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Language-specific effects in Alzheimer's disease: Subject omission in Italian and English

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ABSTRACT

The aim of this study was to verify whether the repetition abilities in Alzheimer patients interact with the linguistic properties of individual languages, such that speakers will omit nominal referents more often only if the omission is a grammatical option in their language. Unlike English, where an overt nominal referent is always required in grammatical subject position, Italian allows grammatical subjects to be unexpressed. In Experiment 1, twelve Italian speakers with Alzheimer's disease (AD) and twelve age- and education-matched controls repeated sentences of varying length and complexity. As predicted, Italian AD speakers omitted sentence subjects in complex sentences while control participants very rarely did. In Experiment 2, ten English AD speakers, matched with the Italian AD participants with respect to age and severity of the disease, and ten age- and education-matched controls repeated translation equivalent materials. Unlike the Italian AD participants, English AD participants did not omit sentence subjects. Italian and English AD participants, however, were comparable in their global ability to repeat sentences of varying length. Together these results indicate that the performance of AD speakers in repeating sentences interacts with language-specific properties.

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1. Introduction

A common observation about the language of patients with Alzheimer's Disease (AD) is that it is "empty", in that it contains a high proportion of words with low semantic content (Hutchinson & Jensen, 1980; Kempler, 1995; Nicholas, Obler, Albert, & Estabrooks-Helm, 1985; Ripich & Terrell, 1988; Ulatowska, Allard, & Donnell, 1988). One area where this is manifest is nominal reference. English speaking AD patients are reported to overuse pronouns instead of full Noun Phrases (NPs) (Almor, Kempler, MacDonald, Andersen, & Tyler, 1999; Bschor, Kühl, & Reischies, 2001; Kempler & Zelinski, 1994; Nebes, 1989; Ripich & Terrell, 1988), but no consensus exists as to why they do so. Explanations range from locating the deficit in central language processes, either related to working memory (Almor et al., 1999), or impoverished lexical-semantic representations (Altmann, Kempler, & Andersen, 2001; Forbes, Venneri, & Shanks, 2002; Venneri et al., 2008), to attributing this pattern to problems with discourse-pragmatics (Ripich & Terrell, 1988; Ulatowska & Chapman, 1995). In this paper, however, we do not address the nature of the cognitive deficit(s) underlying the lexical problems with NPs in AD. We focus instead on how the deficit interacts with the grammatical properties of the language of the speaker with AD. Methodologically, our study falls within the domain of cross-linguistic approaches to language disorders. This approach has a long tradition in aphasia (e.g., Bates, Wulfeck, & McWhinney, 1994; Menn & Obler, 1990) but is much less developed in the study of language in AD (but see Waleski, Sosta, Cappa, & Ullman, 2009).

We hypothesize that the linguistic encoding of nominal referents in both normal and impaired speakers is affected by a number of factors operating simultaneously, including the grammar of the language and the grammatical role of the nominal in a clause, the speaker's cognitive resources, the informational content of each referent in the message, the communicative goals of the speaker, and the demands of the task. To tease these factors apart, independent studies have to be designed to study each factor independently (Valian, Prasada, & Scarpa, 2006). In this study, we examined the effects of language grammar and sentence complexity on the encoding of nominals in grammatical subject position in AD. We examine two languages, English and Italian, that contrast minimally with respect to whether grammatical subjects are required (English) or optional (Italian). The contrast between the two types of languages is illustrated in (1) and (2). Without an overt third person subject (e.g., *she*), English (1) is ungrammatical, whereas the corresponding Italian (2) is fully grammatical. Languages like Italian are often referred to as null-subject languages (Chomsky, 1981; Rizzi, 1982). In these languages the null subject is assumed to be a phonologically silent, syntactically represented element with pronominal properties.

(1) * Walks on the beach
(2) Cammina sulla spiaggia

The prediction was that if null subjects are grammatical in a given language, all other things being equal, speakers should exploit the null-subject option when task demands are high, as for example is the case of long or complex sentences.

Evidence that use of the overt syntactic subjects is affected both by grammatical and performance factors comes from cross-linguistic studies in language acquisition. Two-year-olds acquiring American English use overt syntactic subjects almost twice as much as do Italian children at the same stage of development (Valian, 1991), indicating that both groups are sensitive to the grammatical properties of their native language. In languages that allow null subjects, in young children the use of overt subjects increases with age (Valian & Eisenberg, 1996), while null subjects' use in adult grammars that allow null subjects appears to be negatively correlated with sentence length (Hyams & Wexler, 1993; see also Rizzi, 2000), strongly suggesting a relation between grammatical options and language production both in children and adults.

In the work reported here, we used a repetition task to examine the effect of sentence complexity on the production of syntactic subjects by speakers with AD. English speaking AD patients have been shown to be sensitive to manipulations of sentence complexity (Biassou, Onishi, Hughes, D'Esposito, & Grossman, 1996; Small, Kemper, & Lyons, 2000); however, we do not know how sentence complexity affects their inclusion of particular syntactic constituents. This is the first experimental study in AD to 1) examine the effects of sentence complexity on the production of nominal referents in a particular