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Argumentative Text Comprehension and its Relation with Cognitive Abilities: The Impact of Age and Education Levels

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Introduction

A growing amount of research has been dedicated to the aging effect on cognition, reinforced by the growth of the elderly population worldwide. The World Health Organization predicts that by 2050 there will be an increase of 70% in the population above 65 years old and of 170% in the population above 80 years old. Likewise, a good number of recent studies have concentrated on investigating the impact of education level on cognitive aging, brain organization in elderly and dementia (Ardila et al., 2000), and the relation between aging and cognitive abilities, such as memory and executive control (Salthouse, 2010). These factors may affect communication abilities, including text comprehension. Thus, the aim of this study was to analyze the impact of aging, education level, and cognitive abilities in reading comprehension of argumentative texts.

Method

Participants. Four groups participated in this study, 8 younger low-educated, 13 younger high-educated, 14 older high-educated and 9 older low-educated adults, totaling 43 participants (low education from 3 to 8 years of schooling, high education from 9 to 22 years, younger aged 20 to 35 years old and older aged 60 to 75 years old).

Neuropsychological tests. A battery of tests was administered to assess working memory (Auditory Span of Words in Sentences, subtest from *Brief Neuropsychological Instrument* NEUPSILIN) and verbal episodic memory (*Rey Auditory Verbal Learning Test*), and verbal inhibition (*Hayling Test*).

Linguistic assessment. Participants read, in individual sessions, an argumentative text in a printed version, followed by 18 four-alternative choice comprehension tasks tapping inferential knowledge at different levels. The questions were presented on a computer screen by E-Prime software (<http://www.pstnet.com/eprime.cfm>), which took accuracy and response time measurements.

Statistical analysis. Two-way ANOVA and Spearman's correlation were applied ($p \leq 0.05$).

Results & Discussion

Results of accuracy and response time in the reading comprehension task were related to neuropsychological

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assessment data. A schooling effect was observed in relation to inhibitory control, with the high schooling group demonstrating the highest performance in the Hayling Test (Part B). Regarding working memory (the central executive related to language processing and assessed by the Auditory Span of Words in Sentences), there was an effect of age ($p=0.037$) and schooling ($p=0.019$), with no significant interaction between these variables. Considering the age effect, limitrophe results ($p=0.057$) were registered for episodic verbal memory (RAVLT), with lower results presented by the elderly group in the comparison to the young group. A positive and moderate correlation was found only between accuracy in text processing and working memory ($p<0.001$, $r=0.547$). These results suggest that age and education levels, as well as working memory, have an impact on argumentative text comprehension.

References

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Brief Neuropsychological Instrument NEUPSILIN.

E-Prime.

Hayling Test.

Rey Auditory Verbal Learning Test.

Salthouse, T.A. (2010). Does the meaning of neurocognitive change change with age? *Neuropsychology*, 24, 273-278.