International
SOCIAL SCIENCES STUDIES Journal
Open Access Refereed E-Journal & Indexed & Publishing
e-ISSN: 2587-1587

RESEARCH ARTICLE
Psychology

Adaptation of the Multilingual Naming Test to Azerbaijani Culture: Identifying and Modifying Culturally Inappropriate Items

Azerbaycan Kültürüne Çok Dilli İsimlendirme Testinin Uyumlanması: Kültürel Olarak Uygun Olmayan Maddelerin Belirlenmesi ve Düzenlenmesi

Fidan Huseynzade [1]

ABSTRACT

Objective: The Multilingual Naming Test (MINT) is widely utilized for assessing language abilities in various populations, yet its applicability to Azerbaijani-speaking individuals remains underexplored. This study aimed to identifying culturally inappropriate items on the MINT test for Azerbaijani population (Experiment 1) and adapt test to the population via modifying culturally irrelevant stimulus (Experiment 2). **Method:** Two groups performed MINT in Experiment 1: healthy subjects (N=40) and patients diagnosed with Alzheimer's disease or post-stroke aphasia (N=20). One group performed MINT in Experiment 2: healthy participants (N=100). **Results:** The results of Experiment 1 demonstrated that individuals with Alzheimer's disease or aphasia scored significantly lower on the MINT compared to healthy participants, confirming the test's discriminative validity and its ability to detect anomia in the Azerbaijani population and also identified culturally mismatched items. Experiment 2 revealed that the adapted version of the MINT, which replaced culturally mismatched items, resulted in higher accuracy rates among Azerbaijani participants, indicating improved cultural suitability. **Conclusion:** Overall, the findings suggest that while the MINT is a useful tool for assessing anomia, cultural and linguistic differences must be carefully considered when applying it to non-English-speaking populations, highlighting the necessity of proper adaptation for Azerbaijani speakers. In addition, comparison to age, sex, race, and education-corrected norms to determine impairment is essential.

Keywords: MINT, post-stroke aphasia, Alzheimer's disease, cultural adaptation, language testing

ÖZET

Amaç: Çok Dilli İsimlendirme Testi (Multilingual Naming Test - MINT), farklı popülasyonlarda dil becerilerini değerlendirmek için yaygın olarak kullanılmaktadır; ancak Azerbaycan Türkçesinde konuşan bireyler için uygunluğu henüz yeterince araştırılmamıştır. Bu çalışmanın amacı, MINT testindeki Azerbaycan toplumu için kültürel olarak uygun olmayan maddeleri belirlemek (Deney 1) ve kültürel olarak alakasız uyaranları değiştirerek testi bu topluma uyarlamaktır (Deney 2). **Yöntem:** Deney 1'de iki grup MINT testini uygulamıştır: sağlıklı bireyler (N=40) ve Alzheimer hastalığı ya da travma sonrası afazi tanısı almış hastalar (N=20). Deney 2'de ise yalnızca sağlıklı katılımcılardan oluşan bir grup (N=100) teste tabi tutulmuştur. **Bulgular:** Deney 1'in sonuçları, Alzheimer hastalığı veya afazisi olan bireylerin MINT testinden sağlıklı bireylere kıyasla anlamlı derecede daha düşük puan aldığını ortaya koymuştur. Bu durum, testin ayırt edici geçerliliğini ve Azerbaycan toplumu içerisinde anomi tespitinde etkinliğini doğrulamaktadır. Ayrıca kültürel olarak uyumsuz maddeler de belirlenmiştir. Deney 2'de ise, kültürel olarak uyumsuz maddelerin yerine daha uygun olanların getirildiği uyarlanmış MINT versiyonunun, Azerbaycanlı katılımcılar arasında daha yüksek doğru yanıt oranlarıyla sonuçlandığı bulunmuştur. Bu durum, testin kültürel uygunluğunun artırıldığını göstermektedir. **Sonuç:** Genel olarak, elde edilen bulgular MINT'in anomi değerlendirmesinde yararlı bir araç olduğunu, ancak İngilizce dışındaki dillerde uygulandığında kültürel ve dilsel farklılıkların dikkatle ele alınması gerektiğini ortaya koymaktadır. Azerbaycanlı konuşucular için uygun bir şekilde uyarlanmış testlerin gerekliliğine işaret eden bu çalışma, ayrıca bireyin yaşı, cinsiyeti, ırkı ve eğitim düzeyine göre düzeltilmiş normlarla karşılaştırma yapmanın tanı koymada esas olduğunu vurgulamaktadır.

Anahtar Kelimeler: MINT, travma sonrası afazi, Alzheimer hastalığı, kültürel uyum, dil testi.

How to Cite This Article
Huseynzade, F. (2025). "Adaptation of the Multilingual Naming Test to Azerbaijani Culture: Identifying and Modifying Culturally Inappropriate Items" International Social Sciences Studies Journal, (e-ISSN:2587-1587) Vol:11, Issue:6; pp:1053-1062. DOI: https://doi.org/10.5281/zenodo.15755934

Arrival: 02 May 2025
Published: 27 June 2025

INTRODUCTION

Language, as a unique and fundamental characteristic of human communication, serves as a powerful tool for the exchange and dissemination of intricate concepts and information among individuals. Despite the remarkable nature of language, its acquisition and use are not always straightforward. Language disorders represent a significant challenge for individuals, affecting their ability to comprehend and produce spoken or written communication effectively. These disorders can vary widely in their nature and severity, ranging from

[1] Instr. Western Caspian University, Baku, Azerbaijan

developmental delays in speech and language milestones to acquired conditions following neurological injuries or diseases. (Raymer., 2015).

Language disorder that occupies a significant place in neurolinguistics literature due to its complexity and frequency of occurrence resulting mainly from traumatic brain injury, known as Aphasia. Aphasia is a condition where understanding and producing language are disrupted due to dysfunction in particular parts of the brain. It occurs when the normal process of translating thoughts into language and vice versa breaks down (Pedersen et al., 2004).

Among the well-known types of aphasia, Broca's aphasia and Wernicke's aphasia stand out as classic examples, each characterized by unique patterns of language impairment and associated brain areas. Broca's aphasia is named in honor of the French scientist Paul Broca, who in 1861 correlated a specific set of deficits linked to this aphasia with localized brain damage (Lee, 1981). His discovery stemmed from his care of a patient who could only utter the single word "tan." Broca's aphasia is frequently referred to in the literature as "non-fluent aphasia" or "expressive aphasia."

Wernicke's aphasia and Wernicke's area are named after the German neurologist Carl Wernicke, who first associated this particular speech disorder with damage to a specific area in the left posterior temporal lobe of the brain. In Wernicke's aphasia, there is difficulty understanding the meaning of spoken words and sentences, but the ability to produce connected speech remains relatively unaffected. Because of this characteristic, Wernicke's aphasia is also known as 'fluent aphasia' or 'receptive aphasia' (Clark 2003).

In reviewing the literature, various methods for diagnosing language disorders exist, with word finding tests holding an indispensable position among them. The main reason is that, word finding is an essential skill for communication. When individuals choose particular words to express their thought on the conversation, they apply word finding skills. Those who experience difficulties with word finding frequently encounter challenges in locating the precise word they intend to use in their speech or writing. It also manifests through pauses, distorted sounds, using similar-sounding or similar meaning words instead, incorrect starts, and filler words (Rohrer et al., 2007).

Word finding is connected with ability to retrieve words from verbal word storage and apply according to the conceptual content of the speech. Sometimes it is calling as the word naming which is more complicated process. Word naming impairment referred as anomia is the one of the essential and silent characteristic of Alzheimer's disease.

While anomia primarily affects verbal communication, the clinical evaluation and treatment of word retrieval difficulties often involve the picture confrontation naming tasks. The picture naming process is not only about the calling back the lexical phonological forms for words, it also demands visual object and semantic processing mechanisms (Raymer., 2015). It is believed that, crucial parts of the word retrieval during the talk are the semantic and phonological parts, and problems of these processes are connected with aphasia.

Picture naming tests are using for the diagnosis of variety of disorder, especially to evaluate severity and type of language impairment in patients who suffers from aphasia, Alzheimer' disease, hearing loss or dementia. Besides that, it is also using for different purposes like measuring general intelligence and etc. While applying confrontational naming tests, according to avoiding the problem of not observing tiny deficits (while only using high frequency pictures), it is important to include words of both high and low frequency. Paying attention if there is progress through providing phonological cues (e.g., first letter) or semantic cues (e.g., connected item) is also essential part of using naming tests for diagnosis. Various categories of items should be tested (such as animals, objects, colors, famous face etc.). Significant category- specific impacts are more frequently noticed in acute brain injuries (like encephalitis) than in neurodegenerative diseases (Morkovina et al., 2024).

There are two common confrontational naming tests and one of the most widely utilized and distinguished test is the Boston Naming Test (BNT). The Boston Naming Test (BNT) stands as a cornerstone in neuropsychological assessment, particularly revered for its role in evaluating word retrieval capabilities across diverse cognitive profile (Del Toro et al., 2011). Another confrontational naming test is the Multilingual Naming Test, which will be our primary focus in this study, particularly as we use it to diagnose aphasia or Alzheimer's disease in the Azerbaijani population.

Although the Boston Naming Test has been effective for diagnosing language disorders in English speakers, recent findings indicate it may not be suitable for other languages. As global mobility increases and multicultural societies become more prevalent, the need for psychological evaluations that accommodate multiple languages grows ever more critical. Multilingual tests, like the Multilingual Naming Test (MINT), enable clinicians and researchers to

diagnose and understand cognitive and language disorders in individuals who speak different languages, thus avoiding the biases inherent in monolingual tests. Consequently, Gollan proposed that the Multilingual Naming Test (MINT) offers superior diagnostic utility for both English and Spanish speakers. This has positioned the MINT as a significant tool in assessing language disorders (Stasenko et al., 2019).

A review of the literature reveals various studies addressing the cultural and linguistic biases associated with the Multilingual Naming Test (MINT) across different languages. Research involving older Chinese adults indicates that, while the test generally performs adequately, participants often make significant errors (Li et al., 2022). Specifically, certain items were unfamiliar to this population, leading to difficulties in recognition. These findings suggest that, although the MINT is effective with English-speaking populations, it is necessary to modify and adapt the test items to better align with the cultural context of different populations to obtain more accurate and sensitive results.

The Multilingual Naming Test (MINT) has demonstrated considerable success in detecting language dominance among bilingual individuals. Research involving Spanish English bilinguals reveals that the MINT effectively aligns with self-reported measures of spoken language dominance (Gollan et al., 2012). This indicates that the MINT is not only successful in identifying language proficiency but also provides reliable results that correspond well with individuals' own assessments of their linguistic abilities.

Numerous studies have demonstrated that the Multilingual Naming Test (MINT) performs effectively in experiments involving both healthy controls and patients with Alzheimer's disease (AD). Research indicates that AD patients exhibit significantly more errors and notably lower scores on the naming test compared to control participants. This disparity highlights the sensitivity of the MINT in distinguishing between cognitive impairments associated with AD and typical performance levels observed in healthy individuals (Ivanova et al., 2013).

The MINT's effectiveness extends beyond mere language proficiency, offering valuable insights into cognitive impairments associated with conditions such as Alzheimer’s disease. By adapting the test for different cultural contexts and continuing to validate its accuracy across various linguistic groups, researchers and clinicians can enhance diagnostic precision and improve patient care (Gálvez-Lara et al., 2015).

To date, the Multilingual Naming Test (MINT) has not been utilized within the Azerbaijani population, and there is a notable absence of data or research concerning its application in Azerbaijan. This study represents a preliminary investigation into the use of the MINT with Azerbaijani participants, with a focus on several key objectives. Aim of the study is respectively designed to examine the adaptation of the MINT to diverse linguistic environments, with a special focus on its usefulness within the Azerbaijani samples. There are two main goals. First, to measure how well the MINT works when applied to Azerbaijani language users through identifying and addressing any cultural mismatches within the test stimuli (Experiment 1), and next, to improve a version of the test that precisely reflects the linguistic and cultural characteristics of the Azerbaijani population (Experiment 2).

EXPERIMENT 1

METHOD

Participants

In total, the research sample comprised 60 participants. It included 40 people who were cognitively normal and older than 40, as well as 20 patients with dementia and aphasia. Every participant's ethnic background was Azerbaijani. The Central Neftchiler Hospital of the Azerbaijani Republic's Ministry of Health was the source of the patients with dementia or aphasia. We took into consideration the following inclusion/criteria to include participants in the dementia (DEM) group: individuals who have been diagnosed by their primary care physician as having Alzheimer's disease (AD) dementia, in accordance with the National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer's Disease and Related Disorders Association criteria.

Participants in the control group were volunteers recruited from Baku, Azerbaijan. Adults matched the following inclusion criteria for the control group: adults aged 40 or older, absence of subjective memory complaints explicitly declared by the subject and a clinical interview with a reliable informant (an immediate or close family member, such as partner, offspring, nephews, or nieces) to determine a normal cognitive state.

Overall 60 participants were included in 2 groups. The control group comprised 40 participants, including 17 men and 23 women, who were recruited across four age groups: 40-49, 50-59, 60-69, and 70-79. In the healthy participants group approximately 40% had graduated from university or college, while 60% had only completed secondary education. Only 3 people were left-handed and the rest of them were right-handed. All of their

nationality was Azerbaijani, with Azerbaijani as their mother tongue. Only 5 participants did not know Russian, while the rest were bilingual, with Russian as their second language.

The patient's group consisted of 20 participants and 8 of them were male and 12 were female. 30% had graduated from university or college and 70% had completed only secondary education. All of them were right-handed and according to their relatives and our observation 13 of them were bilingual in Azerbaijani and Russian. Similar to the control group, all participants were Azerbaijani, with Azerbaijani as their mother tongue.

Procedure

As an initial step, a preliminary questionnaire was administered to collect demographic and linguistic background information from participants. This questionnaire included fields for participants to provide their initials, age, gender, handedness, education level, and language background.

The primary assessment tool used in this study was the Multilingual Naming Test (MINT), which consists of 32 images representing various categories, primarily animals and commonly used objects. Each image was presented as a black line drawing on a white background.

Before administering the test, participants were given clear instructions: **"Try to say the names of the objects you see in the picture."** If a participant was unable to recall the correct word within 20 seconds, a phonemic cue—specifically, the initial phoneme of the target word—was provided. If the participant still failed to produce a response after 30 seconds, the experiment proceeded to the next item.

Throughout the testing process, the experimenter recorded responses, took notes, and, with participants' consent, made audio recordings to facilitate later analysis of the data.

Statistical Analysis

The statistical analysis was conducted using SPSS, employing two distinct methods to examine the effects of demographic variables on test performance. A One-Way Analysis of Variance (ANOVA) was used to assess the influence of age and education level on test outcomes in a sample of 40 healthy participants. This method allowed for the comparison of mean test scores across different age and education groups to determine whether significant differences existed between them.

Additionally, an Analysis of Covariance (ANCOVA) was performed to investigate differences in MINT scores while controlling for the potential confounding effects of age and education. This approach enabled a more precise assessment of group differences by statistically adjusting for these variables, ensuring that any observed effects were not solely attributable to variations in age and education levels. The ANCOVA was conducted across both healthy participants and those with a clinical diagnosis, providing a more comprehensive understanding of how these factors influence test performance.

For all statistical analyses, the threshold for statistical significance was set a priori at $p = 0.05$, ensuring that results were interpreted within a standard confidence level.

RESULTS

Looking to the connection between MINT scores with age of the healthy participants, we used One-Way ANOVA. According to the results, our p-value ($p=0.002$) is smaller than 0.05 and $F(2;37) = 7.37$ which demonstrates the significant relationship between age of the participants and MINTS scores (Table 1). Specifically, members of the younger age group exhibited higher scores, while participants in the 70-79 age group showed significantly lower scores.

Table 1:

ANOVA

recoded results

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,821	2	1,410	7,371	,002
Within Groups	7,079	37	,191		
Total	9,900	39			

Continuing with the examining the correlation between MINT scores with education level of healthy participants, we also used One-Way ANOVA. Participants were divided into 3groups (secondary school education, college and

university) according to their answers. On this analyze, our p-value (p= 0.034) was also less than 0.05 and F (3;36) = 3,23 which demonstrates significant relationship between participants' education level and MINT scores (Table 2). Secondary school educated participants exhibit low test scores compare to those with the university degree.

Table 2:

ANOVA

recoded results

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,100	3	,700	3,231	,034
Within Groups	7,800	36	,217		
Total	9,900	39			

After determining the effects of age and education level on the MINT results, we used ANCOVA to examine differences between the scores of healthy and Alzheimer's or Aphasia-diagnosed participants while controlling the age and education factor. We categorized healthy and diagnosed participants' results in the two groups. ANCOVA analysis shows a p-value (Table 3) smaller than 0.05 which also means there is a significance difference of the MINT results and healthy and pathological groups, with healthy participants demonstrated higher scores than Alzheimer's or aphasia-diagnosed groups'.

Table 3:

Tests of Between-Subjects Effects

Dependent Variable: Recoded results

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5,224[a]	3	1,741	10,885	<,001	,368
Intercept	4,464	1	4,464	27,906	<,001	,333
Age2	,094	1	,094	,586	,447	,010
Education2	,675	1	,675	4,222	,045	,070
Groups2	3,046	1	3,046	19,039	<,001	,254
Error	8,959	56	,160			
Total	129,000	60				
Corrected Total	14,183	59				

a. R Squared = ,368 (Adjusted R Squared = ,335)

According to the results, some items were easy and familiar, which is why a great percentage of them were correctly named by the participants. There was one item (i.e., sock) display a 100% correct response across both groups. Several other items like "scissors", "lightbulb", "globe", "ruler", "cow" also had very few wrong answers in both control and patient groups. Conversely, items such as "harp", "pineapple", "snail", "rolling pin", "slipper slide" and "bowling pin" yielded a relatively high nonresponse rate (i.e., "I don't know")

Results from healthy participants demonstrate MINT's usefulness in the Azerbaijani language, but it also displays some cultural biases in different items. For example, almost 90% of participants make errors while naming "pineapple", "harp" and "bowling pin". It can be explained by the culturally unfamiliarity of items. For instance, pineapple is a tropical fruit that is not consumed a lot by the Azerbaijani population because of the richness of local fruits and taking into consideration that the participant's age is older than 40, it can be a culturally biased item while using this test in this population. The harp is also not widely used in Azerbaijani music culture. The elderly population generally listens to traditional music in which they use traditional instruments like "tar" and most of them even do not have any idea about the harp or how it is named in the Azerbaijani language. Bowling pin is also going through the same explanation. We can undoubtedly say that none of our participants ever played or watched a bowling match. This is because the game is not commonly played in Azerbaijan, particularly among the elderly. Overall, the present study shows that some MINT items are generally familiar to Azerbaijani older populations, but some items should be replaced with more culturally appropriate items to improve sensitivity of the test.

EXPERIMENT 2

METHOD

Participants

Overall, research sample is consisted of 100 participants which are combined under one control group. All of them are healthy participants, however they are differing according to their gender, age and education level. Participants were volunteers recruited from Baku, Azerbaijan. Adults matched the following inclusion criteria for the control group: adults aged 20 or older, absence of subjective memory complaints explicitly declared by the subject and a clinical interview with a reliable informant (an immediate or close family member, such as partner, offspring, nephews, or nieces) to determine a normal cognitive state.

Overall 100 participants were part of this research, including 43 men and 57 women, who were recruited across five age groups: 20-29, 30-39, 40-49, 50-59, and 60-69. From participants approximately 60% had graduated from university or college, while 40% had only completed secondary education. Only 8 people were left-handed and the rest of them were right-handed. All of their nationality was Azerbaijani, with Azerbaijani as their mother tongue. Only 10 participants did not know Russian, while the rest were bilingual, with Russian as their second language.

Procedure

As a first step, a preliminary questionnaire was administered to collect demographic information from participants, following the same procedure as in the first experiment.

The primary assessment tool in this experiment was a modified version of the **Multilingual Naming Test (MINT),** adapted for the Azerbaijani population. Similar to the original version, this test consisted of 32 items from various categories. However, modifications were made based on the results of the first experiment to replace culturally mismatched items. Adjustments were guided by the MINT database, which consists of 64 items, ensuring that the revised items were more culturally appropriate for Azerbaijani speakers.

Specifically, the image of a "**pineapple"** was replaced with a "**bone"**, "**harp"** with "**leather"**, and "**bowling pin"** with "**cage",** as these items were considered more familiar to the Azerbaijani population. Each image was presented as a black line drawing on a white background.

Before administering the test, participants were given clear instructions: **"Try to say the names of the objects you see in the picture."** If a participant was unable to recall the correct word within 20 seconds, a phonemic cue—specifically, the initial phoneme of the target word—was provided. If the participant still failed to produce a response after 30 seconds, the experiment proceeded to the next item.

Throughout the testing process, the experimenter recorded responses, took notes, and, with participants' consent, made audio recordings to facilitate later analysis of the data.

Statistical Analysis

On the statistical analysis for Experiment 2 we used RStudio programming tool. To examine the relationships between age and test scores, as well as education level and test scores, we performed a series of one-way ANOVA tests. This approach allowed us to determine if there were significant differences in mean test scores across different age groups and educational levels. Significance was set at $p < 0.05$.

RESULTS

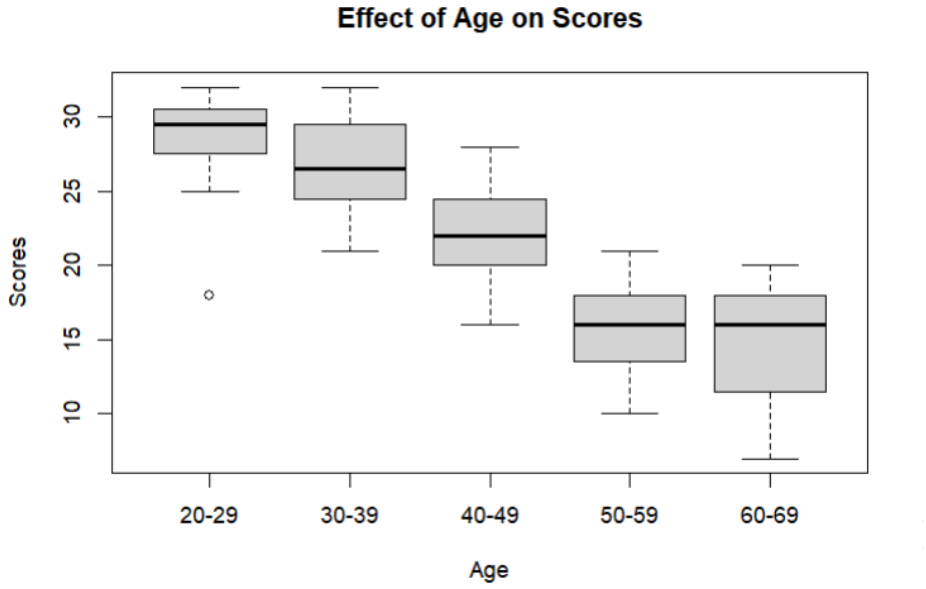
Looking to the connection between MINT scores with age of the healthy participants, we used One-Way ANOVA. According to the results, our p-value (p=0.003) is smaller than 0.05 and F (4;95) = 68.5 which demonstrates the significant relationship between age of the participants and MINTS scores (Table 4). Specifically, members of the younger age group exhibited higher scores, while participants in the 70-79 age group showed significantly lower scores.

Table 4:

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Age	4	3093.76	773.44000	68.50345	3.689033e-27
Residuals	95	1072.60	11.29053	NA	NA

Specifically, members of the younger age group exhibited higher scores, while participants in the 60-69 age group showed significantly lower scores (Table 6).

Table 5:



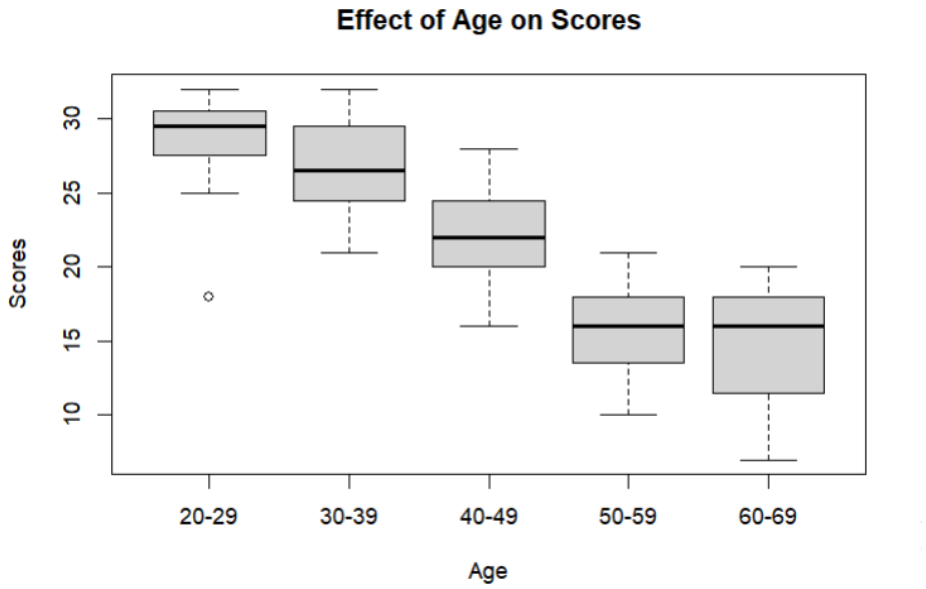
Continuing with the examining the correlation between MINT scores with education level of participants, we also used One-Way ANOVA. Participants were divided into 3groups (secondary school education, college and university) according to their answers. On this analyze, our p-value (p= 0.06) was also less than 0,05 and F (2;97) = 112,09 which demonstrates significant relationship between participants' education level and MINT scores (Table 7). Secondary school educated participants exhibit low test scores compare to those with the university degree.

Table 6:

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Education	2	2908.116	1454.05806	112.0956	6.031002e-26
Residuals	97	1258.244	12.97159	*NA*	*NA*

Secondary school educated participants exhibit low test scores compare to those with the university degree (Table 8).

Table 7:



The modifications made to the multilingual naming test to enhance its cultural appropriateness for the Azerbaijani population were successful. Specifically, the image of a "pineapple" was replaced with a "bone," "harp" was replaced with "leather," and "bowling pin" was replaced with a "cage." These changes were made to ensure that the items were more familiar to the Azerbaijani population, based on cultural relevance.

Importantly, participants' error rates were notably lower for the new, culturally relevant items compared to the original items. This suggests that the changes made to the test, such as replacing the "pineapple" with a "bone," "harp" with "leather," and "bowling pin" with "cage," made the test more recognizable and easier for the participants, contributing to their overall better performance.

These findings suggest that the modifications made to the test have resulted in an improved version that is more culturally adaptable to the Azerbaijani population. Additionally, the influence of age and education on performance highlights the relevance of these demographic factors in test outcomes.

DISCUSSION

The purposes of this research were to examine the psychometric properties of the MINT as a measure of anomia in a sample of older adults and to study the ability of this test to evaluate individuals from the Azerbaijani population.

The aim of Experiment 1 was to examine the suitability of MINT to the Azerbaijani population by conducting it with healthy and patient groups of different ages and education levels and to identify if there are culturally mismatched items to the Azerbaijani population. One fundamental goal of the present study was to determine whether the MINT can distinguish between individuals with or without dementia—that is, to determine the discriminative validity of the test. The results have shown that individuals with dementia or aphasia scored lower than those without dementia or aphasia on the MINT. This finding is consistent with the symptoms of anomia frequently found in patients with dementia and aphasia.

Regarding the possible influence of age and education on the naming tests, we used ANOVA on SPSS and the results showed a negative correlation between age and MINT scores. As the age increased, the results of both groups declined. For observing the effect of education level, we used the same statistical analysis and found that there is a positive correlation between education level and MINT scores. For getting the pure examination of the test we controlled these 2 variables.

In addition, however, MINT showed good results when applied to the Azerbaijani population, we observed that there were 3 main items (“pineapple”, “harp” and “bowling pin”) that were answered wrong by the vast majority of participants. We called them culturally mismatched items, which gave us data for conducting the second part of the experiment.

The goal of Experiment 2 was to test the adapted MINT on healthy participants from the Azerbaijani population for measuring its’ suitability to the population. To adapt MINT, we replaced three items (“pineapple”, “harp” and “bowling pin”) to the “bone”, “leather” and “cage” respectively based on the MINT database. While examining outcomes we see that new items get more real scores than older ones. For the observing impact of age and education level on the MINT scores, we used Rstudio, and again results showed a negative correlation between age and participant’s scores. The same statistical analysis was conducted also to examine the connection between education level and MINT scores. Results showed that the adapted version of MINT is useful for the Azerbaijani population at the mean age.

Despite the promising results, study also has several limitations. First of all, it is conducted with a limited number of participants. To improve the reliability of the test, it is advised to use a large sample size in future research. In addition, language and cultural differences of people living in different regions of Azerbaijan can also affect the results of the test. It should be noted that the results may vary in different regions as the study was only conducted with the citizens of Baku. It would also take into consideration expanding the applied region of the test while developing the MINT for the Azerbaijan population.

In conclusion, despite the clinical utility of the MINT for English speakers, our findings suggest that there is a need to investigate the existing MINT items when used in speakers of a language other than English. Although potentially biased items were identified in Azerbaijani older adults, further research should be conducted to examine if item difficulty levels are sufficient to explain performance differences in English and Azerbaijani monolinguals. To our knowledge, it is the first paper reporting the potential biases in the Azerbaijani version of the MINT. Our study highlights that cultural and linguistic differences leading to unfamiliarity of picture-naming items can influence the test results and indicate the need for a proper linguistic and cultural adaptation of any neuropsychological test material (Ardila 2021).

REFERENCES

Absher, J. R., & Benson, D. F. (1993). Disconnection syndromes: An overview of Geschwind’s contributions. Neurology, 43(5), 862–862.

American psychiatric association (Ed.). (2013). Desk reference to the diagnostic criteria from DSM-5. American psychiatric publ.

Ardila, A. (2021). Cross-cultural differences in cognition and learning. The

SAGE handbook of evolutionary psychology: Foundations of evolutionary

psychology, 420-435.

Clark, D.G., & Cummings, J.L. (2003). Chapter 25 – Aphasia.

Comrie, B. (Ed.). (2018). The world's major languages (Third edition). Routledge.

Damasio, Antonio R, MD. The New England Journal of Medicine; Boston Vol. 326, Iss. 8, (Feb 20, 1992): 531-539.

Del Toro, C. M., Bislick, L. P., Comer, M., Velozo, C., Romero, S., Gonzalez Rothi, L. J., & Kendall, D. L. (2011). Development of a Short Form of the Boston Naming Test for Individuals with Aphasia. Journal of Speech, Language, and Hearing Research, 54(4), 1089–1100.

Fernandez-Coello, A., Gil-Robles, S., & Carreiras, M. (2021). Multilingual Naming. In E. Mandonnet & G. Herbet (Eds.), Intraoperative Mapping of Cognitive Networks (pp. 219–231). Springer International Publishing.

Gálvez-Lara, M., Moriana, J. A., Vilar-López, R., Fasfous, A. F., Hidalgo-Ruzzante, N., & Pérez-García, M. (2015). Validation of the Cross-Linguistic Naming Test: A naming test for different cultures? A preliminary study in the Spanish population. Journal of Clinical and Experimental Neuropsychology, 37(1), 102–112.

Gollan, T. H., Weissberger, G. H., Runnqvist, E., Montoya, R. I., & Cera, C. M. (2012). Self-ratings of spoken language dominance: A Multilingual Naming Test (MINT) and preliminary norms for young and aging Spanish–English bilinguals. Bilingualism: Language and Cognition, 15(3), 594–615.

Grossi, D., Trojano, L., Chiacchio, L., Soricelli, A., Mansi, L., Postiglione, A., & Salvatore, M. (1991). Mixed Transcortical Aphasia: Clinical Features and Neuroanatomical Correlates. European Neurology, 31(4), 204–211.

Ivanova, I., Salmon, D. P., & Gollan, T. H. (2013). The Multilingual Naming Test in Alzheimer's Disease: Clues to the Origin of Naming Impairments. Journal of the International Neuropsychological Society, 19(3), 272–283.

Kiyoshi Honda. Physiological Processes of Speech Production. Handbook of Speech Processing, Heidelberg, Pp.7-26, 2007.

Lee, D. A. (1981). Paul Broca and the history of aphasia: Roland P. Mackay Award Essay, 1980. Neurology, 31(5), 600–600.

Li, C., Zeng, X., Neugroschl, J., Aloysi, A., Zhu, C. W., Xu, M., Teresi, J. A., Ocepek-Welikson, K., Ramirez, M., Joseph, A., Cai, D., Grossman, H., Martin, J., Sewell, M., Loizos, M., & Sano, M. (2022). The 32-Item Multilingual Naming Test: Cultural and Linguistic Biases in Monolingual Chinese-Speaking Older Adults. Journal of the International Neuropsychological Society, 28(5), 511–519.

Mandonnet, E., & Herbet, G. (Eds.). (2021). Intraoperative Mapping of Cognitive Networks: Which Tasks for Which Locations. Springer International Publishing.

Morkovina, O., Manukyan, P., & Sharapkova, A. (2024). Picture naming test through the prism of cognitive neuroscience and linguistics: Adapting the test for cerebellar tumor survivors—or pouring new wine in old sacks? Frontiers in Psychology, 15, 1332391.

Nağısoylu, M., Zeynallı, M., & Hüseynov, S. (2012). Azerbaijani language. Arazyayınları.

Nudel R, Christensen RV, Kalnak N, Schwinn M, Banasik K, Dinh KM; DBDS Genomic Consortium; Erikstrup C, Pedersen OB, Burgdorf KS, Ullum H, Ostrowski SR, Hansen TF, Werge T. Developmental language disorder - a comprehensive study of more than 46,000 individuals. Psychiatry Res. 2023 May.

Orujova, G. (2021). Proceedings of the 4th Conference on Central Asian Languages and Linguistics (ConCALL-4) Defining ways of Turkic elements in medieval Persian dictionaries.

Pedersen, P. M., Vinter, K., & Olsen, T. S. (2004). Aphasia after Stroke: Type, Severity and Prognosis. Cerebrovascular Diseases, 17(1), 35–43.

Raymer, A. M. (2015). Clinical diagnosis and treatment of naming disorders. In A. E. Hillis (Ed.), *The handbook of adult language disorders* (2nd ed., pp. 161–183).

Rohrer, J. D., Knight, W. D., Warren, J. E., Fox, N. C., Rossor, M. N., & Warren, J. D. (2007). Word-finding difficulty: A clinical analysis of the progressive aphasias. Brain, 131(1), 8–38.

Sağın-Şimşek, Ç., & König, W. (2012). Receptive multilingualism and language understanding: Intelligibility of Azerbaijani to Turkish speakers. International Journal of Bilingualism, 16(3), 315–331.

Stasenko, A., Jacobs, D. M., Salmon, D. P., & Gollan, T. H. (2019). The Multilingual Naming Test (MINT) as a Measure of Picture Naming Ability in Alzheimer's Disease. Journal of the International Neuropsychological Society, 25(08), 821–833.

Swieca, M. J. (n.d.). Effective Strategies for Word-Finding Intervention.Vélez-Uribe, I., Rosselli, M., Newman, D., Gonzalez, J., Gonzalez Pineiro, Y., Barker, W. W., Marsiske, M., Fiala, J., Lang, M. K., Conniff, J., Ahne, E., Goytizolo, A., Loewenstein, D. A., Curiel, R. E., & Duara, R. (2024). Cross-cultural Diagnostic Validity of the Multilingual Naming Test (MINT) in a Sample of Older Adults. Archives of Clinical Neuropsychology, 39(4), 464–481.