

Application of Linguistics to Treatment of Aphasia

Hanna K. Ulatowska

The University of Texas at Dallas

In this presentation I will try to give my view of the role of linguistics in the treatment of Aphasia. The ideal encounter between the field of Aphasiology and Linguistics seems to consist of the following main goals. In any utopian set-up a linguist would have at his disposal at least the following information.

1. A description of all features of the normal development of language in children, both spoken and written, indicating the order and rate of development of phonological, grammatical, and semantic structures and correlating these with such factors as age, sex, IQ, socio-economic background and dialect.
2. A description of language in its fully developed state.
3. A full description of the linguistic characteristics of the various categories of communication disorders including means of assessing different kinds and degrees of divergence from the norms of a given language.
4. A set of techniques capable of describing all significant linguistic features in the study of a particular case.
5. A scheme for evaluating language patterns in terms of relative complexity, and a set of recommendations concerning the order in which linguistic forms and structures should be presented in the treatment of disorders.
6. A set of explanatory principles able to account for the specific acquisition and breakdown of language in relation to anatomical, physiological, neurological, psychological and other states.
7. An introduction to the concepts and terminology used, capable of being understood by people lacking professional training in linguistics.

It comes as a shock to many therapists to realize that none of the above areas can be satisfactorily achieved by linguists at the present time, which is not to say that linguistics can do nothing. The hope, however, is that there will be a new phase in the relationship between linguists and speech therapists in which the relevance of linguistics will come to be viewed less idealistically and more realistically than in the past.

At this point, as illustration of the above issue, let me mention to you a couple of incidents from my own experience. At a welcoming party organized when I was appointed as a court neurolinguist in a department of neurology, a chairman of one of the departments of speech pathology was eager to communicate to me that the discovery of distinctive features would solve the problems of articulation disorders. This was the optimistic extreme. A year later I produced my first and only paper which dealt with both research and therapy issues in the recovery of one aphasic patient. I participated very actively in the planning of his therapy. It was the starting point of my humanitarian as opposed to strictly academic interest in aphasia. I gave the draft for comments to an aphasiologist. His response

was "So what?" He rejected it as smacking of an unfamiliar paradigm. I am pleased to mention that since that time the paper has been periodically cited in the literature, so the sentiments must be changing.

It was in the same year that a now renowned neurolinguist gave me some friendly advice. "Don't waste your time on designing linguistic tests for aphasia. This is dirty work and doesn't do anybody any good." Since that time over long years I have done a lot of thinking about the role of linguistics in the field of communication disorders in general and in aphasiology in particular, both for the professionals and for the students in a program such as ours. Here are some of the ideas coming from these deliberations.

In my view, Linguistics can contribute to aphasia treatment only indirectly. Its primary contribution is to the understanding of the nature of human language and the mechanisms underlying its disruption. It is my strong belief that a knowledge of language structure and function is a prerequisite to the diagnosis, prognosis, and treatment of aphasia.

I will discuss the contribution of linguistics under three main categories.

1. Empirical - providing new facts about normal language and disrupted language
2. Procedural - providing frameworks, categories, constructs, and techniques for analysis and assessment of language
3. Theoretical - suggesting new explanations for the particular form linguistic events take

In the last two decades linguistics provided us with relatively extensive though not complete descriptions of both normal and disrupted language. It elucidated both individual and group differences through investigations of styles, dialects, and speakers of different age groups. It came closer to defining the biological and social factors of the human communication system, as opposed to narrowly defined verbal language. Some of the most important facts which emerged from the linguistic studies of aphasic language can be now enumerated.

1. The disruption of language in aphasia is not a random disruption but is a rule-governed phenomenon reflected in the types of deficits manifested.
2. Linguistic disruptions in aphasia can be placed on a continuum from normal language to completely deranged language, since error types, both in normal subjects and aphasic patients, follow the same neurophysiological and psychological constraints.
3. Linguistic universals resulting from biological constraints on the form of human language are reflected in the similarities of aphasic disruptions in languages manifesting different structural types. For example, studies of agrammatism in English, Polish, and Japanese reveal the same characteristics.
4. There is a uniformity of error types and error directions in all types of aphasia. For example, the phonological errors in aphasic speech reflect a systematic disorganization of phonology independent of a particular lesion type (Blumstein, 1973). Error types stay within the limits of the phonological system of a given language. And the most frequent errors are substitutions differing from each other by one distinctive feature. Similarly the hierarchy of difficulty of grammatical constructions does not differ between agrammatic and fluent aphasic patients (Goodglass, 1968; Ludlow, 1973).
5. The fact that aphasic deficits can be selective without destroying the whole system verifies the hierarchical organization of language. For

example, lexical disruption may occur solely in derivationally complex literary words (Kehoe and Whitaker, 1973).

The findings outlined above deal with some very general characteristics of language dissolution in aphasia. Let me now give you some more specific and more unexpected results coming from minute descriptions of aphasic language. In the last meeting of the World Federation of Neurologists, I reported a case of a patient with a posterior lesion who, despite a severe disruption of written language at a sentence level, produced a diary, records of his dreams and letters which had a completely preserved discourse structure. This presents a new picture on two accounts, better preservation of written language than spoken language, and in written language an ability to produce language which preserves structure at a level above sentence. Later on I will return to this case to point out implications for therapy. In a recent article of Baumritter (1978) in a Polish Aphasiology journal I read a well-documented case of an aphasic patient who over the 18-month period of therapy revealed language which had Broca characteristics in the spoken modality and fluent neologistic features in the written language.

The last illustration of a very specific new finding which I will utilize later in my discussion is a recent paper of Cicone, Wapner, Zurif, and Gardner, "On the Relation Between Gesture and Language in Aphasic Communication" (in press), which reports that the gestures of aphasic subjects closely parallel their speech output; i.e. Wernickes subjects produce a much higher proportion of unspecified gestures than Brocas subjects. The finding that anterior aphasic subjects and normal subjects overall produce the same amount of gesturing suggests that anterior patients are not actively compensating for their verbal deficits. The results offer little support for the view that aphasic patients can significantly enhance their communicative efficacy through the use of gesture.

Let us move now to the next level of linguistic contribution, the procedural level. Here linguistics provides theoretical models and constructs for analyzing and collecting data, suggests ways of eliciting linguistic information, and specifies the size of a corpus and units to be used in analysis and in the construction of tests. The model of transformational grammar provided us with the first grammars of aphasic patients (Myerson and Goodglass, 1972).

A Case Grammar model was used in the above-mentioned work on language and gesture to describe the categories of both gestural and verbal language. It was also the Case Grammar model which was used by Whitaker and Noll (1972) in the linguistic analysis of the grammatical complexity of individual items in the Token Test.

It was the emergence of transformational grammar which introduced the distinction between performance and competence, which in turn led to the design of metalinguistic tasks such as anagrams, sorting words, and judgements of grammaticality to study competence.

In the last decade a considerable number of metalinguistic tests have been designed which manipulate linguistic units, as contrasted to bits of normal discourse or utterances. By experimental manipulation of the stimulus variables in these tests it is possible to define more precisely what causes the patient to fail and what permits him to succeed. Judgement of grammaticality tests consisting of sentences which are grammatically or semantically anomalous are one example of metalinguistic tests which are used to reveal deeper levels of linguistic functioning.

Special methods of assessment are devised as a result of the development of new areas of linguistics such as speech acts. One of my doctoral students proposed a complete battery of tests to tap the performance of aphasic patients on speech acts. At present with the upsurge of interest in discourse grammars, we are also constructing tests to elicit procedural and narrative discourses.

Apart from constructing new tests, some of the tests already in existence could be modified according to linguistic principles. For example, Holland (1975) stated that Melodic Intonation Therapy could probably be made more effective by careful linguistic control of the sentences or phrases used as stimulus material.

Finally I get to the level of theoretical contributions, whose role is to suggest new explanations for the particular form linguistic events take. Let me give you several examples from the area of explanation of error types.

In the phonological investigation of aphasic speech (Blumstein, 1973), the notion of distinctive feature provides a principle of explanation for the frequency of the different types of substitution errors. Errors occur most frequently between phonemes differing by one distinctive feature and fewer errors occur between phonemes separated by more than one distinctive feature.

In a study of prosody and grammar in Broca's aphasic subjects (Goodglass, Fodor and Schulhoff, 1967), the omission rate of 70% for initial functors versus 14% for medial functors is explained by the influence of stress, which is virtually independent of grammatical complexity. In another study (Kean, 1978) an argument is made that the nature of the deficit in Broca's aphasia is primarily of a phonological and not a grammatical nature since it is related to disruption of the stress system. In a study by Schnitzer (1974) deletion errors of copulas, pronouns and determiners are found only when those items carry no semantic information; i.e. are recoverable from the text. The same phenomenon is described by me in a recent study of aphasic writing (Ulatowska, Baker and Freedman-Stern, 1979).

The study of the relation of gestures to language in aphasia which reports the similarity of the verbal and gestural characteristics in Broca's and Wernicke's aphasias can be interpreted in terms of a common mechanism underlying these two different communicative modalities.

And now I come to the crux of the matter as to how these contributions can be applied to therapy. Holland (1975), in one of her discussions of the ideal relationship between research and clinical application, states that if we use the research data only to help us understand, we are covering an important half of the distance.

Studies of normal populations of different geographical, social, educational, and age backgrounds, from which aphasic populations are later drawn, may aid in the elucidation of individual differences seen after injury. At the time of the preliminary assessment of the aphasic patient and in the course of his recovery, the premorbid functioning is an important factor in diagnosis and prognosis. In a study of black aphasic subjects (Anderson and Ulatowska, 1975) we demonstrated that any speaker of black English could be incorrectly diagnosed solely on examination of his grammatical features. Without knowledge of dialect, unrealistic goals may be formed for language rehabilitation and social differences, rather than deficiencies, may be treated.

The description of the recovery of syntactic structures in aphasia as documented by Ludlow (1973) shows that the sequence of recovery is best predicted by the frequency of occurrence of these forms in speech. By implication, then, within the category of grammatical morphemes there is probably a relationship between vulnerability to aphasia and frequency of daily usage. There was no evidence of a simplified language system at any point in recovery or changes in the rule system of language during recovery, merely of access to a larger number of more complex forms. This finding should be kept in mind when planning therapy.

In my paper on markedness (1975) I tried to provide both theoretical and behavioral evidence for the existence of marked and unmarked structures in the linguistic system. I collected data from a number of languages representing different structural types, which indicated that in aphasia marked linguistic structures are impaired and unmarked structures relatively preserved. This finding could be incorporated both in the design of tests and into hierarchical therapy activities. The relatively recent finding of Zurif, Caramazza and Myerson (1972) that agrammatism is a limitation on both language production and language comprehension carries an important clinical implication which should be taken into consideration in both assessment and therapy of patients with anterior lesions.

Recent studies of discourse grammars conducted by us, at least in their preliminary stages, confirm the clinical impressions that context facilitates production of coherent language despite a disruption at the sentential level. This has potential implication for both explaining the discrepancy between the performance of aphasic patients on standardized tests and in life-like settings in studies of functional communication, and for designing therapy in such a way that natural discourse provides the context of language stimulation. If we accept the claim of discourse grammars that the sentence is the production planning unit whereas the discourse is the cognitive organizational unit, we might facilitate recovery of language using discourse by providing therapy on a broader cognitive basis instead of on a strictly linguistic basis.

Along the same lines, application of speech act notions to the description of patient-clinician interaction in therapy (Wilcox and Davis, 1977) revealed an extremely narrow range of speech acts, consisting primarily of assertions produced by aphasic patients, and requests produced by clinicians. Since other studies of speech acts produced by aphasic patients in natural settings (Holland, 1975; Ulatowska, *et al.*, 1977; and McCurdy, 1978) also report speech acts such as warning, agreeing, promising, and complaining, the communicative assets of aphasic patients could be enhanced by utilizing more natural communicative settings.

Another area of potential application which I consider very important is the investigation of compensatory features in aphasia. Goodglass (1978) describes some of the compensatory features in agrammatism, such as agrammatic concatenation; i.e. the substitution of a series of juxtaposed simple sentences for a complex simple sentence, the use of direct for indirect discourse, and the substitution of a stressed for an unstressed opening word. These compensatory features could be built into didactic therapy with patients who might not have developed such devices.

Related to the issue of compensatory features is the general area of linguistic strategies utilized by aphasic patients. Over the years I have found the investigation of the strategies employed by aphasic subjects on a variety of linguistic tasks promising for both assessment and prognosis.

This is based on a general finding that there is a reasonably good correlation between an aphasic patient's performance on an experimental task and his ability to benefit from therapy.

In a recent study (Hildebrand, May and Ulatowska, 1978), we extended the investigation to the scrutiny of strategies utilized by employed aphasic individuals in their jobs. We learned from the study that a careful documentation of the strategies and compensations used by these aphasic subjects can be beneficial in planning therapy for other patients.

At this point I would like to close by reiterating the main point of this presentation. Linguistics attempts to provide facts about language, techniques of analysis, and possible explanations of mechanisms underlying the disruptions of language in aphasia. All of these should be approached with caution by a clinician who may then try to apply them to diagnosis, treatment, and prognosis using the knowledge and techniques of his field, his clinical judgement, and insight. There is a gulf of complexity, obscurity, and sheer ignorance separating these levels so we should proceed with patience and humility.

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Summary of the Round Table Discussion on
Application of Linguistics to Aphasia Therapy

H. Ulatowska

The round table discussion focused on the issue of competence and performance in relation to the description and treatment of aphasia. The main issue which was deliberated was whether aphasia is a competence or a performance problem and consequently, whether you could talk about patients who had either performance or competence impaired. Examples of 'pure syndromes' such as "pure agraphia" or "pure apraxia" were given as possible cases of disruption of competence only.

Some disagreements were voiced regarding the classifying of either "pure agraphia" or "pure apraxia" as aphasia. The issue was raised as to whether the distinction between competence and performance in aphasia could be considered in terms of access to the language system at a given time.

This point of view is consistent with the "situational version" of the competence/performance dichotomy which states that performance varies according to the situational context. This view leads to the distinguishing of two types of competence: the basic knowledge of the language itself, and competence for using this basic knowledge in particular situations.

Furthermore, it was pointed out that some aphasiologists profess the view that aphasia is not primarily a linguistic disorder, but a processing disorder. This point of view is compatible with the recent approaches to language in the field of linguistics, whereby language is regarded within a broad cognitive framework. It was emphasized however, that the clinical aphasiologist should make an effort to differentiate language impairment concomitant with aphasia from general impairment in processing such as error detection ability, alertness level, etc.

The main concern of the discussion was how all these issues relate to the techniques and guidelines used in aphasia treatment. Specific questions were asked such as: "Are facilitation techniques (e.g. deblocking) appropriate for treatment of aphasic patients who have competence as opposed to performance problems?" As a response to the above, it was suggested that Chomsky's distinction between competence and performance had been heuristically valuable, but it does not seem to be helpful at this point in time to investigations of aphasia. If we agree that linguistic competence is represented in the brain, and that aphasia results from insult to the brain, it follows that both competence and performance are impaired in aphasia.

As to therapeutic guidelines, since language is an extremely rich and redundant system, it is possible to use facilitation techniques in patients with various types of impairment in an attempt to utilize other connections in the system. It was emphasized that investigations of strategies used by aphasic patients during the process of recovery can be of great help in designing and improving these facilitation techniques.