Journal of
Modern Rehabilitation

January 2023, Volume 17, Number 1

Research Article

The Study of Cognate and Non-Cognate Nouns and Verbs Naming in Mazandarani-Persian Bilinguals

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Citation: Kazemi M, Mehri A, Jalaei S, Agha Golzadeh, Agha Golzadeh F. The Study of Cognate and Non-Cognate Nouns and Verbs Naming in Mazandarani-Persian Bilinguals. Journal of Modern Rehabilitation. 2023; 17(1):63-73. https://doi.org/10.18502/jmr.v17i1.11305

https://doi.org/10.18502/jmr.v17i1.11305

Article info:
Received: 3 Jul 2021
Accepted: 9 Nov 2021
Available Online: 01 Jan 2023

Keywords:
Language test; Naming; Speed and accuracy; Cognate status; Nouns and verbs; Mazandarani-Persian bilingual

ABSTRACT

Introduction: The main purpose of this study was to investigate how words are retrieved in the picture naming tasks (retrieval is discrete serial or cascading and networked) by examining the effect of word cognateness on the ability to name. Obtaining normal data on the ability to name of Mazandarani-Persian bilingual individuals with different genders, ages, and educational groups, was another goal of this study.

Materials and Methods: In this cross-sectional study, after completing the language proficiency questionnaire, 120 Mazandarani-Persian individuals named 109 nouns and 90 verbs in Mazandarani and Persian languages. The speed and voice of people were recorded by DMDX software.

Results: The results show that the accuracy of the naming cognate nouns in Mazandarani, cognate verbs in Mazandarani and Persian, and the speed of naming cognate nouns in Mazandarani is more than non-cognate (P=0.000). Cognate status, gender (men), word type (noun), level of education, and Persian language had a positive effect on naming accuracy.

Conclusion: The results of this study are an example of the effect of cognate status on naming ability and thus confirming the cascaded activation model. Also, gender (men), word type (noun), level of education, and Persian language has a positive effect on naming accuracy.

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1. Introduction

In simple words, bilingualism is defined as the knowledge of two languages and refers to individuals or groups of people who acquire varying degrees of communication skills in verbal or written forms to communicate with speakers of two or more languages in a particular community [1]. The existence of linguistic diversity in Iran indicates the need for bilingual research in Iran. One of these languages is Mazandarani, which is the language of the natives living in a part of the northern regions of Iran [2]. People living in Mazandaran province speak both Mazandarani and Persian languages and they can be called Mazandarani-Persian bilinguals [2]. One of the questions in the field of bilingualism is how to access lexical and speech production in these people [3]. Various models have been proposed by different people over the years that illustrate the steps and how words are retrieved in bilingual people. Among these models, we can name the model of discrete serial [4] and the cascade and network model [5]. According to both models, lexical access occurs in two main stages, semantic and phonological [6].

In the discrete serial model, among the lemmas activated in the semantic representation stage, only the lemma related to the word that is finally produced reaches the phonological representation stage [5], while in cascade and network models, it is assumed that all lemmas represented in the first stage also reach phonological representations [5]. Cascading activation models and discrete serial activation models have different predictions about the effect of cognate status on the performance of bilinguals in picture naming. If the unselected words convey activities to their phonological sections, as suggested in the cascade activation model, pictures related to the cognate words; that is, synonyms in two languages with similar phonological forms should be named by bilinguals better than pictures related to non-cognate words. As a result, due to the existence of common phonemes between similar words in the two languages, the level of activation of these phonemes increases, and the naming process is facilitated. Whereas, based on discrete serial activation models, the cognate and non-cognate words are predicted to behave similarly because only the lexical node of the target language is phonologically coded, and therefore the phonological features do not have a role in naming [6].

One of the crucial issues in the naming process is the difference between naming nouns and verbs. Most studies have shown that nouns are named better than verbs. Verb processing is more complex than noun processing due to the later acquisition of verbs than nouns in the natural development of speech and language [7], the greater use of nouns than verbs in most languages, and the complexity of the semantic representation of verbs than nouns [8].

Barani Zagheh et al. studied the ability to name of Kurdish-Persian bilinguals. Participants included 40 Kurdish-Persian bilinguals (25 males and 15 females) with a mean age of 28.9 years and an education level of 10 to 11. The subject was asked to name 90 verbs from the test of naming Persian verbs. This test includes 42 cognate verbs and 48 non-cognate verbs in Kurdish and Persian. The results showed that the accuracy of the naming cognate verbs in both Persian and Kurdish was significantly higher than non-cognate verbs. No significant difference was observed between the speed of naming cognate and non-cognate verbs in the two languages [9]. Roberts et al examined the ability to name 50 nouns (25 cognate and 25 non-cognates) in 30 English-French bilingual individuals (9 males and 6 females) with an average age of 59 years and an average education of 12.1 years. In English-French bilinguals, pictures of cognate words, especially in English (the second language), are called more accurate than non-cognate words [10]. In 2000, Costa and Caramazza studied 21 Catalan-Spanish bilinguals (15-18 years old) and 21 Spanish monolinguals. They used 40 images of different semantic categories (animals, body parts, household items, etc. (20 cognate nouns and 20 non-cognate nouns]). In this study, bilingual and monolingual individuals showed different patterns. Bilinguals called cognate images faster than non-cognate images. Monolingual people called both types of images with equal speeds [6].

In this study, by examining the effect of cognate words in Mazandarani and Persian languages, we want to conclude whether naming in bilinguals follows a discrete serial model or a cascading and network model. Another purpose of this study is to obtain normal data on the ability to name of Mazandarani-Persian bilingual individuals with different genders, age, and educational groups. No similar research has been done in this field and this study can provide a basis for further studies in the Mazandaran language. Addressing the subject of nouns and verbs in both Persian and Mazandarani languages is another goal of this study. We want to know that for Persian and Mazandarani language users, like many languages that have been studied in the past, is naming nouns easier than naming verbs?

2. Materials and Methods

This research is a cross-sectional study. The sample consisted of 4 age groups, 3 educational groups, and 2 genders of Mazandarani-Persian bilingual individuals. The convenience sampling method was used and individuals who had the inclusion criteria during the 6 months of the study were selected as the sample. The number of participants was 30 in each age group, 40 in each educational group and 60 in each gender, and a total of 120 speakers were studied. First, the demographic information of these people was extracted through history (Table 1). The inclusion criteria included the age range of 30-70 years, without cognitive problems based on the Montreal cognitive assessment (MoCA) (normal range ≥26 scores) [11], Mazandarani-Persian bilinguals and living in Savadkooh, Ghaemshahr and Sari Cities, Iran, based on language skills questionnaire (Q–LEAP) [12], having the healthy vision and hearing (in case of using assistive devices, it is with the person). For a sampling of 30-40 years under diploma group, samples were taken from the surrounding villages of Zirab City, Iran, because no people were observed in the city that were both in the age group of 30 to 40 and had under diploma education. Also, for a sampling of 60-70 years above diploma, referred to the education department of Savadkooh City and contacted the retirees of this department who have a higher level of the diploma. For sampling others groups, we examined family members, relatives, neighbors, colleagues, and friends who were eligible to enter the study (in terms of age, gender and education). The tests were performed on two days, one week apart to decrease interference between the two languages [9]. On the first day, the person must name 109 nouns taken from the Persian version of the noun picture naming test [13], and then 90 verbs taken from the Persian version of the verb picture naming test [14], a total of 199 words in Mazandarani language and on the second day in Persian. This process takes an average of an hour and a half per day. The sampling was done in a quiet place, at the home or the subject or examiner's office. The ethical code was

Table 1. Demographic characteristics of the participants

Gender	Age Category (y)	Number of Participants	Level of Education
Female	30-40	5	Above diploma
			Diploma
			Under diploma
	40-50		Above diploma
			Diploma
			Under diploma
	50-60		Above diploma
			Diploma
			Under diploma
	60-70		Above diploma
			Diploma
			Under diploma
Male	30-40	5	Above diploma
			Diploma
			Under diploma
	40-50		Above diploma
			Diploma
			Under diploma
	50-60		Above diploma
			Diploma
			Under diploma
	60-70		Above diploma
			Diploma
			Under diploma

IR.TUMS.FNM.REC.1398.003 in Tehran University of Medical Sciences.

To conduct this research, first, the Mazandarani-Persian bilingual speech and language pathologist, with the help of a linguist fluent in both languages, translated and equated the nouns and verbs of the Persian naming tests into Mazandarani. In the next step, Persian and Mazandarani nouns and verbs were divided into two parts, cognate and non-cognate, based on the definition of cognateness. Finally, 73 cognate nouns, 36 non-cognate nouns, 46 cognate verbs, and 44 non-cognate verbs were obtained. DMDX software was used to record data related to naming speed according to reaction time. This software is originally designed for language processing studies, which is used to record the exact timing and synchronize visual and auditory outputs in milliseconds. In other words, it can provide visual and auditory stimuli and record reaction time. First, the pictures related to the tests for naming nouns and verbs, as well as the program for performing the test, were entered into the software. In this way, the pictures were displayed at a distance of 10 s and the person had 10 s to name each image. The subject's voice was recorded by the software and the reaction time of the person, called the pictures, was measured and stored in milliseconds. Then the information extracted from naming speed and accuracy was recorded in SPSS v. 25.

To analyze the data, the normality of the data was determined by the Kolmogorov-Smirnov test. To compare the mean percentage of accuracy and speed of naming cognate words with non-cognate words in Mazandarani and Persian languages, to compare the mean percentage of accuracy and speed of naming Mazandarani cognate and non-cognate words with the mean percentage of accuracy and speed of naming Persian cognate and non-cognate words, and to compare mean percentage of accuracy and speed of naming of Mazandarani and Persian cognate and non-cognate nouns with the mean percentage of accuracy and speed of naming of Mazandarani and Persian cognate and non-cognate verbs, paired t test was used, to compare the mean percentage of accuracy and speed of naming of Mazandarani and Persian cognate and non-cognate nouns and verbs among the educational and age groups, for data with normal distribution, analysis of variance (ANOVA) test and Tamhane post hoc test were used and for data with distribution without normality, Kruskal-Wallis and Mann-Whitney tests were used. Also, to investigate the relationship between the mean percentage of the correctness of naming of Mazandarani and Persian cognate and non-cognate words, and the mean speed of naming of Mazandarani and Persian cognate and non-cognate words in Mazandarani-Persian bilinguals, due to the normality of the data, Pearson correlation coefficient was used.

3. Results

In this study, 120 Mazandarani-Persian bilingual individuals (60 females and 60 males), in 3 educational groups (above diploma, diploma, and under diploma) and 4 age groups (30-40, 40-50, 50-60, 60-70 y) have been examined. These people named 109 nouns and 90 verbs in Persian and Mazandaran languages. The results show that in naming accuracy, the highest mean is related to naming non-cognate verbs in Persian, the lowest mean is related to naming non-cognate verbs in the Mazandarani language, and in naming speed, the lowest average (fastest reaction time) is related to naming Persian cognate names and the highest average (longest reaction time) is related to naming non-cognate verbs in Persian. In the following, the findings will be compared and analyzed:

Comparison of the average percentage of accuracy and speed of naming of cognate and non-cognate nouns and verbs based on cognate status

According to Table 2, a significant difference is observed between the mean percentage of the naming nouns and verbs of Mazandarani-Persian bilinguals, in both cognate and non-cognate groups (P=0.000) by paired t test. The average percentage of correct naming of cognate names in Mazandarani and cognate verbs in Mazandarani and Persian is higher than non-cognate. Also, a significant difference is observed between the average speed of naming cognate and non-cognate nouns in the Mazandarani language and cognate and non-cognate verbs in the Mazandarani and Persian languages (P=0.000). Therefore, these people have called Mazandarani cognate nouns faster than Mazandarani non-cognate nouns, Persian, and Mazandarani non-cognate verbs faster than cognate. No significant difference was observed between the cognate and non-cognate nouns in the mean speed of naming nouns in Persian (Table 1).

Comparison of the average percentage of accuracy and speed of naming of cognate and non-cognate nouns and verbs based on language type

According to the results reported in Table 3, a significant difference is observed between the average percentage of the correctness of naming nouns and verbs in both Persian and Mazandarani languages in these individuals (P=0.000). These people have called non-cognate nouns,

Table 2. Accuracy and speed of nouns and verbs based on cognate (n=120)

Variables		Number	Mean±SD	P
The correctness of naming nouns in Mazandarani	Cognate	120	79.17±14.239	0.000
	Non-cognate	120	56.09±17.873	
The correctness of naming nouns in Persian	Cognate	120	58.59±9.684	0.000
	Non-cognate	120	82.57±19.116	
The correctness of naming verbs in Mazandarani	Cognate	120	31.25±9.701	0.000
	Non-cognate	120	22.02±5.822	
The correctness of naming verbs in Persian	Cognate	120	36.95±7.556	0.000
	Non-cognate	120	31.49±6.769	
The speed of naming nouns in Mazandarani	Cognate	120	2612.49±856.772	0.000
	Non-cognate	120	2881.16±1068.233	
The speed of naming names in Persian	Cognate	120	2137.10±602.611	0.459
	Non-cognate	120	2179.50±804.382	
The speed of naming verbs in Mazandarani	Cognate	120	2636.17±870.448	0.000
	Non-cognate	120	2555.27±861.918	
The speed of naming verbs in Persian	Cognate	120	3181.16±987.280	0.000
	Non-cognate	120	2611.11±878.845	

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cognate and non-cognate verbs in Persian with a higher percentage of accuracy than Mazandarani language. A significant difference is observed between the speed of naming of cognate and non-cognate nouns and verbs in Persian and Mazandaran (P=0.000). Speakers named the cognate and non-cognate nouns in Persian faster than Mazandarani and the cognate and non-cognate verbs in Mazandarani faster than Persian.

Comparison of the Average Percentage of Accuracy and Speed of Naming of Cognate and Non-cognate Words in Both Persian and Mazandarani Languages Based on the Type of Word (Nouns or Verbs)

Table 3. Accuracy and speed of nouns and verbs based on language type (n=120)

Variables		Mean±SD	P
The correctness of naming cognate nouns	Mazandarani	79.17±14.239	0.000
	Persian	58.59±9.684	
The correctness of naming non-cognate nouns	Mazandarani	56.09±17.873	0.000
	Persian	82.57±19.116	
The correctness of naming cognate verbs	Mazandarani	67.93±21.089	0.000
	Persian	80.33±16.426	
The correctness of naming non-cognate verbs	Mazandarani	50.04±13.232	0.000
	Persian	71.57±15.383	
The speed of naming cognate nouns	Mazandarani	2612.49±856.772	0.000
	Persian	2137.10±602.611	
The speed of naming non-cognate nouns	Mazandarani	2881.16±1068.233	0.000
	Persian	2179.50±304.382	
The speed of naming cognate verbs	Mazandarani	2555.27±861.918	0.000
	Persian	2611.11±878.845	
The speed of naming non-cognate verbs	Mazandarani	2636.17±870.448	0.000
	Persian	3181.16±987.280	

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Table 4. Accuracy and speed of naming based on the type of word (n=120)

Variables		Mean±SD	P
The correctness of naming cognate words in Mazandarani	Noun	79.17±14.239	0.000
	Verb	67.93±21.089	
The correctness of naming cognate words in Persian	Noun	58.59±9.684	0.000
	Verb	80.33±16.426	
The correctness of naming non-cognate words in Mazandarani	Noun	56.09±17.873	0.000
	Verb	50.04±13.232	
The correctness of naming non-cognate words in Persian	Noun	82.57±19.116	0.000
	Verb	71.57±15.383	
The speed of naming cognate words in Mazandarani	Noun	2612.49±856.772	0.005
	Verb	2555.27±861.918	
The speed of naming cognate words in Persian	Noun	2137.10±602.611	0.000
	Verb	2611.11±878.845	
The speed of naming non-cognate words in Mazandarani	Noun	2881.16±1068.233	0.000
	Verb	2636.17±870.448	
The speed of naming non-cognate words in Persian	Noun	2179.50±804.382	0.000
	Verb	3181.16±987.280	

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In Table 4, a significant difference is observed between the accuracy and speed of the naming nouns and verbs in Mazandarani-Persian bilingual individuals (P≤0.005). The average percentage of accuracy of naming of cognate nouns in Mazandarani, and non-cognate nouns in Mazandarani and Persian is higher than verbs. However, these speakers named Persian verbs more accurately than Persian nouns. Also, cognate and non-cognate nouns in Persian were named faster than verbs, and Mazandarani cognate and non-cognate verbs were named faster than nouns (in Persian nouns and Mazandarani language, verbs were named faster).

Comparison of the average percentage of accuracy and speed of naming of Mazandarani-Persian cognate and non-cognate nouns and verbs based on gender, educational level, and age category

According to the results, among the studied variables, in the average percentage of accuracy of naming non-cognate nouns in Mazandarani and cognate verbs in Persian, a significant difference is observed between the two groups of Mazandarani-Persian bilingual men and women. Their significance level is P=0.006 and P=0.031, respectively. Men named Mazandarani non-cognate nouns and Persian non-cognate verbs with a higher percentage of accuracy.

In terms of educational level, the results show that among the studied variables, the percentage of accuracy of the naming non-cognate verbs and cognate nouns in Mazandarani and speakers with degrees above diploma education is significantly higher than the diploma, respectively (P=0.000), (P=0.005) and below the diploma (P=0.000). The average speed of naming cognate nouns in Persian is significantly higher in people with degrees above diploma than diploma and below the diploma, respectively (P=0.001), (P=0.002). Mean percentage of correctness of naming Persian cognate nouns, Mazandarani non-cognate nouns, cognate verbs in Mazandarani and Persian, non-cognate verbs in Persian in speakers with degrees above diploma is significantly more than diploma, respectively (P=0.016), (P=0.007), (P=0.000) (P=0.001), (P=0.000) and in diploma individuals are more than under diploma (P=0.000). The average percentage of accuracy of naming non-cognate nouns in Persian and the speed of naming non-cognate verbs in Persian are significantly higher in those with degrees above diploma and diploma than in those with under diploma education (P=0.000). Also, the average speed of naming of non-cognate nouns in Mazandarani is significantly higher in speakers with degrees above diploma than with diploma education (P=0.008).

In terms of age group, the percentage of the correctness of naming cognate nouns in Mazandarani, cognate and non-cognate nouns in Persian, cognate verbs in Mazandarani, non-cognate verbs in Persian is significantly lower in speakers aged 70-60 years than other groups. Also, the speed of naming cognate and non-cognate nouns in Mazandarani, non-cognate nouns in Persian,

Table 5. Accuracy and speed of nouns and verbs in bilinguals

Variables	Pearson Correlation Coefficient	P
The mean percentage of accuracy of naming Mazandarani cognate nouns The mean speed of naming of Mazandarani cognate nouns	-0.308	0.001
The mean percentage of accuracy of naming of Persian cognate nouns The mean speed of naming Persian cognate nouns	-0.550	0.000
The mean percentage of accuracy of naming Mazandarani non-cognate nouns The mean speed of naming Mazandarani non-cognate nouns	0.103	0.263
The mean percentage of accuracy of naming Persian non-cognate nouns The mean speed of naming Persian non-cognate nouns	-0.625	0.000
The mean percentage of accuracy of naming Mazandarani cognate verbs The mean speed of naming Mazandarani cognate verbs	-0.089	0.335
The mean percentage of accuracy of naming Persian cognate verbs The mean speed of naming Persian cognate verbs	0.063	0.493
The mean percentage of accuracy of naming Mazandarani non-cognate verbs The mean speed of naming Mazandarani non-cognate verbs	-0.017	0.854
The mean percentage of accuracy of naming Persian non-cognate verbs The mean speed of naming Persian non-cognate verbs	0.004	0.964

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cognate and non-cognate verbs in Persian and Mazandarani in this age group is significantly lower than other age groups (P<0.05).

Relationship between the average percentage of accuracy and speed of naming of Mazandarani and Persian names and verbs in Mazandarani-Persian bilinguals

In this section, the relationship between the mean percentage of accuracy and speed of naming of Mazandarani and Persian names and verbs in Mazandarani-Persian bilinguals has been studied using the Pearson correlation coefficient and the results are shown in Table 5. According to Table 5, a negative correlation is observed between the mean percentage of accuracy and speed of naming of cognate nouns in Mazandarani (P=0.001) and Persian (P=0.000), Persian non-cognate nouns (P=0.000). That is, as the percentage accuracy of naming increases, the speed of naming increases (the person's reaction time to the image is reduced). In other cases, a significant relationship was not observed (P <0.05).

4. Discussion

This study was conducted to investigate the effect of word cognateness, word type, language type, gender, age, and educational level on the accuracy and speed of naming in Mazandarani-Persian bilinguals. In the following, we will review and discuss the findings of the study.

The effect of cognateness on the accuracy of naming: The results show that Mazandarani-Persian bilinguals have named the cognate words better and more correctly than the non-cognate words. Therefore, it seems that the cognateness of words between two languages has a facilitating effect on the ability to name in bilinguals. This finding confirms the cascading and network lexical access model and rejects the discrete serial model. Also, this finding is consistent with the results of the study conducted by Hoshino et al. [15] and Barani Zaghe et al. [9]. No inconsistent study has been found for this subject.

The effect of cognateness on the speed of naming: Findings have shown that in naming words by Mazandarani-Persian bilinguals, cognate nouns were named faster than non-cognate nouns. This difference between the speed of naming cognate and non-cognate nouns was not significant in naming in Persian.

Previous studies conducted by Costa and Caramazza [6] and Hoshino et al. [15] on the difference in the speed of naming cognate and non-cognate nouns have shown a positive effect of cognateness on the speed of naming nouns (cognate nouns were named faster). Of course, these studies have examined the effect of cognateness on only one language (the non-dominant language with a written form). If we consider the Mazandarani language as a non-dominant language, it is consistent with the findings of previous studies. The fact that in Persian, no sig-

nificant difference is observed between the cognate and non-cognate nouns in the speed of naming, can be due to the predominance and widespread use of Persian (the official language of the country with a written form) compared to Mazandarani (the local language with no script), which has not been addressed in previous studies.

In terms of naming verbs, non-cognate verbs, contrary to expectation, were named faster than cognate verbs. Only one previous study conducted by Barani Zaghe et al examined the speed of naming cognate and non-cognate verbs [9], according to which the cognateness of verbs does not make a significant difference in the speed of naming bilingual people.

Ambiguities seem to exist in the effect of cognateness on the speed of naming nouns and verbs that require further studies.

The effect of gender on the accuracy of naming: According to the results, no significant difference is observed between men and women in the correctness of naming of Mazandarani and Persian cognate nouns, Persian non-cognate nouns, Mazandarani cognate verbs, and Persian cognate and non-cognate verbs. While in the naming Mazandarani non-cognate nouns and Persian cognate verbs, men performed better than women. Among Mazandarani-Persian bilinguals, men use the Mazandarani language in more situations than women. They mostly use the Mazandarani language for communication, especially in job situations. Perhaps, for this reason, they were able to better name the Mazandarani non-cognate nouns. It seems that women tend to express Mazandarani words in a similar way to Persian (cognate) instead of using the original Mazandarani words (non-cognate) more than men.

The results are consistent with the studies of Blum et al. [16], Ramsay et al. [17], Welch [18], and Barani Zaghe et al. [9]. According to some of these studies, no significant difference was seen between the two sexes, and in other cases, men named the pictures slightly better than women. This issue needs further investigation in different languages.

The effect of gender on the speed of naming: Findings indicate that no significant difference is observed between men and women in the speed of naming of cognate and non-cognate words in Mazandarani and Persian languages. Of course, in most cases, men could name words faster, but their differences with women were not significant. We assumed that men faster than women can call it in this language due to the greater use of the Mazandarani language in society. The results are almost consistent with the results of studies conducted by Ghaffar Samar et al. [19], and Barani Zaghe et al. [9]. According to the study of these people in most cases, no significant difference is observed between the two sexes and in limited cases, women (Ghaffar Samar et al.) or men (Barani Zagheh et al.) performed better. It seems that the effect of gender on the accuracy and speed of naming cannot be conclusively concluded and further studies are needed in different languages as well as in different studies.

The effect of education level on the accuracy of naming: According to the results, when the education level increase, the correctness of naming of Persian and Mazandarani nouns and verbs also increases. Because the pictures were black and white, people with low levels of education, especially the illiterate, had difficulty understanding the pictures. Although most of them, especially 60-70 and 50-60 years old speakers had a greater command of the original Mazandarani language than their more educated counterparts, they performed poorer in picture naming. Academic education seems to have had a crucial effect on the naming process. People with a higher level of education had a higher ability to translate and switch between languages than their counterparts with a low level of education, and this ability had a positive effect on their naming. These results are consistent with studies by Ramsay et al. [17] and Welch [18], and Barani Zagheet al. [9]. It has been shown that education level has an effect on naming and should be considered in all studies related to evaluation as well as treatment.

The effect of education level on the speed of naming: According to the results, no significant difference is observed between all educational groups in the speed of naming cognate and non-cognate nouns and verbs and it seems that the level of education of Mazandarani-Persian bilinguals did not have a significant effect on the speed of picture naming. We assumed that increasing the level of academic education, especially in Persian, which is the official and academic language, accelerates improvement but with increasing levels of education in most cases, individuals spent more time retrieving vocabulary. These results were consistent with the study of Barani Zaghe et al. [9].

The effect of age on the accuracy of naming: No significant difference is observed between all different age groups in the correctness of naming of cognate and non-cognate nouns and verbs, and it cannot be said that a clear relationship exists between the correctness of word naming and the age of individuals. However, the most

noticeable point among the results is that the accuracy of the naming of 60-70 years old speakers is often lower than younger speakers. The results are consistent with studies by De Bleser et al. [20], Blum et al. [16], Ramsay [17], and Welch [18]. Based on these findings, a decrease in the ability to name is observed in the elderly. It seems that in addition to a decrease in cognitive abilities, such as speed processing, working memory function, long-term memory, and reasoning [21], a decrease in the ability to name is also a complication of brain aging.

The effect of age on the speed of naming: No significant difference is observed between all age groups in the speed of naming of cognate and non-cognate nouns and verbs, and it seems that a clear relationship exists between the speed of word naming and the age of individuals. That is, most cases of 60-70 years old speakers named the pictures slower than other age groups. The results are aligned with the study of Barani Zaghe et al. [9], according to which no significant relationship is observed between age and naming speed. Decreased speed processing may be a factor leading to a decrease in naming speed in the elderly. The recent finding can be justified by studies of the naming functions of older people because the speed of recall is affected by age.

The effect of language type on the accuracy of naming: The results show that the accuracy of non-cognate nouns and verbs and cognate nouns in Persian is higher than Mazandarani language but the accuracy of the naming cognate nouns in the Mazandarani language is higher than in Persian language. It seems that these people named the pictures in Persian (the second language) better than the Mazandarani language (the first language). These results and results of the study by Barani Zaghe et al. [9] are consistent. It seems that the predominant language in these people is Persian. The results can be a consequence that Persian is the only official and academic language of the country and local Iranian languages do not have a written form.

The effect of language type on the speed of naming: The results show that these people named nouns in Persian faster than Mazandarani and verbs in Mazandarani faster than Persian. Results are not consistent with a study by Barani Zaghe et al. [9], that no significant difference was observed between the two languages in the speed of verb naming, but it is consistent with the study of Ghaffar Samar and his colleagues [19], based on their results, people named verbs faster in English (non-dominant language).

According to the inhibitory control model, when a non-target language lemma is activated in the semantic representation phase, several mental control factors control the choice of words in both languages. The degree of control in each language is related to the level of language knowledge in the same language [22]. Therefore, if the language knowledge is more, the mental control factors in that language will increase, thus the speed of reaction and naming in that language will decrease. It seems that in Mazandarani-Persian bilinguals, the level of linguistic knowledge of Mazandarani verbs is low and as a result, the reaction speed is higher. In this way, with the increase of language knowledge, the amount of mental control factors in that language increases, therefore, the speed of reaction and naming in that language decreases.

There seem to be significant differences in studies of a language type, as different languages may have different structures in noun and verb complexity. Therefore, in some languages, nouns and verbs were named better or were expressed faster. Such results also require further examination of similar languages for more definitive results.

The effect of word type on the accuracy of naming: The results show that the correctness of the naming Mazandarani cognate and non-cognate nouns, Persian non-cognate nouns is more than verbs. Nouns were predicted to be named better than verbs due to their greater frequency and usage and simpler structure. The results of this study also show that the correctness of naming of nouns is often higher than verbs. The results are consistent with Mätzig [23] and De Bleser et al. [20]. As stated in the introduction, factors, such as the later acquisition of verbs than nouns in the natural development of speech and language, the greater use of nouns than verbs in most languages, and the complexity of semantic representation of verbs indicate that verbs are more difficult to process than nouns, therefore nouns naming is often more accurate than verbs.

The effect of word type on the speed of naming: Mazandarani-Persian bilingual named verbs faster than nouns in the Mazandarani language, and named nouns faster than verbs in Persian language. According to the Mätzi et al.'s studies [23] on eight English-speaking individuals, 7 persons named nouns faster than verbs, and one named verbs faster similar to Persian. However, no similar study has been found to examine bilinguals. As mentioned before, it seems that the level of language knowledge of Mazandarani-Persian bilinguals in the field of Mazandaran verbs is less than nouns, therefore the rate of language control factors is less and the naming of verbs in this language is faster.

Viewing various studies, it is found that the type of word, i.e. noun and verb, can affect the accuracy and speed. In the present study, more nouns and verbs were selected than in other studies to better investigate this effect. Almost all nouns with different semantic categories as well as verbs with different frequencies in Persian were examined.

The relationship between accuracy and speed of naming: In most cases, a negative relationship is observed between the accuracy and speed of naming, or no relationship is observed between these two variables. Individuals who called the pictures can name them faster. High retrieval speed can lead a person to retrieve the correct word (the critical point here is that as the accuracy increases, the speed decreases numerically, and it becomes faster). The results are consistent with the study of Barani Zaghe et al. [9].

5. Conclusion

The present study showed that in Mazandarani-Persian bilingual individuals, among the studied variables, word cognateness, gender (men), word type (noun), level of education, and Persian language has a positive effect on naming accuracy, while no variable has a positive effect on the speed of naming.

Word cognateness has increased the ability to name in Mazandarani-Persian bilinguals. Therefore, it can be concluded that the process of naming the picture is not serial and discrete. In this type of model, only one lemma is excited and eventually reaches the production stage. Therefore, no difference exists between the cognate and non-cognate words in naming the picture. While based on the cascading naming model, in the process of naming the picture, several lemmas are activated along with their phonological structure. According to this model, when bilinguals name a picture, the words related to the picture are activated in both languages, and in the next step, their phonological structures are also activated. When image-related words are cognate between the two languages, because many of their phonemes are common, the activation rate of common phonemes increases, and as a result, the word associated with the picture is better named in the target language than words that do not have this feature (non-cognate). The results of the present study are also an example of the effect of cognateness on the ability to name, and therefore confirm the cascade model of naming.

Limitations and suggestions

Mazandarani language is a local language and has no written form and this issue may affect the results.

Although it was tried that the people entering the study have sufficient mastery of both languages, it seems that Mazandarani-Persian bilingual speakers' words have changed under the influence of the Persian language instead of the original Mazandarani words. It is necessary to think to preserve this language because, with this process, the Mazandarani language will disappear or become a Persian dialect in the future.

Due to the large number of groups of people studied (24 groups), and due to the time limit of the research, the number of people in each group was 5 people. The small number of people may have influenced the results. It is suggested to consider smaller groups with more people for further studies in this field.

A week interval was between the first language test (Mazandarani) and the second language test (Persian). Everyone first named the exams in Mazandarani language and a week later in Persian. This time interval may not have been enough, and some people who did not notice the picture at that time in the first stage (within 10 milliseconds) were able to name the pictures faster and more accurately in the second stage. The similarity of the pictures of both tests (Persian and Mazandaran) may have a facilitating effect on calling a second language in some people. In future studies, it may be better to increase the time interval between the tests or to make a comparison between people who named the pictures in the first language and then in the second language, and people who first named the pictures in the second language and then in the first language.

Ethical Considerations

Compliance with ethical guidelines

The ethical committee of Tehran University of Medical Sciences approved this study (Code: IR.TUMS.FNM.REC.1398.003).

Funding

The present article is extracted from the MSc. thesis of first author at the Department of Speech Therapy, School of Rehabilitation, Tehran University of Medical Sciences, Tehran.

Authors' contributions

Study concept and design: Mansoureh Kazemi, Azar Mehri; Acquisition, analysis, or interpretation of data: Mansoureh Kazemiand, Shohreh Jalaei; Drafting of the manuscript: Mansoureh Kazemi, Azar Mehri, Shohreh Jalaei, Ferdos Agha Golzadeh; Administrative, technical, or material support: Mansoureh Kazemi, Azar Mehri; Study supervision: Azar Mehri and Shohreh Jalaei, Ferdos Agha Golzadeh.

Conflict of interest

The authors declared no conflict of interest.

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