Adaptation and Norming of the Boston Naming Test for Spanish-Speaking Older Adults in the United States

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OBJECTIVE

- To compare classification accuracy of the extant Boston Naming test- 2nd edition (BNT) norms, provide normative data for a sample of primarily Spanish-speaking older adults, and present alternate linguistic responses.

BACKGROUND

- The BNT is the most commonly used neuropsychological tool for the assessment of confrontal naming skills in individuals with language disturbances caused by stroke, Alzheimer's disease, or other dementing disorders.

- Although several linguistic translations and scoring modifications have been proposed, many do not include alternate responses with corresponding normative data appropriate for Spanish-speaking older adults in the U.S. for the complete 60 items.

- Thus, an alternate word(s) list (which included lexical variations of words representative of various Latin American countries) was created in the present study.

- Inclusion of various sources including the dictionary of the Real Academia Espanola, psycholinguists, and online sources were utilized to create this list.

METHODS

Participants & Procedures

- One hundred and fifty-three, primarily Spanish speaking, cognitively intact community volunteers, living in the US (See Table 1).

- Ages: 50-80; from 15 different Spanish-speaking countries.

- Groups were stratified by level of education:
  - Basic Education (BE) = 6-12 years; College Education (CE) = 13+ years.

- Participants completed all items on the BNT as part of a comprehensive neuropsychological norming study.

Table 1. Demographics – Means and Percentages

	Total Sample (N=153)		Basic Education (N=73)		College Education (N=80)	
	Mean	SD	Mean	SD	Mean	SD
Age	61.48	7.51	61.47	7.76	61.50	7.40
Years in the US*	19.47	12.82	23.52	12.43	16.12	12.24
Acculturation (Marin Acculturation Scale)						
Language*	6.19	1.86	5.86	1.51	6.50	2.10
Media	5.67	2.24	5.34	2.20	5.99	2.25
Ethnic	8.43	2.22	8.11	2.41	8.72	1.99
Total*	20.28	4.99	19.31	4.44	21.18	5.32
	N	%	N	%	N	%
Gender						
Male	59	38.6	27	37	32	40
Female	94	61.4	46	63	48	60
Handedness						
Right	139	90.8	68	93.2	71	88.8
Left	10	6.5	5	6.8	5	6.2
Ambidextrous	4	2.6	0	0	4	5.0
Country of Origin						
Mexico	63	41.2	37	50.7	26	32.5
South America	51	33.3	23	31.5	28	35
Central America	33	21.6	13	1.8	20	25
Caribbean	6	3.9	0	0	6	7.5

*p<.05

METHODS Cont'd.

- Protocols were scored via two methods. First, based on published words, second utilizing the alternate word list developed from the present study.

Statistical Analyses

- Chi-square analyses and independent samples t-tests.

RESULTS

Demographics

- No significant differences were found on demographic characteristics with the exception of years of US residency and level of acculturation. The BE group had longer residency in the US and the CE group language variable (Marin Acculturation Scale) evidenced greater variability.

Classification Accuracy

- Chi-square analyses revealed significant differences in classification accuracy between published BNT norms and corrected BNT norms (i.e., words that were scored utilizing the alternate word(s) list from this study) $(x^2 = 243.76, p<.001)$.

- Utilizing the alternate word list decreased the frequency of deficient and borderline scores.

Table 2. Classification Accuracy

	% of Individuals Classified Based on Existing Norms	% of Individuals Classified Based On Corrected Classification
Deficient (T <29)***	25.5	20.3
Borderline (T=30-35)***	38.6	35.3
Low Average (T=36-43)***	30.7	37.3
Average (T=44-56) ***	5.2	7.2
High Average (T=57-62)	0	0

**p<.001

BNT Corrected Norms

- Age, education and years residing in the US were entered into a regression equation to examine possible outcome predictors.

- Regression analysis indicated that age and education were significant predictors of BNT performance (total scores using alternate word list $(F_{3,135} = 9.43, p < 0.001)$ (Age $\beta = -.21$, $p = 0.001$; Education $\beta = .372$, $p < 0.001$; Years in US $\beta = .042$, $p = .618$).

- Thus, normative data were stratified by age (three groups:50-59, 60-69, & 70-80 years) and by level of education (two groups: BE & CE).

- Significant differences between BE and CE in the 50-59 year old group and 70-80 year old group were found. A trend for the 60-69 year old group was identified (p=0.059).

Table 3. BNT Corrected Norms Stratified by Age and Level of Education

	N	Mean	SD
50-59 Years Old**			
BE	32	42.72	5.71
CE	35	46.46	5.31
60-69 Years Old*			
BE	31	42.10	5.67
CE	35	44.83	5.83
70-80 Years Old**			
BE	10	32.70	9.15
CE	10	44.10	5.74

* p=.059; **p<.01

Alternate Linguistic Responses

- The Following list includes alternate words that were provided by the study's participants. From the original list of provided responses, the alternate word(s) list was formulated based on verification obtained from the previously mentioned sources.

Table 4. List of Published and Alternate Words for the BNT

Published Word(s)	Alternate Word(s)
Casa	Mansion
Peine	Peinilla
Serrucho/ Sierra	Serrote
Camello	Dromedario
Galleta Salada	Pan/ Pan dulce/ Pan de sal/ Pretzel
Caballito de mar/ Hipocampo	Caballo marino
Canoa/ Piragua	Chalupa/ Bote/ Balsa
Globo/ Globo terraqueo	Mapamundi/ Mundo
Armonica/ Rondin/ Dulsaina	Musica de boca
Iglu	Casa (casita) de perro^
Escalera mecanica	Escaleras electricas/ Gradas electricas
Hamaca	Chinchorro
Aldaba/ Cerrojo/ Cerradura/ Pasador/ Llamador	Golpeador/ Tocador/ Aldabon
Pestillo/ Picaporte/ Aldaba/ Cerrojo	Cerrojo/ Pasador/ Cerradura
Espaldera/ Guia/ Enrejado/ Espaldera de jardin	Enredadera

^ While previous research suggests that indigenous people from Central and South America identify this word as an "oven," none of the participants from the present study reported this word, thus it was not considered as an alternate word.

CONCLUSIONS

- Findings revealed differences in classification accuracy between previously published BNT words and the newly presented alternate word(s). The alternate word(s) utilized during the present study decreased the frequency of deficient and borderline scores in this sample of cognitively intact community volunteers.

- Preliminary normative data stratified by age and education using the presented alternate words is provided. Future analysis will examine a regression approach for normative values.

- Consideration of proposed alternate words, as well as the normative data presented, may serve to improve classification accuracy on the BNT performance for primarily Spanish-speaking older adults.

- Future research will present results of an item analysis for the 60-items of the BNT.