

TIP-OF-THE-TONGUE STATES WITH FOREIGN LANGUAGE WORDS: RESOLUTION TYPES AND WORD STRATEGIES

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This article analyzes the resolution types of tip-of-the-tongue (TOT) states with foreign/second language (FL) words. It attempts to describe some of the search passes, strategies, and cues that are used by learners to overcome temporary word retrieval failures. More than a hundred TOT states were recorded in cognitive diaries by Russian and Mexican learners of English and by English-speaking learners of German over periods of four weeks. The subjects reported to have resolved the TOT states through use of references (46% of the time), directed search (22.6% of the time), environmental cues (17.0% of the time), and spontaneous "pop-up" resolutions (12.3% of the time). The diary reports demonstrate that learners frequently recalled and manipulated fragmentary information about the target word and word associates. The latter were mostly intralingual associations (of the FL) that shared sound similarity or meaning similarity with the target word. Differences in the frequency of resolution types and strategy use between the subject groups are suggested to be due to the variation in typological distance between L1 and FL and the kind of FL instruction that learners received.

INTRODUCTION

The tip-of-the-tongue (TOT) phenomenon is a rather frustrating word finding problem that everybody experiences sometimes. A word is said to be on the tip of the tongue if the speaker cannot recall the target word in its completeness and if s/he is certain to know it. Parts of the word (fragmentary information) and/or related words (associates) can come to mind during the search for the target word (target). TOT states with words of speakers' first language (L1) have been studied extensively during the last thirty years (see Brown (1991) for a comprehensive review). However, little attention has been paid to TOT states with foreign or second language (FL) words. Ecke & Garrett (1998) showed that TOT states also occur with FL words and that the study of retrieval failures in bilinguals can contribute to our understanding of the mechanisms of lexical production. This paper utilizes the cognitive diary reports of Ecke's (1996) subjects and particularly focuses on the ways in which FL learners resolve TOT states, including the cues and strategies they use during target word search.

Prerequisites: Stages of Lexical Production

Lexical production, i.e., the automatic retrieval of words, is not a one-step look-up procedure in which a non-verbal concept is matched to a word's form (or phonology). Two-stage models of lexical production (e.g., de Bot, 1992; Garrett, 1976, 1993; Levelt, 1989) assume that the linguistic encoding of a concept (message) involves two major levels of representation: (a) the lemma level, at which a word's semantic and syntactic structure is specified; and (b) the lexeme level, at which a word's phonological features are encoded. Both levels are autonomous modules which store and process information independently from each other and according to different criteria (e.g., Fodor, 1983; Sharwood Smith, 1991).

The characteristics of TOT states have been cited as consistent with two-stage models of lexical production (Ecke & Garrett, 1998; Garrett, 1993; Levelt, 1989; Meyer & Bock, 1992). A TOT state normally represents the failure to retrieve a word's phonology while its meaning and syntactic specification have been accessed. Most speakers in a L1 TOT state can define the

target's meaning, correctly report syntactic class (Burke et al., 1991; Ecke, 1996), as well as name the grammatical gender in the case of noun targets in Italian, Spanish and Russian (Ecke, 1996, pp. 141-146; Vigliocco et al., 1997). This suggests that encoding in the lemma module is completed before encoding in the phonological module fails.

Some researchers suggest that phonological encoding also involves sub-stages. Shattuck-Hufnagel (e.g., 1979, 1992) proposes the initial creation of a syllabic frame which is filled in later by phonological sound segments. Garrett (1984) propounds the idea of a phonological address (consisting of the number of syllables, major stress position, and initial letter) which may be necessary to link a word's meaning to its complete phonological form. Aitchison (1987) notes that word recall in general is better for initial and final letters than for middle letters which are less salient and probably retrieved subsequent to more salient features. Unfortunately, little has been suggested about the processing mechanisms that are employed after automatic (reflexive) word retrieval fails and when extensive, elaborate word search processes--a kind of problem solving mechanism--take over.

Research Questions

This study investigates extensive word search with a focus on the following questions: What are the resolution types of naturally occurring TOT states with FL words? What levels of processing and representation are involved in the subjects' extensive search for FL target words? What output fragments are produced during word search and how are they manipulated in order to resolve TOT states?

METHOD

Participants

The 109 participants were college students enrolled in language programs at the university level. Three groups were distinguished according to the participants' L1 and FL: (a) 28 native speakers of Russian who studied English (R/E) at Voronezh State University, Russia; (b) 28 native speakers of Spanish who studied English (S/E) at the University of Sonora, Mexico; and (c) 53 native speakers of American English who studied German (E/G) at the University of Arizona, U.S.A. Subjects answered a self-rating questionnaire in which they provided information about the age of beginning FL acquisition, an estimate of the frequency of FL use during the last six months on a five-point scale, and a rating of current FL proficiency on a five-point scale (see appendix). The Russian subjects had begun learning English as a FL around age 10 and were at an intermediate high/ advanced level of proficiency compared to the American and Mexican subjects who started to learn the FL in their mid teens and who remained at a novice high/ intermediate low level on the ACTFL scale. The subjects were paid for their participation, and some received extra credit in addition to the payment.

Materials, Design, and Procedure

Participants were asked to record the naturally-occurring TOT states, which they experienced in L1 and FL over a period of four weeks, in structured cognitive diaries (Faerch & Kasper, 1987; Reason & Lucas, 1984). It was emphasized that subjects should take note of their

associations as the TOT state occurred and developed, a procedure analogous to think-aloud-protocols and unlike retrospective reports. The more time that passes between an actual thought or association and the verbal report of it, the less reliable the data will be because of possible restructuring and forgetting processes (Cohen, 1996). Subjects were encouraged to record the information in the diary answer sheets. However, they were also allowed to take note of the TOT state on a regular sheet of paper if the diary was not available at the moment and to copy the information into the diary later.

The following information was requested while the subjects experienced the TOT state: the language of the target; a rating of how well the target was known from 1 (I don't know it) to 5 (sure I know it); known letters or sounds; the number of syllables; and any associated words. Further, subjects were asked to provide the approximate time span for when associations were made and the target was recalled (e.g., 5 minutes after initial search).

After the target was recalled or the search was ended, subjects answered a retrospective questionnaire which included questions about how subjects recalled the target. The TOT resolution types included directed search ("I searched my memory. I used the following strategy:..."), pop-up ("Target popped up later when I did not think about it"), reference use ("I looked up the target in a dictionary/ book"; "I consulted a person"), contextual / environmental cues ("Some context in the environment / situation triggered the target"; "I heard the target somewhere else"; "I read the target somewhere else"), and "other" resolution types (e.g., "Relax and think of something else"). Participants were asked to add any information that they considered interesting with respect to the TOT state. The instructions and diary sheets were given in the subjects' respective native languages. All instruments are available in Ecke (1996).

RESULTS AND DISCUSSION

The three subject groups reported a total of 540 TOT states, giving a mean number of 4.95 TOT instances per subject over the four week period. Only about 20% of the TOT states ($n=107$) involved FL targets. This may appear to be a surprisingly low rate if one assumes that less frequently used FL words are especially prone to word finding problems. However, if one considers that most participants (the E/G and S/E groups) had no more than 4 hours of FL instruction per week, plus perhaps some time for homework, then the ratio between experienced TOT states in L1 and FL may seem less unexpected. It may also be possible that subjects used compensation/ communication strategies (avoidance, paraphrasing, code-switching, etc.) which diminished the occurrence of TOT states (see Dörnyei & Scott, 1997; Poulisse, 1993).

General Resolution Types

This discussion of TOT state resolution types and production strategies will be limited to the TOT states involving FL targets. For a comparison between L1 TOT states and FL TOT states see Ecke (1997, in press-a). The mean ratings of how well the FL target is known was 3.7 for the English/German group, 3.8 for the Russian/English group and 4.2 for the Spanish/English group (on a five-point scale). None of the target words was rated 1 ("I don't know it."). Table 1 displays the percentages of TOT resolution types within and across subject groups.

Table 1. Resolution Types for Foreign Language TOT States within and across Groups

Group	Resolution Type				
	<u>Directed</u> %	<u>Pop-Up</u> %	<u>Reference</u> %	<u>Context</u> %	<u>Other</u> %
E/G ($n = 44$)	29.5	06.8	43.2	15.9	4.5
R/E ($n = 30$)	23.3	13.3	50.0	13.3	0.0
S/E ($n = 32$)	12.5	18.8	46.9	21.8	0.0
All ($n = 106$)	22.6	12.3	46.2	17.0	1.9

Note. n represents the absolute number of resolution types reported by subjects. This does not equal the total number of TOT states (107 occurrences) because one subject did not report the resolution type. E/G = English/German; R/E = Russian/English; S/E = Spanish/English.

Most FL TOT states in the three groups were resolved through reference use, i.e., either through the consultation of a dictionary, text or notebook, or another person. The strategy is used more frequently than for TOT state resolution with L1 words (e.g., Burke et al., 1991). Directed search strategies resolved 22.6% of the TOT states across groups. This rate is comparable with results from L1 TOT studies. Pop-up resolutions occurred relatively infrequently compared to L1 TOT states reported in other studies (Burke et al., 1991; Reason & Lucas, 1984). Note, however, that this study included "contextual/ environmental cues" as an additional option to mark the TOT resolution type, which was not the case in other studies. It might be possible that the rate of pop-up resolutions would have been somewhat higher if the option had not been given.

Differences in TOT resolution types across groups were apparent: The E/G and R/E subjects reported to have resolved TOT states more often through directed search strategies than the S/E subjects. Note that they also provided more fragmentary information about the target compared to the S/E group who, on the other hand, recorded more associates. E/G and especially R/E subjects appeared to be focused more on target form features, whereas the S/E subjects could be characterized as more context-focused. The R/E subjects' focus on word form and directed search might be explainable by the kind of formal (explicit) instruction they received. Unlike the other two groups, these learners were enrolled in an EFL teacher training program which included formal instruction in grammar, pronunciation and linguistics. Most R/E subjects also had some knowledge of a third language (e.g., German). The language distance (typological difference) between Russian and English may be an additional factor which requires learners to be more sensitive to a greater variety of word form features in the learning/ remembering of words, which may result in more frequent success of directed (mostly form-focused) search.

Why the E/G subjects used directed search strategies more frequently compared to the S/E subjects is less clear. It might be possible that the closeness of English and German makes it easier for learners to use form cues (mediators) from both the L1 and the FL, which may result in a higher rate of TOT state resolutions by directed search. While the Russian learner of English, elaborating on form due to language difference, becomes particularly form-sensitive, the English-speaking learner of German may have the natural advantage of using form features that are relatively close to the L1. Both cases may lead to the higher rate of TOT state resolution through directed search. On the other hand, the S/E learner, less trained to focus on form and with a L1 that is neither very close to nor very different from the FL, may be in a less advantageous position to use form cues in directed search efforts. As a possible consequence, the S/E learners resolved more TOT states by drawing on contextual information and as pop-ups.

Specific Production Strategies and Cues

The distribution of the four main TOT resolution types presented above does not yet reflect the richness of the search strategies employed by the FL learners. Search strategy is understood here as a more or less conscious mental procedure applied by the speakers to recall a specific word's form (phonology). Cues refer to stimuli that are generated or recognized by the subject and that can trigger or assist target recall. The list and description of search strategies below will be illustrated by samples from the participants' diary reports.

Directed Search

The most interesting strategies for language processing and memory research are, without doubt, directed search efforts. All TOT states involve directed search initially, but only 23% of the FL TOT states across groups were actually reported to be resolved that way. Various kinds of directed search attempts were applied by the participants of this study.

Draw on fragmentary information

In these TOT states, the subject has access to partial attributes of the target's form. If the subject manages to recognize the similarity of these features to the target and if s/he can use them to recover the target, the TOT state can be resolved in a relatively short time. It is reasonable to assume that the more fragmentary information is available, the greater is the chance to recall the target (Kohn et al., 1987). The partial information which subjects provided for the 103 single target words encompass initial letters/ sounds (39.8% of the times), middle letters/sounds (24.3% of the times) and final letters/sounds (22.3% of the times). The length of syllables was correctly reported 55.3% of the times. The high rates of initial letter recall and syllabic structure suggest that these attributes may reflect organizing principles of the phonological lexicon that are instrumental to FL word form recall, a finding that is consistent with research on L1 word retrieval (Brown & McNeill, 1966; Fay & Cutler, 1977). Example (1) illustrates a TOT state in which the subject accessed the first syllable of the target. In his search, the subject maintained a focus on the lexeme level. The relatively brief time of search (30 seconds) suggests that the partially accessed information facilitated target recall.

Example 1. English-speaking subject searching for "wolzig" [cloudy]

wol	Time
wolzig [cloudy]	30 seconds
I knew I know the word but it just wouldn't come out.	

Trial and Combination Word Fragments

Subjects sometimes deliberately manipulate the partial information they have access to. Known sounds may be pronounced aloud, randomly combined with others, or complemented systematically with one sound after another from the alphabet. In example (2), the subject focused on the lexeme level, combining the initially accessed sound segments with others. After two created non-words, a word similar in sound to the target is produced which, interestingly, immediately triggers target recall. Notice that sound cues have also been reported to be efficient retrieval aids in L1 TOT states (Brown & McNeill, 1966; Meyer & Bock, 1992).

Example 2. Spanish-speaking subject searching for "curse"

Syllables: 2	Time
cuar	seconds
suarbe	seconds
suarse	seconds
course	2 min
<u>curse</u>	2 min
Traté de buscar con qué sílaba comenzaba la palabra y con qué sílaba terminaba. [I tried to find the initial and the final syllable of the word.]	

Draw on word associations

TOT states frequently involve other words that come to mind during target search. Usually the associates are felt to facilitate target recall (Wenzl, 1932). However, there is reason to believe that associates often have no effect on recall at all (Ecke, 1996; Kohn et al., 1987; Perfect & Hanley, 1992) and that they can even hinder TOT resolution in some cases because of possible "blocking" or interference processes (Burke et al., 1991; Jones & Langford, 1987; Reason & Lucas, 1984).

In the present study, 41.7% of the associates ($n = 115$) were similar in sound (SS) to the target, 21.7% were similar in sound and meaning (SSM), and 36.5% were similar in meaning (SM) to the FL target. Table 2 illustrates the percentages of target-associate relation types within and across groups.

Table 2. Target-associate Relation Types

Group	Target -Associate Relation Type			
	SM	SSM	SS	Interlingual
	%	%	%	%
E/G ($n = 51$)	31.4	15.7	52.9	37.2
R/E ($n = 26$)	19.2	38.5	42.3	3.8
S/E ($n = 38$)	55.3	18.4	26.3	21.1
All ($n = 115$)	36.5	21.7	41.7	24.3

Note. E/G = English/German; R/E = Russian/English; S/E = Spanish/English; SM = similar in meaning; SSM = similar in sound and meaning; SS = similar in sound; Interlingual = association of a word which is not of the foreign language.

The fact that most of the associates were either SS or SM is consistent with the assumption of a generally modular structure of the lexical production system which shows little or no interaction between the lemma level and the phonological levels (Ecke & Garrett, 1998; Garrett, 1976, 1984; Levelt, 1989). The occurrence of some SSM pairs is not surprising if one considers that a substantial amount of TOT word search involves higher-order problem solving mechanisms through which information from various representational levels can be manipulated and interrelated.

Across groups, most of the associated words (75.6%) were from the targets' language, i.e., intralingual associations; only 24.4% of the associates were from another language, mostly the participants' first language (interlingual associations). This suggests that the speakers' search in TOT states proceeds mainly within the lexical networks of the target language (see also Ecke, in press-a). This result contradicts findings from studies into lexical errors (e.g., Ecke & Hall, 2000, Williams & Hammarberg, 1998) that demonstrated high degrees of interlingual (cross-language) influence. In a comparison of lexical errors and TOT states, Ecke (in press-a) suggested

processing differences for the two conditions: Errors mainly reflect unintended, automatic retrieval failures (mostly due to interlingual influence that cannot be suppressed) whereas TOT states primarily involve extensive, conscious word search within the target language (partially due to the suppression of interlingual influence).

The more distant or different the L1 and FL are, the more likely it is that intralingual associates occur and the less likely are interlingual associates simply because fewer L1 words are phonologically similar to the FL target. Interlingual associations were produced 37% of the times in the E/G subjects, 21.1% of the times in the S/E subjects, and only 3.8% of the time in the R/E subjects whose L1 is certainly the most distinct from the FL. Consider the German target word "bezahlen" [betsalen] of example (12) below. There are few English verbs with similar sound patterns (i.e., initial segment, syllabic and stress pattern). The frequently occurring sound [be], a prefix in German, is a rare word onset segment in English. The German phoneme [ts] does not exist in English. In German, however, many verbs share these sound features (e.g., bezwingen, bezaubern, bezeugen). Because of their phonological similarity, these words are likely to be stored together, and they may be accessed if automatic retrieval of one of the neighboring words fails.

Draw on meaning-related associates

In example (3) below, the subject associated a meaning-related word that shares syntactic and semantic categories with the target. In this particular case, the SM associate is unlikely to have assisted target recall. Reportedly, the target popped up several hours after the association was made.

Example 3. Russian-speaking subject searching for "suppose"

Syllables: 3	Time
s, p	
think	10 min
<u>suppose</u>	5 h

Meaning-related associations appear to be more successful with respect to the avoidance of and compensation for word finding problems rather than for the actual resolution of TOT states (Ecke, 1996). The activation or priming of episodic/ semantic knowledge structures is likely to better prepare the speaker for word production and for the use of compensation strategies if the retrieval of a target fails (e.g., Dörnyei & Scott, 1997; Faerch & Kasper, 1983).

Generating meaning-related contexts

The speakers' deliberate generation of contexts (phrases, rhymes, or songs) in which the target is well integrated can sometimes assist target recall. Example (4) illustrates a TOT state in which the subject recalled that the inaccessible word was part of a song, and the mental recitation of the song led to the searched-for target. These kinds of resolutions suggest that redirecting search from the phonological level to higher-order levels can, indeed, be of assistance to resolve a mental block. A precondition for recall success, however, seems to be a solid integration of the target word form in the context.

Example 4. Russian-speaking subject searching for "unite(d)"

	Time
-ed, n (verb of action)	
combine	4 min
<u>unite</u>	16 min

Pytalas' vspomnit' slova odnoi pesni: "Baby, one day we'll be united, and I know...
[I tried to recall the lyrics of a song: "Baby, one day we'll be united, and I know...]

Draw on sound-related associates

The majority of word associates (41.7%) produced during TOT search was similar in sound (SS) to the target with no apparent meaning relation. The attributes most frequently shared by SS target-associates pairs were root onset letter (78% of the time), initial letter (72% of the time), and main stress position (74% of the time). The TOT states in examples (5) and (6) involve several intralingual (FL) associates.

Example 5. Russian-speaking subject searching for "soiled"

	Time
Syllables: 2, s-	
soul	10 sec
solitary	1 min
soil	2.5 min
<u>soiled</u>	3 min

V poiske slova ia iskhodila iz sotshetaniei zvukov pervovo iz vspominatel'nykh slov (soul), t.k. ono, po moemu mneniu bylo blizko v zvukovom otnoshenii k iskomu.

[In the word search, I started off with the sounds of the first of the similar words (soul), i.e., I thought it was close in its sound relation to the target.]

Example 6. English-speaking subject searching for "Löffel" [spoon]

	Time
Syllables: 2, L	
Kartoffel [potato]	2 sec
<u>Löffel</u> [spoon]	20 sec

Generating a chain of SS words appears to have helped the subject to recall the FL targets in examples (5) and (6). Like fragmentary information, SS associates can serve as facilitory cues for word retrieval (see Meyer & Bock, 1992). This appears to be the case for both FL and L1 words. The ability to detect similar sound features and to use these as cues to induce the FL target word may be, at least in part, a metacognitive/ metalinguistic skill that is part of a higher cognitive skill. It does not necessarily have to rely upon direct connections between the lexical entries in the store of word form.

Mnemonic (mediation) techniques

Whereas many associates (no matter whether SS or SM) are the products of involuntary or "passive" retrieval processes (the associates "come" to mind), the examples below represent deliberate recall attempts of words which the subjects knew could serve as cues or mediators for target recall. These retrieval strategies are, in principle, comparable to (verbal and visual) mnemonic techniques for the learning of FL word meanings (e.g., Atkinson, 1975; Cohen, 1987; Ecke, in press-b; Pressley et al., 1980; Weise, 1990). It has been suggested that mnemonics are less efficient and less frequently used for word production than for comprehension (Hulstijn, 1997, p. 209-210). The examples below, however, present some evidence for the successful spontaneous use of mnemonics for FL word production by learners who have not had any explicit training in the use of mnemonics.

Example 7. English-speaking subject searching for "Husten" [cough]

Gender: M, Article: der,	Time
Syllables: 2, Hu-Huh	immediate
Houston (as in Texas)	80 min
<u>Husten</u> [cough]	80 min

I thought about how I initially memorized that word: Houston has a very moist summer climate--bad for people who have trouble with their lungs. This method of recalling a word (placing myself mentally in the situation of seeing or studying the word) typically works well for me.

Example (7) is similar to the verbal keyword technique studied by Weise (1990) in which the phonological similarity of a L1 keyword (Houston) to a FL target (Husten) and episodic or semantic knowledge about the keyword (moist climate, bad for the lungs) are used to elicit the target's meaning (cough - a consequence of moist climate) in a creative and elaborate inferencing procedure. After having learned the word's meaning that way and finding herself in a TOT state, the subject used the keyword technique the other way around, i.e., for word form production. The learner wanted to express the meaning of "cough" in German. She generated the previously memorized meaning relation (cough - a consequence of moist summer climate, typical for Houston). The meaningful link lead to the L1 keyword (Houston) which triggered immediate recall of the phonologically related target (Husten). Example (8) below is similar to (7) in principle, but notice that the mediating word (Gefahr) is, like the target (Gefängnis), a FL word.

Example 8. English-speaking subject searching for "Gefängnis" [prison]

Syllables: 2, G-	Time
Gefahr [danger]	1 sec
<u>Gefängnis</u> [prison]	45 sec

I knew that the German word for prison sounded and was like the word "Gefahr" which means danger. Prison is dangerous, so the word Gefahr helped me find the target word.

The subject in example (8) was searching for the German translation equivalent of "prison". It seems that he first created a meaning link (prison is dangerous), then a form link leading to the keyword (danger means Gefahr, and Gefahr sounds like... Gefängnis). The target was recalled in less than a minute.

The mediation examples (7) and (8) indicate that TOT search, indeed, can go beyond automatic lexical processing. In these cases, the subjects deliberately apply complex problem-solving techniques that manipulate information of different representational levels. These problem-solving techniques are relatively slow and operate in a laborious and highly sequential fashion (Sharwood Smith, 1991, p. 16). They may have little to do with automatic lexical retrieval. However, their operation starts at the point where automatic word production fails using the partially accessed target information as cues to generate associative links. In essence, the speaker manages to recognize attributes which are part of or similar to the target and uses these as mediators for target word recall (Ecke & Hall, 2000; Matz et al., 1988; Weise, 1990). The cues used as mediators in examples (7) and (8) come from lexeme, lemma, and non-verbal (conceptual) representations. Their use appears to have been successful for TOT state resolution because the targets were recalled within a short time after the generation of the mediators.

Mnemonic techniques are especially useful for the acquisition of "hard-to-learn" words (Hulstijn, 1997). When less elaborate attempts to recall a new word's meaning or form fail, using key words can be of help. The spontaneous, though limited, use of mnemonics by FL learners in

this study shows that multiple associative links in a mediation procedure can lead the subject to recover temporarily inaccessible words. Key-word techniques may not only be potentially efficient strategies for the recall of word meaning (e.g., Beaton et al., 1995; Pressley et al., 1980), they may also assist the retrieval of word form (Ecke, in press-b).

Reference use

After directed word search attempts fail, subjects often consult external references to find the target. They use dictionaries, note books, vocabulary lists, or consult a peer. At first sight, the consultation of a dictionary may seem of little importance to psycholinguists interested in word retrieval processes. However, a closer look at learners' use of dictionaries, in particular the cues they use to locate an entry in the dictionary, could provide valuable information about FL word search.

Example 9. Russian-speaking subject searching for "concussion"

Syllables: 3, sound [k]	Time
conclusion	15 min
concurrence	1:20 h
<u>concussion</u>	1:49 h

Having given up the idea of searching my memory I've looked the lost word up in the Russian-English dictionary, because I was sure of the word's Russian equivalent - "sotriasenie".

Example (9) displays a TOT state that was resolved through the consultation of a bilingual dictionary. In this case, the L1 translation equivalent served as the entry information for word search. It would be interesting to investigate if and how meaning relations (e.g., synonymy, antonymy) and visual information are exploited as entry information for word search in monolingual, bilingual and pictorial dictionaries. Example (10) suggests that learners, in principle, can use such information. The subject (searching for a L1 word here) used a synonym to look up the target.

Example 10. English-speaking subject searching for "eternal" (L1 word)

i-	Time
permanent	seconds
never ending	seconds
<u>eternal</u>	5 min

I used a thesaurus to find synonyms for "permanent".

Ecke (1996, p. 113) showed that subjects also use phonological attributes (e.g., the target's initial letter) as entry information for word search. It is possible that initial letters are not the only cues exploited by learners. Approximate word length, word endings, and unusual letter combinations are other potential attributes that could be used as cues for word search in dictionaries. Reference use was the most frequent resolution type reported by the participants in this study. It must be considered an important strategy to resolve FL word finding problems. Dictionary use, in particular, not only serves as an efficient means to determine and verify word meanings (Hulstijn et al., 1996; Knight, 1994); it can also solve problems of word production. Novice FL learners might profit from familiarization and practice with the different types of dictionaries for FL learning and use.

Environmental cues

Sometimes, word recall can be triggered by environmental cues (17% of the time in this study). Hearing the target or a similar-sounding word mentioned by someone else, seeing, touching or reaching for the object the target word denotes, or finding oneself in the situation where the word was used before can lead to word recall (Wenzl, 1932; Reason & Lucas, 1984). Example (11), which illustrates such a TOT state with a L1 word, is included here because of the subject's informative comment. The subject's action of reaching for and seeing the folder, which contained the word, may have resolved the memory block. Withdrawing from directed search and redirecting attention towards the physical action of looking up the word could have facilitated target recall.

Example 11. English-speaking subject searching for "aphorism" (L1 word)

	Time
poem	seconds
journal article and -	seconds
<u>aphorism</u>	2 min
I was trying to remember the word "aphorism" since I need to write some for my English class. I couldn't think of it at all, and I finally decided to look it up, but just as I was reaching for my folder, I pictured the word on the page and remembered it!	

Pop-up resolutions

If directed search fails and the subject has no references available, the word can still be recovered, often in rather spectacular ways hours or days after the initial search attempt. After thinking hard about the TOT word, the mind seems to continue its search unconsciously, and sometimes hours or days later, without thinking of it, the target springs to mind. These sudden pop-ups are immediately recognized as the once looked-for target. Example (12) illustrates a somewhat spectacular pop-up resolved by a subject in her dream.

Example 12. English-speaking subject searching for "bezahlen" [to pay]

Syllables: 2, ended in "-en"	Time
bestellen [to order]	0
<u>bezahlen</u> [to pay]	3.5 h
Popped up in my sleep actually!	

There is little one can do to influence the occurrence of a pop-up resolution. However, a prerequisite seems to be an active, extended period of directed search and a strong initial experience of the TOT phenomenon.

SUMMARY AND CONCLUSION

This diary study revealed a variety of resolution types of naturally occurring TOT states with FL words: Almost half of the FL words were recovered with the help of external references. Directed search efforts resolved 23% of the TOT states, contextual/ environmental cues reportedly elicited recall 17% of the time, and spontaneous pop-up resolutions occurred 12% of the time. During word search, learners frequently recalled and manipulated fragmentary target information and associated words which related to the target in sound or in meaning. Most of the associates were of the target word's language and shared sound features with it. This is consistent with the assumption that learners internalize and store FL word forms mostly based on form

similarity with other FL words. However, if FL and L1 words are similar in form, the similarity of the L1 word can also be used for retention and recall.

Learner groups differ in their focus on and use of form during word search and in the amount of intralingual associations made. Speakers whose L1 is relatively distinct from the FL (Russian/English) focus more on partially accessed target word attributes and produce higher rates of intralingual (FL) associations compared to learners whose language is of a moderate distance (Spanish/English). Learners of a language that is relatively close to the L1 (German/English) have the advantage of exploiting frequent instances of interlingual similarity. The certain variation in language influence does not make a difference with respect to the FL learner's general disposition to learn and process new words based on similarity to already represented lexical information. Lexical learning and processing is essentially "parasitic" in its nature (Hall, 1992). Often unconsciously, the learner recognizes and exploits patterns of lexical information of the L1, FL, or another FL to reduce the cognitive effort for word learning and processing (Campaña & Ecke, in press; Ecke, in press-a; Ecke & Hall, 2000; Hall, 1996).

Occasionally subjects applied conscious search strategies, including complex mnemonic techniques, to recall temporarily inaccessible words. Some learners reported the spontaneous generation and use of keywords coming from the L1 as well as from the FL. These strategies indicate that word search in TOT states may go beyond the automatic retrieval of lexical structures (Ecke, in press-a).

Naturally occurring TOT state data are relatively rare and difficult to collect. Experimental elicitation techniques may be used to obtain larger data bases of word retrieval failure records. Word definitions (Brown & McNeill, 1966), pictures (Campaña & Ecke, in press; Smith et al., 1991), and translation equivalents (Ecke, in press-a) can serve as stimuli in recall tasks in which subjects are asked to provide the word form that best fits a certain stimulus. When immediate recall fails and subjects experience a word on the tip-of-the-tongue, they record or verbally report (Kohn et al., 1987) fragmentary target information and associations that come to mind during word search. While experimental studies are in a better position to control external factors and investigate specific aspects of word retrieval failures, naturalistic studies can provide a more holistic picture through a more complete set of data about the TOT phenomenon. They may help to generate hypotheses about speech processing mechanisms and serve as bases for theory formation and experimentation.

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APPENDIX

Background characteristics of participants

Participant Groups	English/German	Russian/English	Spanish/Eng
<u>n</u> Subjects	53	28	28
<u>M</u> Age	20.50	21.90	19.90
FL Proficiency	2.36	3.68	2.2
FL Frequency of Use	3.96	4.39	3.61
<u>M</u> Age of FL Acquisition	15.45	9.96	14.29

Note. FL proficiency was rated on a five-point scale from 1 (very basic) to 5 (perfect). FL frequency of use was rated from 1 (never) to 5 (very frequently).