

Time reference in Spanish and Catalan non-fluent aphasia

Silvia Martínez-Ferreiro^{*}, Roelien Bastiaanse



Center for Language and Cognition Groningen (CLCG), University of Groningen, P.O. Box 716, 9700 AS Groningen, The Netherlands

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Abstract

The vulnerability of time reference, either marked by means of verbal morphology or by adverbs, has been established in an extensive array of languages in agrammatic aphasia. Recent studies (Bastiaanse, 2008; Lee et al., 2008; Nanousi et al., 2006; Martínez-Ferreiro, 2010; Yarbay Duman and Bastiaanse, 2009; among others) have determined that far from being general, the observed deficit is sensitive to tense differences with a clear asymmetry between past and non-past forms.

To account for these findings, Bastiaanse et al. (2011) formulated the PAsT DIscourse LInking Hypothesis (PADILIH), in line with Avrutin's (2000) claim that discourse linking is impaired in Broca's aphasia. Past forms are impaired in opposition to non-past forms due to the fact that the former are discourse linked. However, this hypothesis entails further predictions: if the problem with tense is restricted to discourse linking, we expect present and future forms to be spared or, at least, damaged to the same extent.

In this paper, we investigate time reference in Catalan and Spanish using a sentence completion task with pictures and a sentence-to-picture-matching task (adapted from the TART; Bastiaanse et al., 2008). The results confirm the predicted deficit: forms referring to the past are more impaired than forms referring to non-past, that is, tenses referring to the present and future were better preserved. However, in comprehension, asymmetries arise between present and future forms. Implications for the PADILIH are discussed.

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1. Introduction

Aphasia is an acquired language disorder of diverse etiology due to a lesion in the parts of the brain responsible for language. It can affect any or all of the following skills: production, comprehension, reading, writing, gesturing, repeating, or naming, with severity linked to the amount and the location of brain damage. Related problems such as dysarthria, apraxia or swallowing disorders, muscle weakness, paralysis, or incoordination disturbances affecting communication, speech (vs. language) disorders, impaired vision, or hearing are not to be taken as part of the aphasic syndrome (Goodglass and Kaplan, 1983, 2001; Grodzinsky, 1990; Kertesz, 1979; Diéguez-Vide and Peña-Casanova, 2012).

Although various classification systems have been proposed to account for aphasic manifestations (Head, 1926; Goldstein, 1933; Luria, 1964), eight main syndromes are generally accepted (Goodglass and Kaplan, 1972, 1983). These are classified according to impaired/spared fluency, comprehension, repetition, and naming skills. In this article, we focus

^{*} Corresponding author at: Centre for Language and Cognition (CLCG), University of Groningen, Research Group Neurolinguistics, P.O. Box 716, 9700 AS Groningen, The Netherlands. Tel.: +31 503 63 8133.

E-mail addresses: s.martinez.ferreiro@rug.nl (S. Martínez-Ferreiro), y.r.m.bastiaanse@rug.nl (R. Bastiaanse).

on non-fluent aphasia, which are linguistically associated to relatively spared comprehension and comparatively damaged production.

Within the group of non-fluent aphasia, which includes four major syndromes, Broca's aphasia (BA) has been the focus of attention of the vast majority of studies in the past decades. BA is mainly characterized by difficulties in production, and agrammatic patterns leading to effortful speech and short utterances. Lexical and phonological paraphasia, and problems with word retrieval are sometimes present. However, lexical categories are mostly spared (Grodzinsky, 1990). To a lesser extent, comprehension may also be affected. Repetition, writing, and reading aloud show the same pattern, with comprehension of written materials better preserved (Diéguez-Vide and Peña-Casanova, 2012).

The main symptom of Broca's aphasia is agrammatism, which consists of the omission or substitution of grammatical morphemes and function words. Since word formation rules are preserved, omissions are restricted to free standing morphemes in languages with word-based morphology (e.g. English, Japanese). In stem based morphology languages (e.g. Hebrew, Italian), morphemes are often substituted to avoid the use of 'non-words' (Grodzinsky, 1990). This all leads to morphological simplification. Complex syntactic structures tend to be avoided, or contain multiple mistakes including the omission of many main verbs (Menn and Obler, 1990).

The characteristics of agrammatism make verbs and verbal morphology especially interesting for researchers. In contrast to other lexical categories such as nouns, verbs have been found to be impaired in both spontaneous speech and structured tasks (Bastiaanse and Jonkers, 1998; Caramazza and Hillis, 1991; Miceli et al., 1984, 1989; Saffran et al., 1989; Thompson et al., 1994; among others). The present study focuses on finite verbs, and more specifically tense morphology, in Catalan and Spanish speaking individuals with non-fluent aphasia.

1.1. Tense in non-fluent aphasia

As already pointed out by Kljajevic and Bastiaanse (2011), most research on verb production and comprehension has been carried out with non-fluent aphasic subjects, more specifically, with Broca's aphasia. According to Kolk et al. (2003), the omission of finiteness features, either due to the omission of the verb or to the replacement of the inflected verb with a non-finite form, crucially contributes to the telegraphic appearance of agrammatic speech.

In addition to this, a clear dissociation emerges when focusing on finite forms. Verbal morphology is selectively impaired, with subject-verb agreement better preserved than tense. Contrary to agreement morphology, tense is generally agreed to be damaged cross-linguistically in agrammatism (see Friedmann and Grodzinsky (1997) for Hebrew and Palestinian Arabic, Miceli et al. (1984, 1989) for Italian, Nadeau and Rothi (1992) for English, Nespoulous et al. (1988) for French, Varlokosta et al. (2006) for Greek, and Wenzlaff and Clahsen (2004) for German, among many others).

Focusing on the languages under investigation, some studies have targeted tense morphology in Catalan and Castilian Spanish. The first set of evidence comes from Benedet et al.'s (1998) study of 6 Spanish agrammatic subjects. The results show the expected dissociation between tense and agreement, both in production and comprehension. With the exception of de Diego Balaguer et al. (2004), who report similar error rates for tense and agreement in two agrammatic bilingual Spanish-Catalan speakers, later studies (Diéguez-Vide et al., 2012; Gavarró and Martínez-Ferreiro, 2007; Martínez-Ferreiro, 2003, 2010; or Moreno-Torres Sánchez, 2005) confirm Benedet et al.'s (1998) findings.

Evidence for the preservation of temporal adjuncts has sometimes been used as an indicator of a preserved concept of time in subjects with agrammatism (De Roo, 2001; but see Anjamingasih et al., 2012). However, the specific locus of tense impairment still remains under debate. Leaving aside phonological accounts (Nadeau and Rothi, 1992), most hypotheses point towards a deficit associated with features (Wenzlaff and Clahsen's (2004, 2005) Tense Underspecification Hypothesis (TUH) and Burchert et al.'s (2005) Tense or Agreement Underspecification Hypothesis (TAUH); Nanousi et al.'s (2006), Varlokosta et al.'s (2006), and Fyndanis et al.'s (2012) Impaired Interpretable Feature Hypothesis; or Friedmann and Grodzinsky's (1997) Tree-Pruning Hypothesis (TPH)), a morphosemantic disruption (Faroqi-Shah and Thompson, 2007; Faroqi-Shah and Dickey, 2009; Lee et al., 2008), and/or a more general underlying impairment (Arabatzis and Edwards, 2002).

For many accounts, features are central for the explanation of tense deficits. According to the TUH (Wenzlaff and Clahsen, 2004, 2005; Clahsen and Ali, 2009), difficulties with verbal morphology derive from a deficit in the specification of [\pm Past] tense features in agrammatic aphasia. Burchert et al. (2005) suggest that not only Tense, but also Agreement is subject to individual variation and can be separately underspecified (TAUH). Also related to the specification of features, the Impaired Interpretable Feature Hypothesis (Nanousi et al., 2006; Varlokosta et al., 2006; Fyndanis et al., 2012) postulates that interpretable features are problematic in non-fluent aphasia. According to Varlokosta et al. (2006), the deficit has to do with the access to the syntactic representation. Fyndanis et al. (2012) proposes that, since tense features are interpretable, and interpretable features entail the integration of grammatical and extralinguistic/conceptual information, the extra load is likely to result in retrieval problems. However, other accounts depart from the assumption that the grammatical representation is intact, but grammatical rules and processes are damaged (Arabatzis and Edwards, 2002) and hence tense errors (among other errors) emerge.

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