Zeitschrift: Bulletin suisse de linguistique appliquée / VALS-ASLA
Band: - (1998)
Heft: 68: Études en neurolinguistique

Vorwort: Introduction
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Introduction

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Just a year ago the Bulletin suisse de linguistique appliquée was focussed on developmental and acquired language disorders. The present issue is again concerned with the processing of language; however, in putting together the individual contributions emphasis was placed on making linguists familiar with current models of language processing as evidenced in ongoing studies in Switzerland. Most of the studies are tied up with practical implications, namely the diagnosis and treatment of particular language impairments.

The representation of word meanings is a broad field of interest which has preoccupied not only linguists but also psycholinguists. Both have followed a decompositional approach, the former focussing on the semantic features that constitute the meaning of a word in linguistic terms, the latter exploring the cognitive structure of semantic knowledge. In *La mémoire sémantique* SIEGWART ZESIGER presents a review of the different models of semantic organization that have been forwarded in the past three decades. She points to various empirical findings that support the notion of a featural organization of semantic knowledge. As a number of clinical case studies demonstrate semantic knowledge can be differentially affected depending on whether access is visual, tactile, or auditory. Such dissociations raise the question as to whether semantic knowledge is represented in a modality-specific manner or amodally. In some brain-damaged patients the names of living objects appear to be strikingly less well preserved than the names of non-living or man-made objects. The neural basis of this dissociation has been the topic of numerous recent studies.

The literature pertaining to this particular category-specific impairment in the availability of lexical items is reviewed by RODRIGUEZ and MARTORY in their contribution *Présentation d'un protocole de dessins de mémoire.* They introduce a set of tasks to assess the ability of anomic patients to copy and draw from memory living and non-living objects. Results from a group of healthy controls is reported together with the performance of an anomic patient with particular difficulties in naming animals. The patient displayed comparable difficulties with animals in naming as well as in drawing tasks, providing evidence for an amodal organization of semantic knowledge.

The word-finding difficulties of aphasic patients can be the result of either semantic or phonological processing deficits. LAGANARO in her *Etude des*

transformations phonologiques chez trois aphasiques hispanophones investigates the influence of syllable frequency and structure on the ability to access a word form. The error pattern of the three patients studied is discussed in the context of a sequential and an interactive model of word production; neither of the two models appears to account for the phonological impairments found in the three patients satisfactorily.

The treatment of semantic and phonological word finding difficulties is the topic of two papers, one by OVERTON VENET and GREBER and one by KHATEB, CUSTODI, DEBEAUVAIS and ANNONI. The first paper addresses some of the methodological issues encountered when trying to control for therapy effects. Particularly in clinical settings therapy effects are still often questioned and attributed to spontaneous recovery. The patient described in *Thérapie du manque du mot visant une restauration du lexique phonologique de sortie chez une patiente anomique* had severe difficulties in oral and written word production but performed rather well when asked to match semantically related objects. Her responses were characterized by an abundance of phonological distortions. A therapy program was designed to improve access to word forms. A significant improvement in word production was obtained following therapeutic intervention; the patient showed the same level of performance when tested six months after treatment.

Although it is generally assumed that brain plasticity decreases with time post onset of brain damage improvements may be obtained years after onset of aphasia, as exemplified in the second paper *Chronic aphasia and sensitivity to the training of semantic abilities: clinical evidence of a role of the right hemisphere in language recovery*. This therapy study is noteworthy as it demonstrates that greater treatment effects are achieved when therapy is aimed at improving semantic difficulties in word-finding. However, not all researchers in the field will readily share the authors' hypothesis that the selective recovery of semantic processing abilities is mediated by right hemisphere processing capacities. Indeed, studies of split-brain patients, visual half-field experiments and the performance of patients with unilateral brain lesions on particular linguistic tasks have supplied much evidence for the capacities of the right hemisphere to process certain types of linguistic materials. But the evidence adduced in support of a transfer of language function to the right hemisphere after left hemisphere language disorders is not unequivocal. In some recent imaging studies (WEILLER et al. 1995; WEEKES et al. 1997) an increased activation of right hemisphere areas has been found in recovered aphasic patients; but other researchers (KARBE et al. 1998, PRICE et al. 1998) have

found an activation pattern in the left hemisphere of aphasic patients which is comparable to that of normal controls. The differential effects in the treatment of semantic and phonological word-finding difficulties could have more to do with the fact that word forms (phonology) can not be "computed" from a set of features like word meanings. It is for this reason that the treatment of semantic deficits is more likely to result in a generalization of practice effects whereas the improvements obtained when treating phonological deficits tend to be item-specific.

Much of our knowledge about the mechanisms of language processing is based on hypotheses that have been derived from experimental studies with unilaterally brain-damaged patients and healthy controls. The tests used to assess language processing are generally of an off-line nature, i.e. the responses given by the subjects are not temporally tied to the linguistic variable being studied but rather represent the "end product" of a series of temporally distinct processing stages. For example, the comprehension of spoken language involves a number of linguistic processing abilities: the segmentation and classification of the incoming speech signals, the recognition of individual words and the access to the different types of information associated with them, the construction of a syntactic representation from the extracted morpho-syntactic information; this representation must be integrated with lexical-semantic information and world knowledge to arrive at a sentence interpretation. In patients with an aphasia these abilities are compromised, either selectively or in some variable combination. RACINE, GROSJEAN, BUCCHETTI and BUTTET SOVILLA have been developing a set of tests which are designed to assess the availability of these different components with on-line experimental designs that do no call for a verbal response. In their contribution *Evaluation de la compréhension orale en temps réel chez les aphasiques* they examine the ability of normal controls and aphasic patients (1) to discriminate between different consonant-vowel syllables, (2) to distinguish between words and non-words, (3) to access word meanings, and (4) to capture omissions and errors in the use of grammatical morphemes. Strenuous as such an approach may be for many patients, particularly shortly after onset of illness, it definitely has its merits: it provides the kind of information needed to determine the functional locus of deficits in comprehension and set up the appropriate therapeutic intervention.

In *On the contribution of ERP's to the study of language comprehension* FONTENEAU, FRAUENFELDER and RIZZI are also concerned with the on-line processing of language. However, their interest lies in specifying the brain areas

that are activated when specific linguistic materials must be processed. They seek to determine the time course of linguistic information processing by measuring brain activity in terms of event-related potentials. As this functional brain-imaging technique may not be familiar to many linguists the authors outline the basic principles and main findings of this method with respect to language processing. They present data from an own study in which subjects had to judge whether the sentence displayed on a computer screen was grammatically correct. The ungrammatical sentences violated either morphosyntactic rules or semantic selection restrictions. Different patterns of brain activity were found for these two types of violation in sentential structure, a finding that intuitively may not seem to be surprising. But it is a finding that challenges both proponents of sequential and interactive processing models.

Many brain-damaged patients display no language impairment when subjected to conventional language testing but nevertheless have difficulties in conversational discourse. They are unable to maintain a topic, their contributions are tangential and they fail to observe the rules of turn-taking. They are impaired in their ability to take account of the context in which language is used and "to meet the informational needs of the listener" (MCDONALD, 1991). Disruptions in pragmatic language skills are noted particularly after closed head injury with frontal lobe involvement. As PETER seeks to show in *Ajustements conversationnels: facilitation ou entrave? Un cas de pathologie cérébrale frontale d'origine traumatique* a successful interaction between patients and their conversational partners depends much on how the latter adapt to deficits in monitoring and regulating discourse performance. By turning a communicative interaction into a chain of questions and answers conversational partners are perhaps more likely to create frustration rather than to supply support.

Impairments in pragmatic language skills are not only found after sustained brain injury; in the elderly they may signal the deterioration of mental capacities. As numerous studies in recent years have shown phonological and syntactic processing remain preserved for quite some time in dementia. Semantic knowledge tends to break down early and results in further cognitive dysfunctions. As CHRISTEN SCHÖNAUER, SCHWARZ, MEIER and MONSCH hypothesize the ability to maintain coherence in discourse is probably one of the first symptoms of mental deterioration. They argue that a careful analysis of the discourse performance of the elderly could turn out to be a feasible diagnostic tool in assessing the presence of a dementing cortical degeneration. Their research project is outlined in *Analyse des Gesprächsverhaltens gesunder und*

dementer betagter Menschen in der deutschen Schweiz: Kohärenz / Inkohärenz im Antwortverhalten. As the title of the paper suggests, the outline is limited to linguistic aspects; but for all subjects participating in the study data from neuropsychological testing will be collected and integrated. Such discourse analyses will only serve their purpose if clinical aspects are given due consideration.

An issue often debated is whether the cognitive processing models based on the performance of adult subjects may also be used in locating the functional locus of developmental processing deficits. In cases of acquired reading disorders particular processing routes are found to be deficient; underlying the interpretation of test findings is the assumption that all possible reading routes were available before brain injury. In cases of developmental dyslexia it is quite possible that a reading route has not yet been fully mastered. In examining an eleven year-old boy with difficulties in processing written language ZESIGER, ROULET, DAVIDOFF, MAYOR and DEONNA applied a cognitive approach that goes beyond assessing phonological awareness. Together with their other two case studies in *Neuropsychologie et langage chez l'enfant: quelques illustrations* they demonstrate the impact of neuropsychological tools on the assessment of developmental language disorders.

The papers collected in this issue are devoted to different topics in the field of neurolinguistics. Hopefully, they will make linguists aware of how easy it is to describe language as "an innate human faculty" but how intricately complex it becomes when language is examined experimentally within a framework of cognitive processing. We should like to thank all the authors for their contributions.

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