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Verbal Fluency and Repetition Skills in Healthy Older Spanish–English Bilinguals

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The influence of bilingualism on cognitive test performance in older adults has received limited attention in the neuropsychology literature. The aim of this study was to examine the impact of bilingualism on verbal fluency and repetition tests in older Hispanic bilinguals. Eighty-two right-handed participants (28 men and 54 women) with a mean age of 61.76 years (SD = 9.30; range = 50–84) and a mean educational level of 14.8 years (SD = 3.6; range 2–23) were selected. Forty-five of the participants were English monolinguals, 18 were Spanish monolinguals, and 19 were Spanish–English bilinguals. Verbal fluency was tested by electing a verbal description of a picture and by asking participants to generate words within phonemic and semantic categories. Repetition was tested using a sentence-repetition test. The bilinguals' test scores were compared to English monolinguals' and Spanish monolinguals' test scores. Results demonstrated equal performance of bilingual and monolingual participants in all tests except that of semantic verbal fluency. Bilinguals who learned English before age 12 performed significantly better on the English repetition test and produced a higher number of words in the description of a picture than the bilinguals who learned English after age 12. Variables such as task demands, language interference, linguistic mode, and level of bilingualism are addressed in the Discussion section.

Key words: bilingualism, aging, language, neuropsychology, fluency, repetition, naming

The influence of bilingualism on neuropsychological test performance has received limited attention by researchers. Neuropsychological research on bilingualism has primarily focused on the cerebral organization of language in bilingual people (Obler & Hannigan, 1996), differential language loss, and recovery in bilingual individuals with neurological disorders (Paradis, 1997). Some studies have examined the influence of speaking two languages on memory tests (Harris, Cullum, & Puente, 1995; Harris, Heaton, & Cullum, 1993).

Our knowledge of bilingualism as it interacts with the aging brain is still minimal, and the available literature on language in the aging bilingual is very limited. When we reviewed the literature, we found only three studies on normal aging and bilingualism. The first was a case report of an elderly German–English bilingual woman whose English started to show traces of first language (L1) accent and words as she aged (Clyne,

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1977). The health status in this case was not reported, so it is unclear if the condition was due to a dementing process. The second study was a preliminary report on the language test performance of 11 bilinguals and 32 monolinguals with a mean age of 73. No significant differences were observed between bilinguals and monolinguals on most language tests (naming, phonemic verbal fluency, and speech perception). However, the bilingual group outperformed the monolingual group in animal list generation, and the monolingual group performed better than the bilingual group in automatic speech and proverbs tests (Obler, Albert, & Lozowick, 1986). The third study of language in elderly bilinguals reported difficulties in comprehension tasks in bilinguals when compared to monolinguals (Bergman, 1980).

Two competing hypotheses have been proposed with respect to the influence of bilingualism on cognition. The first hypothesis suggests a subtractive effect of bilingualism, and the second hypothesis suggests an additive effect. The first view proposes that bilinguals, when compared to monolinguals, show deficiencies in the processing of the L1 and second language (L2) in memory systems (Cook, 1998). Consistent with that subtractive hypothesis, Ransdell and Fischler (1987) found that adults who had been bilingual all their lives were slower at responding on list recognition and lexical decision tasks even if their accuracy was the same. The second hypothesis proposes that bilingualism has a beneficial effect on the awareness of language and, consistent with that additive hypothesis, general creative thinking skills. Bilinguals develop more awareness of the nature of language (Cook, 1998). Davine, Tucker, and Lambert (1971) found a higher level of phonological awareness, and Galambos and Goldin-Meadow (1990) found a faster development of grammatical awareness in bilingual children. More cognitive flexibility has also been described in bilinguals (Landry, 1974).

It seems that there are both losses and gains in specific areas of cognitive function as a result of learning an L2. These losses and gains may be influenced by the age of acquisition of the L2 as well as the number of years that the L2 has been used. In verbal memory tests, it has been reported that nonbalanced Spanish–English bilinguals (i.e., individuals mastering both languages at different levels) retain fewer words in their L2 when compared to balanced bilinguals and English monolinguals. These differences disappear when the bilinguals are tested in their dominant language (Harris et al., 1995). Short-term memory deficits in the L2 have been found in children (Cook, 1979), and differences in long-term memory between monolingual and bilingual college students have been documented (Cook, 1998).

Much of the previous research on bilinguals used children or college students as participants. Very little is known about the brain changes over time after the bilingual has used the two languages for many years. Bilingualism is an important variable that may moderate the effect of age on language processes.

The purpose of this study was twofold. First, we wanted to examine the impact of bilingualism on verbal fluency and repetition tests in older Hispanic bilinguals. Verbal fluency was tested using verbal description of a picture and generation of words within phonemic and semantic categories. Repetition was tested using a sentence-repetition test. Results were compared to those of English and Spanish monolinguals. It was hypothesized that bilingual and monolingual individuals would demonstrate equivalent performances on spontaneous verbal fluency (number of words produced in describing a picture). In contrast, it was predicted that bilinguals would recall fewer words than either Spanish or English monolinguals within semantic and phonemic categories. The generation of words under categories is more demanding, and interference of the two languages was expected. Second, we wanted to examine the effects of the age of acquisition of the L2 on test performance in both languages. It was predicted that early bilinguals, when using their L2, would outperform late bilinguals in verbal fluency and repetition tests.

Method

Participants

There were 82 right-handed participants (28 men and 54 women) with a mean age of 61.76 (*SD* = 9.30; range = 50–84) and a mean educational level of 14.8 years (*SD* = 3.6; range = 2–23). Participants were South Florida residents from Miami–Dade and Broward counties. Participants volunteered to participate and claimed to be Spanish or English monolingual or Spanish–English bilingual.

All participants were carefully screened for any history of neurological or psychiatric problems using a structured interview. All lived independently and were able to successfully complete their daily activities. The Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) and the Beck Depression Inventory–II (BDI–II; Beck, Steer, & Brown, 1996)

were used to rule out dementia and depression. All participants scored above 27 on the MMSE (Folstein et al., 1975) and below 5 on the BDI–II (Beck et al., 1996).

The Boston Naming Test (BNT; Kaplan, Goodglass, & Weintraub, 1983a) was used to test naming proficiency; participants with abnormal performance on the BNT were excluded from the sample. The Spanish monolinguals were tested with the Spanish versions of the previously mentioned tests (Ardila, Rosselli, & Puente, 1994; Beck et al., 1996; Kaplan, Goodglass, & Weintraub, 1983b).

A questionnaire was used to assess participants' bilingualism. Forty-five participants claimed English as their only language, 18 participants recognized Spanish as their only language, and 19 participants considered themselves proficient in both English and Spanish. The demographic and neurological description of the sample is presented in Table 1. An analysis of variance (ANOVA) indicated no significant differences among groups in age, level of education, and MMSE score.

Monolingual sample. All English monolingual participants were born in the United States and only spoke English. All Spanish monolingual participants were Latin American immigrants living in the city of Hialeah (Dade County, Florida), in which approximately 95% of the population is Hispanic and Spanish is the language spoken in daily activities. Spanish monolingual participants had no formal education in English or previous employment in which English was required. All Spanish monolinguals migrated to the United States after age 50 and had been living in the United States an average of 5 years. Spanish monolinguals were unable to name, in English, more than five drawings of the BNT and were unable to answer demographic information when the questions were presented in English. In a self-report questionnaire, the Spanish monolingual participants stated that they watched television, listened to the radio, read the newspaper, and spoke to relatives and friends only in Spanish.

Bilingual sample. The bilingual participants were screened according to the information provided on a language background questionnaire. The following criteria were used to assess bilingual proficiency in Spanish and English:

1. The oral administration of a 20-item bilingual questionnaire that included the following types of questions: (a) At what age and in what manner did the participant acquire each language, (b) how much contact with Spanish and English did the participant acquire, and (c) what was the participants' preference in the use of each language (e.g., at home, at work, with friends, with relatives, to watch television, to read)? Because schooling language is an important variable, only participants who received more than 5 years of formal education in English and used both languages at work for at least 10 years were selected.

2. Participants' self-rated language proficiency in speaking, understanding, reading, and writing in English and Spanish. For example, participants were asked to rate themselves on how well they under-

Table 1. *Sample Characteristics for the Three Groups Studied (One-Way Analysis of Variance, Means, and Standard Deviations)*

	Bilingual[a]		Monolingual Spanish[b]		Monolingual English[c]			
Characteristic	***M***	***SD***	***M***	***SD***	***M***	***SD***	***F***	***p***
Age	60.6	9.7	61.3	8.1	63.4	10.1	0.71	.491
Education	14.5	3.6	13.3	4.8	16.6	2.4	1.05	.353
Sex								
Female	10	14	30					
Male	9	4	15					
MMSE	28.4	1.3	29.0	1.3	28.7	1.1	1.45	.240
BDI–II	1.1	1.09	1.0	1.4	1.4	1.61	0.49	.610
BNT								
Spanish	52.9	6.1	51.1	4.1			1.08	.306
English	52.4	7.1			54.9	4.8	2.85	.096

Note: MMSE = Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975); BDI–II = Beck Depression Inventory–II (Beck, Steer, & Brown, 1996); BNT = Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1983a).
[a]$n = 19$. [b]$n = 18$. [c]$n = 45$.

stood, spoke, wrote, and read Spanish or English as (a) *not at all,* (b) *limited,* (c) *relatively well,* (d) *quite well,* or (e) *very well.* Only participants who responded *quite well* or *very well* to all questions were selected. The researcher was a proficient bilingual who was able to corroborate participant understanding and expression in both languages while doing the interview. The self-report proficiency in reading and writing in Spanish and English were not corroborated by the researcher.

3. A normal score on the Spanish (Kaplan et al., 1983b) and English (Kaplan et al., 1983a) versions of the BNT Norms, correcting for age (Spreen & Strauss, 1998).

All bilingual participants claimed Spanish as their L1. Nine (47%) bilingual participants had contact with English before age 12, and 10 (53%) had contact after age 12. The mean age of exposure to the L2 was 18.85 (*SD* = 14.24), and the mean number of years that they had been exposed to English was 35.95 (*SD* = 13.37). One participant was born in the United States, 6 in Puerto Rico, 7 in Central America or the Caribbean, and 5 in South America. Eighty-four percent of the bilingual participants spoke Spanish at home during childhood, and 16% spoke English and Spanish at home during childhood. All bilinguals had used both languages on a daily basis for at least 10 years, but 63% mainly spoke Spanish at home. At the time of evaluation, 26% spoke mainly English at home, and 10% spoke English and Spanish at home. Fifty-six percent mainly spoke English at work, and 44% spoke English and Spanish. Fifty-two percent considered Spanish as their better-spoken language, 38% considered English as their better-spoken language, and 10% felt they spoke English and Spanish equally well. All bilingual participants had formal methods of English acquisition.

Instruments

The following language functions were tested:

1. Verbal fluency within a phonemic category. Three 1-min fluency trials were given using the letters *F, A,* and *S* (Ardila et al., 1994; Spreen & Strauss, 1998).
2. Verbal fluency within a semantic category. Two 1-min fluency trials, using animals and fruits as the categories, were given (Ardila et al., 1994; Spreen & Strauss, 1998).
3. Oral description of the picture *The Cookie Theft* from the Boston Diagnostic Aphasia Examination (Goodglass & Kaplan, 1983). Participant responses were recorded using a tape recorder. The score was the total number of words. The number of nouns and verbs also were counted.
4. Sentence Repetition from the Multilingual Aphasia Examination (MAE) Spanish and English versions (Benton & Hamsher, 1989; Rey & Benton, 1991). The participant was asked to repeat 14 sentences, 1 at a time. The total number of sentences correctly repeated was recorded.

Procedures

First, participants were interviewed to determine eligibility. This first structured interview included demographic description, neurological history, psychiatric history, and language history. The MMSE, BDI, and BNT were administered to rule out cognitive decline, depression, and naming difficulties. If the participant met the inclusion criteria, the researcher proceeded to administer the verbal fluency tests and the repetition tests. Interview and test instructions were presented in Spanish to Spanish monolingual participants and in English to English monolingual participants. Bilingual participants were interviewed and tested in Spanish and English. All tests were given in both languages. The participants had to switch between languages several times from one language to the other over the session. The participants were encouraged to use only the language—English or Spanish—required for that particular test. The order of presentation of the languages and the presentation of the tests was counterbalanced across participants. The approximate time required to complete all tasks was 45 min for monolinguals and 75 min for bilinguals.

Results

Table 2 presents the means and standard deviations for each language test in Spanish and English for Spanish and English monolinguals and for bilinguals. ANOVAs demonstrated significant differences only in the total semantic fluency test scores. The bilingual group produced significantly fewer Spanish words within the fruit category and significantly fewer English words within both animal and fruit categories. The bilinguals' generation of words within phonemic categories was almost identical in number to both the Spanish and English monolinguals.

Table 3 shows the means and standard deviations obtained by the bilingual group in the Spanish and Eng-

Table 2. *Means, Standard Deviations,* t *Test and* p *Values for Each Language Test in Spanish and English for the Spanish and English Monolinguals and the Bilinguals*

	Spanish Test						English Test					
	Bilingual[a]		Monolingual[b]				Bilingual[c]		Monolingual[d]			
Measure	***M***	***SD***	***M***	***SD***	***F***	***p***	***M***	***SD***	***M***	***SD***	***F***	***p***
Fluency												
Animals	14.5	3.8	16.7	3.8	3.04	.090	14.2	4.1	16.8	5.2	4.06	.048
Fruits	11.3	3.6	14.8	3.8	8.29	.007	11.6	3.2	13.7	3.6	4.86	.031
Total	26.4	7.6	31.7	7.2	4.23	.048	26.0	6.1	30.5	7.9	4.89	.030
F	11.3	4.3	11.7	4.1	0.10	.745	12.5	5.0	12.9	5.4	0.09	.756
A	12.3	4.6	11.8	4.6	0.10	.753	10.7	5.4	10.7	5.1	0.00	.969
S	11.6	5.4	11.4	3.8	0.02	.875	12.4	3.9	13.8	5.4	1.03	.312
Total	35.2	13.8	34.9	11.2	0.00	.949	34.9	13.8	37.7	15.2	0.46	.496
Repetition	11.2	2.3	10.2	1.4	2.46	.126	10.7	3.1	12.0	2.1	3.63	.061
Plate # 1 (BDAE)												
Total # of Words	65.0	32.1	61.6	46.0	0.06	.796	77.4	45.9	83.7	48.6	0.22	.634
Nouns	16.3	7.8	16.0	11.1	0.01	.909	23.0	14.6	28.3	16.3	1.48	.221
Verbs	15.6	7.3	15.8	11.2	0.00	.937	19.2	10.1	21.5	12.7	0.48	.488
BNT	52.9	6.1	51.1	4.1	1.08	.306	52.4	7.1	54.9	4.8	2.85	.096

Note: BDAE = Boston Diagnostic Aphasia Examination (Goodglass & Kaplan, 1983); BNT = Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1983a).
[a]$n = 19$. [b]$n = 18$. [c]$n = 19$. [d]$n = 45$.

Table 3. *Means, Standard Deviations,* t *Test and* p *Values for Each Language Test in Spanish and English for the Bilingual Sample*

	Spanish		English			
Measure	***M***	***SD***	***M***	***SD***	***t***	***p***
Fluency						
Animals	14.5	3.8	14.2	4.1	0.46	.645
Fruits	11.3	3.6	11.6	3.2	0.28	.777
Total Semantic	26.4	7.6	26.0	6.1	0.70	.491
F	11.3	4.3	12.5	5.0	1.47	.157
A	12.3	4.6	10.7	5.4	1.48	.155
S	11.6	5.4	12.4	3.9	0.72	.480
Total Phonemic	35.2	13.8	34.9	13.8	0.23	.821
Repetition (MAE)	11.2	2.3	10.7	3.1	0.64	.530
Plate # 1 (BDAE)						
Total # of Words	65.0	32.1	77.4	45.9	2.16	.044
Nouns	16.3	7.8	23.0	14.6	3.35	.003
Verbs	15.6	7.3	19.2	10.1	2.72	.014
BNT	52.9	6.1	52.4	7.1	0.35	.728

Note: $n = 19$. MAE = Multilingual Aphasia Examination (Benton & Hamsher, 1989; Rey & Benton, 1991); BDAE = Boston Diagnostic Aphasia Examination (Goodglass & Kaplan, 1983); BNT = Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1983a).

lish tests. Test performance in Spanish and English within the bilingual group was very similar. Paired *t*-test results revealed a significant difference only in the number of words produced in the description of *The Cookie Theft* plate. The bilingual group produced a higher number of words when using English. This difference was significant also for the number of verbs and nouns.

The bilingual group was subdivided in two subgroups: those who acquired English at or before age 12 (before-12 group) and those who acquired English after age 12 (after-12 group). Age 12 was selected to divide the two groups following Scovel's (1988) proposal that, in puberty, there is a critical period for the acquisition of L2 pronunciation. The effects of the age of acquisition of the L2 (English) on test performance

were analyzed. A 2 × 2 repeated measures ANOVA was used; the between-subject factor was the language (Spanish and English) in which the test was taken. The means, standard deviations, main effects, and interactions by group are displayed in Table 4.

The main effect of the age of acquisition was not significant for any of the language measurements. The main effect of the language factor (using Spanish or English) and the interaction (Language × Age) were significant for the repetition subtest. Before-12 participants performed significantly better in the English repetition test than the after-12 participants did. The after-12 group did significantly better in the Spanish condition of this subtest. Significant interactions without significant main effects were observed in the spontaneous description of the plate and in the BNT. The before-12 group had significantly higher scores on the English version of these two tests.

Discussion

Results from this study show that bilingualism is a significant variable in the performance of semantic verbal fluency tests. It was not, however, a significant variable in the performance of phonemic verbal fluency tests or in free spontaneous fluency tests. Repetition of sentences was also not affected by the bilingual variable.

The influence of bilingualism on the performance of the verbal fluency tests in elderly participants has been previously analyzed. Obler et al. (1986) compared the performance of 11 elderly bilinguals and 32 monolinguals in two tasks of word generation. Animal list generation and word lists that began with the letters *F, A,* and *S* were used. They found, as we did, that the differences emerged only in the animal word generation, but their results were in the opposite direction. Their bilingual sample outperformed their monolingual group. The mean scores of Obler et al.'s sample in the animal word-list generation for bilinguals and monolinguals were 21.4 and 19.2 respectively (no standard deviations were given). These scores are above the 75th percentile according to Spreen and Strauss's (1998) norms. In our study, bilingual and monolingual mean scores were 14.2 and 16.8, respectively. These raw scores correspond roughly to the 25th percentile. It seems that Obler et al.'s sample had exceptional linguistic characteristics and may not have been a representative sample of the bilingual population. Another disadvantage of Obler et al.'s study was the small bilingual sample size and the poor definition of the linguistic characteristics of their bilingual group.

Roberts and Le Dorze (1997) studied verbal fluency in forty 26- to 77-year-old French–English balanced bilinguals. They analyzed the degree of similarity between verbal fluency responses in each language. The semantic categories used were animals and foods. There was no language effect on the number of correct responses across language tests. In animal recall, bilingual participants recalled more subcategory names in French than in English, which suggested to the authors a richer associative network in French. Some semantic fields may have a similar type or degree of semantic organization across languages, whereas others may differ between languages even in people who learned both languages in childhood. Similar to Roberts and Le Dorze, we did not find an effect of the language used in

Table 4. *2 × 2 Analyses of Variance: Means, Standard Deviations, and Effects of Age of Acquisition of English (Before and After Age 12) on the Spanish and English Test Performance Scores*

	Age of Acquisition													
	Before 12[a]				After 12[b]									
	Spanish		English		Spanish		English		Age Effect		Language Effect		Interaction	
Test	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	*F*	*p*	*F*	*p*
Semantic Fluency	23.0	6.1	24.8	3.7	30.2	6.3	26.8	7.5	3.54	.077	0.21	.646	2.70	.119
Phonemic Fluency	33.8	15.5	39.4	6.9	34.7	15.1	31.7	16.9	0.29	.597	0.24	.629	2.61	.124
Repetition	9.5	2.1	11.8	3.1	12.5	1.6	10.0	3.2	0.31	.583	0.03	.846	20.69	.001
Spontaneous Speech	70.1	30.7	96.4	48.7	71.3	34.0	63.6	40.5	1.45	.254	7.49	.014	5.22	.035
BNT	53.0	7.0	56.6	3.8	52.9	5.7	49.4	7.5	1.98	.177	0.00	.976	7.76	.013

Note: BNT = Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1983a).
[a]$n = 8$. [b]$n = 11$.

the number of correct responses in the verbal fluency semantic tests. Bilinguals performed similarly in English and Spanish when recalling animals or fruits. However, our bilingual participants' scores were lower than the scores of Spanish and English monolinguals. This decrease in the bilingual scores was observed in the semantic condition but not for the generation of words within a phonemic category. There are at least two possible explanations for this pattern of results.

First, the nature of the task may influence the generation of words. Semantic verbal fluency only includes the recall of concrete nouns, whereas phonemic fluency does not. Concrete nouns may share more elements of their representations across languages than nonconcrete words (De Groot, 1992). The semantic fluency tasks may, therefore, promote more language interference.

Second, each task may produce a differential state of language activation. According to Grosjean (1998), a bilingual's state of activation with respect to his or her two languages can influence test performance. This state of activation is controlled by factors such as with whom the bilingual is speaking or to whom he or she is listening, the situation, or the topic. When the listener is a bilingual, both languages are activated and mixing of the two languages will take place. The bilingual will show interference when he or she is speaking to another bilingual who does not wish to speak the other language. In this study, bilinguals were required to use English or Spanish depending on the specific test administered. However, the participant knew that the evaluator was a bilingual and that the study was about bilingualism. It may be that the bilingual participant was in a bilingual mode and the two languages were activated over the whole testing session, causing interference. Also, our results suggest that more interference takes place when there is a semantic search than when the bilingual is searching for a word based on phonemic properties.

In neuropsychological assessment, semantic fluency and phonemic fluency tests are done to look for the ability to generate words. The semantic verbal fluency usually correlates with lexical knowledge, whereas the phonemic verbal fluency correlates more with executive function tasks. Our results suggest that different language processes are tapped when using these two tasks. Different brain areas are activated with each of these tasks. PET studies have demonstrated that the frontal lobe is activated in phonemic generation, whereas the temporal lobe is more active in the semantic generation of words (Warburton et al., 1996). The better explanation for our discrepancy in the two verbal fluency tests is that these two tasks required different language processes that produced different language activation in older bilinguals.

Our results support neither a general detrimental nor enhancement view of the effect of bilingualism on language test performance in older adults. We found an effect of bilingualism only on the recall of words within a semantic category. The tests that were administered were neuropsychological tests commonly used in clinical practice. We found that Hispanic participants who learned English as an L2 during childhood or early adulthood and who maintained use of both languages on a daily basis did not suffer a linguistic decline in either language.

Our results also showed that the age of acquisition of the L2 did interact with the language in which the tests were given for the repetition and naming tests and for the number of words in the free spontaneous fluency test. Earlier learners of English as an L2 performed significantly higher in the English versions of these tests.

A limitation of this study was the small sample size. However, the limited collection of the sample was due to the difficulty in finding fluent elderly bilingual individuals that met the criteria of bilingualism. A second limitation refers to the generalizabilty of the results. The definition of bilingualism and multilinguism is very difficult to determine due to the great variability that can be found in the mastery of an L2 (Ardila, 1998). Bilinguals are rarely equally fluent in all language skills in both their languages. The characteristics of bilinguals are influenced by the complementarity principle: Bilinguals usually acquire and use their languages for different purposes, in different domains in life, and with different people (Grosjean, 1998). We cannot state that our bilingual group was a balanced bilingual group because they were not exposed to the two languages simultaneously. They did, however, score similarly in the Spanish and English versions of the neuropsychological tests. All bilingual participants used both languages on a daily basis. De Groot (1995) suggested that recent use of a language affects one's lexical representations. None of our participants were learners of English at the moment of the evaluation. In fact, they had been using English an average of 18 years, but most of them used Spanish with relatives and both languages with friends.

Some problems may be raised by the use of the letters *F, A,* and *S.* The *H* in Spanish is silent and many words that start with *H* are pronounced /a/. Accordingly, words that start with *C* or *Z* are pronounced /s/. So the knowledge of orthography may affect test performance (Ardila et al., 1994). The use of the letters *F, A,* and *S* to test Spanish speakers is not optimal. In

our research, however, we wanted to use the same letters in both Spanish and English to maintain consistency of stimuli. We controlled for the possible orthographic effect by using a matched Spanish monolingual sample.

In conclusion, the results of this study suggest that elderly bilinguals who learned an L2 during childhood or early adulthood and used both languages for more than 10 years generally performed at the same level as monolinguals on neuropsychological tests. Bilingualism does not influence performance on free spontaneous fluency tasks, generation of words by phonemic categories, and repetition tests. Specific norms for elderly bilingual participants for semantic fluency tests should be developed. Future research using larger aging bilingual samples is required to better understand the influence of bilingualism in the cognitive changes that take place with age.

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