

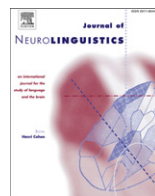


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## Time reference in agrammatic aphasia: A cross-linguistic study

Roelien Bastiaanse<sup>a,\*</sup>, Elif Bamyacı<sup>b</sup>, Chien-Ju Hsu<sup>b</sup>, Jiyeon Lee<sup>c</sup>,  
Tuba Yarbay Duman<sup>a</sup>, Cynthia K. Thompson<sup>c</sup>

<sup>a</sup> Center for Language and Cognition Groningen (CLCG), University of Groningen, The Netherlands

<sup>b</sup> European Master's of Clinical Linguistics (EMCL), University of Groningen, The Netherlands and Potsdam, Germany

<sup>c</sup> Department of Communication Sciences and Disorders, and Neurology, Cognitive Neurology and Alzheimer's Disease Center, Northwestern University, Evanston, IL, USA

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### ABSTRACT

It has been shown across several languages that verb inflection is difficult for agrammatic aphasic speakers. In particular, Tense inflection is vulnerable. Several theoretical accounts for this have been posed, for example, a pure syntactic one suggesting that the Tense node is unavailable due to its position in the syntactic tree (Friedmann & Grodzinsky, 1997); one suggesting that the interpretable features of the Tense node are underspecified (Burchert, Swoboda-Moll, & De Bleser, 2005; Wenzlaff & Clahsen, 2004, 2005); and a morphosemantic one, arguing that the diacritic Tense features are affected in agrammatism (Faroqi-Shah & Dickey, 2009; Lee, Milman, & Thompson, 2008). However recent findings (Bastiaanse, 2008) and a reanalysis of some oral production studies (e.g. Lee et al., 2008; Nanousi, Masterson, Druks, & Atkinson, 2006) suggest that both Tense and Aspect are impaired and, most importantly, reference to the past is selectively impaired, both through simple verb forms (such as simple past in English) and through periphrastic verb forms (such as the present perfect, 'has V-ed', in English). It will be argued that reference to the past is discourse linked and reference to the present and future is not (Zagana, 2003, *in press*). In-line with Avrutin's (2000) theory that suggests discourse linking is impaired in Broca's aphasia, the PAST Discourse Linking Hypothesis (PADILIH) has been formulated. Three predictions were tested: (1) patients with agrammatic aphasia are selectively impaired in use of grammatical morphology associated with

\* Corresponding author. Department of Linguistics, University Groningen, PO Box 716, 9700 AS Groningen, The Netherlands. Tel.: +31 503635558; fax: +31 503636855.

E-mail address: [y.r.m.bastiaanse@rug.nl](mailto:y.r.m.bastiaanse@rug.nl) (R. Bastiaanse).

reference to the past, whereas, inflected forms which refer to the present and future are relatively spared; (2) this impairment is language-independent; and (3) this impairment will occur in both production and comprehension.

Agrammatic Chinese, English and Turkish speakers were tested with the Test for Assessing Reference of Time (TART; Bastiaanse, Jonkers, & Thompson, unpublished). Results showed that both the English and Turkish agrammatic speakers performed as hypothesized, showing a selective deficit for production of inflected forms referring to the past, despite the typological difference between the languages. The Chinese agrammatic speakers were poor in reference to the past as well, but reference to the present and future also was severely impaired. For comprehension, the results were strikingly similar for the three languages: reference to the past was impaired for all. These results confirmed our hypothesis that reference to the past is discourse linked and, therefore, grammatical morphology used for reference to the past is impaired in agrammatic aphasia, whether this is done through Tense and/or Aspect markers.

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## 1. Introduction

Agrammatic speech is characterized by omissions and substitutions of grammatical morphemes. Goodglass and Hunt (1958) showed that the vulnerability of a grammatical morpheme is dependent upon its function. In English, the –s of plural nouns (books) is less prone to errors than the genitive –s (John's book), which is better preserved than the Agreement –s (John reads the book). More recently, it has been demonstrated for a number of languages that Tense inflection is more impaired than Agreement and Mood inflection (Dutch: Kok, Kolk, & Haverkort, 2006; German: Burchert, Swoboda & De Bleser, 2005; Clahsen & Ali, 2009; Wenzlaff & Clahsen, 2004, 2005; Hebrew: Friedmann & Grodzinsky, 1997; Ibero-Spanish: Gavarró & Martínez-Ferreiro, 2007; but see Dutch: Bastiaanse, 2008; English: Lee et al., 2008).

Bastiaanse (2008) also reported a deficit with Tense in Dutch agrammatic speakers, but the problems of these patients were not restricted to Tensed verb forms, nor were present and past Tense equally impaired. She therefore argued that it is not Tense that is impaired in agrammatic aphasia, but time reference through verb forms in general; in particular, reference to the past is impaired. This was confirmed by a study on Turkish agrammatic speakers, who were more impaired in verb forms referring to the past than to the future (Yarbay Duman & Bastiaanse, 2009). This raises several questions, for example, whether time reference through grammatical morphology is also impaired in languages that do not use verb inflection but aspectual adverbs, like Chinese. Also, in order to fully understand the time reference problem in agrammatic aphasia, both production and comprehension should be studied in typological different languages. This is what we intend with the current study.

In the next section, time reference by grammatical morphology will be discussed. We will first clarify the terminology. This will be followed by a description of the time reference systems of the languages involved in the present study: Chinese, English and Turkish. Next, the results of the most relevant studies to agrammatic production and processing of time reference by grammatical morphology will be discussed in relation to the test designs that have been used. Then, a theory that can describe the reported results will be presented and the hypotheses will be formulated.

### 1.1. Time reference through grammatical morphology

Reference to a certain time frame can be accomplished in several ways. One can use a lexical adverb or a prepositional phrase, like *yesterday*, *previously*, or *in the past* to refer to the past, *now* or *at this moment* for reference to the present and *in a minute* or *next year* to refer to the future. However, in

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