



INTRODUCTION

There is a pressing need for psychometrically sound naming materials for Polish/English bilingual adults with aphasia, especially locally in the Chicagoland area. SLPs face the challenge of assessing and developing treatment for bilinguals with aphasia with limited consensus for protocol in the literature.

Recent surveys revealed majority of SLPs working with adults in the United States felt their academic and clinical training left them adequately prepared for assessment and treatment of bilingual aphasic clients (Centeno, 2009).

When looking at Polish language speakers in the United States (US), the 2010 Census reports at least 608,333 Polish speakers living in the US and 179,243 of those speakers reside in Illinois (Data Access and Dissemination Systems, 2010).

To address this, the study was designed to examine the linguistic needs and considerations for administering **The Boston Aphasia Naming Test** and provides normative data of bilingual English/Polish adults.

The Boston Aphasia Naming Test

The BNT consists of 60 color pictures representing items and is divided into seven categories: objects of daily use, tools and machines, body parts, items of clothing, animals, fruits, plants. This is an important part of the assessment, designed to assess visual confrontation naming abilities in adults. Clinicians use test confrontation naming in order to investigate anomic features of individuals with aphasia.

PURPOSE & Goals

1. examine the performance of bilingual Polish-English adults, both with and without aphasia, on the Boston Naming Test (BNT) in English
2. Develop and examine their performance on a Polish adaptation of the BNT
3. Compare participants' performance in English and Polish
4. examine the utility of cross-linguistic scoring modifications on both versions of the BNT.

Participants

1. Participants included 22 bilingual Polish-English adults between the ages of 20 and 72 (14 female and 8 male).
2. Participants were eligible for inclusion if they spoke and understood Polish and English
3. Participants were asked to complete language input and output charts of their language use
 - This was done in order to calculate language proficiency and determine the most appropriate dominance category to assign each participant for statistical analysis (Peña et al., 2013)
4. Participants were found to be either functionally English monolingual (1), bilingual English dominant (5), balanced bilingual (5), bilingual Polish dominant (6), and or functionally Polish monolingual (1).
 - Monolingual bilingual participants were not included in statistical analyses.
5. Two participants with a prior medical history of cerebrovascular accident were also included in order to allow for preliminary analysis of performance as compared to the larger sample without impairment.

METHODS

Measures

The participants completed The Boston Naming Test (BNT; (Kaplan et al. 1983) in both Polish and English. For the two participants with histories of cerebrovascular infarcts, both semantic and phonemic cues for the respective language were provided if a participant failed to name the item correctly. A record was made of also participants' incorrect responses, non-verbal behavior, and language utilized.

RESULTS

A Polish adaptation of the BNT was created as a byproduct of this study in order to provide a tool and resource indented for clinicians who are evaluating naming in Polish bilingual patients.

Based on the data collected during the Polish administrations of the BNT, the adaptation was produced by analyzing percent correct scores of individual items. The items were organized by percent correct values in perceived difficulty level. The higher the percent correct value, the more participants responded correctly, the less difficult that item is to name by Polish bilinguals.

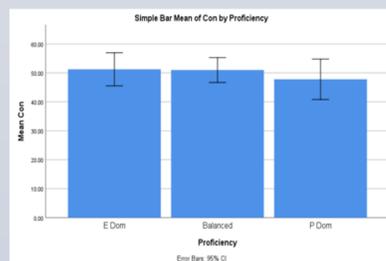
Statistics Analysis

A one-way between subjects ANOVA was conducted to compare the effect of proficiency level (English dominant, balanced, Polish dominant) on the total English scores when administering the BNT. Functionally monolingual speakers were excluded due to insufficient group size. There was a significant effect of between the groups at the $p < .05$ level for the three conditions [$F(2,11) = 7.353, p = .009$.] Post hoc testing of planned contrast for multiple comparisons between each proficiency level revealed significant results between groups including: English dominant and Polish dominant $p = .003$ as well as the balanced and Polish dominant $p = .032$.

A one-way between subjects ANOVA was also conducted to compare the effect of proficiency level (English dominant, balanced, Polish dominant) on the total Polish scores when administering the BNT. Functionally monolingual speakers were excluded due to insufficient group size. There was a nearly significant effect between the groups at the $p < .05$ level for the three conditions [$F(2,11) = 3.332, p = .074$.] However, post hoc testing of planned contrast for multiple comparisons between each proficiency level revealed significant results between groups including: English dominant ($M = 35.5$) and Polish dominant ($M = 46.00$) $p = .026$.

A between subjects ANOVA was conducted to compare the effect of proficiency level (English dominant, balanced, Polish dominant) on the total conceptual scores (combined English + Polish scores). Functionally monolingual speakers were again excluded due to insufficient group size. There was no significant effect between the groups at the $p < .05$ level for the three conditions [$F(2,11) = 3.332, p = .430$.] Post hoc testing of planned contrast for multiple comparisons between each proficiency level revealed significant results between groups including: English dominant ($M = 51.25$) and Polish dominant ($M = 47.80$) $p = .026$.

The data shows that the average English BNT score drops from $M=49$ in English dominant participants, to $M=42$ in balanced language speakers and finally $M=31$ in Polish dominant participants.



Although this was expected, it does not inherently prove that the test is not accurate. Combined scores increased as many as 16.6 items correct, which also demonstrates that when the BNT is given in its entirety, there is a 27% discrepancy of total language ability.

Figure 1 shows that when comparing all the scores, Polish dominant bilinguals displayed comparable skills to dominant English users and balanced bilinguals, which in turn supports the notion that combined scoring provides clinicians with more representative assessment of participants' abilities.

BNT Item	Polish % Correct
bed	100.00%
tree	100.00%
pencil	100.00%
house	100.00%
scissors	100.00%
flower	100.00%
toothbrush	100.00%
mushroom	100.00%
comb	93.75%
saw	93.75%
helicopter	93.75%
mask	93.75%
whistle	87.50%
broom	87.50%
hanger	87.50%
bench	87.50%
boat	87.50%
igloo	87.50%
cactus	87.50%
pyramid	87.50%
funnel	87.50%
octopus	81.25%
wheelchair	81.25%
volcano	81.25%
wreath	81.25%
acorn	81.25%
dominoes	81.25%
hammock	81.25%
accordion	81.25%
tennis racket	75.00%
snail	75.00%
seahorse	68.75%
harmonica	68.75%
asparagus	68.75%
pretzel	62.50%
dart	62.50%
abacus	62.50%
camel	56.25%
globe	56.25%
escalator	56.25%
tongs	56.25%
beaver	50.00%
pelican	50.00%
rhinoceros	43.75%
latch	43.75%
sphinx	43.75%
trellis	43.75%
harp	37.50%
stethoscope	37.50%
palette	37.50%
noose	31.25%
compass	31.25%
easel	31.25%
protractor	31.25%
muzzle	25.00%
stilts	18.75%
unicorn	18.75%
yoke	18.75%
knocker	6.25%
scroll	6.25%

CONCLUSIONS

This study was also able to provide information about test psychometrics. The design of the test is found to be inadequate for Polish speakers as the difficulty is not matched. This is addressed in a percent correct chart and indicates a preferred organizational structure to reflect difficulty. Future studies should focus on completing a study to test the validity for this new organization by administering it to different bilingual groups. Items such as *unicorn* are not culturally relevant for Polish speakers as their folk tales or child pop culture do not contain images of many mythical creatures. As anticipated, accuracy was low on that item

Discussion

One of the challenging aspects of this study was judging correctness of the varying synonyms for Polish item due to the richness of the Polish language. For example, (item 12) *szczotka* vs *miotła*, (item 19) *kondorek* vs *pretzel*, *rogalik*, *paluszek*, (item 25) *szczala* vs *lotka*, (item 29) *bóbr* vs *wydra*, (item 37) *schody automatyczne* vs *ruchome*, (item 40) *ręczny dzwonek* vs *kolatka*, (item 42) *sluchawki do serca* vs *sluchawki lekarskie*, (item 53) *pergamini* vs *papirus*, (item 54) *chwyty* vs *szczypce*, (item 58) *zestaw do malowania* vs *paleta kolorów*, (item 59) *kątomierz* vs *ekierka* and (item 60) *liczydło* vs *licznik*. These synonyms were all considered correct versions whether they were identified as correct by researchers during the preliminary phases of administration or redefined as correct after reviewing recorded data.

An additional observation that the data presented was consistent use of diminutive forms of words in Polish. This additive property to words should not impede comprehension for clinicians and interpreters; however, these are less common in English and not traditionally accepted and particularly can be seen as disordered if used too frequently.

Clinical implications

The results of this study can aid clinicians by bringing awareness to practice of considering proficiency prior to conducting naming assessments in order to properly analyze results and make decisions about naming abilities. As discussed, Due to the limited research in this area, clinicians may refer to this study to consider combined scoring for both balanced English Polish and Polish dominant bilinguals. Clinicians may also individual items used in the BNT and assess the probability of their correctness as compared to Polish dominant speakers.

Further research should also contain a differential item functioning (DIF) analysis within what is called item response theory (IRT). This is a "modern approach" for evaluating the psychometric properties of assessment instruments and generate new instruments that are more sound by estimating naming difficulty by addressing assessing responses based on discrimination, difficulty, and guessing (Jahn, Mauer, Menon, Edwards, Dressel, & O'Bryant, 2013).

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