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Introduction

Studies in Alzheimer's disease (AD) have observed difficulties in sentence comprehension, particularly in structures with non-canonical argument order, such as object-extracted relative clauses (ORCs) (e.g., Emery, 1985; Marková et al., 2017; Molympaki et al., 2013). However, these difficulties occur in a moderate stage of the disease, whereas in an early stage lexical-semantic deficits are often present (Taler & Phillips, 2008). Lately, difficulties in the comprehension of non-canonical structures in people with acquired language deficits, like agrammatic aphasia, have been discussed within the *Relativized Minimality* (RM) approach (Rizzi, 1990, 2004). According to this approach, ORCs are hard to comprehend when the moved and the intervening subject DP carry similar φ-features, whereas mismatch in φ-features between the two DPs facilitates comprehension (Garaffa & Grillo, 2008; Grillo, 2009). However, it has been argued that only features of the verbal inflection system that trigger syntactic movement count in the computation of minimality (Friedmann et al., 2017; Terzi et al., 2018). The extent to which comprehension of ORCs in AD can be accounted within RM remains unknown. This study aims to test the RM approach in mild AD by experimentally manipulating syntactically active φ-features (i.e. number in Greek) and lexical-semantic φ-features (i.e. gender in Greek) in the comprehension of ORCs.

Methods

Twenty-seven Greek-speaking individuals with mild AD (MMSE score: 18-26, 65-86 years old) and 27 age- and education-matched healthy adults (MMSE score: 28-30) were administered an off-line sentence comprehension task that manipulated number x gender in a within-subjects nested design. Stimuli consisted of 80 object right-branching relative clauses. In 20 of the sentences the subject and the object DP were singular and had the same gender value (number match/gender match), in 20 sentences the two DPs had same gender but different number values (number mismatch), in 20 sentences they had same number but different gender values (gender mismatch) and in 20 sentences they had different number and gender values (number mismatch/gender mismatch).

Results

Healthy controls showed no interaction but a significant main effect of number (Repeated Measures ANOVA $F(1,26)=15,921$, $p=.000$, $\eta_p^2=.380$), as they presented better performance in number mismatch. However, participants with AD showed an interaction between number and gender ($F(1,26)=17,196$, $p=.000$, $\eta_p^2=.398$) and a significant main effect of number ($F(1,26)=10,506$, $p=.003$, $\eta_p^2=.288$). Better performance was observed in sentences with number mismatch and gender match (80.4%) and worse performance was observed in sentences with

number match and gender match (66.7%). On the other hand, gender mismatch was better in sentences with number match (77.4%) but worse in sentences with number mismatch (71.5%) (see Figure 1).

Conclusions

Features triggering syntactic movement (i.e. number in Greek) are accessible to individuals with mild AD and to healthy elderly, as their comprehension of ORCs improved in mismatch conditions. However, individuals with mild AD present an impairment in lexical features like gender, which manifests even when syntactic comprehension is easier, as in the number mismatch conditions.

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Acknowledgments

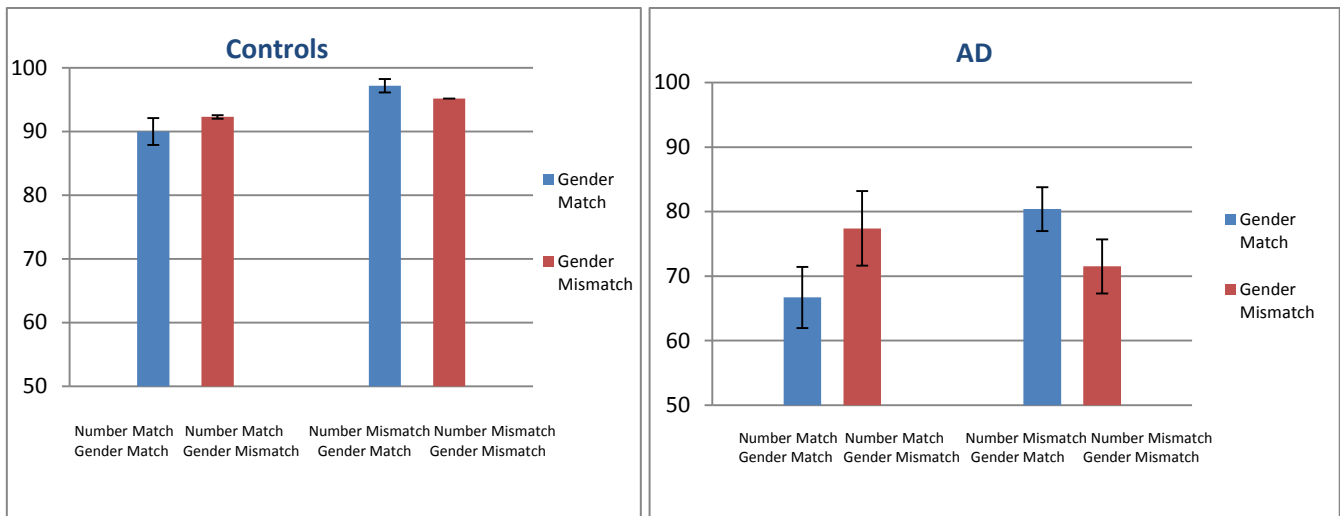We would like to thank our participants and referring physicians for their dedication and interest in our study.

Figure 1. Accuracy performance in healthy controls and in AD.