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Editorial

Linguistics in a Neuropsychiatric Frame
A look at the dialogue of brain and mind

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"How frightful is the self-inflicted fate
Of learned men who cleverly create
Strange forks that, prongless, fail to bifurcate."
Botha (1989)

Thomas & Fraser's excellent paper on linguistics (*BJP*, this issue, pp. 585–592), and its application to psychiatry leaves many of us with a sense of regret that we have been tardy in recognising the methods and presumed benefit of this approach. For linguistics to be meaningful in a psychiatric context, it is not enough to analyse the grammatical or propositional context: it is also necessary to establish the act accomplished by an utterance, the relevance of the discourse, and the resulting social interaction between speaker and listener. For example, we should not enter too hastily on the analysis of schizophrenic speech without taking note of the culture of the patients and the languages they use: isolating languages (dependent on word order), inflecting (where suffixes alter the meaning of words), polysyllabic or agglutinating (words built from long sequences of units, e.g. antidisestablishmentarianism). Another example is how the symptoms of aphasia depend on the underlying syntactic structure: thus, so-called agrammatic speech disorders feature more prominently in German papers on aphasia than in English (Bay, 1962).

The most open and least inhibited speech is found in communities, such as seaports, where there is a flux of many languages, with little attention to grammar, and meaning is achieved by gesture and quick-witted intelligence. The language of primitive communities has, by contrast, to be grammatically correct. Foreigners are liable to be misunderstood if their pronunciation is inexact or they fail to use the proper portmanteau phrase. But even the least bright within the community gain confidence from their mastery of grammatical construction. This observation has been examined experimentally by Leonard *et al* (1987) in a comparison of the pattern of morphological errors of English-speaking and Italian children with developmental language impairment – Italian being a more inflecting language. It was found that the Italian children made fewer morphological errors than those learning English.

The study of language

Language has many functions in addition to propositional speech. It is the result of complex nervous activity which allows emotional and psychological states to be expressed or perceived through auditory, graphic or gestural signs using sensory or motor functions not initially specialised for this purpose (Alajouanine, 1968).

In everyday speech, intimacy clauses are used to place speaker and listener in an empathic relationship. The hostage John McCarthy described the early part of his captivity:

> "I desperately missed conversation. In the past I'd talked a lot of nonsense, playing with words, using humour to get to know people. It may have been frivolous, but it was contact, an intimate bond with others." (McCarthy & Morrell, 1994, p. 79)

Later, he was able to use his conversational skills to cajole his fellow prisoners, calm the excesses of his guards, and cause them to select him as their emissary.

In the 1920s, behaviourists (e.g. B. F. Skinner) declared that the talk they had to listen to could be explained in large measure without supposing that people think. Chomsky's disagreement with this hypothesis led directly to the formulation of his transformational grammar.

Linguistics developed from the writings of the grammarians of earlier centuries. The foundations were laid by Ferdinand de Saussure (1916) and amplified by Grewel (1951), Panse (1955), and Jakobson & Halle (1956). The present generation of physicians became aware of linguistics through the writings of Noam Chomsky, as in the addendum to Lenneberg's *Biological Foundations of Language* (1967). Progress continues unabated. Linguistics and psychology have become interwoven, "as that part of psychology that focuses its attention on one specific cognitive domain and one faculty of mind, the language faculty" (Chomsky, 1980), to discover the correct characterisation of the language faculty and its initial and attained states, an abstract characterisation of the theory of mind, and an enquiry into mechanisms in the brain sciences. In principle, discoveries about the brain should influence theory of mind and

at the same time the abstract study of states of the language faculty should formulate properties to be explained by the theory of the brain (Chomsky, 1986).

Aphasia

The study of aphasia is central to an understanding of speech disorders, but there are few satisfactory definitions:

(a) a disturbance of normally developed language functions resulting from acquired circumscribed brain damage (Barr *et al*, 1989)
(b) the generic term for loss or impairment of all forms of language as a result of brain damage, in practice usually confined to loss of the ability to formulate, express or understand spoken words (Critchley, 1987).

What it is not, as the term 'aphasia' would imply, is absence of speech. Hughlings Jackson was emphatic in stating that the aphasic patient is not unable to speak but unable to make propositions, that is, to relate concepts to each other; and that language is not a 'word heap' but involves meaning gained by placing words in context. There have been many oversimplifications – with speech regarded as a complex faculty distinct from thought, even though related thereto. Can the chasm between words heard and words articulated be filled adequately by such terms as 'concepts', 'ideas', 'word-schemata', or 'preverbitum'? We need both a theory of brain and a theory of mind.

Despite modern methods of investigation, it is difficult to maintain the notion that specific subtypes of aphasia are associated with specific centres within the language area (Willmes & Poeck, 1993). Lesions at a particular site do not invariably produce aphasia (even after the exclusion of brain reorganisation or plasticity following prenatal damage) and no unequivocal association exists between the type of aphasia and localisation of the lesion. The pattern may be a factor of the age at onset (Obler *et al*, 1978), the type of aphasia may evolve with time (Kertesz & McCabe, 1977), and restitution of language function may occur despite persisting damage.

Direct involvement of the cerebral cortex seems essential to the development of aphasia, and the infarcts tend to be larger than in non-aphasic patients (Weiller *et al*, 1993). There remains no unanimity about the nature of the specialised roles of parts of the cortex and precisely what the functions are that *are* localised remains obscure (Phillips *et al*, 1984).

Extension to the basal ganglia increases the variability of the language impairment, irrespective of lesion size (Willmes & Poeck, 1993).

Dementia and Parkinsonism

Study of dementia reaffirms the importance of the receptive aspect of speech. The deaf are often presumed to be daft, and failure to comprehend is often mistaken for deafness.

The differentiation between deafness and comprehension deficits must always be made when assessing and treating patients. Many of the rarer, central disorders of language are misdiagnosed as due to deafness and may be found among patients attending psychiatric units for the deaf.

Slowness of comprehension is a feature of subcortical dementias. Slower pathways for comprehension are used to overcome word deafness (Auerbach *et al*, 1982; Ellis & Young, 1988) (and presumably are also used by the non-fluent linguist).

Among an ageing population, 'dithering' of comprehension, as though uncertain whether understood, may be observed – suggesting similarities to the motor dithering of judgement and speech in idiopathic Parkinsonism.

Stereotactic operations for Parkinsonism have revealed that the integration of speech production is organised asymmetrically at the thalamic level (Darley *et al*, 1975); such operations may affect the physical production and rate of speech or result in transient aphasia and anomia. Pulvinar lesions may cause nominal aphasia with paraphrasia, and ventrolateral lesions may cause difficulty with word finding (Tanridag & Kirshner, 1985). Neurotransmitter substances enhance the clarity, volume and perseveration of phonation, and the latency and smoothness of articulation (Critchley, 1987).

Localising language

Attention has been focused on the language role of the frontal lobes and non-dominant hemisphere. The frontal lobes are implicated in the facilitating and processing of verbal instructions, the execution of complex sequencing of actions, often in a distinctly verbal context (Kaczmarek, 1987), and interference with frontal monitoring can lead to digression and confabulation (Luria, 1980; Brown, 1985). Liddle *et al* (1992) have sought to correlate poverty of speech in schizophrenia with hypoperfusion and malfunction of the left dorsolateral frontosubcortical system, disordered forms of thought with a right ventral prefrontal abnormality, and reality distortion with the left parahippocampal region.

The right hemisphere is involved to a greater extent in reading than in speech, in the prosody of speech

production, and more especially in speech comprehension (identifying the voice, its affect and gestural interpretation), in monitoring the feedback of one's own speech, and in certain 'supra-language' cognitive functions: problem solving, metaphor interpretation, abstract concepts, spatial reasoning, punch-line selection, and verbal humour (Critchley, 1991).

To fill the chasm between comprehension and expressive speech, and to note the deficits in aphasia, requires a theory of the mind, explaining the agrammaticism of Broca's aphasia, the paragrammaticism of Wernicke's aphasia, and the recurrent utterances and neologisms of global aphasia (Willmes & Poeck, 1993). Concepts in aphasia are impaired, lack clarity, and may be accompanied by vague and helpless gestures (Bay, 1962). Among the non-verbal disorders in aphasia are an inevitable lowering of intelligence (IQ), a poverty of ideas, lack of self-criticism, and failure to recognise the reaction of the listener.

In children with Asperger's syndrome, ability to communicate is hindered by abnormal behaviour, monotonous and perseverative speech, reduced facial expression, peculiarities of gaze, and inability to relate normally to other people (Gillberg, 1985). The importance of facial expression as an adjunct to communication is best illustrated by deaf people using sign language. Unrecognised facial rigidity in early Parkinsonism can result in a breakdown in communication and misread emotions (Critchley, 1985). Children with facial agenesis are often regarded as unintelligent. Both schizophrenics (Walker *et al*, 1984) and maladjusted children (Taylor & Harris, 1984) are impaired in their ability to extract salient emotional cues from faces.

Cohesion analysis and discourse analysis

Psycholinguistics, in particular cohesion analysis – 'mapping grammar onto the mind' – and discourse analysis – examining the sociocultural context of communication – have provided major advances in understanding the accessory requirements for speech. Many factors, such as style and politeness, affect language use (Chomsky, 1965). Conversation requires the integration of communicative, social and emotional skills, the use of social signals and interactive strategies, for example encouragement and partial withdrawal, as in bargaining.

Abnormalities may include failure to initiate or sustain conversation, repetition or stereotyped language, pronominal difficulties (using I and you), and speech impediments affecting pitch, stress, rate, rhythm, and intonation.

Speech strategies, possibly developed within the frontal lobes, include an appreciation of the listener's needs in following speech, a flexible plan of action sequences, and ability to inhibit or defer a response to a more appropriate time (McEvoy *et al*, 1993). Coherence may depend on pre-planning. Mutual repair of speech errors during rapid, abbreviated exchanges between recipient and speaker may enhance understanding. The flexibility of normal conversation, often at the expense of syntax, has been most clearly understood by the very best of women novelists.

Psychiatrists will be particularly interested in two applications of discourse analysis: to impaired language development and to psychoses. Bishop (1992) and others examining children with specific language impairment found that many children initially exhibited a functional articulation disorder with dyslalic defects secondary to inadequate auditory perception. The grammatical impairments and subtle comprehension defects of this syndrome were also similar to problems experienced by prenatally deaf children. But when reexamined two or three years later, the clinical picture changed markedly, and many children had outgrown their difficulties (Bernstein & Stark, 1985; Bishop & Edmondson, 1987).

The irregularities of schizophrenic speech – paraphrasias, neologisms, incoherencies and agrammaticisms – which become more error-ridden with chronicity (King *et al*, 1990), led Chaika (1974) to conclude that there was an intermittent aphasia characterised by inability to organise linguistic elements into meaningful structures. However, in Andreasen's series (1979) only 16% of schizophrenics exhibited clearly disorganised speech, and most observers regard the language disorder as reflecting a primary disorder of thought. In the present debate the thought disorder is seen as a multi-level disturbance involving a true thought disorder, a pragmatic language disturbance, and faulty social cognition (Cutting, 1985; Frith, 1992). Many of these disturbances–including perseveration and abnormal behaviour – may represent an aspect of frontal lobe dysfunction in the realm of language (Barr *et al*, 1989; Liddle *et al*, 1992).

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