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Adaptation and psychometric data of the Exploration of Natural Metalinguistic Skills in Aphasia Protocol (MetAphAs) - Chilean version

Adaptación y datos psicométricos de la versión chilena del Protocolo de Exploración de Habilidades Metalingüísticas Naturales en Afasia (MetAphAs)

Keywords

ABSTRACT

Purpose: This study aimed to cross culturally adapt the Protocol for the Exploration of Natural Metalinguistic Skills in Aphasia (MetAphAs), contributing to the future application in the aphasic Chilean population. **Method:** The sample corresponds to 72 healthy subjects in the region of Valparaíso, between the ages of 50 to 85. The MetAphAs measures natural metalinguistic skills and presents the basic elements on which to base the exploration of the metacognitive dimensions involved in verbal behavior. The validity was ascertained by means of Cronbach's Alpha Coefficient, including the values of each of the 6 sections; the correlations between variables were analyzed by the Pearson coefficient. **Results:** We observed that 64% of the sample corresponded to the female and 36% to the male gender, with predominant age ranging from 61 to 70 years. We verified adequate correlation between the variables according to the Pearson coefficient, and highly positive values according to Cronbach's Alpha. **Conclusion:** The use of the protocol is viable, with data demonstrating high reliability. The results evidenced high liability, which encourages the continuation process of its validation with Chilean aphasic population.

Palabras llave

RESUMEN

Objetivo: El objetivo de este estudio fue adaptar transculturalmente el Protocolo de Exploración de Habilidades Metalingüísticas Naturales en Afasia (MetAphAs), contribuyendo a la aplicación futura del instrumento en la población afásica chilena. **Método:** la muestra corresponde a 72 individuos sanos de la región de Valparaíso, de 50 a 85 años. El Protocolo MetAphAs mide las habilidades metalingüísticas naturales y presenta los elementos básicos en los que debe basarse una exploración de la dimensión metacognitiva involucrada en el comportamiento verbal. La validez se verificó mediante el coeficiente alfa de Cronbach, incluidos los valores de cada una de las 6 secciones; las correlaciones entre las variables fueron analizadas por el coeficiente de Pearson. **Resultados:** el 64% de la muestra correspondió a mujeres y el 36% a hombres, con el mayor grupo de edad de participación de 61 a 70 años; se verifica una correlación adecuada entre las variables según el coeficiente de Pearson y los valores altamente positivos según el alfa de Cronbach. **Conclusión:** el uso del protocolo fue factible y relevante, con datos que demostraron una alta confiabilidad. Los resultados obtenidos y las ventajas indicadas alientan el uso de este tipo de instrumento como una opción viable para la validación en afásicos chilenos.

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INTRODUCTION

Senescence is characterized by an increase in the population aged 60 years and over and its relevance because it promotes multiple social impacts on education, health, economy and the workforce composition. Chile is one of the Latin American countries that have shown an accelerated transition in the aging of its population[1].

Elderly people maintain the ability to use language and communication with certain characteristics[2,3] such as: hearing loss, a common problem, may be one of the causes of oral comprehension problems and communication skills changes[3,4], vocabulary increase or preservation, difficulties in accessing the lexicon (in spite of conceptual knowledge preservation), problems in understanding and repeating complex syntactic structures and difficulties in adequately producing different discourse genres[3-6].

Cognitive processing is naturally affected in the aged, with consequences in all processes, especially working memory and attention. Cognitive processes influence language performance[7], because human communication dynamics are controlled by metacognitive mechanisms related to conscious introspection of knowledge and the way of planning and organizing one's own thinking. Metalinguistic activity is closely related to the functionality of language and speech because it regulates linguistic ability to use oral and written codes[7,8].

Metalinguistic awareness allows us to reflect and examine the different dimensions of the linguistic system: each language level can be taken as an object of reflection[9] and analyzed in relation to its form, content and use in communicative contexts[8,9]. Metalinguistic reasoning is associated with an explicit type of thinking about language and with cognitive task control[10].

When facing a process of natural cognitive decline, cognitive processing capacity is particularly affected, with consequences for all sub processes, especially working memory and attention, which influence communication and language[7], because human communication dynamics are controlled by metacognitive mechanisms related to conscious introspection of the states of knowledge and individual ways of planning and organizing their own thinking. Therefore, metalinguistic activity, which regulates the linguistic ability to use oral and written sub codes, would be included in metacognition[8]. Metalinguistic activity is closely related to the functionality of language and speech[7].

Metalinguistic awareness allows subjects to reflect and examine different dimensions of the linguistic system, that is, each language level can be taken as an object of reflection and analysis in relation to its form, content and use in communicative contexts[8,9]. Metalinguistic reasoning is associated with an explicit type of thinking about language and with cognitive control over tasks[10]. Metalinguistic activity is not necessarily automatic and intentional, because it involves the person's ability to monitor their own language[10,11] and requires a complex analysis of aspects such as making grammatical acceptance judgments, correcting unacceptable sentences (locating the wrong part and achieving a correct explanation), assessing ambiguity, establishing synonym and antonym relations, performing auditory and kinesthetic analysis of phonemes with a quick verification of the syllabic-phonetic structure of words, manipulating language segments in analysis and synthesis operations, coordinating form and content and operating sentence segmentation, amongst others[11].

Researchers, that address metalinguistic skills in adults and elderly together with procedures and tasks that consign metacognitive dimension in verbal behavior, are important to the development of communication and language disorders sciences, because they aggregate cognitive support for language use studies, in particular on conscious and reflexive use (such as everyday language contexts)[3,8,11].

Therefore, the objective of this study* is to describe metalinguistic skills in healthy adults and elderly, through the application of the protocol for exploring metalinguistic skills in aphasia - MetAphAs[12]. The protocol was developed to assess metalinguistic skills and to explore possible alterations of language metacognitive dimension or of projected executive function on verbal behavior in aphasia. MetAphAs can also be used as an assessment tool for other disorders such as cognitive disorder and dementia. One of its advantages is that it evaluates metalinguistic skills ecologically, that is, in daily use of language. The MetAphAs protocol was created and developed by Vicente Rosell Clari (speech pathologist) and Carlos Hernández Sacristán (linguist), professors from the University of Valencia, Spain[12].

METHOD

This study is descriptive, cross-sectional and non-experimental. Ethical approval was obtained from the Ethics Committee of the Santo Tomás University (Chile), using number 94.16. All subjects voluntarily signed the informed consent.

The sample was composed of 72 healthy individuals, from 50 years of age, randomly selected from associations and community groups of adults and older adults in the Valparaíso region which has the highest aging population[13].

The inclusion criteria were: healthy subjects, both genders, with all educational levels. Exclusion criteria were: subjects with impaired hearing or basic motor speech processes, with psychiatric or neurological disorders, dependent on drugs, alcohol or medications that compromise cognitive performance and who did not agree to sign the informed consent.

Trained volunteer students of the Speech Pathology and Audiology School of Santo Tomas University Internship Program carried out the application of the MetAphAs Protocol.

This instrument has six sections, with a total of 40 items (Annex 1), which are applied by asking the subject to repeat, read, assemble a puzzle, identify and name pictures, answer questions, describe and sing, among others tasks. The responses are rated from 0 to 4 points, using a Likert scale, with a total score of 160 points.

The results were analysed according to the central tendency values (mode, median and mean) and dispersion (range, standard deviation and variance). Internal consistency was verified using Cronbach's Alpha Coefficient, including the values of each of the 6 sections; correlations between variables were analysed by Pearson's coefficient, version 16.

RESULTS

The study sample consists of 72 healthy individuals from the Valparaíso region: 64% corresponds to the female gender and 36% to the male gender, with the highest participation group from 61 to 70 years of age, followed by the group of 50 to 60 years. Regarding education, the group with highest number had a secondary level, followed by an incomplete secondary and higher level.

In relation to the total score of the protocol, the central tendency values were: N = 72, mean = 139, median = 145 and mode = 145; the dispersion values were: range = 104, standard deviation = 18 and variance = 328, with a minimum of 56 points and a maximum of 160. The data analysed with the Cronbach's alpha coefficient test indicated a result of 0.91, which shows high reliability, with 90% of the variables also presenting consistency and correlation in their responses. The same method was also used to analyse each section responses, with the following results: Section 1 = 0.353, Section 2 = 0.791, Section 3 = 0.715, Section 4 = 0.503, Section 5 = 0.616 and Section 6 = 0.776. The Cronbach coefficient indicates that there is a high internal consistency among the sections of the MetAphAs protocol, except in Section 1.

In addition, an analysis was performed for calculating Pearson's correlation coefficient to determine the relationship between the variables for each of the sections. This data set shown in Table 1 indicates that the values are positive and it also evidences reliability and a high internal consistency.

In addition to the previous analysis, Table 2 displays percentile scores of the values obtained in the different sections of the protocol: section 4 (reported speech or referred discourse and associated phenomena) indicated the lowest score followed by section 3 (definition of terms, circumlocutions, "tip of the tongue" phenomenon and paraphasias); the highest scores were evidenced in section 5 (monitoring abilities and contextualization cues) and in section 6 (displaced uses of language and Theory of the Mind).

Table 1. Correlations between sections

	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6
Section 1	1	0.643**	0.651**	0.529**	0.517**	0.504**
Section 2	0.643**	1	0.714**	0.588*	0.561**	0.601**
Section 3	0.651**	0.714**	1	0.734**	0.603**	0.688**
Section 4	0.529**	0.588**	0.734**	1	0.600**	0.672**
Section 5	0.517**	0.561**	0.603**	0.600**	1	0.728**
Section 6	0.504**	0.601**	0.688**	0.672**	0.728**	1

Table 2. Percentile Sections Scores

Per-centile	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Total
10	17.00	15.00	14.00	10.00	28.30	25.00	114.90
20	19.00	18.00	16.00	12.00	30.00	29.00	127.60
30	20.00	18.00	17.00	13.00	32.00	32.00	134.00
40	20.00	19.00	18.00	14.00	34.00	34.20	140.00
50	21.00	20.00	18.00	15.00	35.00	36.00	145.00
60	21.00	20.00	19.00	16.00	36.00	37.80	147.00
70	22.10	20.00	19.10	16.00	37.00	39.00	150.00
80	23.00	20.00	20.00	16.00	39.00	39.00	152.40
90	23.00	20.00	20.00	16.00	40.00	40.00	158.00

DISCUSSION

The sample demographic profile is disclosed in accordance with the official Chilean population 2017 census. Regarding reliability, the data indicated adequate internal consistency (Cronbach's alpha of 0.91) and positive correlation between sections.

The use of this protocol to explore metalinguistic skills in healthy adults and older adults is statistically justified. The result of item 4 (silent reading) of section 1, which presented a low score in relation to all the others, may be associated with the low levels of reading habits found in the Chilean population when compared to the Spanish population[14].

Among the main advantages of MetAphAs Protocol that could be observed during the development of this study, we highlight the tasks content and form, which include specific elements addressing each metalanguage characteristic aspect, which are directly related to the language functions observed in the natural environment/context. They offer strong evidence of the ecological nature of the protocol, since the subjects must answer feasible and daily questions, perceive common visual stimuli and manipulate game pieces commonly known as puzzles[13].

Another advantage of its application is that the subjects have a possibility to respond and interact with the evaluator over the topics covered in each section, according to the authors' orientation in the instruction manual. One of the disadvantages could be the estimated application time of approximately 45 to 60 minutes, which, depending on the type and severity of the communication disorder could be very long for the patient.

CONCLUSION

Results and the referred advantages suggest that the use of this instrument is a viable option in the investigation of metalinguistic skills in healthy Chilean adult individuals, which allows us to expand the study for its validation in aphasic subjects.

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Authors' contributions

Ana Paula M. G. Mac-Kay: idealization of the research project, supervision of data collection, analysis and interpretation of data, planning and writing of the final text. Vicente Rosell Clari: orientation of data collection, critical intellectual review and responsibility for final approval for publication. Felipe Espinosa: planning of the fundamentals of the method, analysis and interpretation of the data, participation in the edition of final text. Andrea Monserrat Miranda Veliz: data collection, data analysis and interpretation, article writing. Vicky Stefhany Palacios Olivares: data collection, data analysis and interpretation, article writing.

Annex 1. Protocol MetAphAs Sections

Section I: Inner, inhibited and deferred speech

1. Monological activities
2. Verbalizations supporting everyday activities
3. Whispering
4. Silent reading
5. Deferred use of language (deferred answer)
6. Deferred use of language (deferred description)

Section II: Control of concurrent semiotic procedures

7. Discursive markers
8. Gesturing concurring with verbal activity
9. Melodic intonation
10. Phonic gesture and emotional content expressions
11. Conventional intonation

Section III: Paraphrastic abilities and associated phenomena

12. Definition of terms naming particular objects
13. Definition of abstract terms
14. Circumlocutions
15. " Tip of the tongue " phenomena
16. Paraphasias

Section IV: Reported speech and associated phenomena

17. Reported speech
18. Reported speech and phonic gesturing
19. Voice imitation
20. Reporting a story

Section V: Monitoring ability and contextualization cues

21. Monitoring syllables: Separating syllables in a word
22. Monitoring phrase structure: Sense stress for emphasis
23. Monitoring syllables with the support of gesturing
24. Ways of saying in context
25. Monochannel communication ability
26. Communication ability with absent addressee
27. Self-correction ability
28. Hetero-correction ability
29. Assessing another's word
30. Ability to fill in lexical gaps

Section VI: Displaced use of language and Theory of Mind (ToM)

31. Describing a non present object or situation
32. Remembering recent past events
33. Remembering remote past events
34. Anticipating future events
35. Describing a scene
36. Ability to find antonyms
37. Emotion reading
38. Fictional use of language
39. Ability to lie
40. Expressing irony