Complex Syntax Analysis in Alzheimer's Disease

Felipe Venâncio Barbosa and Stella Terribile Garbugio

Introduction

The literature on Alzheimer's disease is predominantly clear in indicating that one of the main symptoms of this dementia is the progressive impairment of language. In this research, our focus is on syntactic impairment, specifically on the production of complex sentences by elderly individuals with this dementia. Authors such as Noguchi (1997) point out that syntactic deficits are among the last linguistic domains to be affected in dementia, being preserved throughout most of the course of the disease. Emery (2000) highlights the production of atypical syntax in this disease, with the use of syntactically simpler sentences, that is, with a high incidence of descriptive or infinitive sentences, the use of structural syntactic recursion with incorrect or irrelevant content, incorrect attribution of thematic roles, and low use of situational and non-situational sentences.

Research Objective

This research aims to describe and analyze the production and comprehension of complex sentences in AD and verify whether the impairment follows the inverse hierarchical order of language acquisition. We hypothesized that the loss of syntax in this dementia follows the inverse pattern of language acquisition, meaning that syntactic structures acquired earlier would be lost later, respecting a certain order of complexity.

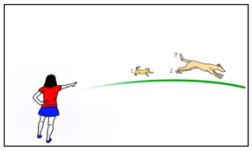
Methods and Analysis

Test Elaboration

For the research proposed in this paper, we developed a test aimed at understanding and producing complex structures in Brazilian Portuguese. For the syntactic production test, sentence structures in the passive voice, adverbial sentences, complement sentences and relative sentences were used. For each type of structure, we developed 5 sentences. Here are some examples: (i) Ela sonha que está na praia. (complement) 'She dreams that she is on the beach'; (ii) A menina viu o gato correndo atrás do cachorro. (relative) 'The girl saw the cat running after the dog.' For the production test, 15 sentences were written and 15 images were drawn. The drawings were designed by the author and produced with the support of a professional artist hired specifically for this work. As an example, using the sentences mentioned above, the final images were:

(1)

(2)



Data Collection

Twelve elderly individuals treated at a Psychogeriatric Outpatient participated in this study, including 6 healthy participants and 6 participants with AD. The tests developed were applied to the twelve participants. The applications were recorded, transcribed into text format and analyzed.

Results

Our results support the preservation of simple syntax, that is, elderly individuals with AD produce grammatically and syntactically well-formed sentences, but it is already possible to observe, even in the early stages, the loss of complex syntax. The results show that of the total sentences in the control group, 62.28% were simple and 37.72% were complex. The AD group produced 75.2% of simple structures and 24.8% of complex ones. This result is in line with the literature, which is homogeneous in describing the lower frequency of complex constructions in AD. Therefore, we have a difference of approximately 13% in the production of complex syntax between both groups. Furthermore, simple syntax also shows a pattern in the use of syntactic structures acquired earlier in childhood: the speech of elderly individuals with AD was predominantly composed of linking verbs and verbs in the infinitive, structures acquired from the age of 1 year. This data is relevant if we consider linguistic deterioration in this dementia as a gradual process, which would respect a certain order of language complexity. Given that even in the early stages of dementia, we have a lower production of complex sentences, we can turn to the field of language and begin to draw a parallel between the order of acquisition and loss. It seems that this type of complex structure, acquired later in the acquisition process, is also deteriorated earlier in the dementia process.

Conclusion

The findings of this study contribute significantly to the understanding of syntactic impairment in Alzheimer's Disease (AD), specifically concerning the production of complex sentences. Our analysis reveals that while elderly individuals with AD exhibit a preservation of simple syntax, there is a marked decline in their ability to produce complex sentence structures. This aligns with the literature indicating that the complexity of syntactic constructions diminishes as the disease progresses. Notably, the syntactic profile of the AD group demonstrated a reliance on simpler structures, with a 13% decrease in the production of complex sentences compared to their healthy peers. Moreover, the speech patterns in the AD participants predominantly featured linguistic elements acquired early in life, reinforcing the notion that language deterioration may follow an inverse order of acquisition as previously suggested. By establishing a connection between the loss of syntax and the trajectory of language acquisition, our study provides a framework for understanding the linguistic challenges faced by individuals with AD. Future research could further explore these patterns and their implications for therapeutic approaches, potentially informing interventions aimed at preserving communication abilities in affected individuals. Ultimately, the preservation of simple syntax amidst the deterioration of complex structures highlights the importance of understanding the nuances of language impairment in dementia, paving the way for enhanced support and care strategies tailored to individual needs.

References

Noguchi, Milica Satake. A linguagem na doença de Alzheimer: considerações sobre o modelo de funcionamento linguistico-cognitivo. 1997. Tese de Doutorado. [sn].

Emery, V. Olga B. Language Impairment in Dementia of the Alzheimer Type: A Hierarchical Decline? The International Journal of Psychiatry in Medicine, 30(2), 2000. 145–164. doi:10.2190/x09p-n7au-ucha-vw08