

Introduction

This study investigates the „tree pruning hypothesis“(TPH; Friedmann & Grodzinsky, 1997) in a bilingual individual with Broca’s aphasia. In Broca’s aphasia, one of the main symptoms is agrammatism. The TPH suggests that syntactic deficits are highly selective: tense inflection is impaired while agreement inflection is preserved. To explain this obvious performance dissociation, the TPH uses the “phrase marker split inflection tree” (Pollock, 1989). In this phrase marker, the functional category agreement (AgrP) is located below tense (TP). According to the TPH, in persons with moderate agrammatism, the “phrase marker split inflection tree” is pruned between the two categories AgrP and TP, which causes an impairment of TP and all categories above it while AgrP and all nodes below it stay intact. Several studies done in different languages such as German (Wenzlaff & Clahsen, 2004), Spanish, Galician and Catalan (Gavarró & Martínez-Ferreiro, 2004), Hebrew, Arabic (Friedmann, 2001) and Japanese (Hagiwara, 1995) provided evidence for the TPH. All these studies dealt with monolingual aphasia.

The TPH is based on the “phrase marker split inflection tree”. Therefore, in bilingual aphasia, the question arises if each language is represented in a discrete phrase marker or if both languages fit into one single syntactic tree. According the “principles and parameter theory” (Chomsky, 1981), the syntactic tree forms the basis of every language’s grammar, so each language can be represented in only one single phrase marker. In our study, we used German and Luxembourgish, the functional categories of which seem to be the same. We hypothesized that there may be only one phrase marker. Furthermore, this phrase marker is pruned between tense and agreement, which results in the same performance dissociation in German and in Luxembourgish. We assumed that the TPH could be applied in both languages.

On the other hand, a language specific impairment of functional categories can be observed in bilingual aphasia (Alexiadou & Stavrakaki, 2003; Nilipour & Paradis, 1995). Therefore, there may be two single phrase markers – they only differ with regard to the localization of the rupture. According to the “neurolinguistic theory of bilingualism” (Paradis, 2004), each phrase marker, which is part of the morphosyntax, forms a part of a language subsystem. Both subsystems form a part of the verbal communication system. Based on the assumption that both languages were balanced pre-onset, language impairment post-onset can only be determined by aphasia. Aphasia may cause the phrase markers to be pruned differently.

The goal of this study is to find out if there is a performance dissociation between the two categories ‘Tense’ and ‘Agreement’ in both languages in a bilingual German-Luxembourgish aphasic with Broca’s aphasia.

Materials and Procedure

Tense and agreement inflections were tested in a 2x2 factorial design, each in German and Luxembourgish. We investigated two expressive sentence completion tasks (Agreement Expressive & Tense Expressive) and two grammatical judgment tasks (Agreement Receptive & Tense Receptive). Together, 160 items per language, 40 for each task were used.

The tense-expressive task consisted of two sentences. The first one included a verb already inflected; in the second phrase, the subject had to alter the tense and to inflect the verb correctly (“*Yesterday I told you my telephone number. Today I ____ you the number again.*”). The agreement-expressive task had to be filled with an inflected verb according to the personal pronoun and the infinite verb was placed in parentheses behind (A.: “*He ____ a cup of coffee [drinking]*”). Sentences of both tasks were introduced with a temporal adverbial or a personal pronoun.

In the grammatical judgment tasks, we presented a counter-balanced set of grammatically correct and incorrect sentences (“*The child is playing with the teddy bear*” or “*Tomorrow we*

were in Luxembourg.”). The subject had to indicate whether the sentence was correct. The incorrect sentences contained tense or agreement errors in the inflected verbs. In the tense tasks, we only used present tense, past tense and present perfect, the agreement tasks tested gender and number in Luxembourgish and German.

The subject of this study is AM, a 39 year old patient with Broca’s aphasia and moderate agrammatism. AM is a balanced-bilingual patient (German–Luxembourgish) with Luxembourgish as his mother tongue. Until he started school at the age of six, he only spoke Luxembourgish. At school, he learned German. German is the official language, which is used in public; Luxembourgish was only spoken at home. After he finished school, he worked as a truck- and bus driver. In August 2003, AM suffered a left CVA. First, a German speech therapist diagnosed him with jargon- aphasia based on results from the “Aachener Aphasia Test” (Huber et al., 1983) which, after 6 months, developed into a Broca’s aphasia. There are no Luxembourgish aphasia test results.

Results

The results show a clear performance dissociation between tense and agreement. AM was much better with tasks concerning agreement inflection than with tasks focusing on tense inflection ($p < 0.001$). This pattern was found in German as well as in Luxembourgish. Beyond this, the subject performed up to 23% worse in the Luxembourgian part of the tests (for more details see figure 1).

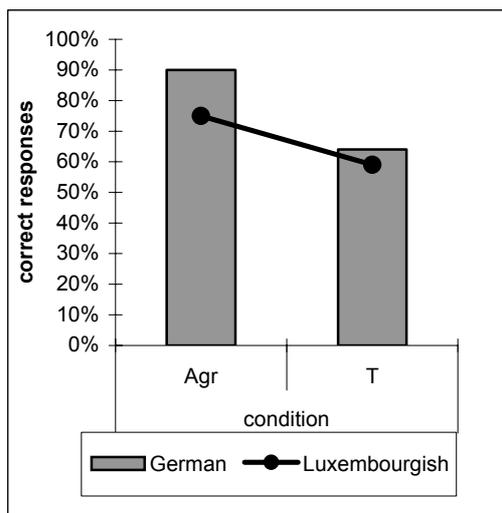


Figure 1: Differences between agreement and tense.

Discussion

These results confirm the “Tree pruning hypothesis” in both languages, because the “phrase marker split inflection tree” is pruned at the tense node in German and in Luxembourgish. Although the same performance dissociation according to the TPH was found in both languages, which is also possible in only one “phrase marker split inflection tree”, we conclude that there are two different phrase markers, because the general performance in Luxembourgish yielded results up to 23% worse than the German results, which may have been caused by the different ways in which the languages were acquired. Such a performance difference between the two languages is impossible if both languages are represented in one single phrase marker. So, this study provides evidence for the TPH in a bilingual individual, and we assume that each language is represented in its own phrase marker.

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