Available online at www.sciencedirect.com
SCIENCE DIRECT®
Brain and Language 89 (2004) 174–181
Brain and Language
www.elsevier.com/locate/b&l

Do alternative names block young and older adults' retrieval of proper names?☆

Emily S. Cross[1] and Deborah M. Burke*

Psychology Department, 550 Harvard Ave., Pomona College, Claremont, CA 91711, USA

Accepted 2 September 2003

Abstract

This study evaluates whether tip of the tongue experiences (TOTs) are caused by a more accessible word which blocks retrieval of the target word, especially for older adults. In a "competitor priming" paradigm, young and older adults produced the name of a famous character (e.g., Eliza Doolittle) in response to a question and subsequently named a picture of a famous actor or actress depicting this character (e.g., Audrey Hepburn as Eliza Doolittle). Older adults produced more TOTs than young adults, but prior production of a related character name did not affect TOTs, although it did reduce incorrect responses. There were no age differences in knowledge of films and TV and thus the age-related increase in TOTs is not because older adults have more relevant knowledge. The findings are compatible with models in which alternate words are a consequence not a cause of TOT.

Keywords: Tip of the tongue; Aging; Proper names; Inhibition; Blocking; Transmission deficits; Naming; Language production

1. Introduction

Proper names are more difficult to retrieve than other information about people such as their occupation (Cohen & Burke, 1993; Valentine, Brennen, & Bredart, 1996) and proper name retrieval appears to be disproportionately impaired in old age. Older adults report that their ability to retrieve names deteriorates as they age and that this is their most disturbing cognitive problem (e.g., Lovelace & Twohig, 1990). The tip of the tongue experience (TOT) is perhaps the best-known type of word retrieval failure, occurring when a person is certain that they know a word although they are temporarily unable to produce it. Proper names comprise the majority of naturally occurring TOTs for adults regardless of age, and the increase in frequency of TOTs in old age is greater for proper names than for other types of words (Burke, MacKay, Worthley, & Wade, 1991; Evrard, 2002; Rastle & Burke, 1996).

One explanation for TOTs is that they are caused by a more accessible but incorrect alternate word that comes to mind first and suppresses the target word, preventing its retrieval (e.g., Anderson & Bjork, 1994; Brown, 1991; Jones, 1989; Reason & Lucas, 1984; Schacter, 1999). There is clear evidence that alternate words come repeatedly and involuntarily to mind and are experienced during many proper name TOTs that occur spontaneously in everyday life (Burke et al., 1991; Cohen & Faulkner, 1986). These recurring responses have been labeled "blockers," but we will use the more theoretically neutral term "persistent alternates" because their functional effect on retrieval is in dispute (James & Burke, 2000; Meyer & Bock, 1992; Perfect & Hanley, 1992).

Under the inhibition deficit (ID) hypothesis, persistent alternates would impair retrieval more for older than young adults because the ability to inhibit irrelevant information declines in old age. Irrelevant information, that is, persistent alternates in the case of TOTs, block retrieval of the target word until the alternate is inhibited (e.g., Hasher & Zacks, 1988; Zacks & Hasher, 1994). Within this framework, inhibition deficits at two

☆ This research was supported by Grant AG 08835 from the National Institute on Aging.
* Corresponding author. Fax: 1-909-621-8623.
E-mail address: dburke@pomona.edu (D.M. Burke).
[1] Present address: Department of Psychology, University of Otago, New Zealand.

0093-934X/$ - see front matter © 2003 Published by Elsevier Inc.
doi:10.1016/S0093-934X(03)00363-8

levels of processing are germane. Older adults' inhibition deficits would allow priming during lexical access to spread more broadly through the semantic network, increasing the likelihood of activation of a related alternate word (Hasher, Zacks, & May, 1999). Second, older adults are less able to control the access of activated information to conscious awareness (Hasher et al., 1999), increasing the likelihood that a persistent alternate would come repeatedly to mind. Thus, older adults are more likely than young adults to fail to retrieve proper names because irrelevant names are activated and interfere with retrieval of the target name (Zacks & Hasher, 1994). This study tests this ID explanation of increased retrieval failures for proper names in old age.

Jones (1989; Jones & Langford, 1987; see also Maylor, 1990) provided evidence that related alternate words block target words causing TOTs. He presented TOT inducing questions with an alternate word that was related in one of four ways to the answer: phonologically related, semantically related, both semantically and phonologically related or unrelated. Questions presented with phonologically related alternate words produced more TOTs than questions presented with an unrelated word. Two studies, however, have failed to replicate Jones' findings. The Jones studies confounded TOT questions with type of alternate word. When the different alternate word conditions were counterbalanced across TOT questions, phonologically related alternates no longer increased TOTs (Meyer & Bock, 1992; Perfect & Hanley, 1992). Indeed, several studies have reported that phonologically related words increased correct retrieval and reduced TOTs compared to unrelated alternate words (e.g., James & Burke, 2000; Meyer & Bock, 1992; White & Abrams, 2002). However, we need further research on the effect of *semantically* related alternate words because Meyer and Bock reported that more TOTs occurred when semantically related compared to unrelated alternate words were presented when a participant failed to answer a question.

Related to the blocking hypothesis is the argument that older adults are more susceptible to TOTs because they have greater knowledge than young adults (Dahlgren, 1998). Within an ID framework, this greater knowledge may increase the number of competitors during retrieval of a specific word or name and these competitors would be especially disruptive to older adults who are deficient in suppressing non-target responses. Older adults usually produce more correct responses, as well as more TOTs, to questions compared to young adults (e.g., Brown & Nix, 1996; Burke et al., 1991; Dahlgren, 1998; Heine, Ober, & Shenaut, 1999; James & Burke, 2000; Rastle & Burke, 1996). This suggests that older adults have acquired more knowledge relevant to the kind of questions used to induce TOTs than young adults. Indeed, the age difference in TOTs disappeared when Dahlgren (1998) controlled level of knowledge across age. In the present study, we test for age differences in TOTs for proper names of film and TV stars in participants who were selected so that knowledge of film and TV media would be equivalent across age.

An alternative theoretical framework for TOTs is provided by the transmission deficit (TD) hypothesis that explains TOTs within the functional architecture of a connectionist interactive activation model with localist representation. TOTs occur not because of interference from alternate words, but rather because the strength of the connections among phonological nodes is too weak to transmit sufficient priming to allow retrieval of the complete phonology of the TOT target word (Burke et al., 1991; MacKay & Burke, 1990). Connection strength weakens when nodes have not been activated recently or frequently, decreasing priming transmission. This explains why TOTs involve low rather than high frequency words and words that have not been used recently (Burke et al., 1991; Harley & Bown, 1998; Rastle & Burke, 1996). Aging also weakens connection strength explaining why TOTs increase in old age. A persistent alternate in this model is a *consequence* of a TOT, not the *cause*. The alternate word is primed via semantic and/or phonological representations shared with the target word and when retrieval of the phonology of the target word fails because of transmission deficits, the alternate is the most primed and activated (Burke et al., 1991).

There is evidence that once a TOT occurs, an alternate word that comes to mind spontaneously will delay resolution. Burke et al. (1991) reported that young and older adults' were slower to resolve a naturally occurring TOT in everyday life that occurred with a persistent alternate word, compared to a TOT that occurred with no persistent alternate coming to mind. Laboratory induced TOTs were less likely to be resolved during the experiment if the TOT occurred with a persistent alternate (that came to mind spontaneously) than if the TOT occurred with no persistent alternate. These effects of alternates on resolution are consistent with both the blocking account and the transmission deficit account. The persistent alternate could slow resolution by blocking retrieval of the target word. Alternatively, Burke et al. argued that the persistent alternate word is activated after the TOT occurs, but once activated the persistent alternate will come repeatedly to mind because activation strengthens its connections making it more accessible than the target word, until the effects of the recent activation of the alternate subside.

The present study tests these alternative explanations of TOTs and their increase in old age using a "competitor priming" paradigm that reveals the effect of related but incorrect words on naming. Wheeldon and

Monsell (1994) presented participants with verbal cues that elicited a word that was related semantically and structurally (e.g., *shark*) or unrelated (e.g., *dice*) to a subsequent target picture (e.g., *whale*) which they named. The related words were competitors with the target word for production because they corresponded to objects that were structurally and semantically similar to the object in the picture. Picture naming was slower following production of a competitor compared to an unrelated word. Within a blocking model, the picture activated both the target word and the competitor, with greater interference from the competitor if it had just been produced. The prior production of the competitor makes it more accessible than the target in early stages of lexical selection and inhibition of the competitor is necessary for retrieval of the target word.

In the present experiment, participants responded to a question that elicited the name of a media character who was related (e.g., *Eliza Doolittle*) or unrelated (e.g., *Scarlett O'Hara*) to a subsequent target picture of a famous actor dressed as the related character whom they had portrayed (e.g., *Audrey Hepburn* dressed as Eliza Doolittle). Participants always named the actor, not the character in the picture. Within a blocking model, the related character name will compete with the actor name for retrieval because the picture activates both the target actor name and the character name, with interference from the character name enhanced by its recent production. Prior production of the related character name makes it more accessible than the target name early in lexical selection and inhibition of the character name is necessary for correct naming. Under the ID hypothesis, inhibition becomes less efficient in old age so that older adults should suffer more interference from prior production of related character names than young adults in retrieving the target name. TOTs will increase with a related competitor because it blocks retrieval of the target name, especially for older adults who are less able to inhibit alternate words. Under the TD hypothesis, prior production of the related competitor will have no effect on probability of a TOT because weak connections cause TOTs, not blocking by a competing alternate word. Indeed, inasmuch as prior production of the competitor strengthens semantic connections shared with the target word, it may increase correct responses.

We measured interference from prior production of a related character name in two ways: increased TOTs for actors' names and slowing of actor naming latency. We used proper names as competitors because persistent alternates occurring spontaneously are in the same syntactic class as the TOT target, and TOTs for proper names consistently produced persistent alternates that were proper names (Burke et al., 1991).

Another goal of this study was to determine if older adults produce more TOTs than young adults when background knowledge of the tested domain is comparable across age. To measure knowledge of popular media, we developed the *Media Savvy Test*, which measured recognition of titles of TV shows and films. All participants were selected on the basis of their performance on this test. The goal was to select samples of young and older adults who were comparable in their knowledge of film and TV. If older adults produced more TOTs for the names of TV and film stars under these conditions, it would be difficult to attribute this age difference to their greater knowledge of this domain.

2. Method

2.1. Participants

Participants were 24 young ($M = 20.2$ years, $SD = 2.3$) and 24 older ($M = 72.6$ years, $SD = 4.6$) adults who were native English speakers. Young adults participated for credit in introductory psychology courses and older adults were paid for their participation. Older adults were from the Claremont Project on Memory and Aging's participant pool, and had been recruited from retirement communities, senior centers, or were graduates and retired employees of the Claremont Colleges. Because all the young adults were expected to obtain college degrees, we selected older adults with college degrees from the participant pool as often as possible. Mean years of education for young and older adults were 14.2 ($SD = 1.4$) and 16.4 ($SD = 3.4$), respectively. Mean scores on the Shipley vocabulary test (maximum = 25) were significantly higher for older ($M = 22.8$, $SD = 2.0$) than young adults' ($M = 21.3$, $SD = 1.6$), $t(df) = 2.53$, $p < .02$. Only participants who scored 69% correct responses (hits and correct rejections) or better on the *Media Savvy Test* were included in this study; the percent correct scores for young ($M = 89.1$, $SD = 7.15$) and older adults ($M = 84.1$, $SD = 7.05$) were not significantly different.

2.2. Materials

To construct the *Media Savvy Test*, we selected 18 real movie titles and 18 real television program titles and we developed 18 false movie titles and 18 false television program titles (see Appendix A). These titles were presented on a computer screen one at a time in random order. Participants pressed one button for real title responses and another button for false title responses.

For the main experiment, we collected from the Internet Movie Database 48 black and white photographs of famous actors and actresses dressed as famous characters in movies from the 1930's to the present. Pictures were modified using Adobe Photoshop to standardize the view of the person. We tested recognition of both the

character and actor in the picture in 15 young and 15 older adults drawn from the same sources as in the main experiment. We selected 32 pictures that were familiar to both young and older adults. We also constructed target questions to elicit the names of the characters the actors or actresses were depicting, for example, "This movie character is the eccentric owner of a magical and wonderful chocolate factory, WI____ WO____" (Willy Wonka). Questions were 15–37 words long and included the first 1–2 letters of the first and last name of the correct name.

We selected an additional 32 pictures of familiar famous people, including actors, singers, sports stars, politicians (e.g., Marilyn Monroe, Prince Charles, and Bob Hope) from books, magazines, and the internet for filler pictures. We constructed 48 filler questions that elicited the names of famous people or famous characters whose picture did not appear in the experiment.

2.3. Procedure

Trials were organized into sets of four trials with alternating pictures and questions as shown in Fig. 1: a question about the character depicted in the subsequent target picture (primed condition) or an unrelated filler question (unprimed condition), a filler picture, a filler

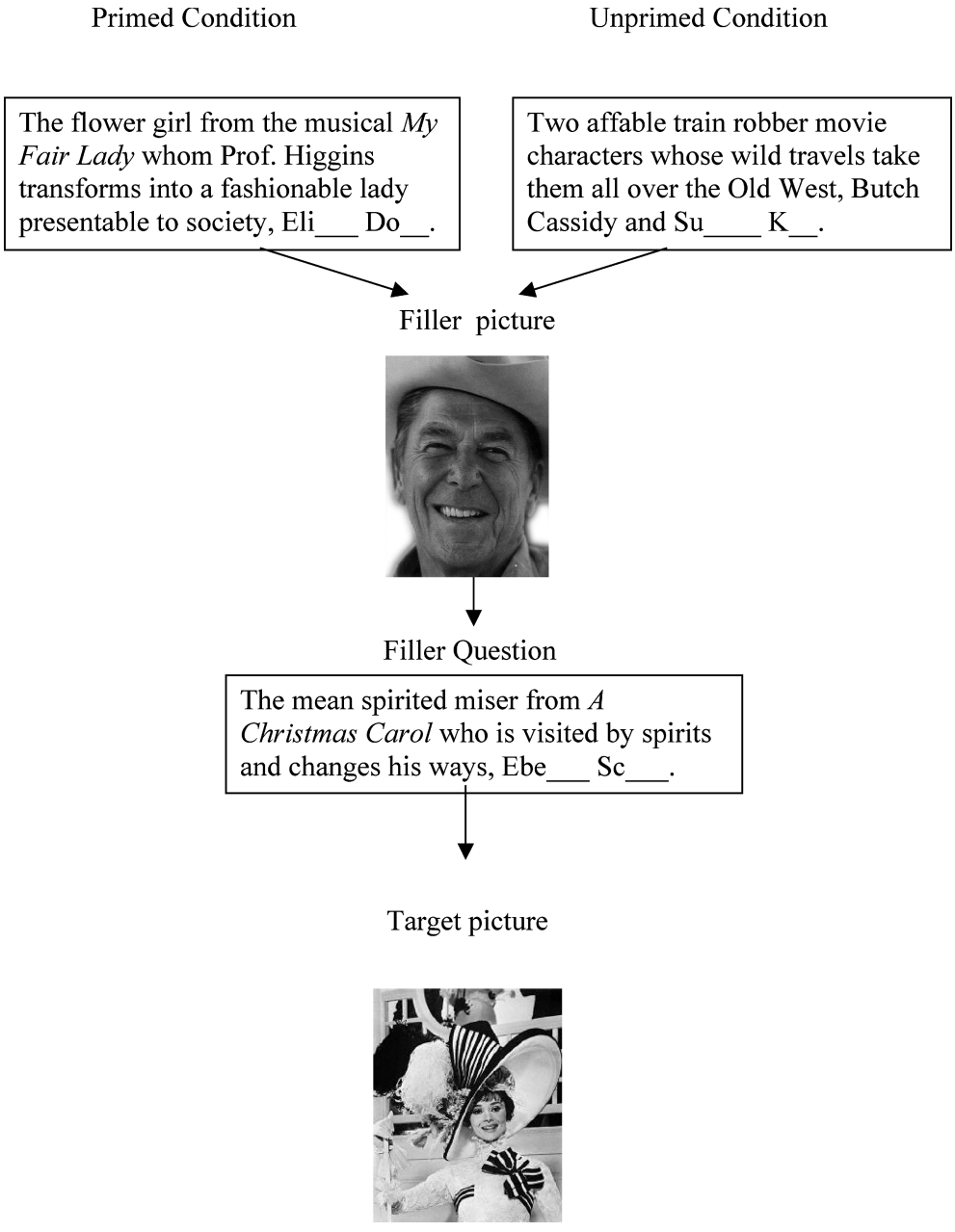

Fig. 1. Illustration of sequence of trials presenting definitions and pictures in Experiment 1.

question, a target picture. Two versions of the experiment were programmed so that for each participant half of the target pictures were preceded by their relevant character question and half by an unrelated question; over participants each target picture was preceded by its relevant character question and an unrelated question an equal number of times.

Participants were instructed that they should produce the appropriate name for questions, and the name of the real person in each picture (*not* the character). They were told that if they were certain that they knew the name and that it was on the verge of coming back to them, they should respond, "tip of the tongue." Because we were only interested in examining the TOT experience for pictures (specifically the target pictures), we recorded TOT responses for pictures only. After two sets of practice trials, the 32 sets of 4 trials each were presented continuously with no demarcation of the 4 trial sets.

A Macintosh computer programmed with PsyScope software presented instructions and stimuli, and recorded all responses including naming latencies for pictures. Participants spoke all responses into a head mounted microphone and were requested to avoid other vocal noises so as not to trigger the microphone. Latency was measured from the onset of the picture to the participant's vocal response. The experimenter coded via a button box whether each response to a picture was correct, incorrect (including don't know responses), or a TOT. When participants stated they were in a TOT state, the experimenter provided the correct name and asked the participant if that was the name they were trying to retrieve. Responses were only recorded as TOTs if the answer to this question was positive. The experimenter also recorded all microphone and definition errors so that these trials could be eliminated in later analyses. After completing all trials, participants were debriefed and compensated for their participation.

3. Results

Responses to target pictures were excluded from the analysis when the participants did not produce the correct character name in response to the preceding question. This eliminated a mean of 3.3 trials for young and 4.9 trials for older adults. Table 1 presents the percent of correct, TOT, and don't know/incorrect responses for naming primed and unprimed target pictures by age group. Repeated measures MANOVAs were conducted separately on each type of response and revealed several significant effects. Older adults produced significantly more TOTs than did younger adults, $F(1,46) = 17.93$, $p < .001$. Young adults produced significantly more correct picture names than older adults, $F(1,46) = 4.09$, $p < .05$. Finally, there was no age difference in don't know/incorrect responses, but there were more don't know/incorrect responses in the unprimed than in the primed condition, $F(1,46) = 5.61$, $p = .02$. There were no other significant effects.

Table 1
Mean percent correct, incorrect, and TOT responses by participant age and prime condition

Age group		Primed	Unprimed	Primed–unprimed
Young Adults	Correct	72.1	67.7	4.4
	Incorrect	19.4	24.3	−4.9
	TOT	8.6	8.1	.5
Older Adults	Correct	57.8	57.2	.6
	Incorrect	16.1	21.8	−5.7
	TOT	26.2	22.4	3.8

Table 2
Mean naming latencies and standard deviations by participant age and prime condition

Prime condition	Young		Older	
	M	*SD*	*M*	*SD*
Primed	2360	641	2196	526
Unprimed	2252	435	2414	549

Correlations between each participant's vocabulary score and number of TOTs revealed a moderate, significant negative correlation for older adults ($r = -.44$, $p < .05$), and no significant correlation for young adults.

When analyzing response time data, only correct responses were of interest. We eliminated trials where the microphone mis-triggered, 4.3 and 8.1% of trials for young and older adults, respectively. In addition, one older adult was eliminated from the analyses due to an excess of mis-triggered responses. We also eliminated 15 response times for older adults and 16 response times for younger adults that were longer than 7000 ms.

Table 2 presents mean naming latencies and standard deviations as a function of age and prime condition. Naming latencies were long compared to naming latencies for objects (Bowles, 1994; Oldfield & Wingfield, 1965) and there was considerable variability. A repeated measures MANOVA did not reveal any significant main effects of age or priming, nor was any interaction effect apparent. Paired samples *t* tests for primed and unprimed response times within the younger and older populations also revealed no significant differences.

4. Discussion

Prior production of a character name highly relevant to a subsequent picture of an actor had no effect on the

likelihood that young or older adults experienced a TOT for the actor's name. This finding is inconsistent with the blocking hypothesis that TOTs are caused by a more accessible related word that blocks retrieval of the target word. The findings also provide no support for the ID hypothesis that blocking is worse for older than young adults because older adults are less efficient in inhibiting competing alternate words (Zacks & Hasher, 1994). Indeed, prior production of the related character name actually reduced incorrect naming for both age groups, directly contradicting both blocking and inhibition deficits. The character name appeared to provide semantic information that eliminated wrong names.

The present results are in line with the dearth of support in previous studies for blocking as a cause of TOTs. Phonologically related words improved retrieval and reduced TOTs (e.g., James & Burke, 2000; Meyer & Bock, 1992). The only suggestion of a blocking effect was Meyer and Bock's finding that when participants failed to produce the answer to a question, presentation of a semantically related word compared to an unrelated word reduced correct responses and increased TOTs as the participant tried to respond to the question. Two findings suggest, however, that this result is best understood in terms of the alternate word delaying resolution of a TOT that had already occurred rather than causing the TOT. First, Meyer and Bock reported no effect of semantically related words on correct retrieval or TOTs when the words were presented with the question *before* the participant responded. Second, the present results show that semantically related names presented before the target question decreased incorrect retrieval and had no effect on TOTs.

The pronounced increase in frequency of TOTs for older compared to young adults is consistent with previous studies (e.g., Burke et al., 1991; Heine et al., 1999; Maylor, 1990). The age difference here is larger than that typically found in TOT studies where targets are not proper names, even those that used pictures of objects to evoke TOTs (Brown & Nix, 1996). This is consistent with the claim that aging effects on word retrieval are greater for proper names than other types of words.

Under the TD hypothesis, TOTs occur when connections among phonological connections are too weak to transmit sufficient priming for activation and retrieval of the phonological representations. Recent and frequent activation of nodes, in production of a word for example, strengthens connections increasing priming transmission, whereas aging weakens connections, reducing priming transmission (Burke et al., 1991; Burke & MacKay, 1997; MacKay & Burke, 1990). Burke et al. argued that alternates are a *consequence* not a *cause* of TOTs and are activated when the target word cannot be retrieved. Within this framework, older adults in a TOT state should produce less partial phonological information and fewer alternate words because their connections are weaker than young adults', reducing phonological priming necessary for activation of related information. These age differences are observed (Burke et al., 1991; Brown & Nix, 1996; Heine et al., 1999; Maylor, 1990).

The TD hypothesis predicts that presentation of alternate words will not increase the probability of TOTs because TOTs are caused by transmission deficits, not interference. Interestingly, Jacoby makes a similar argument about blocking effects in episodic memory (Hay & Jacoby, 1999; Jacoby, 1999). Using a misinformation paradigm, he demonstrated that presenting a related (alternate) word did not affect young or older adults' ability to recollect a previously studied word pair. Participants sometimes recalled the alternate word, but Jacoby argued that this occurred only after recollection had failed. As observed in the present study, he reported no evidence that presentation of the alternate word reduced the ability to recall the target word.

The results are inconsistent with the hypothesis that older adults produce more TOTs because they have greater knowledge related to the target word than young adults and this greater knowledge produces competitors that interfere with target retrieval (e.g., Dahlgren, 1998). There were no age differences on the *Media Savvy Test*, providing no evidence that older participants had greater knowledge than young participants of films and television. Although older adults produced fewer correct responses than young adults, this was because they produced more TOTs than young adults: there was no age difference in the number of incorrect responses. Although there was no indication that older adults knew more of the material being tested, they still reported significantly more TOTs than did younger adults. Indeed, general verbal knowledge as measured by the vocabulary test showed that as verbal knowledge increased, TOTs declined. Thus there is no evidence that TOTs increase in old age because older adults have accumulated a greater store of relevant knowledge.

The popularity of the blocking explanation of TOTs (e.g., Schacter, 1999; Smith, Choi, Gerkens, & Hull, 2002) is paradoxical given the absence of supporting evidence. Production of phonologically related words reduced TOTs (James & Burke, 2000; White & Abrams, 2002) and the present results show that semantically related names had no effect on TOTs but reduced incorrect responses. When a persistent alternate occurs spontaneously during a TOT, the phenomenological experience is that the alternate is blocking retrieval of the target. This appears to be correct in that alternates may delay retrieval once a TOT occurs (Burke et al., 1991), but the present results provide no evidence that related alternate words cause TOTs.

Appendix A. Media Savvy test

Movie titles	Television show titles
Flatliners (real)	Home Improvement (real)
As Good As It Gets (real)	Dynasty (real)
Out of Tibet (false)	Sutton Place (false)
On the Waterfront (real)	Days Gone By (false)
Summer's Over (false)	Code Blue (false)
The Color Purple (real)	The Drew Carey Show (real)
Air Force One (real)	Fantasy Island (real)
Talon's Song (false)	On the Town (false)
Driving Miss Daisy (real)	Hello, Goodbye (false)
Empire Records (real)	The X-Files (real)
Tolstoy's Dream (false)	Nightline (real)
Cool Off (false)	Girl Talk (false)
Shane (real)	Quantum Leap (real)
The Sound of Music (real)	Crime Watch (false)
Spilt Milk (false)	Our Neighborhood (false)
Breaking Even (false)	Picket Fences (real)
Free & Clear (false)	In the Wild (false)
The Way We Were (real)	French Fryes (false)
Out of Africa (real)	Access Hollywood (real)
The Nice Guy (false)	7th Heaven (real)
Misery (real)	Blue Jay Way (false)
The Clash of the Titans (real)	The Highlander (real)
Navy Seals (real)	Friends (real)
Sliding Into Home (false)	In the Public Eye (false)
Mordant Observations (false)	The View (false)
The Mat (false)	Groove Street (false)
The Last Boyscout (real)	The Beverly Hillbillies (real)
The Joy Luck Club (real)	Dallas (real)
Unspeakable Contrivances (false)	The Odd Couple (real)
Wild Roses (false)	Boston Public (real)
Hacking It (false)	Dive Quest (false)
Horse Sense (false)	Family Ties (real)
The Adventurists (false)	Side By Side (false)
Remains of the Day (real)	Party of Five (real)
Alien Scientist (false)	Act Naturally (false)
Saving Private Ryan (real)	A Day in the Life (false)

Note. Participants identified each title as real or false.

References

Anderson, M. C., & Bjork, R. A. (1994). Mechanisms of inhibition in long-term memory: A new taxonomy. In D. Dagenbach & T. H. Carr (Eds.), *Inhibitory processes in attention, memory, and language* (pp. 265–325). San Diego, CA: Academic Press.

Bowles, N. L. (1994). Age and rate of activation in semantic memory. *Psychology and Aging, 9*, 414–429.

Brown, A. S. (1991). The tip of the tongue experience: A review and evaluation. *Psychological Bulletin, 109*, 204–223.

Brown, A. S., & Nix, L. A. (1996). Age-related changes in the tip-of-the-tongue experience. *American Journal of Psychology, 109*, 79–91.

Burke, D. M., & MacKay, D. G. (1997). Memory, language and ageing. *Philosophical Transactions of the Royal Society: Biological Sciences, 352*, 1845–1856.

Burke, D. M., MacKay, D. G., Worthley, J. S., & Wade, E. (1991). On the tip-of-the-tongue: What causes word finding failures in young and older adults. *Journal of Memory and Language, 30*, 542–579.

Cohen, G., & Burke, D. M. (1993). Memory for proper names: A review. *Memory, 1*, 249–263.

Cohen, G., & Faulkner, D. (1986). Memory for proper names: Age differences in retrieval. *British Journal of Psychology, 4*, 187–197.

Dahlgren, D. J. (1998). Impact of knowledge and age on tip-of-the-tongue rates. *Experimental Aging Research, 24*, 139–153.

Evrard, M. (2002). Ageing and lexical access to common and proper names in picture naming. *Brain and Language, 81*, 174–179.

Harley, T. A., & Bown, H. E. (1998). What causes a tip-of-the-tongue state? Evidence for lexical neighbourhood effects in speech production. *British Journal of Psychology, 89*, 151–174.

Hasher, L., & Zacks, R. T. (1988). Working memory, comprehension, and aging: A review and a new view. In G. Bower (Ed.), *The psychology of learning and motivation* (Vol. 22, pp. 193–225). San Diego, CA: Academic Press.

Hasher, L., Zacks, R. T., & May, C. P. (1999). Inhibitory control, circadian arousal and age. In D. Gopher & A. Koriat (Eds.), *Attention and performance XVII; Cognitive regulation and performance: Interaction of theory and application. Attention and performance* (pp. 653–675). Cambridge, MA: MIT Press.

Hay, J. F., & Jacoby, L. L. (1999). Separating habit and recollection in young and older adults: Effects of elaborative processing and distinctiveness. *Psychology and Aging, 14*, 122–134.

Heine, M., Ober, B., & Shenaut, G. (1999). Naturally occurring and experimentally induced tip-of-the-tongue experiences in three adult age groups. *Psychology and Aging, 14*, 445–457.

Jacoby, L. L. (1999). Deceiving the elderly: Effects of accessibility bias in cued-recall performance. *Cognitive Neuropsychology, 16*, 417–436.

James, L. E., & Burke, D. M. (2000). Phonological priming effects on word retrieval and tip-of-the-tongue experiences. *Journal of Experimental Psychology: Learning, Memory and Cognition, 26*, 1378–1391.

Jones, G. V. (1989). Back to Woodworth: Role of interlopers in the tip of the tongue phenomenon. *Memory and Cognition, 17*, 69–76.

Jones, G. V., & Langford, S. (1987). Phonological blocking in the tip of the tongue state. *Cognition, 26*, 115–122.

Lovelace, E. A., & Twohig, P. T. (1990). Healthy older adults' perceptions of their memory functioning and use of mnemonics. *Bulletin of the Psychonomic Society, 28*, 115–118.

MacKay, D. G., & Burke, D. M. (1990). Cognition and aging: New learning and the use of old connections. In T. M. Hess (Ed.), *Aging and cognition: Knowledge organization and utilization* (pp. 213–263). Amsterdam: North Holland.

Maylor, E. (1990). Recognizing and naming faces: aging, memory retrieval and the tip of the tongue state. *Journal of Gerontology: Psychological Sciences, 45*, 215–225.

Meyer, A. S., & Bock, K. (1992). The tip-of-the-tongue phenomenon: Blocking or partial activation? *Memory and Cognition, 20*, 715–726.

Perfect, T. J., & Hanley, J. R. (1992). The tip-of-the-tongue phenomenon: Do experimenter-presented interlopers have any effect? *Cognition, 45*, 55–75.

Oldfield, R. C., & Wingfield, A. (1965). Response latencies in naming objects. *Quarterly Journal of Experimental Psychology, 17*, 273–281.

Rastle, K. G., & Burke, D. M. (1996). Priming the tip of the tongue: Effects of prior processing on word retrieval in young and older adults. *Journal of Memory and Language, 35*, 586–605.

Reason, J. T., & Lucas, D. (1984). Using cognitive diaries to investigate naturally occurring memory blocks. In J. E. Harris & P. E. Morris (Eds.), *Everyday memory actions and absent-mindedness* (pp. 53–70). London: Academic Press.

Schacter, D. L. (1999). The seven sins of memory: Insights from psychology and cognitive neuroscience. *American Psychologist, 54*, 182–203.

Smith, S. M., Choi, H., Gerkens, D. R., & Hull, R. G., (2002, November). Resolving memory blocks. Paper presented at the meeting of the Psychonomic Society, Kansas City.

Valentine, P., Brennen, T., & Bredart, S. (1996). *The cognitive psychology of proper names: On the importance of being Ernest*. London: Routledge.

Wheeldon, L. R., & Monsell, S. (1994). Inhibition of spoken word production by priming a semantic competitor. *Journal of Memory and Language, 33*, 332–356.

White, K. K., & Abrams, L. (2002). Does priming specific syllables during tip-of-the-tongue states facilitate word retrieval in older adults? *Psychology and Aging, 17*, 226–235.

Zacks, R. T., & Hasher, L. (1994). Directed ignoring: Inhibitory regulation of working memory. In D. Dagenbach & T. H. Carr (Eds.), *Inhibitory processes in attention, memory, and language* (pp. 241–264). San Diego, CA: Academic Press.