Specific Effects of Aging on Proper Name Retrieval: Now You See Them, Now You Don’t

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Existing research is equivocal as to whether aging negatively affects the retrieval of proper names more than other types of words. To clarify previous results, this study had young and older participants name and provide specific biographical information in response to pictures of familiar celebrities; it used two different measures of recall errors. An analysis of tip-of-the-tongue (TOT) responses indicated specific age-related increases in TOTs for names compared with words representing biographical information. An analysis including all other (non-TOT) recall errors did not indicate age-related deficits in name retrieval. These findings highlight the importance of the measures adopted in forming conclusions about age effects on the retrieval of names.

For people of all ages, names are prone to retrieval failures, including tip-of-the-tongue (TOT) states, which are those frustrating instances when we cannot produce well-known information even though we believe retrieval is imminent (e.g., Burke, MacKay, Worthley, & Wade, 1991; Gollan, Bonanni, & Montoya, 2005; Hanley & Cowell, 1988; Valentine, Brennen, & Brédart, 1996). In a TOT state, information is often available about the phonology of the desired word (e.g., its initial sound or number of syllables) and the word’s meaning is known. TOTs are therefore qualitatively different than other sorts of recall errors (e.g., when something is unknown, or when an incorrect word or name is retrieved).

Existing literature is equivocal as to whether name retrieval is more adversely affected than the retrieval of other sorts of information during the course of normal aging. Research has consistently revealed age-related declines in proper name retrieval (e.g., Burke, Locantore, Austin, & Chae, 2004; Maylor, 1990, 1998; Maylor & Valentine, 1992), but my aim in the present research was to test whether name retrieval suffers greater age-related impairment than does the retrieval of other types of words. Some studies have identified disproportionate age-related increases in TOT rates for proper names compared with other types of words (e.g., Burke et al., 1991; Evrard, 2002; Rastle & Burke, 1996), but other studies indicate age declines of similar magnitude in the retrieval of names and other word types (e.g., Maylor, 1995, 1997). One possible reason for the discrepancy is that these studies (Maylor, 1995, 1997) measured the proportion correct instead of TOT incidence to assess name retrieval (see endnote). There are a variety of types of error that might occur when an individual is attempting to recall a name (e.g., the person’s name may be unknown, a wrong name may be known for the person, or a speech error could occur when the individual produces the name). Perhaps assessing these errors en masse (i.e., measuring the proportion of correct responses) obscures specific age-related declines in the ability to retrieve well-known names (see Maylor, 1997, p. 213, for a similar suggestion). For example, there should be no age differences in unknown information when stimuli are selected to be well known to all participants (as in the present experiment). Furthermore, age-related increases in some error types (e.g., speech errors, when the correct information is misproduced) could be offset by age-related decreases in other types of errors (e.g., incorrect information, when something is produced that is wrongly believed to be correct).

The present experiment tested whether the measure adopted to assess name-retrieval failures is an important factor in the inconsistent existing findings. Each celebrity photograph served as the stimulus from which participants retrieved and produced a proper name and biographical (nonproper name) words, so that each participant’s familiarity with the stimulus for the responses was completely controlled (i.e., both types of information were retrieved in response to one pictured celebrity). Analyses tested whether the measure used to assess name-retrieval difficulty (measuring TOTs only vs measuring total errors) would influence the conclusions drawn from the experiment.

Methods

Participants

Thirty-six young (age, $M = 19.03$ years; range = 18–26, $SD = 1.67$) and 36 older (age, $M = 69.94$ years; range = 61–82, $SD = 5.11$) adults participated for extra school credit or cash payment. Young adults had less education ($M = 12.71$ years, $SD = 1.05$) than did older adults ($M = 17.19$ years, $SD = 3.44$), $t(64) = 7.34$ (all effects are significant at $p < .05$ unless indicated otherwise), and young adults scored lower on a 25-item version of the Shipley (1940) vocabulary test ($M = 19.94$ correct, $SD = 2.40$) than did older adults ($M = 22.24$ correct, $SD = 2.41$), $t(65) = 3.91$.

Materials

The study used 58 celebrity photographs. Celebrities included actors who starred primarily in films (43%) or on television (19%), political figures (17%), musicians (9%), and others (12%; e.g., athletes, business figures). About half the celebrities first achieved fame before 1980, and 33% were women. The experimenters interspersed 6 photographs of nonfamous people with the celebrities to ensure that participants carefully considered the familiarity of each face. Judgments of these nonfamous faces as familiar did not differ by age (young adults, $M = 13%$,
older adults, $M = 12\%; t < 1$), and are not discussed further. Four additional celebrity pictures served as practice stimuli. Each picture showed the person’s face with minimal clothing and background within a 4 in. $\times$ 5 in. (approximately $10 \times 12$ cm) rectangle on a separate page. Response sheets had spaces for participants to write down whether each face was familiar, the celebrity’s name, and the celebrity’s biographical information.

Procedure
The experimenter tested participants individually or in pairs, seated approximately 3 ft (91.4 cm) across a table from the experimenter. The experimenter presented photographs in a binder in a predetermined, random order until responses were made (or a maximum of 60 s elapsed). When participants judged a face to be familiar, they wrote the person’s first and last name and biographical information in the appropriate spaces. For biographical information, they were to write the person’s specific occupation (e.g., to indicate a film, political office, or musical genre with which a person was associated). The experimenter told participants that they could include other biographical information (e.g., the decade during which the person rose to fame) as a way to prevent pure guessing of occupations.

Participants left the space blank if they did not know the celebrity’s name or biographical information. TOTs were described and participants indicated on their response sheet all TOTs they experienced for names or biographical information. After participants wrote their responses, the experimenter said the correct name and some occupation information, and incorrect TOTs (in which the participant was thinking of incorrect information) were excluded from analyses. The experimenter instructed participants to never change any previous response.

Results
Young adults judged more of the 58 celebrity faces as familiar ($M = 41.22$, $SD = 9.00$) than did older adults ($M = 37.00$, $SD = 9.24$), which is a small but significant difference: $t(70) = 1.96$, $p = .05$. For each face judged to be familiar, the experimenter strictly scored the name and biographical information provided as “correct” or “incorrect.” The percentage of familiar faces for which participants provided the correct name and biographical information did not differ by age (young adults, $M = 48\%$, $SD = 21\%$; older adults, $M = 50\%$, $SD = 18\%$; $t < 1$). This suggests that, although on average young adults judged slightly more faces to be familiar, there was equivalent familiarity across the age groups for faces identified as familiar.

The experimenters divided incorrect responses into two categories: TOTs versus other recall errors. Other errors included failures to respond, that is, blanks on the response sheet; completely incorrect information, such as misnaming Halle Berry as “Tina Turner,” or identifying James Dean as the “singer from the 50s/60s”; partially incorrect information, such as misnaming Nicholas Cage as “Nicholas Gates,” describing Glenn Close as “[man’s name] Close,” or indicating that James Dean was an “actor who overdosed on drugs”; or providing information too vague to determine accuracy, such as “actor” for Sammy Davis Jr. or “athlete” for Babe Ruth. For comparability with previous research, the research team did not initially differentiate these other error types.

The research team analyzed the percentage of familiar faces with errors in a 2 (error type: TOT vs other) $\times$ 2 (error item: name vs biographical information) $\times$ 2 (age group: young vs older) mixed analysis of variance (ANOVA). There was a main effect of error item, $F(1, 70) = 89.27$, partial $\eta^2 = 0.56$, but no effect of age, $p > .55$, and no Error item $\times$ Age interaction, $p > .85$. As shown in Figure 1, there was a significant three-way interaction of error type, error item, and age, $F(1, 70) = 6.98$, partial $\eta^2 = 0.09$. The pattern of effects clearly differed for TOTs and other error types, so I conducted separate ANOVAs on each of the two measures.

For TOTs, there were main effects of error item, $F(1, 70) = 120.62$, partial $\eta^2 = 0.63$ (more TOTs for names than for biographical information) and of age, $F(1, 70) = 6.14$, partial $\eta^2 = 0.08$ (more TOTs for older than young adults). Importantly, there was an Error item $\times$ Age interaction, $F(1, 70) = 6.05$, partial $\eta^2 = 0.08$, because TOTs increased with age for names, $t(70) = 2.62$, but not for biographical information, $p > .25$.

For other (non-TOT) errors, there were no main effects of error item, $p > .27$, or age, $p > .12$, but there was an Error item $\times$ Age interaction, $F(1, 70) = 4.10$, partial $\eta^2 = 0.06$, because of a marginally significant decrease in errors with age for names, $t(70) = 1.94$, $p = .06$, with no age difference for biographical information, $p > .38$. The majority (66%) of non-TOT errors were failures to respond. A 2 (error item) $\times$ 2 (age group) ANOVA on the percentage of non-TOT errors that were failures to respond indicated only a main effect of error item, $F(1, 66) = 36.06$, partial $\eta^2 = 0.36$, because blanks comprised a greater
percentage of errors for names (78%) than for occupations (53%). There was no main effect of or interaction with age.

One common problem was misidentification of celebrities (e.g., misidentifying Donald Trump as “Dan Rather; news anchor,” misnaming Glenn Close as “Meryl Streep” with the vague biographical information “actress,” or providing no name but specific, incorrect biographical information, such as calling Justice Clarence Thomas a “commentator for sports; ex-football player”). Misidentifications did not differ by age (as percentage of faces judged familiar; young adults, $M = 8\%$, $SD = 7\%$; older adults, $M = 10\%$, $SD = 9\%$, $t < 1$). Nonetheless, to ensure that the obtained pattern of findings was not due to the inclusion of misidentified celebrities, the research team conducted analyses excluding these cases, and the pattern was unchanged. Separate analyses testing TOTs and other errors yielded only one different effect than the initial analysis: For non-TOT errors, there was a main effect of age, $F(1, 70) = 4.58$, partial $\eta^2 = 0.06$, because young adults had more recall errors than did older adults.

**DISCUSSION**

Dividing incorrect responses into TOTs versus other (non-TOT) errors proved very informative: TOTs showed a specific age-related increase in retrieval failures for proper names, but a different pattern emerged for other error types. This result indicates that the measure used to assess retrieval is critical in making conclusions about the existence of a specific age-related impairment in proper name retrieval. To my knowledge, only one published project has identified a disproportionate age deficit in name recall without specifically measuring TOTs: Rendell, Castel, and Craik (2005) replicated the study by Evrard (2002) and found a greater age-related decrease in the proportion of correct responses for proper names than for object names. Present results suggest that unmeasured age-related increases in TOTs for proper names may have caused the obtained interaction in the study by Rendell and colleagues (although one cannot rule out increases in other error types as well). Clouding the interpretation of their findings, Rendell and colleagues and Evrard used different pools of stimuli to elicit proper names and common nouns, and familiarity with the two stimulus sets may not have been equivalent across age.

In the present experiment, older adults had more TOTs than did young adults for names, but there was no age difference in TOTs for occupations, validating older adults’ reports of greater increases in retrieval failures for proper names than for other types of words or information (e.g., Cohen & Faulkner, 1984; Maylor, 1997). The age difference in TOTs for names replicates past results (e.g., Burke et al., 1991, 2004; Maylor, 1990; Rastle & Burke, 1996). The finding that TOTs for biographical information (such as occupations) were very rare was expected for young participants: Words representing occupations tend to be frequently used and are therefore unlikely to suffer TOTs, and there are typically synonyms or other pieces of information that could be substituted for any item of biographical information that is not currently accessible. Importantly, older adults could in principle have had more biographical-information TOTs than did young adults, which would have eliminated the interaction. Indeed, many studies have shown age-related increases in TOTs for non-proper-name words (e.g., Heine, Ober, & Shenaut, 1999; James & Burke, 2000; White & Abrams, 2002). Furthermore, confidence intervals around the means for biographical-information TOTs do not include zero (see Figure 1). Nevertheless, the obtained interaction might result from a floor effect for TOTs for biographical information, and therefore it should be interpreted cautiously.

The analysis including other (non-TOT) errors for names and biographical information resulted in an interaction because of a marginally significant decrease in name errors with age, but no age-related difference in errors for biographical information. These data include many error types that likely result from a variety of underlying causes. Failures to respond (blanks) comprised the majority of these errors, but the pattern of blanks did not differ by age. An interesting goal for future research is to determine and explain the age-related trajectories for various types of name-recall errors.

The present experiment highlights the importance of the measures that researchers adopt in a particular experiment when they draw conclusions about disproportionate age-related effects on the retrieval of proper names. Present results indicate that theories of name memory and aging will have to distinguish mechanisms for TOTs versus other recall failures and will have to explain why aging disproportionately increases TOTs but not other errors for names.

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**REFERENCES**


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**Endnote**

Differences between Maylor (1995, 1997) and Burke and colleagues (1991), Rastle and Burke (1996), and Evrard (2002) might also result from Maylor’s use of participants in their 50s as the “younger adult” group (the other researchers tested standard “young adult” groups). Maylor’s procedure effectively equates celebrity familiarity across age groups, but there may be critical changes in name-retrieval ability prior to the age of 50 that are not assessed in these studies (but see Maylor, 1990).