0-20.2</td>
<td>5.97</td>
<td>0.9-5.7</td>
</tr>
</tbody>
</table>
Sample Stimuli: Definitions

Homophone: What do you call a female sheep?
LF control: What part of the candle do you light?
HF control: What is the opposite of night?

Sample Stimuli: Pictures

<table>
<thead>
<tr>
<th>Homophone</th>
<th>LF Control</th>
<th>HF Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beets</td>
<td>Squid</td>
<td>Gun</td>
</tr>
</tbody>
</table>

Predictions

- **Homophone Frequency Inheritance** predicts homophones (e.g., *ewe*) should be as easy to retrieve as HF controls (e.g., *day*).
- **Alternative models** predict homophones (e.g., *ewe*) should be as difficult to retrieve as their low frequency controls (e.g., *wick*).
- **Both models** predict a frequency effect: HF controls (e.g., *day*) should be easier to retrieve than LF controls (e.g., *wick*).

Dependent Measures

- **GOT** = Correct retrieval
- **TOT** = Speaker reports a TOT and later confirms target as word had in mind
- **notGOT** = Failure to retrieve target followed by reported recognition/knowledge of that target
- **post-DK** = Failure to retrieve target followed by reported non-recognition/lack of knowledge of that target

Results

Homophones elicit more failed retrievals than LF controls

![Graph showing comparison of different conditions](image)
Results (cont’d)

Specific Frequency Predicts Homophone Retrieval

Cumulative Frequency Does NOT Predict Homophone Retrieval

Preliminary Results
1) Homophone targets and LF controls were more difficult to retrieve than HF controls
2) Surprisingly, homophone targets were more difficult to retrieve than LF controls (significantly so for GOTs, RTs and TOTs)—a “homophone interference” effect

Additional Post-Hoc Control

- Preliminary Result (2) is difficult to explain on any account of language production. Were homophone-eliciting stimuli less effective than those for the LF controls?
- To evaluate this possibility, an additional 21 participants rated the effectiveness of the elicitation stimuli on a scale of 1–7:
  “We’d like you to judge the performance of a person in a game-show...Please rate how good the clue is for the purpose of helping their game-partner to think of the meaning of the word...”
These ratings were partialed out of the above data, leaving the following adjusted results:

**Homophones & LF Controls Do Not Differ**

**Final Result**
Homophones pattern like low-frequency controls, NOT like high-frequency controls

**Conclusions**

- A low-frequency word does not accrue any retrievability benefit from having a high-frequency homophone even in the TOT paradigm which should be sensitive to any possible inheritance benefit i.e., **there is no Homophone Frequency Inheritance**
- At least one of Jescheniak & Levelt’s claims must be incorrect:
  - lexemes are not the locus of frequency accumulation (but this is unlikely, cf. Kittredge et al. 2008), so:
  - **homophones do not share lexemes**

**Further Discussion**

Why varying results across studies?

- **Populations**: Jescheniak & Levelt (1994) was a study with bilinguals; Biedermann & Nickels (2008) was a study with one aphasic; our study & Caramazza’s studies were done with monolingual unimpaired speakers;
- **Tasks**: Jescheniak & Levelt used a translation task; Biedermann & Nickels used 11 training sessions where some or all target phonology was provided (and didn’t manipulate frequency); Dell (1990) elicited speech errors (didn’t compare frequency-matched homophones vs. nonhomophones), found cumulative frequency predicts slip rates but specific frequency does not—perhaps our study, Caramazza et al. are about lexical retrieval & Dell’s is about phonological realization

**REFERENCES**


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