INTRODUCTION

Naming consistently reveals an age-related word finding deficit. The task requires an individual to provide lexical information when presented with conceptual information. Stimuli directly activate semantic representations at the semantic network level, then indirectly activate the word name at the lexical level. Aging has not been found to adversely affect semantic memory; however, reasons for age-related decline have been investigated, including breakdown in the access route from semantic representation to lexicon, with lexicon and semantic representation both remaining intact (i.e., transmission hypothesis). Others have suggested that naming context may influence ability to retrieve words efficiently with age. That is, some contexts are easier than others; sentence completion is easier than confrontation naming, particularly for objects, and both tasks are easier than definition naming. However, influence of aging on this pattern has not been described.

Using descriptive analysis, Hough (1990) identified three distinct performance profiles in a group of typically aging adults on the Test of Adolescent/Adult Word Finding (TAWF; Gorman, 1990): 1) normal standard scores (SS) and performance across all subtests; 2) normal SS but selective impairment on one subtest; and 3) abnormal SS with impaired performance on at least two subtests. The purpose of the current investigation was to confirm these descriptive results in a group of non-neurologically impaired older adults. Cluster analysis is a means procedure was used for confirmation of naming patterns on the TAWF.

RESULTS

Overall TAWF results (standard scores [SS], mean accuracy percentage) are in Table 2. Hierarchical cluster analysis (SHC; Ward’s cluster method, Squared Euclidean Distance) was performed on these data to confirm presence of subgroups identified by Hough (1996, 2007) (Table 3). HCA partitioned the sample into two groups (56 and 14 participants), differentiating between individuals scoring within/below normal, respectively, and confirming TAWF performance, except one participant scoring below normal but clustered into the normal group. Box plots representing group subtest performance scoring above/below normal are in Figures 1 and 2, respectively. A delta cluster revealed two distinct subgroups within the sample scoring within normal. Analysis revealed no performance differentials between subgroups for one subtest; however, HCA revealed that participants on the second normal sub-cluster demonstrated specific impairment on Picture Naming. Normal performance on other subtests. Thus, HCA partitioned the sample into three distinct groups.

The three subgroups were originally identified by Hough (1996, 2007) via SS and each participant’s subtest performance relative to the overall TAWF grand mean accuracy percentage (85.1) and one standard deviation below this mean (73.4) (Tables 4, 5). This information, in addition to SS and HCA, confirmed the three TAWF patterns. Group One: participants having normal SS and normal accuracy percentage (all SS > 85; Group Three). Group Two: participants having normal SS but selective impairment on Picture Naming. Nouns. Mean accuracy percentage on this subtest was greater than one standard deviation below overall TAWF grand mean for all participants (Figure 4). Group Three: individuals with SS below normal. Participants exhibited abnormal scores on Picture Naming: Nouns and at least one other subtest (Category Naming) relative to overall TAWF grand mean.

A k-means procedure, performed to corroborate findings based on the HCA and mean percentage of variance, substantiated the HCA, differentiating between the same groups of individuals performing within/below normal. The k-means procedure partitioned participants into clusters (27, 9, and 14 participants were designated to Groups One, Two, and Three, respectively, except one participant displaced from Group Two to Group Three from the original analysis (Hough, 2007).

Pearson Product-Moment Correlations between age, gender, education, PPVT-R, TAWF SS, TAWF SS and accuracy percentage revealed significant positive correlations between PPVT-R and both TAWF scores (SS r = .883, p<.0001; accuracy percentage r = .536, p<.0001).

DISCUSSION

Results confirmed presence of three distinct patterns of performance on the TAWF identified by Hough (1996, 2007) in a non-neurologically impaired adults: 1) normal SS and performance across subtests (54%); 2) normal SS with impairment on Picture Naming. Nouns (18%); and 3) abnormal SS with impairment on two subtests (Picture Naming: Nouns, Category Naming) (28%).

Word retrieval patterns of these groups may represent variances in naming among typically aging adults. Performance variability between individuals increases with advancing age on naming. However, significant relationships were not observed between age and TAWF or PPVT-R.

Group Two and Three subgroups pattern revealed lowest and highest performance on Picture Naming: Nouns and Verbs, respectively. Object picture naming is currently affected by normal developing children. Picture naming declines with age regardless of naming objects or actions; others have found decline in noun naming with inconclusive verb findings. Better performance on Verbs than Nouns may relate to increased verb usage with age. Verbs do not involve as much specificity as needed for nouns. Increased noun specificity requires more interaction between semantic representation and the lexicon during noun production. As one ages, this interaction may be less accessible or disrupted by a transmission deficit.

Variables and predictors have been examined for identifying neurologically healthy individuals at risk for cognitive decline including naming impairments. Current TAWF findings should be considered relative to identified predictors of decline or successful aging.

MATERIALS & METHODS

Fifty adults (23M, 28F) between 54 and 75 participated. All passed a modified pure-tone hearing screening for older adults; had normal or corrected visual acuity; were native English speakers, and right-handed. There was no history of neurologically inert: head injury, psychiatric disturbance, alcoholism/substance abuse, or learning disability/physical education placement for any participant. All received the Mini-Mental Status Examination (MMSE) with no participant scoring < 27 (Table 1). All had normal scores on the Peabody Picture Vocabulary Test—Revised (PPVT-R) and Benton Visual Retention (ABVR) (Hars Table 2). The Test of Adolescent/Adult Word Finding (TAWF) was administered to all participants. It is a standardized test for examining word retrieval skills in adults, with six subtests: Picture Naming: Nouns, Sentence Completion, Descriptive Naming, Picture Naming: Verbs, Category Naming, and Comprehension. The test was administered/recorded according to test procedures.

Table 1: Participant Characteristics Including Gender, Age, Education Level, and Who Filled out Form

Table 2: Hierarchical Cluster Analysis Using Ward's Cluster Method for Identifying Groups Based on TAWF Scores

Table 3: Pearson Product-Moment Correlations Between Age, Gender, Education, PPVT-R, TAWF Scores, and Accuracy Percentage

Table 4: Mean Accuracy Percentage Across All Subtests

Table 5: Mean Percentage of Accuracy Across All Subtests

Table 6: Mean Percentage of Accuracy Across All Subtests

Table 7: Mean Percentage of Accuracy Across All Subtests