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The Influence of Ethnicity on Language Tests: A comparison between Balinese and Banjarese

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Abstract

Indonesia, characterized by a large population with a large variety of ethnic groups speaking their languages, is challenging for a fair assessment of all ethnic groups. This study aims to analyze whether an ethnic factor affects the performance of three commonly used and for Indonesia-adapted language tests, namely the Boston Naming Test, the Token Test, and the Verbal Fluency Test, through a comparison of two ethnic groups, Banjarese (N=52) and Balinese (N=95). Participants aged 16 to over 60, 64.2% females and education levels from elementary to postgraduate participated in the study. The assessment was done in Bahasa, Indonesia. Ethnic differences were analyzed by ANCOVA's with age, education, sex, and language(s) spoken as cofactors. The Banjarese group performed better on the number of spontaneously generated words in the BNT, while the Balinese group needed more phonemic and a-phonemic cues. Banjarese showed a higher score than Balinese in BNT total score. The Balinese did better on the Verbal Fluency Test, while there was no difference between the two ethnic groups on the Token test. The preliminary results indicate that ethnic factors need to be considered in interpreting the test results of the two groups. This may have consequences for the normative data of these tests, which might be corrected. Larger and more groups need to be included in this comparison to do justice to the neuropsychological assessment of the wide variety of Indonesia's inhabitants.

Keywords: Ethnic, neuropsychology, language, test, Indonesia

Introduction

Indonesia, as a multiethnic country, has more than 300 distinct ethnic groups; the most numerous are the Javanese (over 40%) and Sundanese (15.5%), followed by Batak (3.58%), Madurese (3.03%), Chinese (3%), Betawi (2.88%), Minangkabau (2.73%), Malay (2.27%), Bantenese (1.97%), Banjarese (1.74%), Balinese (1.67%), Makassarese (1.13%), and many other smaller groups (Ananta, Arifin, Hasbullah, Handayani, & Pramono, 2015; World Population Review, 2022). The wide variety of ethnic groups was a significant issue in forming national identity via acculturation and assimilation of various ethnic groups. Multiculturalism is also essential to interactions between Indonesian population groups (Suryani et al., 2019). Each ethnic group has its characteristics that can be seen, e.g. language and dialect.

Ethnicity can be defined as the characterization of a group that has a history, a common ancestry, and cultural characteristics, including language, values, music, fashion, and so on (Cockley, 2007); in Indonesia, this points to a community living in a particular region of Indonesia and speaking a particular language (Goebel, 2013). Research on inter-ethnicity in Indonesia has previously been carried out on ethnic identity, multiculturalism, social distance, and Indonesian national identity between Chinese and non-Chinese ethnicities. In the latter study, especially Batakese, Minangkaunese, Chinese, Javanese, and Balinese ethnicities were compared (Suryani et al., 2019).

Ethnicity is also considered a factor in cross-cultural neuropsychological assessment (Ardila, 2005; Mushquash & Bova, 2007; Ostrosky-Solís, Ramirez, & Ardila, 2004; Fletcher-Janzen, Strickland, Reynolds, 2000). Cross-cultural neuropsychology analyzes the influence of cultural variables on cognition from a neuropsychological perspective. In the last twenty years, there has been a growing awareness that many worldwide used neuro-psychological tests have a Westernized origin, that these tests are certainly not culture-free, and that normative data from non-Western countries are lacking. All this is disadvantageous for non-Western, non-Caucasian persons living in non-individualistic societies and cultures. Other cross-cultural studies investigate differences in the brain organization affecting cognition and how the brain's pathology manifests itself in different cultural contexts (Ardila, 2020). Cross-cultural differences, including language differences, can cause various problems, such as when a test is carried out on individuals who speak daily and at home a language that is different from the language in which the assessment is done.

In addition, bias in cross-culture assessment can also occur where the differences produced by participants are not due to capacity but are the result of differences in the familiarity with test stimuli, differences in administrative procedures, and other factors shown between cultural groups (van de Vijver & Tanzer, 2004). The Boston Naming Test (BNT) is an example of a test developed in a particular cultural context and can be culturally and linguistically biased (Ardila, 2007). One of the steps that can be taken to minimize intercultural bias in assessment is by adapting pre-existing instruments so that they can be used in certain groups (Fernandez et al., 2017), especially in the Indonesian population, such as research on normative data on BNT-Indonesia (Sulastri et al., 2019) and the adaptation of the Token Test in Bahasa Indonesian (Jap & Arumsari, 2017).

Variables that affect language tests, such as age, sex, and education (Snitz, 2009; Maseda et al., 2014; Rodríguez-Lorenzana et al., 2020; Nogueira, Reis, Vieira, 2016; Peña-Casanova et al., 2009) have been widely investigated, but research towards the influence of ethnicity on language test scores is still limited. Previous studies conducted on White, Black, and Hispanic groups showed no significant differences in F-A-S Phonemic Verbal Fluency Test and animal names (AN) word fluency scores, meaning that there was no pattern of differences in performance on measurements between these groups (Johnson-Selfridge, Zalewski, Aboudarham, 1998). Other studies involving African American, White, Chinese, Hispanic, and Vietnamese ethnicities made show differences, where Vietnamese scored highest and Hispanics scored lowest on the verbal fluency task after controlling for age and education (Kempler et al., 1998). Another inter-ethnic/racial group difference was found on the BNT: Caucasian adults scored higher than African Americans (Pedraza et al., 2009), and this was confirmed on the AN fluency and Token Test (Snitz et al., 2009). Likewise, ethnic differences were revealed for the BNT: the scores were lower for black compared to white people with aphasia after controlling for age, education, and duration of treatment (Ellis & Peach, 2016).

The results of these studies indicate that people from different cultural backgrounds may perform differently on the three language tests in Indonesia's adapted Neuropsychological test battery (Wahyuningrum et al., 2021). Here, we report the data of a preliminary study in which two Indonesian ethnic groups, Balinese and Banjarese, each speaking a different language, were compared on three language tests. In case of differences are found, this may have consequences for the interpretation of the test scores assuming that other demographic factors are equal, that both ethnic groups need their normative scores.

Methods

Participants

In total, 147 participants were included in this study (M_{age}=38.73, SD_{age}=14.847), 64.2% (95) were females. The data originated from our database (Wahyuningrum et al., 2021). Age was divided into six groups consisted of 16-19 years (n=11), 20-29 years (n=38), 30-39 years (n=30), 40-49 years (n=29), 50-59 years (n=26), and >60 years (n=13). Years of education were divided into five categories based on the Indonesian education system: 0-6 years of

education (elementary school; n=10), 7-9 years of education (junior high school; n=7), 10-12 years of education (senior high school; n=59), 13-16 years of education (at least undergraduate; n=66), and > 17 years of education (graduate or postgraduate; n=5). Ethnicity was identified by the mother's ethnicity and the father's ethnicity. 52 Banjarese (35.1%) and 95 Balinese (64.2%) were included in this study. Banjarese was coded as G1 and Balinese as G2.

Table 1. Demographic data (N=147)

	n	(%)
Sex		
Female	95	64.2
Male	52	35.1
Age		
16-19	11	7.4
20-29	38	25.7
30-39	30	20.3
40-49	29	19.6
50-59	26	17.6
> 60	13	8.8
Years of Education		
0-6	10	6.8
7-9	7	4.7
10-12	59	39.9
13-16	66	44.6
> 17	5	3.4
Ethnicity		
Banjarese (G1)	52	35.1
Balinese (G2)	95	64.2

Measurements

All three tests were part of the Indonesian Neuropsychological Test Battery (INTB). All subjects did ten cognitive tests, and the language used for all participants was Bahasa Indonesia. BNT measures naming ability using black and white pictorial stimuli. BNT consists of 60 pictorial stimuli (Lezak, Howieson, Bigler, & Tranel, 2012). The Indonesian adapted version of the BNT (I-BNT) was used in this study (Sulastri et al., 2019). The BNT has been translated into at least five languages, and these translations have retained the original high reliability and validity (Ferraro and Lowell, 2010). Therefore, we assume this is also the case for the I-BNT; the test-retest reliability of the I-BNT is currently investigated and turns out to be > .85 for the total number of correct items (Wahyuningrum et al., 2022). The test administrator asked participants to name all pictorial stimuli in the I-BNT. In the first trial, participants were asked to name the stimuli spontaneously. Test administrators gave an a-phonemic cue if the participants did not name the stimuli correctly or did not respond within 20 seconds again. Secondly, participants were asked to respond in 20 seconds after a-phonemic cues were given. Lastly, if the participants did not name the stimuli correctly or did not respond 20 seconds again after an a-phonemic cue was given, test administrators gave a phonemic cue. Responses from the participants were recorded and listed on the answer sheet. The target words in the I-BNT are words in Bahasa Indonesia.

Token Test (TT) measured verbal comprehension ability (Lezak et al., 2012). TT consisted of six parts (A, B, C, D, E, and F). The instructions for each part were ordered from simple to complex tasks. The test administrators read the instructions. Only the instructions for parts A and B can be repeated. The test-retest reliability, as is currently established by us, was higher than .80 for the number of errors made (Wahyuningrum et al., 2022)

The phonemic Verbal Fluency Test (pVFT) is a language capacity test measuring word production ability (Lezak et al., 2012). The pVFT measures, besides access to one's lexicon, also an individual's ability to think flexibly and switch and monitor responses (Lezak et al., 2012). These latter features are considered to belong to the domain of executive functions. Test administrators asked participants to produce words starting with letters S, K, and T as many as possible within one minute for each letter. Words in Bahasa Indonesia, *slang* and local languages were considered correct answers. The test-retest reliability of the three subscales was .67, .59, and .65, respectively (Wahyuningrum et al., 2022).

Data Analysis

Two four-way MANOVAs were used to compare the effect sizes of ethnicity, age, education, and daily language, either daily language spoken in the public or daily language is spoken at home, on the score of language tests. Following that, Analysis of Covariances (ANCOVA) was used to examine the effect of ethnicity on the score of language tests while controlling for the significant demographic factors by using them as covariate variables. The p-values used in this study were p<.05 to represent a significant difference.

Results and Discussion

The first MANOVA examined the effects of ethnicity, age, education, and daily language spoken at home on language test performances. The result of the MANOVA showed that language test score differed according to ethnicity [F (1,134) =3.881, p<.01, $\acute{\eta}^2$=.343)], age [F (5,134) =1.308, p<.05, $\acute{\eta}^2$=.145)], and education [F (4,134) = 2.027, p<.01, $\acute{\eta}^2$=.210)]. Daily language spoken at home did not affect the performances on language tests [F (2,134) =.767, p=.814, $\acute{\eta}^2$=.093)]. The second MANOVA examined the effects of ethnicity, age, education, and daily language spoken in public on language test performances. The result of the MANOVA showed that language test score differed according to ethnicity [F (1,134) =4.369, p<.01, $\acute{\eta}^2$=.372)], age [F (5, 134) =1.326, p<.05, $\acute{\eta}^2$=.148)], and education [F (4, 134) =2.007, p<.01, $\acute{\eta}^2$=.210)]. Daily language spoken in public did not affect the performance on language tests [F (3,134) =1.376, p=.057, $\acute{\eta}^2$=.155)]. The results obtained are in line with previous findings where naming ability is related to the level of education and age, where the elderly group shows the lowest ability to find names (Tsang & Lee, 2003; Mackay, Connor, Albert, & Obler, 2002)

Considering the effect of age and education on ethnicity on language test scores, these significant demographic variables were included as covariate variables while determining the effect of ethnicity on language test scores. The result of ANCOVA showed there were significant language score differences according to ethnicity [F (1,143) =4.911, p<.01, $\acute{\eta}^2$=.380)] while controlling age and education as covariate variables. The estimated language test mean score differences according to a group of ethnicity (Balinese and Banjarese) can be seen in Table 2.

Table 2. The influence of ethnicity on language tests while controlling age and education as a covariate variable

Language tests	Estimated mean scores (Standard error)		F	p-value	$\acute{\eta}^2$	Group difference
	G1	G2				
Boston Naming Test						
BNT Spontaneous	49.300 (.936)	43.425 (.689)	25.150	.000	.150	G1 > G2[a]
BNT A-phonemic	1.996 (.401)	3.792 (.295)	12.801	.000	.082	G1 < G2[a]
BNT Phonemic	2.238 (.417)	4.775 (.307)	23.649	.000	.142	G1 > G2[a]
BNT Total Score	53.534 (.610)	51.992 (.449)	4.077	.045	.028	G1 > G2[a]
BNT Total Error	6.466 (.610)	8.008 (.449)	4.077	.045	.028	
BNT Total Time	558.204 (39.807)	580.372 (29.302)	.198	.657	.001	
Token Test						
TT Part A	6.996 (.075)	6.879 (.055)	1.126	.291	.008	

Table 2. The influence of ethnicity on language tests while controlling age and education as a covariate variable

Language tests	Estimated mean scores (Standard error)		F	p-value	$ή^2$	Group difference
	G1	G2				
TT Part B	7.838 (.069)	7.941 (.051)	1.440	.232	.010	
TT Part C	11.550 (.080)	11.909 (.059)	12.879	.000	.083	G1 > G2[a]
TT Part D	15.692 (.238)	15.316 (.175)	1.588	.210	.011	
TT Part E	22.502 (.401)	23.420 (.295)	3.339	.070	.023	
TT Part F	81.585 (2.077)	82.617 (1.529)	.157	.692	.001	
TT Total Score	146.163 (2.354)	148.100 (1.732)	.432	.512	.003	
Verbal Fluency Test						
VFT Letter S	10.733 (.616)	12.957 (.453)	8.333	.004	.055	G1 > G2[a]
VFT Letter K	11.778 (.586)	13.416 (.432)	4.989	.027	.034	G1 > G2[a]
VFT Letter T	10.666 (.606)	12.709 (.446)	7.267	.008	.048	G1 > G2[a]
VFT Total Correct	33.176 (1.589)	39.082 (1.170)	8.819	.003	.058	G1 > G2[a]

a: p<.05, G1= Banjarese, G2= Balinese

According to the data and outcomes presented in Table 2, ethnicity influences BNT scores. Banjarese scored higher BNT Spontaneous scores than Balinese (F=25.150, p<.01, $ή^2$=.150). Meanwhile, Balinese needed more a-phonemic (F=12.801, p<.01, $ή^2$=.082) and phonemic cues (F=23.649, p<.01, $ή^2$=.142). The differences in BNT were also found in the total score (F=4.077, p<.05, $ή^2$=.028). These results demonstrate that Banjarese showed more spontaneous responses in naming the pictorial stimuli and that Balinese needed more a-phonemic and phonemic cues to name the pictorial stimuli than Banjarese. The total score indicated that Balinese still performed lower than Banjarese in the BNT test, despite more cues given to the Balinese. The first finding, BNT is sensitive to the language spoken. A previous study from Roberts, Garcia, and Desrochers (2002) confirmed that proficient bilinguals scored lower than unilingual speakers in BNT. However, these findings need to be further investigated by an experimental study comparing the performance of balanced and imbalanced bilinguals.

The data also showed that the Balinese performed better on the pVFT, which regarded all three subscales. Many different factors can cause the different performances between Banjarese and the Balinese. One is the type of language used by individuals at home and in public, the frequency of using either Bahasa or the local language and the proficiency of the languages. Next, cross-tabulation descriptive analyses were used to describe the languages used by Banjarese and Balinese at home and in public, see Table 3 and Table 4.

Table 3. The cross-tabulation for ethnicity and daily spoken language at home

		Ethnicity			
		Banjarese (G1)		Balinese (G2)	
		n	(%)	n	(%)
Language at home	Local language dominant at home	26	50.0%	74	80.4%
	Only Bahasa Indonesia at home	24	46.2%	20	21.7%
	Bahasa Indonesia plus one or two other languages at home	2	3.9%	1	1.1%
Total		52	100%	92	100%

According to Table 3, approximately 80.4% of Balinese speak the local language at home, 21.7% speak only Bahasa Indonesia, and 1.1% speak Bahasa Indonesia plus one or two other languages at home. In comparison: 50% of the Banjarese speak their local language at home, 46.2 % of them speak only Bahasa Indonesia, and 3.9% of Banjarese speak the local language plus one or two other languages at home. These results showed that the local language usage was more dominant in the Balinese sample compared to Banjarese. More than three-quarters of Balinese speak the local language at home. The differences in the usage of Bahasa Indonesia at home between the two ethnic groups may have affected the difference between Banjarese and Balinese in the two language production tests. It is worth noting that further studies on I-BNT should consider the test administration in local languages, especially for individuals who speak the local language dominantly.

Table 4. The cross-tabulation for ethnicity and daily spoken language in public

		Ethnicity			
		Banjarese (G1)		Balinese (G2)	
		n	(%)	n	(%)
Language in public	Local language dominant in public	2	3.85%	10	10.87%
	Only Bahasa Indonesia in public	9	17.31%	11	11.96%
	Bahasa Indonesia plus one or two other languages in public	41	78.85%	74	80.43%
Total		52	100%	92	100%

According to Table 4, Bahasa Indonesia is often used by Banjarese and Balinese in public, as well as in one or two other languages used. More than three-quarters of Banjarese and Balinese speak at least Bahasa Indonesia and other languages. The other languages used by Banjarese and Balinese might be local languages alongside Bahasa Indonesia. However, the frequency of whether local languages or Bahasa Indonesia is spoken in public might be affected by socio-cultural relationships within each ethnic group and differences between ethnic groups. Balinese have language systems embedded in social relationships, whether at home or in public, local language (*Bahasa Bali*) is used as a medium of communication in the society (Machdalena, 2014).

Furthermore, *Bahasa Bali* has a stratum of languages, i.e. high Balinese languages, that show respectful communication. This is commonly used in inter-caste and low Balinese languages commonly used during the daily conversation (Sartini, Arttawa, Sukiada, & Palupi, 2020). These explanations hint at the language behaviour among Balinese in public or at home. *Bahasa Bali* is often used in conversations between the Balinese.

On the other hand, Banjarese tends to speak *Bahasa Banjar* more often among members of the same ethnic group, while Bahasa Indonesia is more often spoken in public, i.e. at school (Augustine, Asi, & Luardini, 2021). A survey from Gunarwan (2021) showed that Banjarese hold a positive attitude toward *Bahasa Banjar,* but Banjarese found it unnecessary to speak Banjarese at home. These results explained that Banjarese more often uses Bahasa Indonesia at home and in public. Our statistical analyses, however, showed that both daily languages spoken in public and spoken at home do not explain sufficient variance (their effects on the language tests were insignificant or just failed to reach significance). On the other hand, the effect size of both factors were .093 and .155, respectively and can be considered moderate (Richardson, 2011) and should not be ignored, and certainly not in case more subjects will be included in future studies aimed at elucidating the complex relationships between the language spoken, either daily at home and in public,

ethnicity, age and education and performances on cognitive tests. The advantage of Balinese above Banjarese in the performance of the pVFT is not easy to explain; known is that the scores on the pVFT, that is, the number of words generated, are dependent on the letter frequency within each language, next to the level of education, as was shown by a meta-analysis in which the pVFT scores of five different languages were compared (Oberg & Ramírez, 2006).

On the other hand, the pVFT is also an EF task and whether there are differences between these ethnic groups in other EF tests needs to be explored further. Anyway, this difference needs to be further investigated. For now, it implies that different normative scores might be used for Balinese and Banjarese.

Conclusion

This small study shows that performance on language assessment scales depends on the ethnic group. This implies that normative scores need to be adapted to create fairness and accuracy in the cognitive assessment of individuals from different ethnic groups. These adaptations seem imperative, next to the more common adaptations for age and years of education.

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