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Edited by **JOHN FIELD**

University of Reading

Cross-Linguistic Influence on Word Search in Tip-of-the-Tongue States

PETER ECKE

The University of Arizona

Tucson, Arizona, United States

■ This study examined the effects of English as a second language (L2) vocabulary on native Spanish speakers' word searches in Spanish (first language or L1). It analyzed word-finding problems, known as tip-of-the-tongue states, in three groups of Spanish native speakers with different proficiency levels in English L2 and explored whether and to what extent English L2 words interact with and influence the retrieval of Spanish L1 words reported to be on the tip of the tongue.

A *tip-of-the-tongue state* (TOT) is a temporary (and often frustrating) word-finding problem in which the speaker is certain that he or she knows the momentarily inaccessible word (the *target*), feels close to recalling it, and frequently has access to partial attributes of the target (e.g., letters or sounds within it) and/or words that are related in sound or in meaning to it (*associates*). A speaker in a TOT usually has semantic information about the target and its syntactic specification (word class, etc.); but has not accessed or has only partially accessed the target's phonology and/or orthography (its *form*).

Psycholinguists have studied this kind of delayed word search in the hope that it will reveal insights into the operating mechanisms of word production. Along with studies on speech errors, TOT studies have helped researchers develop models of speech production that sketch out the main processing levels involved in word production (conceptual/semantic, syntactic, and phonological levels), their principles of organi-

zation, as well as the general time course of the word production process (Garrett, 1975; Levelt, 1989).

Researchers have found that some word types (e.g., proper names and infrequent words) are especially frequent in TOT states, and that certain speaker types (e.g., aphasic or anomic patients, older adults, and bilinguals) are especially prone to this kind of word retrieval failure (see Brown, 1991; Ecke, in press; and Schwartz, 2002 for reviews). Two hypotheses have been proposed to explain the causes for TOT state occurrence. The *blocking hypothesis* assumes that a previously activated competing word inhibits or interferes with target retrieval (Jones & Langford, 1987), whereas the *incomplete activation hypothesis* holds that, as a consequence of infrequent word use, lexical connections between semantic and phonological levels become weaker, resulting in temporary transmission deficits (Burke, MacKay, Worthley, & Wade, 1991).

The effect of associate words on target recall has been a much disputed issue in TOT studies with monolinguals. Psycholinguists have mostly attempted to investigate the issue through TOT elicitation experiments in the laboratory. In these studies, participants are given definitions of low-frequency words that they are asked to recall (Brown & McNeill, 1966). Some of these tasks generate TOT states that may or may not involve word associations. The researcher then compares the TOT states that involve associates with those that do not. In another type of study, TOT states are elicited via word definitions, and if participants experience a TOT state, they are given a cue word that is related in form to the target, related in meaning to it, or unrelated. The researcher then analyzes whether the cue word types have any effect on target recall. Early research reported that cue words similar in sound to the target can block TOT resolution (Jones & Langford, 1987), but most of the later studies found that phonologically related words have a positive effect or, at least, no negative effect on target retrieval (Meyer & Bock, 1992; Perfect & Hanley, 1992). It has also been suggested that phonologically related words only facilitate target retrieval if they share the first syllable with the target (Abrams, White, & Eitel, 2003).

Understanding the psycholinguistic bases of temporary word-finding problems, including their causes, is of interest for teachers and learners of foreign languages. As developing multilinguals, learners as well as teachers may perceive themselves as particularly prone to word-finding problems and to transfer or cross-linguistic influence (hereafter CLI) in one or more of the languages they use, including potentially their L1 (Major, 1992; Porte, 2003). Becoming increasingly proficient in another language increases the speakers' communicative potential and scope but also increases the burden put on the speech processor to find appropriate words in a larger lexicon that could be subject to cross-linguistic

interaction between language representations and access routes. Part of such unintended interaction may surface as transfer errors in speech and as interlingual word associations during word search in TOT states or during translation.

Extensive research has been done on the influence of L1 on the learning and processing of L2 (e.g., Dechert & Raupach, 1989; Odlin, 1989). Recently, some studies have also shown the possibility of L2 influence on speakers' access to their L1, sometimes also called *reverse*, *backward*, or *bidirectional transfer* (Cook, 2003; Pavlenko & Jarvis, 2002). The current study continues this line of research and attempts to ascertain to what extent L2 influence is present in TOT states experienced by developing bilinguals when seeking L1 words. It analyzes the words that language users draw on during TOT states with respect to the language from which they derive: Are the words that come to mind during extended word searches exclusively from the target L1 (Spanish) and thus intralingual in nature, or do they also include items drawn from the speakers' L2 (English)? The latter, interlingual associations will be taken as indicators of CLI by the L2 vocabulary during the attempted retrieval of L1 words. This article also explores whether the L2 associations have an observable negative or positive effect on L1 target recall through a qualitative analysis of participants' records of the time span between associate retrieval and target recall in selected TOT states.

METHOD

Three groups of Spanish speakers participated in the study. All acquired Spanish as their L1, but the groups differed in acquisition history and proficiency levels in English as an L2 (see Table 1). The term *bilingual* in this context refers to language users who are fluent in L1 but may vary in the level of L2 proficiency. The three groups are termed *low*, *intermediate*, and *high* according to their proficiency level in English L2. The 28 participants of the low-level group and the 76 participants of the intermediate-level group were students enrolled at two Mexican universities; the 37 participants of the high-level group consisted of proficient Spanish–English bilingual students enrolled at a university in the southwestern United States who reported themselves to be slightly dominant in English.

The participants were asked to keep a cognitive diary over a period of 4 weeks and record all TOT states as they occurred (see Reason & Lucas, 1984, on this method). On diary sheets, they recorded fragmentary information (accessed letters and sounds, the number of syllables) relating to the targets, other words that came to mind during their word searches (associates), the targets if they were finally retrieved, and an estimate of

TABLE 1
Average Language Background Characteristics of Participants Across Groups

Characteristics	Low English L2 Proficiency Group (<i>n</i> = 28)	Intermediate English L2 Proficiency Group (<i>n</i> = 76)	High English L2 Proficiency Group (<i>n</i> = 37)
Spanish proficiency ¹	4.4	4.9	4.0
Spanish frequency of use ²	5.0	5.0	4.7
Beginning age of Spanish acquisition	1.0	1.1	1.2
English proficiency ¹	2.2	4.1	4.4
English frequency of use ²	3.6	4.2	4.9
Beginning age of English acquisition	14.3	6.7	4.4

¹ Measured on a five-point scale from 1 (basic) to 5 (perfect).

² Measured on a five-point scale from 1 (not used) to 5 (frequently used).

Note. The low-group members were enrolled in beginners' EFL courses. The intermediate-group members were at the intermediate-high/advanced level of proficiency and had completed the TOEFL with a minimum score of 500 points.

the time lapse between the onset of the TOT state, retrieval of the associate words, and successful retrieval of the target. Frequently, they also reported their impressions of the TOT experience. The data analyzed here are limited to TOT states reported with Spanish targets and to the comparison of associate–target pairs with respect to language. The research question was: Do Spanish speakers who experience TOT states with L1 words only search within the Spanish L1 lexicon, or do they also retrieve items of the nontarget English L2 lexicon? Do search patterns differ between the three groups of English L2 speakers relative to their L2 proficiency level?

A qualitative analysis of the recorded time span between TOT onset, associate retrieval, and target recall was conducted to formulate hypotheses about possible effects of L2 associate retrieval on target recall. If a target is recalled immediately or within a few seconds after a certain associate, one may reasonably assume that the associate facilitated target recall. If, on the other hand, an associate is followed by a long gap of several minutes or hours until the target is recalled or if the target is never recalled, one may assume that the associate has blocked or hindered TOT resolution.

RESULTS

Interlingual Association and Proficiency Level

Overall, 443 TOT states and 828 associate words were reported by the participants of the three groups. These include 133 TOT states and 256 associates from the low-level group, 220 TOT states and 386 associates

TABLE 2
Frequency of TOT States and Associates Across Groups

	Low English L2 Proficiency Group (<i>n</i> = 28)	Intermediate English L2 Proficiency Group (<i>n</i> = 76)	High English L2 Proficiency Group (<i>n</i> = 37)
<i>M</i> of TOT states per participant ¹	4.75	2.89	2.43
<i>M</i> of associates per TOT state	1.92	1.75	2.07
% of TOT states with associates in English	0.7	9.1	34.4
% of associates in English	0.8	5.7	26.9

¹Mean numbers (*M*) of TOT states relate to TOT states reported by participants where the target was a Spanish word. TOT states reported with English targets are not included.

from the intermediate-level group and 90 TOT states and 186 associates from the high-level group. Table 2 presents the mean numbers of Spanish TOT states per participant, the mean numbers of associates per TOT state reported by the participants of each group, and the percentages of interlingual associates, that is, English words that came to the speakers' minds while searching for a Spanish L1 target. TOT states experienced by the participants with English L2 targets are not reported in this article.

In the low-proficiency group of English learners, all except two associates were intralingual (i.e., were Spanish words). Example 1, reported by Low-Level Participant 10, shows a TOT state with such intralingual associations. The word shown in bold type is the target for which the respondent was striving. The numbers indicate the time that had passed between TOT onset and retrieval of associate and target.

Example 1. TOT State With Exclusively Intralingual (Spanish) Associations

Target description: *Es lo que ves a lo lejos y no es nada.* [It's what you see in the distance and is nothing.] *Viste el _____—parece real.* [Did you see the _____—(it) seems real.]

3 syllables, article: *el* [masculine]

es-

reflejo [reflection] 5 min.

espejo [mirror] 30 min.

espejismo [mirage, illusion] 21.45 hrs.

Que al momento de querer acordarme, me desespero y se me cerro el mundo y ahí lo deje hasta q'el día siguiente sin pensar se me vino a la mente. [When I wanted to remember, I got desperate and the world closed over me and there I let it go until the next day when without thinking it came to my mind.]

Intermediate-level English users do occasionally report interlingual associations (in 9.1% of the TOT states and 5.7% of the associates produced). Example 2, reported by Intermediate-Level Participant 39, illustrates a TOT state with mostly intralingual associates and one interlingual associate (*bake*).

EXAMPLE 2. TOT State With Intralingual (Spanish) Associations and an Interlingual (English) Association

Target description: *Es cuando cocinas pero en especial pays, pastelillos*. [It's when you cook but especially pies and cakes.]

Vamos a _____ pastel. [Let's _____ cake.]

3 syllables

cocina [kitchen] within a minute

pastel [cake] within a minute

pay [pie] within a minute

bake 3 min.

hornear [bake] 5 min.

Es una palabra que no se utiliza mucho, porque siempre ocupas cocinar, casi no hornear. [It is a word that is not used much, because you always choose cook, almost never bake.]

About one third of the TOT states experienced by the high-proficiency group included one or more interlingual associates. Of all the associates produced by this group, 26.9% were English words. Example 3, reported by High-Level Participant 35, lists a TOT state in which two English words (*bargain* and *buy*) were retrieved during her search for the target *oferta* [sale].

EXAMPLE 3. TOT State With Intralingual (Spanish) and Interlingual (English) Associations

Target description: *Los pantalones están en _____ en aquella tienda*. [The pants are for _____ in that shop.]

2 syllables

ganga [bargain] within a minute

bargain within a minute

buy within a minute

especial [special] within a minute

oferta [sale] 1 min.

Estaba segura que me sabía esa palabra . . . Como estaba tratando de traducir “bargain”—mayoría de las palabras que se me venían a la mente eran en inglés. [I was sure that I knew the word . . . When I was trying to translate “bargain”—most of the words that came to mind were in English.]

Effects of Associates

I now examine whether the interlingual word associates generated during TOT word search had any detectable effect on target recall. Participants frequently provided an estimate of how many minutes or hours after TOT onset associate(s) and target were recalled. Based on this information, one may infer the approximate time span between associate retrieval and target recall. Four examples will be presented which suggest that associates can have rather different effects on target recall.

Examples 4 and 5, reported by High-Level Participants 27 and 9, respectively, illustrate TOT states with interlingual associates that are similar in sound to the target. Both associates seem to have assisted or triggered target recall immediately or shortly after they had been retrieved. In Example 4, the associate *recognize* is a *near cognate* of the target *reconocimiento*; that is, it is similar in sound and meaning to the target; whereas in Example 5, the associate *eagle* is solely related in phonology and orthography to the target *egolatría*. The participants' comments after TOT resolution indicated that speakers felt that the associates had helped them in finding the targets.

EXAMPLE 4. TOT State With Facilitating Associate

El _____ de Frida Kahlo fue a través de sus pinturas. [Frida Kahlo's _____ came through her paintings.]

el re / 5 + syllables

recognize within a minute

conozco [I know] within a minute

up rising within a minute

papulirad [nonword] within a minute

fame within a minute

popularity within a minute

reconocer [recognize] within a minute

reconocimiento [recognition] 1 min.

La palabra clave no se me hizo muy difícil de encontrar porque si me la sabía, nada mas que no la recordaba en español. En inglés sí se me vino a la mente. Por eso fue que la logre encontrar. [It was not really difficult to find the target word. I just did not know it in Spanish. In English it came to mind. That's why I managed to get it.]

EXAMPLE 5. TOT State With Facilitating Associate

Tu _____ te llevará a la tumba. [Your _____ is going to kill you.]

4 syllables

self center within a minute

eagle 2 hrs.

egolatra (egolatría) [self-worship] 2 hrs.

Algo raro, nunca antes había asociado una palabra con un animal o ave pero por la forma de la palabra se hacia conocida. [Something strange, never before I have associated a word with an animal or bird; but through its form it made itself known.]

Examples 6 and 7, on the other hand, reported by High-Level Participants 3 and 25, respectively, show TOT states in which associates appear to block, or at least not assist, target recall. In Example 6, the speaker recalls sound fragments from the target and from its English equivalent; he then retrieves the English word *trust* after about 5 minutes, and only after a relatively long gap of 30 more minutes is the Spanish equivalent and target *confianza* successfully accessed. Example 7 shows a TOT state with a proper name. Associates of proper names were not generally classified as interlingual, although in this case the associated name could be perceived as of French or English origin whereas the target is a Spanish name. This particular example is informative because it illustrates how similarity in form can have a negative effect on target recall when the speaker confuses the sequence of partially recalled sound segments. The speaker reported feeling strongly that the target began with the sound segment *cha* which led him on the wrong track, resulting in the association of *Chamberlaine*. The target *Echavarria* was only found on the next day (22 hours after TOT onset).

EXAMPLE 6. TOT State With Potential Blocking Associate

Tenga _____ en mí. [Have _____ in me.]

3 syllables

t, a, co

ta within a minute

trust 5 min.

co 5 min.+

confianza 35 min.

EXAMPLE 7. TOT State With Potential Blocking Associate

4 syllables

cha 30 min.

ber all day

Chamberlaine no information given

ria all day

Echavarria 22 hrs.

“Cha” sí era característica. “Ber” no lo era y me impedía a encontrar la palabra. Yo empezaba la palabra con “cha” cuando en realidad empezaba con “e” y por eso no podía encontrar la palabra. [Yes, “cha” was characteristic, “ber” not. That was what impeded finding the word. I started the word with “cha” although it started with “e” in reality, and that’s why I couldn’t find the word.]

DISCUSSION

The analysis of language of associates during TOT states revealed that lexical search for Spanish L1 words proceeds primarily within the Spanish lexicon in all three groups. Like most bilinguals, the participants of this study successfully overruled the overt influence of English L2 words in the majority of cases. However, the influence of English, as reflected in the percentages of English associates, increased in line with speakers’ proficiency level in English L2. Whereas the low-proficiency group reported only 0.8% of interlingual associates, the intermediate-proficiency group reported a more substantial 5.7% of English associates, and the high-proficiency group reported a remarkable 26.9% of English associates in TOT states with Spanish targets.

The low rate of L2 associates in the TOT states of the low-proficiency respondents may be due to the respondents’ small L2 vocabulary. It might also indicate an activation threshold for L2 words that was too high for CLI to occur. In other words, the low frequency with which the L2 words had been encountered by these respondents may have meant that the words provided very weak candidates for any possible TOT match. The increased rate of CLI in the L1 TOT states of highly proficient L2 speakers might be explained as follows. As the L2 vocabulary

increases, more concepts can potentially be expressed through L2 forms, and thus, more potential associations in the L2 are possible. With increased use of the L2, the activation threshold for L2 words becomes lower, regardless of whether the target language is L1 or L2. The retrieval of L2 words becomes less demanding and more automatic in L2 contexts but also becomes more likely to contribute to CLI in the form of interlingual word associations in L1 word searches. Conversely, a decreased use of the L1 in cases where, for example, the user has become resident in an L2 environment and the L1 suffers attrition, may lead to higher activation thresholds in the retrieval of L1 words. This higher threshold would slow down the retrieval of L1 words and provide more time and opportunity for L2 words to slip into the process. CLI in the form of L2 word retrieval might also come to feature in other intrusions, such as lexical errors and instances of nonintended code-switching (Pavlenko & Jarvis, 2002; Porte, 2003).

The findings of the current study support the view that bilinguals have only one common lexicon that integrates L1 and L2 structures not only at the semantic but also, at least in part, at the phonological and orthographic levels. The substantial amount of interlingual word association in the TOT states of the proficient bilinguals studied here seems to suggest that word search in that population involves the parallel activation of both L1 and L2 information (nonselective access) as opposed to the alternative view that bilinguals maintain separate lexicons and activate only one (*language-specific* or *selective access*; see de Bot, 2004). In nonproficient bilinguals, however, the L2 is still too weak to become part of nonselective access. In that case, L1 words are probably retrieved selectively featuring no or very little influence from the L2.

The findings are consistent with a dynamic view of language development in bilingual learners (e.g., Herdina & Jessner, 2002) and show that CLI in the form of word associations is not only possible from L1 to L2 (Kroll & Stewart, 1994) but also from L2 to L1, especially in highly proficient L2 users (cf. McElree, Jia, & Litvak, 2000).

The results are also compatible with findings from TOT elicitation studies with bilingual speakers, which suggest that bilinguals face additional processing demands that lead to more frequent lexical retrieval failures compared with monolinguals. Bilingual speakers are reported to be more prone to TOT states in their nondominant language compared with monolingual speakers of that language (Ecke, 2004), and they experience more TOT states in their dominant language compared with monolingual controls (Gollan & Acenas, 2004). This disadvantage is not very surprising if one takes into account that bilinguals, intending to express a certain concept, have to select a target form among potentially competing equivalents in an overall larger lexicon compared with monolinguals. In addition, bilinguals living in an L2 environment use the

words of the two (or more) languages they speak less frequently compared with monolinguals who use the words of a single language all the time. Burke et al. (1991) suggest that less frequent word use leads to weakened connections between the form and meaning representations of words and an increased possibility of a *transmission deficit* in the form of a failure in the links between the semantic criteria that drive a speaker's word search and the phonological form that is being sought. TOT states may be a result of such a transmission deficit.

This study also explored whether interlingual word associates generated during TOT states had any detectable effect on target recall. An analysis of participants' time records of the word retrieval sequences during TOT states suggests that associates can have different effects. In most cases, they appear to have no effect at all, simply reflecting partially activated attributes of the target. In some cases, however, associates that share certain formal features with the target occurring in similar positions (word-initial, medial, or final) may assist or trigger target recall (as in the example of *eagle-egolatria*). These data are consistent with findings obtained from laboratory experiments (Meyer & Bock, 1992; Perfect & Hanley, 1992) and the assumption that phonological similarity can assist target recall, even if associates are from a language other than the target.

However, other TOT state reports presented in this study suggest that the targets may be blocked if phonologically related associates differ from the target in the position or sequence of the formal features they share with it, as in the case of the pair *Chamberlaine-Echavarria*. The speaker in this example was certain that the target contained the letter and sound sequence *cha*, but mistakenly expected it to be in word-initial position which led him astray, kept his attention on the wrong track, and prolonged the search for the target. Blocking seems particularly likely if a speaker confuses the beginning of the target word. The initial segment of a word form has been shown to be particularly important as a cue or salient feature in word retrieval, including in many slip-of-the-tongue studies (Abrams et al., 2003; Fay & Cutler, 1977).

Future investigations may wish to pursue the agenda of establishing under what circumstances certain associates assist or interfere with target recall or have no effect on it at all. Although cognitive diary studies, such as the present one, may be instrumental in uncovering and interpreting interesting patterns of TOT word search, subsequent research should include controlled experimentation to further test and confirm these findings.

ACKNOWLEDGMENTS

I thank the three anonymous reviewers and John Field for valuable comments and suggestions.

THE AUTHOR

Peter Ecke is an associate professor and faculty member in the Department of German Studies and the Interdisciplinary Ph.D. Program in Second Language Acquisition and Teaching at the University of Arizona, Tucson, Arizona, United States. His research interests include the bilingual lexicon, vocabulary acquisition, and language attrition.

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