

Syllable cueing and segmental overlap effects in tip-of-the-tongue resolution

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Abstract

The tip-of-the-tongue (TOT) phenomenon refers to a temporary word finding failure. To induce TOTs in the lab, a common method is to ask for terms after providing created definitions. When in a TOT, syllable cues were presented in order to manipulate TOT resolution. After the presentation of the correct first syllable of the target word, TOTs could be resolved faster and more accurately than after the presentation of an incorrect syllable of some other word or the control condition (Experiment 1: *syllable cueing effect*). The presentation of the extended syllable of the word (the first syllable with one more segment) facilitated TOT resolution and boosted lexical retrieval even more than the regular syllable (Experiment 2: *segmental overlap effect*).

Key words: tip-of-the-tongue (TOT), resolution, cueing, syllable, segmental overlap

Introduction

The tip-of-the-tongue phenomenon (TOT) represents a temporary impairment in speech production. When experiencing a TOT, one has access to semantic (concept) and syntactic information (lemma) but only partial access to phonological information (lexeme). While the complete word form cannot be retrieved, one has a strong feeling of knowing the word and “recall is felt to be imminent” (Brown & McNeill 1966, p. 325). Often, speakers are able to retrieve the first letter or phoneme, the number of syllables and also words with similar sound and similar meaning (Brown 2012, p. 196).

In order to induce TOTs in a laboratory setting, definitions were presented on a computer screen, for example, “a lift consisting of a series of linked compartments moving continuously” for *paternoster*. In the cueing paradigm so far, syllable cues were embedded in words or pseudowords, and presented in word lists in order to manipulate TOT resolution (for an overview, see Hofferberth-Sauer & Abrams 2014). Abrams, White, and Eitel (2003) illustrated, for example, that the *entire* first syllable is required for TOT resolution – the first phoneme or first grapheme alone had no effect. In the present studies, syllable cues were presented in isolation. The advantage of this procedure is that the syllable itself has no semantic and syntactic information. The

presentation of isolated correct, incorrect, and extended syllables is new in TOT research.

Previous studies

In the pre-tests, definitions had been collected and verified (Hofferberth, 2011). In two pilot studies (Hofferberth, 2012), the design of the experiment was evaluated, and more definitions were collected and validated. Thereafter, two experiments were performed. The first experiment (Hofferberth 2014; Hofferberth-Sauer & Abrams 2014) will be presented here only marginally while the focus is on the second experiment (cf. 3.). All the data was collected within my Ph.D. project (Sauer 2015).

Experiment 1

In the first experiment, definitions were presented on a computer screen. When in a TOT, one of three cues was presented. It was shown that after the presentation of the correct syllable (e.g., *pa* for *paternoster*), TOTs could be resolved about twice as fast compared to after an incorrect syllable (e.g., *o*) and to the control condition (*xxx*). The correct syllable also led to significantly more accurate answers ($M = 73.5\%$, $SD = 18.6\%$) compared to the control condition ($M = 24.3\%$, $SD = 16.4\%$, $t(47) = 16.39$, $p < .001$), and to the incorrect syllable ($M = 16.0\%$, $SD = 13.6\%$, $t(47) = 20.06$, $p < .001$). The control condition led to significantly more accurate TOT resolutions compared to the incorrect syllable ($t(47) = 3.71$, $p = .001$). The incorrect syllable did not block TOT resolution (not leading to more inaccurate answers), but there was an inhibition effect: There were fewer accurate answers and more unresolved TOTs. After demonstrating the cueing effect of the first syllable in Experiment 1, a further experiment was conducted in order to test if the syllable border plays a role (*syllable preference effect*).

Experiment 2

Method

Participants

69 under- and postgraduates (42 female, 27 male) between 21 and 35 years ($M = 27.9$ years, $SD = 4.3$) participated in this study.

Apparatus and material

The material was visually presented on a computer screen using the program *Presentation*. There were 240 definitions of German nouns

presented in order to induce TOTs (the English examples here are only for demonstration purposes).

Procedure

The subjects were told to press a button on the keyboard as fast as possible indicating that they know the word (KNOW), that they do not know the word (DON'T KNOW), or that the word is on their tip of the tongue (TOT). They had 10 seconds to react to the definition. After pressing KNOW, they typed in the answer, and another definition was presented. After pressing DON'T KNOW, the next definition appeared on the screen. After pressing TOT, a cue was presented visually: either the regular syllable (e.g., *pa* for *paternoster*), the extended syllable (e.g., *pat*), or the control condition (marked by xxx). The cue was presented for 25 seconds. In this time, the subjects had to type in their answer.

Results

TOT rate

The number of TOTs varied between 21 (8.8%) and 194 TOTs (80.8%). Through 16560 stimuli overall, 5600 TOTs were induced, i.e., the TOT rate was 33.8% with 81 TOTs per person on average ($SD = 14.7\%$). Out of the 5600 TOTs, 3385 TOTs (60.5%) were resolved in the given time of 25 seconds, with reaction times (RTs) between 571 ms and 24948 ms ($M = 4049$ ms, $SD = 4325$ ms). There were 50.3% accurate answers, and 10.2% inaccurate answers.

Cue analysis

The number of accurate TOT resolutions differed between the three types of cues ($F(2, 136) = 415.65$, $p < .001$). With the extended syllable, TOTs were accurately resolved significantly more often ($M = 72.0\%$, $SD = 18.7\%$) in comparison to the regular syllable ($M = 60.3\%$, $SD = 19.0\%$, $t(68) = 7.00$, $p < .001$), and to the control condition ($M = 18.7\%$, $SD = 13.0\%$, $t(68) = 26.26$, $p < .001$). The regular syllable led to significantly more accurately resolved TOTs ($t(68) = 19.80$, $p < .001$).

The RTs were significantly shorter after the presentation of the extended syllable ($M = 2330$ ms, $SD = 887$ ms) in comparison to the regular syllable ($M = 2803$ ms, $SD = 1166$ ms, $t(67) = 3.92$, $p < .001$), and to the control condition ($M = 3017$ ms, $SD = 1592$ ms, $t(62) = 2.89$, $p = .005$). There was no significant difference between the regular syllable and the control condition ($t(62) = 0.78$, $p = .436$).

Discussion

While Experiment 1 showed the syllable cueing effect, i.e., the correct first syllable helped to overcome transmission deficits from the lemma to the lexeme level, Experiment 2 showed the segmental overlap effect, i.e. a speaker needs even more than the first syllable for successful TOT resolution. It was demonstrated that the extended syllable (e.g., *pat* for *paternoster*) significantly speeded up lexical access (shorter RTs), and significantly increased TOT resolution (more accurate answers) compared to after the regular syllable (e.g., *pa*) and to the control condition (xxx). The key factor was not the syllable per se but the information content: the bigger the segmental overlap between cue and target, the faster and better the TOT resolution. Therefore, it is helpful to get as much information as possible about the beginning of the target word. The unit of the syllable only plays a marginal role.

Syllable cueing and segmental overlap effects do not have to exclude each other but rather can both be explained within speech production models that allow for an interactive activation spreading and have a syllable level *below* the phoneme level. For an interpretation and discussion of these results within different models of speech production see Sauer and Schade (2016).

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