

Telling stories in the elderly. Influence of attentional and working memory processes (preliminary study)

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The capacity to tell stories appears to depend on two main factors: narrative competence and attentional and working memory mechanisms. Several studies of narrative competence in the elderly found an age-related decrement in the later years of life for comprehending and telling stories (Juncos-Rabadan, 1996; Kemper, et al., 1990; Ulatowska, et al., 1986). Other studies (Holland and Rabbit, 1990; Prat, Boyes and Robins, 1986) have related a decline in narrative competence to a decrease in attentional and working memory capacity.

The present paper is a preliminary part of our wide research project on narratives in the elderly which aims to analyse the old people's capacity to tell stories in the presence of their pictorial representations and to study the influence of attention, working memory and processing speed on the story-telling processes.

METHOD

Subjects. A total of 24 subjects participated in this preliminary study classified in four groups of 6 subjects each (3 men and 3 women): Group 1 composed by subjects in the fifth decade of life (mean 44.30 yrs, standard deviation 2.9 yrs); Group 2 composed by individuals in the sixth decade of life (mean 57.72 yrs, standard deviation 3.05 yrs); Group 3 composed by subjects ranged from 61 to 70 years (mean 64.34 yrs, standard deviation 0.69 yrs) and Group 4 composed by individuals who were over 70 years of age (mean 76 yrs, standard deviation 3.60). None of the subjects had any neurological or psychiatric disease, or other problems that could directly affect their performance of the tasks. All of the subjects had similar level of education (primary school) and similar scores on Vocabulary Subtest of WAIS (mean 25, standard deviation 10.90).

Narrative tasks. The task consisted in telling the six-picture «Nest story» from the Bilingual Aphasia Test (Paradis, 1987). The same instructions were given to all the subjects: «I am going to show you a set of six pictures. All together the pictures make a little story. Look at the pictures and tell me the story». Subjects told the story whilst viewing the pictures, and their stories were taped and transcribed.

Narrative measures. We analysed the subjects' stories in terms of four categories: 1) structure, 2) content, 3) cohesion and 4) style. For each category we had several measures. For structure we had as measures the number of words, the number of utterances and the number of subordinate sentences per utterance. For content we measured the number of concepts and

relations of the story's semantic structure. The measures of cohesion were the number of endophoric referential pronouns per utterance, the number of endophoric referential pronouns per the total number of pronouns and the number of cohesive conjunctions per utterance. For the story style we had the number of deictic forms per the total number of words, the number of exophoric referential pronouns per the total number of words, the number of subjective additions and the number of objective additions.

Tasks for inhibition, working memory and processing speed. We used the tasks of incompatibility, working memory and alert (phasic and tonic) from the Test for Assessment of Attention, TAP (Zimmermann and Fimm, 1995) in the Spanish computerized version. For inhibition we used the Wisconsin Sorting Card Test (Heaton et al., 1993).

RESULTS

Two types of analysis were conducted: exploratory factorial analysis (Oblimin rotation) and multiple regression analysis. Exploratory factorial analysis was used to determine if the measures were clustered in main factors. Table 1 shows that the Factor 1 (story content) is composed by the number of units of semantic content, total number of words and the number of special deictics; Factor 2 (structural complexity) is composed by the number of subordinate sentences and the number of deictics; Factor 3 (endophoric reference, as a coherence parameter) is composed by the number of endophoric referential pronouns and the density of endophoric reference; and Factor 4 (cohesion) is measured by the number of cohesive conjunctions. These factors together explained the 78.5% of the variance

TABLE 1
Exploratory factorial analysis for the narrative measures

<i>Narrative measures</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Communality</i>
<i>Semantic content</i>	-.89718				.82843
<i>Total number of words</i>	.84924				.78374
<i>Special deiptics</i>	.71014				.68092
<i>Number of subordinate sentences</i>		.83122			.77577
<i>Deiptics</i>		-.72547			.75483
<i>Endophoric referential pronouns</i>			.87301		.73583
<i>Endophoric referential density</i>			.81221		.80235
<i>Cohesive conjuntions</i>				.95526	.92766
EIGEN VALUE	2.73	1.74	1.56	1.02	
CUMULATIVE PERCENTAGE OF VARIANCE					
FACTOR 1	CONTENT/QUANTITY		30.4%		
FACTOR 2	COMPLEXITY		19.4%		
FACTOR 3	ENDOPHORIC REFERENCE		17.4%		
FACTOR 4	COHESION		11.3%		
SUM			78.5%		

Exploratory factorial analysis for cognitive measures appear in Table 2. Factor 1 (working memory, WM) composed by omission scores on WM trials and correct scores on WM trials explained 34.4% of the variance, Factor 2 (processing speed or alert) composed by reaction times (RT) on phasic and tonic alert trials explained 30.8% of the variance, and Factor 3 composed by the number of correct responses on incompatibility trials of the TAP and the number of perseverative responses on WSCT explained 16.7% of the variance.

TABLE 2
Exploratory factorial analysis for the working memory inhibition and processing speed measures
(cognitive measures)

<i>Narrative measures</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Communality</i>
<i>Omission scores on WM trials</i>	-.98479				.97559
<i>Correct scores on WM trials</i>	.98283				.97352
<i>Reaction times on phasic alert trials</i>		.96578			.93338
<i>Reaction times on tonic alert trials</i>		.95439			.92622
<i>Correct responses on incompatibility trials</i>			.95141		
<i>Perseverative responses on WSCT</i>	-.50825		-.57729		.70556
<i>EIGEN VALUE</i>	2.40	2.15	1.18		
CUMULATIVE PERCENTAGE OF VARIANCE					
FACTOR 1	ALERT (SPEED PROCESSING)		34.4%		
FACTOR 2	WORKING MEMORY		30.8%		
FACTOR 3	INHIBITION		16.9%		
SUM			82.1%		

Multiple regression analysis according to a hierarchical model was used to determine the relative contribution of age to the narrative and cognitive measures and the relations between the narrative measures and the cognitive measures. From this analysis the following tendencies are shown:

1. Higher reaction times in alert trials seem to be directly related with increasing age.
2. Working memory is directly related with density of endophoric reference through all age groups.

3. The content/quantity factor looks directly related with age (older subjects have a higher quantity of narrative speech and a lower score on semantic content).
4. Adequacy of semantic content of narrative speech to the target story seems to fall with increasing age.

DISCUSSION

Examinations of the results shows that the categories used in this preliminar study are apropiapriate for analyzing narrative structure of stories with respect to its semantic content, its structural complexity and its textual cohesion. Our results also indicate that some tasks from the Test for Assessment of Attention (working memory, alert and incompatibility) and from the Wiscosin Sorting Card Test fits to assess working memory , processing speed and inhibition in he elderly.

We can suggest that density of endophoric reference is directly related with the working memory capacity. That measure is one of the most appropriate parameters to evaluate the story cohesion. Therefore a decreament in the working memory in the elderly could be manifested by a lower density of endophoric reference . From our study we can observe that inverse relation between content and quantity is other tendency of narrative speech in the elderly. That means that older subjects have higher quantity of narrative speech and fewer semantic content. At the same time the content adequacy seem to fall with increasing age.

We hope that our whole data which will be obtained from our research project in a next future show new evidences about these tendencies and make possible conclusions about the relations between age, telling stories capacity and the working memory, speed processig and inhibiton variables.

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