

MORPHOLOGY AND SYNTAX AND CROSSLINGUISTIC FINDINGS  
IN NEUROLINGUISTICS

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## ANNOTATION

In this article disturbances especially agrammarism and other aphasic disorders are enlightened with correlation morphology. Agrammatism has been the main object of studies of grammar and aphasia and shed on the light the relationship between comprehension and production. Some syntactic phenomena characterizing aphasia are listed.

**Keywords:** disturbances of grammar, communication system, brain, linguistics

Disturbances of grammar have been appealing topic for many linguists, since many linguistic theories consider grammar to be especially pivotal part to the language system. This fact has led debates and encouraged research related to grammar in aphasia. The traditional view of grammatical disorders in aphasia was linked to two main syndromes. One of them is Wernicke's aphasia, which results from posterior lesions (i.e., posterior to the central fissure, affecting the temporal and parietal lobes) and is characterized by fluent speech. The grammar of these patients was characterized as paragrammatism and did not really attract much attention from researchers. The fluent speech of these patients is characterized by frequent self-interruptions, restarts, and circumlocutions, caused by their anomic problems (word-finding difficulties). This makes it contain more "grammatical frames" or parts of grammatical frames, with a relative lack of nouns in particular, but also of adjectives and main verbs and with substitutions of grammatical morphemes. Since paragrammatism was interpreted as possibly being a secondary phenomenon to word-finding problems and since these patients often have comprehension problems, making their participation in experimental studies difficult, their grammar was not the best starting point for traditional research into this issue. The second main syndrome was Broca's aphasia, which results from frontal lesions and is characterized by nonfluent speech. The grammar of these patients is often very sparse, and they have even been characterized as agrammatic. They tend to speak in very short, simple sentences or even shorter structures mainly containing nouns, main

verbs and adjectives, but omitting most grammatical morphemes (such as noun and verb inflections) and so-called function words (conjunctions, articles, etc.). Agrammatism has been the main object of studies of grammar and aphasia. The basic description of agrammatism in Broca's aphasia above, however, is much too simple to do justice to the grammatical disturbances in aphasia. The status of the traditional division of grammatical disorders into agrammatism and paragrammatism has also been called into question by cross-linguistic research into aphasia and grammatical disorders. Studies of agrammatism are the main basis for theories about morphology and syntax in neurolinguistics. There is an extensive body of research on agrammatism in relation to specific hypotheses about the grammatical features of structures and processes. Some of the questions that have been discussed are:

1. **The relationship between comprehension and production.** Are disorders of grammar central, thus affecting both comprehension and production, or can production be selectively disturbed while comprehension is maintained? Although many patients with aphasia show disturbances of both comprehension and production, there are clear cases of dissociation, where only production is affected (e.g., Miceli, Mazzuchi, Menn, & Goodglass, 1983). It has also been shown (Linebarger, Schwartz, & Saffran, 1983) that there are persons who show disorders of comprehension as well as production in tests of grammar, but can still make metalinguistic judgments about whether a sentence is correct or not, which indicates that some grammatical ability remains.

2. **The relationship between agrammatism and paragrammatism.** Are agrammatism and paragrammatism really two fundamentally different phenomena or are they different surface manifestations of grammatical problems that are basically similar but are accompanied by different sets of additional symptoms in Broca's and Wernicke's aphasia? Cross-linguistic studies have pointed to difficulties with the traditional definitions of agrammatism and paragrammatism. These definitions can only partially be applied to languages with a rich morphology, such as Italian (Miceli, Silveri, Romani, & Caramazza, 1989) and languages where grammatical morphemes are not segments that can be omitted, such as Hebrew (Grodzinsky, 1984, 1986). Examples of necessary modifications include the findings that substitutions of grammatical morphemes seem to be just as common as omissions and that main verbs are often omitted. The borderline between agrammatism and paragrammatism might thus have been more due to their occurrence with certain aphasic syndromes than to any neurolinguistic motivation.

The role of the verb in grammar and disturbances of grammar The role of the verb in grammar is a central topic for research on disorders affecting grammar. As we have seen above, for a long time there was a fairly strong belief in the classical aphasiological tradition about the localization of "word meanings." Word meanings,

concepts, the mental lexicon, or whatever term was used to capture the semantic representation and/or processes associated with words (especially nouns, verbs, and adjectives) were strictly posterior left-hemisphere phenomena. On the other hand, more holistic, cognitively oriented theories often claimed that a more distributed representation, requiring widespread networks or functional systems, was more likely. However, we have seen a change and nowadays the right hemisphere is considered to play an important role with respect to semantics. We have also seen that, especially for the activation of at least certain verbs of motion and action, frontal lobe activity seems to be essential. This development is partly a result of brain activation imaging studies. Disturbances of grammar have traditionally been linked to lefthemisphere frontal lesions. We can now see that the role of verb semantics and the structural constraints used in the formation of grammatical structures and sequences can become central and link semantics and syntax, which opens the way for different hypotheses about grammatical disturbances. A recent suggestion of a link between mirror neurons for goal-directed grasping in the monkey and schemata for handling verb-argument structures is made by Arbib (2005). Morphology, grammar, and cross-linguistic findings In the last 20 years, a large number of studies of grammatical disturbances (usually defined as agrammatism) in typologically different languages and comparative studies using several languages have increased our knowledge of grammatical disorders in aphasia. In this section, some of the main findings from multi- and cross-linguistic studies of agrammatism (e.g., Bates & Wulfeck, 1989; Menn & Opler, 1990ab) will be mentioned and their potential interpretations discussed. We will start with morphology.

### **Morphology**

1. Free grammatical morphemes (e.g., function words) tend to be omitted, but they are sometimes substituted as well.
2. Bound grammatical morphemes (e.g., inflectional endings) are rarely omitted, but are often substituted. There seems to be a difference between free and bound grammatical morphemes. Both types can be substituted, but only free morphemes are omitted. Forms such as infinitives and verb stems (if they can occur as words) are produced and different inflections are substituted.

Depending on the type of language, the border between morphology and syntax can vary. Some syntactic phenomena characterizing aphasia are listed below, but some of them can also be seen as morpholexical.

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