

Discourse Coherence and its Relation with Cognition in Alzheimer's Disease*

Coherencia del Discurso y su Relación con Cognición en la Enfermedad de Alzheimer

Lenisa Brandão^I
Tatiane Machado Lima^I
Maria Alice de Mattos Pimenta Parente^{II}
Jordi Peña-Casanova^{III}

Abstract

This study investigates discourse coherence and its relation with cognitive deficits in Alzheimer's disease (AD). Participants consisted, in two groups of individuals, 18 with AD in the moderate and moderate severe stages of cognitive decline, and 16 older adults without dementia matched by age, sex and education. Discourse tasks differed according to the presence of non-informative and informative prompts. Verbal comprehension, semantic memory, episodic memory and working memory were tested. Findings showed that global coherence was affected in AD participants. Correlations between discourse and cognitive variables were observed. The strongest correlations found related global coherence to episodic and semantic memory in the informative prompt task. Results are discussed according to clinical and theoretical implications for the understanding of discourse production in AD.

Keywords: Discourse production; Alzheimer's disease; coherence; cognition.

Resumen

Este estudio investiga la coherencia del discurso de las personas con enfermedad de Alzheimer (EA) y las posibles relaciones con déficits cognitivos. Los participantes fueron 18 personas con EA en las fases moderada y severa-moderada y 16 idosos sanos pareados por edad, educación y género. Dos tareas discursivas fueron usadas, una sin ayudas informativas y otra con ayudas informativas. La comprensión verbal, la memoria semántica, la memoria episódica y la memoria de trabajo fueron evaluadas. Los resultados mostraron coherencia global afectada en participantes con EA. Se observaron correlaciones entre el discurso y las variables cognitivas, especialmente entre coherencia y memoria episódica y semántica. La discusión debate la evaluación clínica discursiva y sus implicaciones para entender la comunicación de personas con Alzheimer.

Palabras claves: Producción del discurso; la enfermedad de Alzheimer; coherencia; cognición.

^IUniversidade Federal do Rio Grande do Sul (Porto Alegre), Brasil

^{II}Professora visitante CAPES, Universidade Federal do ABC (Santo André), Brasil

^{III}Department of Behavioral Neurology. Service of Neurology, Hospital del Mar & Behavioral Neurology Research Group, Program of Neuropsychopharmacology, Municipal Institute of Medical Research, Universidad Autonoma de Barcelona (Barcelona), Espanha

Discourse declines significantly in Alzheimer's disease (AD), becoming increasingly unorganized and empty. As the disease progresses, a number of discourse features appear, such as abrupt topic shifts, uninformative speech, indefinite terms, meaningless sentences and the absence of relevant elements for the comprehension of the message expressed (Cecato et al., 2010; Ortiz & Bertolucci, 2005). The reduction of coherence demands a greater amount of turn taking from the listener, who often needs to interrupt the speaker's discourse flow to ask for clarifications (Dijkstra, Bourgeois, Allen & Burgio, 2004; Dijkstra, Bourgeois, Petrie, Burgio & Allen-Burge, 2002).

Coherence is the property which establishes the relations between meaning elements in a discourse. Additionally to its semantic nature, coherence assigns intelligibility to discourse through the consideration of shared representations of world knowledge and contextual rules between communication partners. Coherence can be classified according to the relations between sequences of propositions (local coherence) and between each proposition, and the discourse topic (Global coherence) (Van Dijk & Kintsch, 1983). Previous research which focused on local and global discourse coherence in AD, converges to the idea that global coherence is affected earlier than local coherence in the

course of the disease (Dijkstra, Bourgeois, Petrie, Burgio & Allen-Burge, 2002; Dijkstra, Bourgeois, Allen & Burgio, 2004).

It is clear that, until now, studies in the area have not given a broader picture of the many neuropsychological skills which are involved in discourse macroplanning. Additionally, studies with this population have not explored thoroughly the idea that the context of a discourse task changes the interplay between discourse and cognition. Therefore, the method used in the present article has implications for theoretical models on discourse production, which benefits from studies that investigate the link between cognitive neuropsychology and linguistic theories on discourse production.

Besides having the goal of contributing to shed light on theoretical questions about discourse production processes, the current study also focuses on understanding the clinical applications of this knowledge for the evaluation and treatment of the communication of AD patients. Differences between the two discourses tasks used in our study may be useful in providing information on how to compensate cognitive deficits during autobiographical conversations, as informative prompts may have the potential to prevent cognitive decline from affecting discourse coherence in AD. In this manner, our study examines three main questions: “Does discourse coherence improve when the communicative partner provides informative prompts?”, “Does it change significantly from moderate to moderate severe cognitive decline?”, and finally, “Which cognitive processes may be related to discourse coherence?”

Method

Participants

AD groups – Participants with AD consisted of 8 older adults in stage 4, and 10 older adults in stage 5 of the disease. All of them had a primary level of education and were patients in the Neuropsychology Service of the Hospital del Mar, Barcelona, Spain, where the study took place. Inclusion criteria, results of the screening with the Mini-mental State Exam (MMSE) (Blesa et al., 2001; Folstein, Folstein & McHugh, 1975), along with a complete neuropsychological profile of the groups can be viewed in Table 1. AD subjects were classified in stages of cognitive decline with the Global Deterioration Scale (GDS), which enabled the selection of patients in stages, 4 and 5 of Reisberg, Ferris, de León and Crook (1982), which represent moderate cognitive decline and moderate-severe cognitive decline, respectively.

Control group – A group of 16 older adults, consisting of volunteers paired by age and years of education were screened to exclude neurological and psychiatric pathologies. These subjects were interviewed and reported being in good health, with no history of speech, language or hearing problems. The individuals also met the MMSE criteria for exclusion of dementia.

Accompanying family members – Accompanying family members were asked to tell a personal story from the participant’s life in order to provide a basis of information for the narrative prompts that

Table 1. Neuropsychological profile of participants

	MMSE	Token Test	Pyramids and Palm Threes Test	Boston Naming Test	Digit span	Digit ordering	AMI		Prose memory	
							Semantic	Incident	Free	Prompted
Controls	28,75 (1,12) ^a	32,65 (2,24) ^a	49,81 (1,60) ^a	44,43 (4,56) ^a	5,43 (0,62) ^a	5,06 (0,85) ^a	53,81 (3,02) ^a	24,06 (1,65) ^a	14,90 (2,85) ^a	17,93 (1,97) ^a
GDS 4	22,50 (4,40) ^b	24,12 (8,85) ^b	43,21 (6,54) ^b	29,00 (7,46) ^b	4,50 (0,92) ^b	3,00 (2,20) ^b	16,09 ^b	7,72 ^b	2,93 ^b	4,44 ^b
GDS 5	16,10 (2,18) ^c	17,00 (5,29) ^c	30,50 (7,48) ^c	21,30 (4,98) ^c	4,1 (0,87) ^b	0,60 (0,96) ^c	10,11 ^c	6,21 ^b	2,01 ^c	2,97 ^c

Mean and standard deviation values accompanied with different letters indicate that significant differences were detected ($p < 0,05$) with the Kruskal-Wallis test. GDS 4: Global Deterioration Scale 4; GDS 5: Global Deterioration Scale 5; MMSE: Mini-Mental State Exam; AMI: Autobiographical Memory Interview; Semantic: personal semantic knowledge; Incident: autobiographical knowledge; Free: free recall; Prompted: prompted recall.

would be given during the interview with the AD patient.

All participants (controls and AD patients), as well as accompanying family members, received information about the study and participated as volunteers. A letter of consent that explained the purpose of the study was signed by the participant and by the responsible member from the family. The project was previously approved by the Ethics Committee of Hospital del Mar, Barcelona, Spain.

Social and Cultural Features of the Samples

The Kruskal-Wallis statistical test did not detect significant differences between groups concerning age and education. The AD group had a medium of 79.83 (SD=3.63) years of age, while the control group had a medium of 79.50 (SD=3.20) years. Concerning years of education, the AD group had 5.5 (SD=2.91) years, while the control group had 7.37 (SD=3.07) years of education. The chi-square test also did not find significant difference between groups concerning gender and first language. In the AD group, 83.33% were women, and in the control group, 81.25% were women. Concerning first language, in the AD group 50% had Spanish as a first language and the other 50%, Catalan. In the control group, 56.25% had Spanish as first language and 43.75 had Catalan.

Neuropsychological Evaluations

To evaluate semantic memory, we used the Pyramids and Palm Threes Test (Gudayol-Ferré, 2000; Howard & Patterson, 1992); comprehension was tested with the Token Test (De Renzi & Faglioni, 1978); lexical-semantic systems were tested with the Boston Naming Test (BNT) (Kaplan, Goodglass & Weintraub, 2001); short-term memory was tested using the Digit span task (Wechsler, 1997; Peña-Casanova, 1990) and working memory was evaluated using the Digit ordering task (MacDonald, Almor, Henderson, Kempler & Andersen, 2001). Episodic memory evaluations included the Autobiographical Memory Interview (AMI) (Kopelman, 1994) and the textual memory task from the Barcelona Test (Peña-Casanova, 1990). According to the Mann-Whitney test, the AD sample differed significantly ($p < 0.01$) from the control group in all neuropsychological scores.

Procedures

First, accompanying family members of AD participants were interviewed individually in order to obtain information necessary for creating the prompts which would be provided in the informative prompt task. Details of this procedure are described in Brandão et al. (2009).

Discourse Tasks

The topic-directed interviews took place in a quiet room, and the participants were assessed individually. All of the interviews were audiotaped, and all of the interviewees knew that they were being taped. Each task differed by the type of prompt provided by the examiner.

Non-informative Prompts

The wedding theme was selected due to high autobiographical memory scoring. The instruction consisted of asking participants to tell a story related to their wedding. The examiner used signs of attention and support (such as bouncing his or her head and saying yes and *umhum*). Non informative prompts consisted in: (1) general prompts for the recovery of an autobiographical event were given when the participant did not recall any event on that topic; (2) continuity prompts were given during long pauses and whenever there was an early interruption; and (3) topic return prompts were given whenever the participant changed topic abruptly.

Informative Prompts

In this kind of task, informative prompts were given in a second attempt to obtain the narrative proposed, only in the cases in which discourse lacked more than one category of the narrative superstructure¹. The patient was then told that information about the story was given by the family member, and that hints would be provided if needed. During the patient's long pauses (up to 3 seconds), the examiner provided information in an orderly manner. Subcategories consisted of setting information, such as participants, time and

¹ Superstructure refers to the presence of the main categories of a discourse gender. In this case, the narrative gender is formed mainly by setting (with a scenery and participants), complication and resolution.

place, as well as action progression, such as complication and resolution.

Transcripts

Each interview was transcribed in its entirety, both orthographically and verbatim. Contextual notes, such as important gestures and other nonverbal behaviors that affected the comprehension of the story were reported. Unintelligible utterances were excluded from the analysis. The analysis was done in terms of proposition relations. Discourse analysis of coherence was pursued by two judges who followed the written transcripts.

Local Coherence

This feature was evaluated by examining the presence of functional or conditional semantic relations of each pair of propositions (1 or zero). The number of semantically related pairs of propositions was calculated over the total number of pairs of propositions expressed in discourse.

Global Coherence

This feature was evaluated by examining the presence of functional or conditional relations between each sentence and the discourse topic. Propositions considered directly related to the topic were rated with a score of 1.0; propositions considered indirectly related to the topic were rated with a score of 0.5; and propositions considered as non related to the topic were rated with a score of 0.0. The final global coherence score was the Sum of the coherence scores given to each proposition calculated over the total number of propositions expressed in discourse.

Reliability of Discourse Analysis

A random part of the transcripts (15%) was taken to calculate the agreement between the two independent judges, using Kendall's Tau statistical test. For local coherence scores the agreement was 97% and for global coherence the agreement was 90%.

Results

Neuropsychological Profile of the Groups

According to the Mann-Whitney test, the AD sample differed significantly ($p < 0.001$) from the control group in all neuropsychological scores. All evaluations yielded significant differences between groups, except Digit Span and Autobiographical Memory for incidents.

Global Coherence Differences Between Groups

AD groups (GDS 4 – $n=8$; and GDS 5 – $n=10$) did not differ from each other in terms of global coherence in any of the discourse tasks. However, the H of Kruskal-Wallis test showed that global coherence scores of both AD groups differed significantly from the control group's scores in the non informative prompt task ($\chi^2=15.92$; $p < 0.001$).

We observed various correlations between global coherence and cognitive variables. The correlation with verbal comprehension was the most consistent, appearing in both discourse tasks.

Positive correlations were observed between global coherence and a variety of cognitive measures. In the non informative prompt task ($n=18$), global coherence correlated with the results of the Token test (verbal comprehension).

Table 2. Coherence differences between groups

Discourse task	Coherence	GDS 4 M (SD)	GDS 5 M (SD)	Control M (SD)
Non informative	Global	58.16 (30,43) ^a	47.75 (25,13) ^a	88.20 (11,35) ^b
	Local	68.82 (34,56) ^a	72.64 (22,86) ^a	85.21 (12,04) ^a
Informative	Global	83.05 (37,13) ^a	49.06 (38,59) ^a	–
	Local	79.77 (35,68) ^a	69.04 (19,09) ^a	–

Values accompanied by different letters represent significant differences between groups ($p < 0.001$); M: mean; SD: standard deviation; GDS 4: Global Deterioration Scale 4; GDS 5: Global Deterioration Scale 5

Table 3. *Correlations between coherence and cognitive scores*

	Non informative prompts		Informative Prompts	
	Coherence		Coherence	
	Global	Local	Global	Local
Token Test	0.54*	0.41	0.59*	0.41
Boston Naming Test	0.19	0.29	0.38	0.28
Pyramids and Palm Threes Test	0.29	0.48*	0.67*	0.46
Digit span	0.40	0.64**	0.49	0.24
Digit ordering	0.30	0.30	0.50	0.48
Free recall textual memory Barcelona	0.43	0.45	0.66*	0.53
Prompted recall textual memory Barcelona	0.45	0.47*	0.67*	0.40
Autobiographical Memory Inter- view (AMI)	0.38	0.27	0.86**	0.70*

*p<0.05; **p<0.01

In the informative prompt task (n=13), global coherence correlated not only with Token test scores, but also with the Pyramids and Palm Threes scores (ability to access detailed semantic representations), free recall and prompted recall scores from the Barcelona test and AMI scores. Most of the correlations were moderate, and autobiographical memory scores had strong correlations with discourse coherence. This was not a surprise, since episodic memory deficits are important features of AD and the narrative task required autobiographical recall.

Correlations between Local Coherence and Cognitive Scores (AD group)

Local coherence scores correlated with various cognitive measures (Table 2). In the non informative task (n=18) moderate correlations were observed with scores of the Pyramids and Palm Threes test (ability to access detailed semantic representations), Digit span

(short term memory capacity) and prompted recall of textual memory (Barcelona test). Local coherence correlated strongly with autobiographical memory scores in the informative prompt task (n=13). This result confirms the idea that autobiographical memory deficits of AD patients can have an important relation with incoherences expressed in their personal narrative.

Discussion

Our results concerning coherence deficits in persons with AD, confirms the findings of other researchers who have demonstrated that global coherence is affected in the early and moderate stages of the disease (Chapman et al., 2002; Dijkstra, Bourgeois, Petrie, Burgio & Allen-Burge., 2002; Dijkstra, Bourgeois, Allen & Burgio, 2004).

The current study raises evidence to the discussion of discourse production in AD by pinpointing the importance of discourse task demands on macro-planning processes. Global coherence scores had a

tendency to be higher in the informative prompt task than in the non informative prompt task. The idea that the nature of discourse tasks influences coherence in the non demented population is not new and has been greatly highlighted in comprehension studies. It is well known that goals are an important aspect of discourse processes (Magliano & Radvansky, 2001). Macrostructure construction and understanding depends on context, such as our identities, roles, goals, and knowledge as language users. As we know from studies on memory for texts (Trabasso, 2005), when different goals are given to readers, they build topics in a different manner. Discourse goals are represented in a type of episodic memory for the communicative situation, that is, the context model (Van Dijk, 2008). When the context model receives additional informative input on the listener's goals, it may facilitate access to specific mental models of the episodes that should be told by the speaker.

The fact that informative prompts somehow seemed to function as facilitators of discourse coherence indicates that verbal hints given by the communicative partner of the person with AD are potential strategies that may compensate for discourse problems in this population. Other studies have shown that external autobiographical memory aids compensate the difficulties of persons with AD in expressing relevant ideas (Dijkstra, Bourgeois, Burgio & Allen, 2002; Mcpherson et al., 2001; Williams et al., 2011). These findings provide strategies which should be further tested in studies designed to examine how to improve communicative abilities in AD. Training programs directed to family members and caregivers of persons with AD can be proposed to teach effective communication strategies to be used in daily situations. For instance, Roque, Ortiz and Bertolucci (2009) were successful in promoting a positive change in the communicative behavior of caregivers of persons with AD.

Our results on the cognitive skills related to global coherence point to the relevance of verbal comprehension, as measured by the Token test. This linguistic skill seemed to be relevant to the production of globally coherent discourse. It is likely that persons with AD use their comprehension skills to keep in tune with their communication partner. It was especially evident that the only cognitive measure which correlated with global coherence in the non informative prompt task was verbal comprehension. This may

be because in a narrative task in which the communicative partner does not provide additional information on the topic, the speaker relies more on his or her own comprehension skills in order to produce global coherence. This result somehow corroborates with the finding that global coherence in similar discourse tasks relates with semantic memory (Dijkstra, Bourgeois, Allen & Burgio, 2004).

On the other hand, many correlations were found between global coherence in the informative prompt task and cognitive scores. In this case, not only the ability to understand verbal information seems to be important, but also the abilities to access detailed semantic representations (Pyramids and Palm Threes scores), to recall episodic information (logical memory Barcelona subtest), and to recall (AMI) scores. Therefore, many cognitive abilities are necessary in order to benefit from informative prompts given by a communicative partner.

Apart from traditional long-term memory measures currently being used in neurolinguistic studies, discourse models speculate that there is a special kind of memory related to discourse production and which is not yet fully accounted for in neuropsychology. According with discourse processing models (Van Dijk, 1988/1996, 2008; Van Dijk & Kintsch, 1983), global coherence (macrostructures, topics) is represented in the mental model of discourse which is built in Episodic Memory (EM). This means that global coherence depends a great deal in long-term memory (LTM). However, obviously, so as not to get lost in online production, language users need to be able to "stay on topic" and cannot do so only by checking the model in LTM/EM. Hence, as Kellogg (2001), Oulasvirta and Saariluoma (2006) have proposed, there must be some kind of long-term working memory that plays an important role in global coherence. Actually, this idea corroborates with Kintsch and van Dijk's (1978) old idea of a "Control System" that is overseeing processing (sentential and sequential – local – understanding) in short term memory. This kind of Control Memory would not only keep track of the current and main macroproposition (what the topic of the current Pgraph and the whole text are), but also of the context model, that is, the pragmatic information of the communicative event: Setting, Participants, current Action, Goals and Knowledge. Without this cognitive process, language users would have no idea, also in reading, why they are reading.

Future studies should dedicate effort on developing consistent measures and models on this possible type of memory used to maintain global coherence.

Findings on local coherence also confirmed the results of other studies (Dijkstra, Bourgeois, Petrie, Burgio & Allen-Burge, 2002; Dijkstra, Bourgeois, Allen & Burgio, 2004). Local coherence was preserved in the moderate and moderate-severe stages. Accordance with Dijkstra, Bourgeois, Petrie, Burgio, & Allen-Burge (2002) in a study on in autobiographical discourse, this type of coherence is affected only in the severe stages of AD. The new findings we yield is that local coherence scores in AD had more relations with cognitive measures than did global coherence. This might be because this discourse ability is lost only when general cognitive decline is greater, while global coherence declines in the earlier stages of the disease, when many cognitive skills are still preserved. An interesting result related to local coherence was that it correlated not only with episodic and semantic memory, but also with short-term memory capacity. Note that short-term memory did not correlate with global coherence in any of the tasks. This might be so because the ability to preserve meaning relations between each idea expressed and the topic relates to long-term memory, not to short-term memory. In contrast, producing related subsequent ideas is clearly associated with being able to remember recent information expressed.

Studies suggest that difficulties in topic management seem to be associated with pragmatic (Carlomagno, Santoro, Menditti, Pandolfi & Marini, 2005), linguistic (Rousseaux, Sève, Vallet, Pasquiera, & Mackowiak-Cordoliani, 2010) and memory deficits (Caspari & Parkinson, 2000; Small & Perry, 2005). Although many authors agree with these general relations, rarely do studies investigate the correlations between discourse and a range of cognitive abilities. Our findings support the idea that many neuropsychological measures are related to discourse. Therefore, it is reasonable to infer that discourse production is a complex task which requires the activity of many cognitive mechanisms and is probably considerably vulnerable to global cognitive decline. It is important to point out that the correlation findings reported here are not aimed to tease out the exact relationship between discourse coherence and cognition. The results rather show that the role of cognition in discourse production is partly determined by the context in which communication takes place. In agreement with March, Pattison and Wales (2009), we

support the idea that the communicative context plays a fundamental role on the interplay between discourse and cognition. Correlations between coherence and cognition vary across the different discourse conditions. This corroborates to the idea that the use of multiple discourse tasks is essential in understanding the relation between discourse and cognition, considering the properties and demands of different communicative contexts.

References

- Blesa, R., Pujol, M., Aguilar, M., Santacruz, P., Bertran-Serra, I., Hernández, G., Sol, J. M., & Peña-Casanova, J. (2001). Clinical validity of the "mini-mental state" for Spanish speaking communities. *Neuropsychologia*, 39(11), 1150-1157.
- Brandão, L., Castelló, F. G., van Dijk, T. A., Parente, M. A. M. P., & Peña-Casanova, J. (2009). Cognition and discourse production in Alzheimer's disease: using informative prompts. *Psychology & Neuroscience*, 2(2), 99-107.
- Carlomagno, S., Santoro, A., Menditti, A., Pandolfi, M., & Marini, A. (2005). Referential communication in Alzheimer's type dementia. *Cortex*, 41(4), 520-534.
- Caspari, I., & Parkinson, S. (2000). Effects of memory impairment on discourse. *Journal of Neurolinguistics*, 13(1), 15-36.
- Cecato, J. F., Martinellil, J. E., Bartholomeu, L. L., Basqueira, A. P., Yassuda, M. S., & Aprahamian, I. (2010). Verbal behavior in Alzheimer disease patients - analysis of phrase repetition. *Dementia & Neuropsychologia*, 4(3), 202-206.
- Chapman, S. B., Zientz, J., Weiner, M., Rosenberg, R., Frawley, W., & Burns, M. H. (2002). Discourse changes in early Alzheimer disease, mild cognitive impairment, and normal aging. *Alzheimer Disease and Associated Disorders*, 16(3), 177-186.
- De Renzi, E., & Faglioni, P. (1978). Normative data and screening power of a shortened version of the Token Test. *Cortex*, 14(1), 41-49.
- Dijkstra, K., Bourgeois, M., Petrie, G., Burgio, L., & Allen-Burge, R. (2002). My recaller is on vacation: Discourse analysis of nursing home residents with dementia. *Discourse Processes*, 33(1), 55-76.
- Dijkstra K., Bourgeois, M., Burgio, L., & Allen, R. (2002). Effects of a communication intervention on the discourse of nursing home residents with dementia and their nursing assistants. *Journal of Medical Speech - Language Pathology*, 10(2), 143-157.

- Dijkstra, K., Bourgeois, M. S., Allen, R. S., & Burgio, L. D. (2004). Conversational coherence: Discourse analysis of older adults with and without dementia. *Journal of Neurolinguistics*, 17(4), 263-283.
- Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). Mini-Mental State. A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, 12(3), 189-198.
- Gudayol-Ferré, E. (2000). Normalización del Test de Pirâmides y Palmeras en una población española. *Tésina de Máster de formación profesional en Neuropsicología*. Universitat Autònoma de Barcelona.
- Howard, D., & Patterson, K. (1992). *The Pyramids and Palm Trees Test*. Berkshire, UK: Thames Valley Test Company.
- Kaplan E., Goodglass H., & Weintraub, S. (2001). *Boston Naming Test* (2nd ed). Philadelphia: Lippincott Williams, & Wilkins.
- Kellogg, R. T. (2001). Long-term working memory in text production. *Memory & Cognition*, 29(1), 43-52.
- Kintsch, W., & Van Dijk, T. (1978). Toward a model of text comprehension and production. *Psychological Review*, 85(5), 363-383.
- Kopelman, M. D. (1994). The autobiographical memory interview (AMI) in organic and psychogenic amnesia. *Memory*, 2(2), 211-235.
- Magliano, J. P., & Radvansky, G. A. (2001). Goal coordination in narrative comprehension. *Psychonomic Bulletin & Review*, 8(2), 372-376.
- March, E. G., Patisson, P., & Wales, R. (2009). The role of cognition in context-dependent language use: Evidence from Alzheimer's disease. *Journal of Neurolinguistics*, 22(1), 18-36.
- MacDonald, M., Almor, A., Henderson, V., Kempler, D., & Andersen, E. (2001). Assessing working memory and language comprehension in Alzheimer's Disease. *Brain and Language*, 78(1), 17-42.
- Mcpherson, A., Furniss, F. G., Sdogati, C., Cesaroni, F., Tartaglino, B., & Lindesay, J. (2001). Effects Of Individualized Memory Aids on The Conversation Of Persons With Severe Dementia: A pilot study. *Aging & Mental Health*, 5(3), 289-294.
- Ortiz, K. Z., & Bertolucci, P. H. F. (2005). Alterações de linguagem nas fases iniciais da doença de Alzheimer. *Arquivos de Neuro-Psiquiatria*, 63(2A), 311-317.
- Oulasvirta, A., & Saariluoma, P. (2006). Surviving task interruptions: Investigating the implications of long-term working memory theory. *Internal Journal Human-Computer Studies*, 64(10), 941-961.
- Peña-Casanova, J. (1990). *Programa Integrado de Exploración Neuropsicológica test Barcelona* (Manual). Barcelona: Masson.
- Reisberg, B., Ferris, S. H., de León, M. J., & Crook T. (1982, September). The global deterioration scale for assesment of primary degenerative dementia. *American Journal of Psychiatry*, 139(9), 1136-1139.
- Roque, F. P., Ortiz, K. Z., & Bertolucci, P. H. F. (2009). Eficácia de treinamento de estratégias comunicativas a cuidadores de pacientes com demência. *Pró Fono*, 21(3), 225-230.
- Rousseaux, M., Sève, A., Vallet, M., Pasquiera, F., & Mackowiak-Cordoliani, M. A. (2010). An analysis of communication in conversation in patients with dementia. *Neuropsychologia*, 48(13), 3884-3890.
- Small, J. A., & Perry, J. (2005). Do You Remember? How Caregivers Question Their Spouses Who Have Alzheimer's Disease and the Impact on Communication. *Journal of Speech, Language, and Hearing Research*, 48(1), 125-136.
- Trabasso, T. (2005). Goal plans of action and inferences during comprehension of narratives. *Discourse Processes*, 39(2-3), 129-164.
- Van Dijk, T., & Kintsch, W. (1983). *Strategies of discourse comprehension*. Orlando FLA: Academic press.
- Van Dijk, T. (1988/1996). Modelos de memória – o papel da representação das situações no processamento do discurso. In I. V. Koch (Trad. e Org.), *Cognição, discurso e interação*. São Paulo: Contexto.
- van Dijk, T. A. (2008). *Discourse and context: A socio-cognitive approach*. Cambridge: Cambridge University Press.
- Wechsler, D. (1997). *Wechsler Adult Intelligence Scale*. (3rd ed.). (WAIS-III) Administration and Scoring Manual. San Antonio, TX: The Psychological Corporation.
- Williams, K., Harris, B., Lueger, A., Ward, K., Wassmer, R. & Weber, A. (2011). Visual Cues for Person-centered Communication. *Clinical Nursing Research*, 20(4), 448-461.

Endereço para correspondência:

Lenisa Brandão
Instituto de Psicologia da
Universidade Federal do Rio Grande do Sul
Ramiro Barcelos, 2600, 1º andar, sala 112
CEP 90035-003 – Porto Alegre/RS
E-mail: lenisa.brandao@ufrgs.br

Recebido em 27/02/2013

Revisto em 14/04/2013

Aceito em 30/04/2013

- * Our gratitude to the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), which provided a one year scholarship of the first author in Barcelona (Spain). We also thank the neurologist Dra. Carmen Terrón, for her cooperation in the selection of patients and the Neuropsychologist Christine Lesmes for transcriptions and autobiographical memory scoring. Last but not least, our very special thank you to Dr. Teun A. van Dijk for honouring this study with his comments and suggestions.