clasp) were to be produced in inflected form (e.g., claps and clapped vs. claps and clasped). Of the 60 trials total for each tense, 39 affixes were produced correctly for stems ending in a single consonant (C) and only 27 for the consonant clusters (CC). Moreover, this pattern held for both third person singular /s/ (C = 22, CC = 17) and the consistently less successful past tense /d/ (C = 17, CC = 13).

In sum, stem frequency, gang effects and word length in syllables did not influence suffix productions, but the consonant cluster status of the stem ending did. Previous studies (Trost & Canter, 1974; Shankweiler & Harris, 1960) have indicated difficulty with word final consonant cluster production as well, linking it to their subjects’ motor disturbance, but our data here suggest that the phonologically governed morphosyntactic difficulty was obtained for non-dysarthric/non-apraxic agrammatics as well as the dysarthric subject.

References


13. ERP Characteristics of Function and Content Words in Broca’s Aphasies with Agrammatic Comprehension

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Introduction. Agrammatic comprehenders are often claimed to have difficulties in processing words serving a specifically grammatical function, i.e., the function words (e.g., Bradley et al., 1980). Exactly how these difficulties relate to their agrammatic comprehension has been the issue of a long-standing debate (Kean, 1985). Many studies have argued that agrammatic comprehension is not so much the result of a disruption of the (syntactic or lexical) knowledge itself but rather the result of a problem in gaining access or manipulating in principle available knowledge associated with grammatical morphemes.

Evidence from event-related brain potential recordings (ERPs) is relevant
to this issue. Recently, two papers (Neville et al., 1992; Nobre & McCarthy, 1994) have provided evidence for the existence of ERP components in normal adults that are especially sensitive to the processing of function words.

The purpose of this study was to examine the ERP characteristics of function and content words in agrammatic aphasics and to explore the possibility that comprehension deficits in agrammatics are related to an impairment in the processing of function words. This is done by comparing the ERP responses to function and content words of agrammatic comprehenders with those of age-matched controls.

**Experiment.** The experiment consists of the reading of a simple short story, presented word by word on the center of a screen, at a relatively slow rate (SOA = 800 msec); this presentation rate avoids overlap of ERPs to adjacent words. The story is constructed such that it allows for systematic comparison of ERPs elicited by different types of function (articles, auxiliaries, prepositions, conjunctions) and content words (nouns, verbs, adjectives). Electrical activity over the scalp was recorded using a 32 evenly-spaced electrode montage, including all of the 10–20 sites. Subjects were instructed to read the story for comprehension with no additional task.

**Subjects.** Seven patients with aphasia secondary to a single CVA in the left hemisphere participated. All patients were diagnosed as Broca’s aphasics with a comprehension deficit, ranging from light to severe, on the basis of the standardized Dutch version of the Aachen Aphasia Test (Graetz et al., 1992). Agrammatic comprehension was further assessed by an off-line test for syntactic comprehension. Seven normal control subjects, matched in age and education to these patients, were also tested. All subjects were (premorbidly) right-handed, native speakers of Dutch with normal visual and auditory acuity.

**Results and discussion.** The results for the control subjects show that function and content words each elicit a distinct ERP pattern. Figs. 10a and 10b show, for the controls, the ERPs to function and content words over representative left and right frontal electrodes F3 and F4, respectively. Between 200 and 300 msec both content and function words elicit a negative peak followed by a positive shift. This early peak is more negative for the function words. From 350 msec on, the waveforms clearly diverge: the function words show a strong negative shift, whereas the content words remain positive. This ERP profile is broadly distributed over both hemispheres, but slightly more prominent over the left hemisphere. These results are in accordance with the results of Neville et al. (1992) and Nobre and McCarthy (1994). The late negative shift restricted to the function words, seems to be elicited only by function words in sentence context, since Neville et al., (1992), who presented function and content words in sentences, also report this late negative shift, but Nobre and McCarthy, (1994), who presented the different word types in lists, do not.

Figs 10c and 10d show, for the agrammatics, the ERPs to function and
content words over the same electrodes as the controls, F3 and F4, respectively. In this group, the ERP profiles are highly asymmetrical over the left and right hemisphere. Over the right hemisphere, the ERPs to the different word types are similar to those of the controls, although the differences are more reduced. However, over the left hemisphere, the marked difference between function and content words in the later part of the waveform of the controls is absent in the agrammatics. Moreover, over the right hemisphere, this separation starts later in agrammatics than in controls.

We interpret these results as support for the notion that agrammatic comprehenders are particularly impaired in integrating lexical and syntactical information into a sentence context, since the late difference in the ERP waveforms between function and content words seems to be elicited only in context. It is, therefore, not related to inherent lexical characteristics of the two word classes, but to their differential role in sentence processing.

Fig. 10. Grand average ERPs for the controls (a, b) and the agrammatics (c, d) to content (solid line) and function words (dotted line) over left and right electrode sites F3 (a, c) and F4 (b, d), respectively.
14. The Analysis of Three-place Predicate Constructions in Aphasic Narrative Production

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A concordance of three-place predicate (3PP) constructions collected from six aphasic subjects producing narratives elicited by 15-min movie clips was examined to determine the extent to which the maximum expansion of argument-taking possibilities by a verb poses problems for English speakers with a syntactic deficit. Also examined was the extent to which properties of the internal arguments of these 3PPs (lack of prepositional licensing, abstract incorporation into the verb, or freezing of syntactic productivity as a consequence of being an idiom remnant or the argument of a phrasal verb) factored into its usability. Since all subjects were chronic aphasies, the analysis also focused upon their compensation strategies with respect to the redistribution of problematic constructions into classes of constructions with argument structure patterns still viable in the aphasic subject’s repertoire. Since this redistribution involved the changing of semantic verb class, we also examined the semantic skewing involved in this lexical reanalysis.

Background. The linguistically selected array of components of a verb’s lexical entry that determines the syntactic constructions in which it will appear consists of three arguments: external (x), direct (y), and indirect (z). Arguments can occur in a move to argument positions and bear specific thematic roles with respect to the verb at both lexical conceptual structure and d-structure. An additional lexically selected component of many constructions is an obligatory adjunct: The chicken(y) weighs three pounds (w); The cool temperatures(x) froze the lake(y) solid(w). An obligatory adjunct can be a phrase of any category, typically degenerate, that is part of the lexical representation of the verb in construction but does not serve as an argument: