

ALZHEIMER'S DISEASE: COGNITION AND PICTURE-BASED NARRATIVE DISCOURSE

Doença de Alzheimer: cognição e discurso narrativo com apoio em figuras

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ABSTRACT

Purpose: to investigate discourse in Alzheimer's disease (AD) using a picture narrative task; to examine possible difficulties in the expression of knowledge and the relationship between discourse and cognition. **Methods:** the design of the study was transversal, using quantitative comparison of groups. The clinical sample consisted of eighteen subjects with AD, eight of them with moderate cognitive decline (GDS 4) and ten with moderate-severe cognitive decline (GDS 5); the control group consisted of sixteen subjects without neurological or psychiatric disorders. All were matched for gender, native language, age and education and subjects underwent cognitive assessments. The discourse task consisted of a picture narrative of the tale "Little Red Riding Hood." **Results:** participants with AD had lower overall coherence scores and more difficulties in the expression of knowledge than subjects without AD. Discourse deficits correlated with performance on cognitive measures. The GDS 4 and GDS 5 groups differed in local coherence scores. **Conclusion:** discourse of subjects with AD was characterized by failure in coherence and informativeness, which related strongly with their cognitive deficits.

KEYWORDS: Alzheimer Disease; Speech; Sense of Coherence; Language; Memory; Cognition

■ INTRODUCTION

Dementia is characterized by the presence of cognitive or behavioral symptoms that interfere in daily activities and represent a decline of previous level of functioning and performance. People with dementia present a cognitive deterioration,

being affected in at least two cognitive domains¹. Among the different types of existing dementias, Alzheimer's disease (AD) is the most prevalent form in the elderly population. The AD diagnosis is currently made on clinical grounds and among its main cognitive features are the difficulties related to memory, language, executive functions and visual-spatial skills^{1,2}. According to previous studies, it is estimated that the frequency of AD detection will double every 20 years until 2040³. Although the number of people diagnosed with AD is high, the pharmacological treatment does not lead to a cure. Therefore, there is a growing recognition of the need for evaluation and cognitive interventions in order to seek a delay in the declining process and an increase in the quality of life of this population.

Some studies concerning the language of people with AD have indicated the presence of difficulties in finding words, paraphasias and impairments in discourse comprehension and production⁴. According to previous research, one of the variables

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related to language performance in AD is education, since individuals with more years of study present better performance in this ability⁵.

Frequently, discourse is described as repetitive, with a high number of undefined terms, meaningless sentences, abrupt thematic changes, lack of coherence and informativeness, as well as an absence of important elements to the interlocutor understanding^{6,7}. Thus, it can be stated that the disruption in discourse production is one of the most devastating impairments related to the cognitive damages that AD entails.

Coherence is the necessary condition for "good discourse production". It sets the textual unit and the relationship between the significant elements, making the discourse comprehensible⁸. Coherence can also be defined as the semantic property of speech; it is what gives meaning to discourse, that is, it is what distinguishes a speech from an arbitrary set of sentences⁹. It is linked to the interpretation of each individual proposition (idea) related to the interpretation of other expressed propositions. Thus, coherence can be studied with regard to the relation between sequences of propositions, as it can also be studied as the coherence relations between discourse propositions and macropropositions (main idea). Each of these levels of analysis relates to two types of coherence: local and global, respectively. The concepts of local and global coherence originate from the idea that discourse propositions are organized according to the macrostructure (main ideas) and the microstructure (less relevant ideas)¹⁰.

Several investigations show that the discourse of participants with AD presents impairments in global coherence, with local coherence being preserved until later stages of the disease¹¹⁻¹³. However, there are still little research devoted to observe the effects of the type of discourse task over discourse coherence. Likewise, few studies seek to understand the possible relationship between discourse coherence and cognitive abilities of people with AD.

Narrative tasks that use pictures to elicit speech seem to reduce memory demands, since the content of the story is accessible to the participant who is facing the picture¹⁴. Despite this supposed reduction of memory demand, research using pictures to induce narratives participants with AD have not shown that they present less empty and repetitive narrative discourses^{15,16}. Discourse deficits in such tasks can therefore be also highly related to failures in the linguistic and executive systems.

The choice of discursive task is crucial, given that it affects the discourse genre adopted by the participant¹⁷. Studies recommend the use of sequenced pictures for the induction of narrative production in

subjects with AD, due to their greater effectiveness related to single pictures, which often elicits a more descriptive discourse with the occurrence of simple naming of the illustrated elements^{18,19}. Only few studies investigate the discursive performance of participants with AD in narrative tasks with sequenced pictures²⁰.

A study examined the the language of participants with AD²⁰ based on four tasks with pictures of different types: one single picture, one sequence of ten related pictures and one map for a route description. The use of deictics (place and person) and nouns in the speech of AD participants was investigated, and it was verified that the type of deictic used and the use of nouns varied according to the task requirements. The predominance of deictics in the discourse of people with AD was confirmed, with more prevalent use of place deictics. Few nouns were used in the tasks; in comparison with healthy subjects, however, there was a greater use of nouns in the single picture task. After expanding the previous analysis and observing the possible existing relationships between the findings and the cognitive variables involved, the authors could conclude that the cognitive abilities are related to the use of deictics and nouns in discursive tasks. Although a greater number of correlations with neuropsychological variables and the use of spatial deictics have been observed, there were also relations with person deictic and nouns. Impairments in the auditory verbal working memory, in the visual working memory, in the verbal fluency and in the general cognitive functioning were some of the deficient abilities that correlated to the discursive variables²¹.

A study¹⁹ accessed the speech of people with AD in comparison with healthy subjects and was able to correlate discursive findings with cognitive variables. To obtain the narrative production from participants, a simple visual stimuli (single picture) and a complex visual stimuli (ordered sequence of seven pictures) were used. The authors could observe that the AD participants presented more discursive deficits in the single picture task. Meanwhile, the sequence of pictures helped participants in the temporal organization of the story. Both discursive tasks were correlated with cognitive variables, although the memory, language and visual-spatial ability scores were the most discriminative ones from the cognitive assessments.

This study had the goal of investigating coherence and difficulties in the expression of knowledge of participants with AD in moderate and moderate-severe cognitive decline stages based on a visual stimulus. Furthermore, it aimed to investigate possible correlations between the failures of

coherence and informativeness presented and the cognitive performance in language and memory assessments.

METHODS

This is a quantitative cross-sectional study with a comparison group analysis. It was approved by the Ethical Committee of Clinical investigation from *Instituto Municipal de Asistencia Sanitaria (CEIC-IMAS)*, under the protocol number 2001/1182/l. The study was conducted at the Department of

Neurology at Hospital Del Mar in Barcelona (Spain). The total sample of participants consisted of thirty-four subjects, from which eighteen had probable AD and sixteen had no neurological or psychiatric disorders, constituting therefore the control group. No significant differences were found between the groups regarding age, education, gender and mother language (Table 1). All participants and family member from the AD group were informed about the procedures of the study and consented to participate voluntarily by signing an Informed Consent document.

Table 1 –Socio-cultural characteristic from the sample

	Sex		Mother Language		Age	Education
	Female	Male	Spanish	Catalan	Mean (SD)	Mean (SD)
Subjects with AD	83.33% ^a	16.66% ^a	50% ^a	50% ^a	79.83 (3.63) ^a	5.50 (2.91) ^a
Subjects without AD	81.25% ^a	18.75% ^a	56.25% ^a	43.75% ^a	79.50 (3.20) ^a	7.37 (3.07) ^a

The values followed by equal letters indicate that no significant differences were detected ($p < 0,05$). Kruskal-Wallis H test (age and education) and Chi-square test (sex and mother language).

The AD group was previously selected by a neurologist and a neuropsychologist, based on exams to evaluate patients' cognitive and functional abilities. Patients' AD stage was classified by the neurologist through the Global Deterioration Scale (GDS)²². Twenty AD subjects were selected to participate in this study, but two of them were excluded because they did not attend a second session of data collection. From the eighteen AD patients, two groups were formed: the first with eight subjects presenting a moderate cognitive decline (GDS 4) and, the second group with ten moderate-severe cognitive decline subjects (GDS 5).

Twenty subjects from a parish and from a civic center in Barcelona were selected to participate in the control group. Four of them were excluded after completing the Mini-Mental²³ and going through a preliminary interview: one of them had suffered a stroke six years ago, and the other three had low scores on the Mini-Mental, as well as signs of mild cognitive impairment. The latter were referred to the Neuropsychology Service at the Hospital del Mar.

The data collection took place in two moments, on the first moment the discursive task was performed and after that the neuropsychological evaluations were applied. To obtain discursive data, a sequence of pictures that illustrate the fairy tale "Little Red Riding Hood"²⁴ was selected. This tale was known (according to family members) by all participants. The pictorial stimulus used consisted of an A4 paper sheet containing a sequence of twelve pictures arranged in a sequenced manner and ordered in time. Participants were asked to narrate the story of Little Red Riding Hood by looking at the pictures and paying attention to their order. Besides the title, no verbal information about actions, characters and scenarios from the story were provided to participants. When participants made long pauses (lasting three seconds or more) the examiner only called their attention to the pictures and asked questions about the actions of the illustrated characters. This task was recorded and later transcribed by Spanish native speakers.

For the analysis of the speech transcripts, the speech emissions were first divided into propositions and the analysis was made in terms of number of propositions and propositional relationships. A proposition consists of a predicate followed by its arguments. The predicate is usually expressed by a verb or adjective and arguments are usually nouns that serve as object or agent. The analysis criteria are displayed below:

Global coherence

It is assessed by the analysis of the relationship between the meaning of each proposition and the global topic proposed by the interviewer. Propositions directly related to the topic were scored as 1.0; propositions indirectly related to the topic were scored as 0.5; and proposition unrelated to the topic were scored as 0.0. The final score for global coherence was calculated by dividing the sum of scores of each proposition by the total number of propositions in each speech.

Local coherence

It is analyzed by assessing the semantic connection of each proposition in relation to the previous one. Conditional and functional relations were scored as 1.0; and the lack of semantic relations between propositions was scored as 0.0. The final score of local coherence was calculated by dividing the sum of scores by the total number of possible relationships between propositions.

Failures in knowledge expression

The failures are quantified and classified in: (1) presence of knowledge gaps in speech, that is, lack of information relevant to understanding the interlocutor; and (2) expression of unnecessary knowledge, that is, unnecessary repetition of ideas. In every passage in which one of these items was perceived a score 1.0 was given, with a score of such pragmatic deficit equivalent to the sum of the points.

In the second phase of data collection, the neuropsychological evaluations were conducted.

The language skills assessed were the verbal comprehension, the lexical-semantic system and the ability to detect detailed semantic relations through the Token tests²⁵, The Boston Naming Test (BNT)²⁶ and Pyramids and Palm Trees²⁷ respectively. The memory systems related to speech production evaluated were the short-term memory, the working memory and the episodic memory through the tests of Digit Span²⁸, Digit Ordering²⁹, Episodic Memory for Barcelona Test³⁰ and Autobiographical Memory Interview (AMI)³¹ respectively. The application and punctuation procedures were the same contained in the manuals of these tests.

For data analysis, the nonparametric Kruskal-Wallis H test was used for comparing the three groups (control, GDS 4 and GDS5); the Mann-Whitney test to compare only the AD group and the control group; the Spearman correlation coefficient test to investigate the possible correlations between the measures of neuropsychological tests performance and the speech variables. The statistical analyses were mainly conducted through SPSS, although the BIOSTAT was also used specifically for the multiple comparisons between each group on the Kruskal-Wallis and Friedman test. We adopted the significance levels of 5% and 1%.

■ RESULTS

Global and local coherence

Differences between the groups

The Kruskal-Wallis H test demonstrated that global coherence scores from the control group (N=16) differed significantly ($\chi^2=16,00$; $p<0,001$) from the scores of the GDS4 group (N=8) and the GDS 5 group (N=10). In other words, the global coherence is significantly affected even in people with AD in a moderate stage. As to the local coherence, it is observed that the groups with AD differed significantly from each other ($\chi^2=18,50$; $p<0,001$) and in comparison with the control group, with a worse performance in the participants with a moderate-severe cognitive decline (Table 2).

Table 2 – Differences between groups related to the global and local coherence

	GDS 4	GDS 5	Controls
	Mean (SD)	Mean (SD)	Mean (SD)
Global coherence	44.96 (31.64) ^a	20.63 (24.74) ^a	81.23 (14.68) ^b
Local Coherence	56.57 (20.86) ^c	27.79 (27.10) ^d	83.98 (11.21) ^e

The values followed by distinct letters represent significant differences between groups ($p < 0,001$).
Kruskal-Wallis H test

In order to investigate possible dissociations between local and global coherence, the differences between local and global coherence scores were tested using the Wilcoxon test to make comparisons. Low scores for both types of coherence were observed. There were also no significant differences between the global coherence and the local coherence in the speech of the control group participants.

Correlations with cognitive variables (sample with AD)

All neuropsychological assessments were correlated with the global coherence scores, with the exception of the Digit Span task. With regard to local coherence, all cognitive variables were correlated, with mostly strong associations (see Table 3).

Table 3 – Correlations between global and local coherence scores and cognitive assessments scores

	Global Coherence	Local Coherence
Token Test	0.67**	0.76**
Boston Naming Test	0.77**	0.63**
Pyramids and Palm Trees	0.74**	0.78**
Digit Span	0.47	0.64**
Digit Ordering	0.65*	0.75**
Free recall Barcelona Test	0.75**	0.73**
Cued recall Barcelona Test	0.78**	0.69**
Autobiographical Memory Interview (EMA)	0.73**	0.75**

The values followed by * represent significant differences between groups with $p < 0,05$ and by ** with $p < 0,01$.
Spearman correlation coefficient

Failures in knowledge expression

As demonstrated in Table 4, the groups with AD differed significantly from the control group as to the presence of failures in knowledge expression ($\chi^2 = 12.62$; 2; $p < 0.05$). By isolating the variables that constituted the discursive variable, it was observed

that the “lack of information” variable, along with the “repetition of ideas” were the most sensible discursive markers to identify significant differences between the speech of the individuals with AD and the speech of the subjects without AD.

Table 4 – Differences between groups related to the failures in knowledge expression

Deficit in knowledge management	GDS 4	GDS 5	Controls
	Mean (SD)	Mean (SD)	Mean (SD)
Total score	13.00 (12.00) ^a	5.87 (4.61) ^a	1.86 (2.16) ^b
Information gaps	10.66 (13.36) ^a	4.87 (3.18) ^a	1.53 (1.68) ^b
Information repetition	2.33 (2.65) ^a	1.00 (2.13) ^{ab}	0.33 (0.72) ^b

The values followed by distinct letters represent significant differences between groups ($p < 0,05$).
Kruskal-Wallis H test

Despite finding differences between the number of repetitions expressed by the GDS 4 participants and the control group participants, differences between groups were not observed when calculating the ratio between the repetitive ideas and the total of ideas of each individual. Considering this ratio, the controls presented on average 0.02 (SD=0.02) repetitions; subjects from the GDS 4 group presented on average 0.07 (SD=0.04) repetitions; and subjects from the GDS 5 presented on average 0.09 (SD=0.17) repetitions. The number of expressed ideas from each group differed significantly ($\chi^2=11.37$; 2; $p<0.01$). The subjects from the control group expressed more ideas (Mean=37.93; SD=20.20) than the AD group, and the subjects from the GDS4 group (Mean=28.83; SD=10.30) expressed more ideas than those on the GDS 5 (Mean=12.87; SD=10.02).

■ DISCUSSION

The scores for global coherence from the GDS 4 and GDS 5 groups were significantly lower than the control group scores. The results confirm the findings of studies that investigated global coherence and topic changes in AD discourse^{12,13}. These results corroborated with the idea that there may be a macrostructural disorder that affects the discourse of individuals with AD already in the beginning of the disease¹¹.

The pictorial stimulus used in the task seemed to offer considerable challenges to the production of globally coherent discourse by the participants with AD. This result agrees with the fact that it seems necessary to access a rich supply of world knowledge to produce discourses endowed with greater global coherence in narratives based on sequences of pictures³².

Local coherence were affected in the discourse of participants with AD, even those who were in the GDS 4 stage of Alzheimer's disease. Therefore, the ability to produce discourse endowed with local coherence also appears to be considerably affected in AD subjects. This result contradicts the idea of a preservation of this ability in contrast with the global coherence decline widely observed in other studies^{11-13,33}. This finding may be explained by the sensitivity of the discursive task used, because in autobiographical discourse tasks without the support of pictures, local coherence seems to be preserved³³. In addition to the fact that the findings detected local coherence deficits, it was possible to observe an evident local coherence decline in the different disease stages. Local coherence scores from the GDS 5 participants were significantly lower than the scores from the GDS 4 participants. This

demonstrates that the measure of local coherence using this discourse task can be used as an efficient marker to demonstrate the severity of the disease.

As for the cognitive scores, several correlations with global and local coherence were verified. With the exception of the Digit Span task, which did not correlate to global coherence, the remaining cognitive tasks correlated with these discourse measures. These data indicate that the production process of narrative with sequential pictures involves interactions with several mental abilities. This visual cued task seems to require considerable integration of the cognitive processes in narrative production. Thus, the results of this study corroborate the idea that the discourse production system cannot be understood only as an arbitrary linguistic system, isolated and separated from the non-linguistic substrate³⁴.

The lack of correlation between the global coherence and the Digit Span task, and the correlation with the Digit Ordering task confirms the idea that the global coherence is a discursive property much more related to working memory, requiring the participant to plan his speech directing his attention to the relevant cues in the picture, while keeping in memory what has already been said and reacting appropriately to the dialogical cues. It is possible that the central executive system of working memory is easily overwhelmed in trying to extract a global and local meaning from the sequential illustrations for an online construction of a mental model.

Besides the verbal comprehension, working memory and episodic memory, the semantic system seems to be widely involved in discourse global processing. The progressive deterioration of the long-term memory in the early stages of AD leads to losses of semantic knowledge. This decline, as well as working memory deficits, interact with difficulties in establishing meaning relations in a more global sense, which would provide meaning to the discourse as a whole¹³.

The discursive difficulties observed were probably influenced by the complexity of the visual input used, which consisted of a stimulus with twelve figures in temporal sequence. This complexity of the task stimulus may have caused the low scores in local coherence, which is not commonly observed in the discourse of individuals in early and moderate stages of AD³³. A study³⁵ also showed that characteristics that are also rarely observed in the language of people with early stages of AD, such as the presence of a large number of paraphasias, were triggered by a task that consisted in the description of a complex pictorial stimulus and not by the description of a simple pictorial stimulus. The number of observed language deficits was greater

in the complex pictorial task, which may indicate that it is more sensitive to show differences between subjects with initial AD and older adults without dementia.

The results from the present study suggest that the use of sequential picture tasks can require mental processes impaired by subjects with AD. The interpretation of a pictorial stimulus, for example, has the direct participation of linguistic processes that operate in the visual perception organization. Alzheimer's disease compromises the relationship between the visual cognitive and linguistic processes, preventing the construction of meaning from organizing the visual-perceptual field³⁶.

Among the findings related to the deficits in knowledge management, the repetitions were more frequent in the GDS4 group. This can be explained by the fact that those participants spoke more during the discursive task than the GDS5 group. Some studies suggest the predominance of repetitions of ideas in the discourse of individuals with AD^{7,14,15}, although, one study³⁷ has observed that the repetition of ideas was more frequent in participants with early stages of AD than in participants with more advanced AD. This finding can indicate that repetitions are actually discourse strategies⁷. However, the authors pointed out that the repetition of ideas could be considered perseverations related to the attention deficit of AD patients. In this case, AD participants repeated propositions because they were failing to inhibit previously activated ideas³⁸. It is known that AD causes deficits in the executive functions, such as inhibition³⁹, however, this cognitive ability was not assessed in the present study, which is one of its limitations.

Particularly, more information gaps were observed in the discourse of subjects with AD than in the control group. The lack of an information element is the cohesion variable which is more related to discourse deficits of subjects with AD¹³.

Some studies suggest that the deficits in the management of the discursive topic seem to be associated with problems in the pragmatic⁴⁰, linguistic⁴ and cognitive¹⁹ domains. The pragmatic domain, though implicit in the discursive task, was not separately assessed as part of the neuropsychological battery used in the present study. The lack of assessments of the pragmatic abilities such as the inferential ability, the comprehension of indirect speech acts, and metaphor interpretation can also be considered one of the limitations of this study. However, the data obtained contradict the idea that the global coherence problems are exclusively of linguistic nature. The ability to produce global and local coherent discourses seems to be related to

a variety of cognitive functions that are involved in pragmatic processes.

The topic changes in the discourse of subjects with AD seem to consist of strategies that indicate the maintenance of flexibility in the communicative system of those individuals⁴⁰. It seems to be more important to analyze the discursive patterns than the linguistic deficits, considering that a great number of compensatory communication strategies can be used by individuals with AD in moderate stages of cognitive decline. Neuropsychology is increasingly adopting the idea that a particular difference observed in patients with cognitive impairments can represent not a deficit *per se*, but a strategy used to compensate a deficit. Viewed from this perspective, topic changes are used by subjects with AD to compensate the difficulty to activate new information about the same topic. In order to keep the conversational turn, the speaker with AD uses the discursive processing flexibility to activate other themes.

The results obtained in the present investigation agree with the findings of other studies that used pictorial stimulus tasks to investigate discourse in AD. However, we alert to the fact that this data should not be interpreted to generalize the discursive performance of people with AD in all tasks, because the tasks that do not rely on pictures show different results³⁴, and the ones that use a single pictorial stimulus also present differences when compared to the use of complex visual stimuli¹⁸⁻²⁰. The interpretative process varies according to the type of picture¹⁹.

The data demonstrates that sequential visual cued discourse tasks are very sensible to detect discourse deficits in AD. They involve several cognitive processes related to discourse production. Thus, it is important to highlight the utility of this kind of discourse tasks for the detection of AD, since it seems to emphasize the discursive deficits that may appear in a more discrete way in other discursive tasks³³. We suggest this type of task to be used in screening procedures for the detection of the vulnerabilities in the language production system of patients with AD. We also highlight the need for the creation of other instruments to assess discourse through sequential pictures, avoiding childish nature, and which could facilitate subjects to take advantage of an already known episodic scheme at least partially preserved in memory. Besides that, more studies are necessary to increase the knowledge about the possible role that those tasks can play in the language intervention of AD patients.

■ CONCLUSION

The results from this study revealed that AD subjects presented lower coherence scores when compared to subjects without AD. Subjects with AD also presented failures in knowledge expression in comparison with subjects without dementia. The

discourse characteristics of AD participants correlated with their cognitive abilities. The GDS 4 group and the GDS 5 group differed from each other with respect to local coherence. These findings can contribute to expand and to deepen the methods of early detection, evaluation and intervention of discursive disorders in people with AD.

RESUMO

Objetivo: investigar as características discursivas de pessoas com Doença de Alzheimer (DA) nos estágios moderado e moderado-grave por meio de uma tarefa com apoio em figuras; examinar possíveis falhas na expressão do conhecimento e a relação entre o discurso e a cognição. **Métodos:** trata-se de um estudo com delineamento transversal, quantitativo, utilizando-se da análise de comparação de grupos. A amostra do grupo clínico foi constituída por dezoito participantes com DA (oito sujeitos com declínio cognitivo moderado (GDS 4), e dez com declínio cognitivo moderado-grave (GDS 5); o grupo controle foi composto de dezesseis sujeitos sem distúrbios neurológicos ou psiquiátricos. Todos sujeitos foram pareados quanto ao gênero, língua materna, idade e escolaridade e todos submetidos a avaliações de habilidades cognitivas. A tarefa discursiva consistiu na narrativa baseada em uma sequência de figuras do conto “Chapeuzinho Vermelho”. **Resultados:** os sujeitos com DA apresentaram escores de coerência global mais baixos, bem como mais falhas na expressão de conhecimento do que sujeitos sem DA e suas características discursivas correlacionaram-se com suas habilidades cognitivas. Os grupos GDS 4 e GDS 5 diferiram com relação à coerência local. **Conclusão:** o discurso dos participantes com DA caracteriza-se por falhas de coerência e informatividade que apresentam relações estreitas com seus déficits cognitivos.

DESCRITORES: Doença de Alzheimer; Fala; Senso de Coerência; Linguagem; Memória; Cognição

■ REFERENCES

1. Frota NAF, Nitrini R, Damasceno BP, Forlenza O, Dias-Tosta E, da Silva AB et al. Critérios para o diagnóstico de doença de Alzheimer. *Dement Neuropsychol*. 2011; 5(1):5-10.
2. Robles A, Alom DS, Peña-Casanova J. Propuesta de criterios para el diagnóstico clínico del deterioro cognitivo ligero, la demencia y la enfermedad de Alzheimer. *Neurología*. 2002;17(1):17-32.
3. Reitz C, Brayne C, Mayeux R. Epidemiology of Alzheimer disease. *Nat Rev Neurol*. 2011;7(3):137-52.
4. Rosseaux M, Sève A, Vallet M, Pasquier F, Mackowiak-Cordoliani MA. An analysis of communication in conversation in patients with dementia. *Neuropsychologia*. 2010; 48(13):3884-90.
5. Azevedo PG, Landim ME, Fávero GP, Chiappetta ALML. Linguagem e memória na doença de Alzheimer em fase moderada. *REV CEFAC*. 2010;12(3):393-9.
6. March EG, Wales R, Pattison P. The uses of nouns and deixis in discourse production in Alzheimer's disease. *J Neurolinguistics*. 2006;19(4):311-40.
7. Cruz FM. Verbal repetitions and echolalia in Alzheimer's discourse. *Clin Linguist Phon*. 2010;24(11):848-58.
8. Koch IGV, Travaglia LC. Texto e coerência. São Paulo: Cortez; 1995.
9. van Dijk T. Texto y contexto: Semántica y pragmática del discurso. Madrid: Catedra; 1998.
10. Kintsch W, van Dijk T. Toward a model of text comprehension and production. *Psychol Rev*. 1978;85(5):363-94.
11. Chapman SB, Zientz J, Weiner M, Rosenberg R, Frawley W, Burns MH. Discourse changes in early Alzheimer disease, mild cognitive impairment, and normal aging. *Alzheimer Dis Assoc Disord*. 2002;16(3):177-86.
12. Dijkstra K, Bourgeois M, Petrie G, Burgio L, Allen-Burge R. My recaller is on vacation: Discourse analysis of nursing home residents with dementia. *Disc Process*. 2002;33(1):55-76.

13. Dijkstra K, Bourgeois MS, Allen RS, Burgio LD. Conversational coherence: Discourse analysis of older adults with and without dementia. *J Neurolinguistics*. 2004;17:263-83.
14. Duong A, Tardif A, Ska B. Discourse about discourse: what is it and how does it progress in Alzheimer's disease? *Brain Cogn*. 2003;53(2):177-80.
15. de Lira JO, Ortiz KZ, Campanha AC, Bertolucci PHF, Minett TSC. Microlinguistic aspects of the oral narrative in patients with Alzheimer's disease. *Int Psychogeriatr*. 2011;23(3):404-12.
16. Lai Y, Lin Y. Discourse markers produced by Chinese-speaking seniors with and without Alzheimer's disease. *J Pragmat*. 2012;44(14):1982-2003.
17. Brandão L, Parente MAMP. Doença de Alzheimer e a aplicação de diferentes tarefas discursivas. *Psicol: Reflex Crit*. 2011;24(1):161-9.
18. Forbes-MacKay KE, Venneri A. Detecting subtle spontaneous language decline in early Alzheimer's disease with a picture description task. *Neurol Sci*. 2005;26(4):243-54.
19. Duong A, Giroux F, Tardif A, Ska B. The heterogeneity of picture-supported narratives in Alzheimer's. *Brain Lang*. 2005;93(2):173-84.
20. March EG, Wales R, Pattison P. The uses of nouns and deixis in discourse production in Alzheimer's disease. *J Neurolinguistics*. 2006;19(4):311-40.
21. March EG, Pattison P, Wales R. The role of cognition in context-dependent language use: Evidence from Alzheimer's disease. *J Neurolinguistics*. 2009;22(1):18-36.
22. Reisberg B, Ferris SH, de León MJ, Crook T. The Global Deterioration Scale for assesment of primary degenerative dementia. *Am J Psychiatry*. 1982;139(9):1136-9.
23. Folstein MF, Folstein SE, McHugh PR. Mini-Mental State. A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res*. 1975;12(3):189-98.
24. Lecours AR, Lhermitte F. *L'aphasie*. Paris: Flammarion; 1979.
25. De Renzi E, Faglioni P. Normative data and screening power of a shortened version of the Token Test. *Cortex*. 1978;14(1):41-9.
26. Kaplan E, Goodglass H, Weintraub S. *Boston Naming Test*. 2nd Edition. Philadelphia: Lippincott Williams & Wilkins; 2001.
27. Howard D, Patterson K. *The Pyramids and Palm Trees Test*. Berkshire, UK: Thames Valley Test Company; 1992.
28. Wechsler D. *Wechsler Adult Intelligence Scale. Administration and Scoring Manual (WAIS-III)*. 3rd ed. San Antonio, TX: The Psychological Corporation; 1997.
29. MacDonald M, Almor A, Henderson V, Kempler D, Andersen E. Assessing working memory and language comprehension in Alzheimer's Disease. *Brain Lang*. 2001;78(1):17-42.
30. Peña-Casanova J. *Programa Integrado de Exploración Neuropsicológica Test Barcelona (Manual)*. Barcelona: Masson; 1990.
31. Kopelman M, Wilson B, Baddely A. *The Autobiographical Memory Interview*. Windsor, UK: Thames Valley Test Company; 1990.
32. Duong A, Ska B. Production of narratives: picture sequence facilitates organizational but not conceptual processing in less educated subjects. *Brain Cogn*. 2001;46(1-2):121-4.
33. Brandão L, Lima TM, Parente MAMP, Peña-Casanova J. Discourse coherence and its relation with cognition in Alzheimer's disease. *Psic Pesq*. No prelo 2013.
34. Kintsch W. Types of mental representation. 2005. Recuperado da internet em 25 de junho de 2005 de : www.fathom.com/feature/122109
35. Forbes KE, Venneri A, Shanks MF. Distinct patterns of spontaneous speech deterioration: an early predictor of Alzheimer's disease. *Brain and Cogn*. 2002;48(2-3):356-61.
36. Luria AR. *Fundamentos de Neuropsicologia*. São Paulo: EDUSP; 1981.
37. Tomoeda CK, Bayles KA. Longitudinal effects of Alzheimer disease on discourse production. *Alzheimer Dis Assoc Disord*. 1993;7(4):223-36.
38. Tomoeda CK, Bayles KA, Trosset MW, Azuma T, McGeagh A. Cross-sectional analysis of Alzheimer disease effects on oral discourse in a picture description task. *Alzheimer Dis Assoc Disord*. 1996;10(4):204-15.
39. Amieva H, Phillips LH, Sala SD, Henry JD. Inhibitory functioning in Alzheimer's disease. *Brain*. 2004;127(5):949-64.
40. Ripich DN, Fritsch T, Ziol E, Durand E. Compensatory strategies in picture description across severity levels in Alzheimer's disease: a longitudinal study. *Am J Alzheimer's Dis*. 2000;15(4):217-28.

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