

DISORDERS OF SPEECH

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Given the pervasive and multi-faceted role of language as a means of social interaction and personal expression, the devastating effect that a speech disorder can have on the development and integration of an individual is not difficult to appreciate. A whole range of potential problems arise in their various degrees: the speech may be unintelligible, ambiguous, inappropriate, ineffective, inadequate, unpleasant . . . and, as a result, promote a host of associated problems, largely (but by no means exclusively) psychopathological in character.

Surprisingly, only in recent years has the study of speech disorders emerged as an autonomous area. But the new degree schemes (a development of the diploma training given to speech therapists) taught in centres such as Reading or Manchester are beginning to focus on the multi-disciplinary training required in order to understand speech problems. Obligatory foundation components include medicine, psychology and linguistics. A typical medical component would comprise anatomy, physiology and neurology (with particular reference to the head and neck area), ENT, paediatrics, geriatrics, plastic surgery, and orthodontics. Psychology involves, in particular, physiological, social, cognitive and

developmental aspects. Linguistics includes studies of the adult sound system, grammar and vocabulary, as well as the acquisition of these areas by children and the analysis of the linguistic characteristics of the various types of disorder. In addition, a degree course may include a remedial component geared to the needs of a particular profession, such as speech therapy, clinical audiology, or teaching the deaf.

The juxtaposing of these components highlights the crux of the problem facing the investigator of speech disorders: the fact that different academic disciplines approach the subject from different and often contradictory points of view. One may appositely contrast the medical and the psychological/linguistic approaches. The former tends to look at speech disorders in aetiological terms. Thus, for example, one may isolate anatomical factors (*eg* to explain hypernasality as a result of a cleft palate condition), physiological factors (*eg* a voice disorder arising out of an endocrine imbalance), traumatic factors (*eg* aphasic speech as a result of lesions in Broca's or Wernicke's areas), as well as the less determinate factors of a psychological, social or functional kind. By contrast, the viewpoint of the psychologist/linguist is to make a classification based upon a detailed analysis of the linguistic or behavioural characteristics of a disorder. A linguist might accordingly isolate the

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phonetic features characteristic of deaf speech, the truncated grammar of language delayed children; or the word finding problems of the aphasic.

The central theoretical difficulty is that, in the area of speech disability, a one to one correlation between aetiology and behaviour is never found. Even very clear aetiologies, such as cleft palate, give rise to complex linguistic behaviour. Several features of the speech of the cleft palate patient can be correlated directly with the anatomical/surgical condition, but several aspects cannot, *eg* one may encounter delay in grammar or vocabulary, hearing loss, and poor social-linguistic interaction. Likewise, a category such as aphasia may be unambiguously the result of lesions in a given brain area, but the resulting linguistic behaviour is highly diverse. To say that there are as many types of aphasia as there are aphasics would be too extreme, but that emphasis is far more realistic than the simplistic classifications of aphasics into two or three types that can be found in early textbooks.

Any theory of language disability must interrelate the medical and behavioural models of investigation—but such a theory is nowhere in sight. Recent techniques in physiological psychology and neuropsychology, such as the use of dichotic listening tasks to establish which brain hemisphere processes a stimulus, have proved invaluable in advancing

knowledge, and the contribution of linguistics to the analysis and classification of speech disorders has been great.

Four themes are of particular importance:

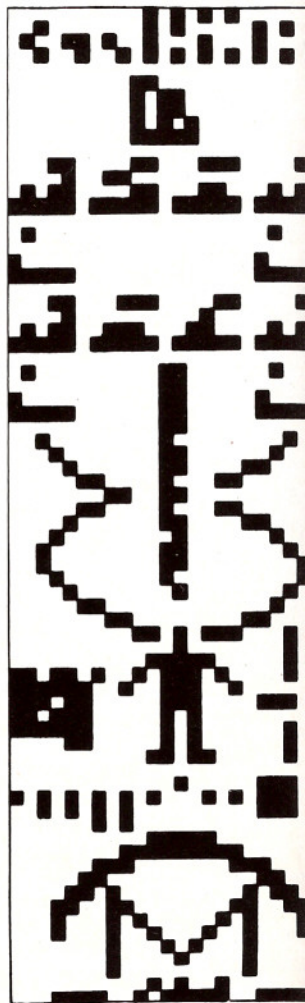
- The view of language as *multimodal*, *ie* keeping distinct the modes of speaking, listening, reading and writing. A disorder may affect any one mode or any combination of modes, as clearly shown by the variable performance of aphasics on the test batteries designed to cover the whole range.

- The emphasis on the abstract language system that underlies all four of these modes, namely the grammar, semantics (meaning), and transmission features (the rules governing the sound system of speech, or the alphabetic system of writing).

- The distinction between a disability which is the result of *immature* use of the linguistic system (due to delayed learning in children or regressive behaviour in adults) and that which is the result of using a *deviant* linguistic system, *ie* sounds/letters, grammar, or vocabulary outside the normal range of child/adult usage.

- The need to interrelate the categories of disorder into a single theoretical framework; the most widely used notion is the 'speech chain'.

The speech chain is best explained as a commentary on a diagram of two communicating individuals (Figure 1). A has a cognitive-linguistic organisation of experience, an aspect of which—'the message'



Radio message beamed from Cornell University's Arecibo Observatory in Puerto Rico to outer space.

From top to bottom, the message shows numbers 1 to 10, five important atoms (H, C, N, O, P), four amino acids (adenine, guanine, thymine and cytosine), a sugar and phosphate, the DNA double helix, a human figure, the solar system and the Arecibo radio telescope dish

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—he wishes to transmit to B. At least the following stages are involved for speech:

- a) Neurological encoding and transmission, via the efferent motor nerves
- b) Physiological encoding and transmission (articulation)
- c) Acoustic transmission, as sound waves
- d) Anatomical/physiological reception by the ear (audition)
- e) Auditory, neurological transmission, via the cochlea and VIII nerve
- f) Neurological decoding in the auditory and associated areas of the cortex
- g) Cognitive-linguistic interpretation of the signal.

Using a model of this kind has limitations, in particular, insufficient emphasis is laid on the 'mixed' nature of many speech situations, *eg* a disorder that might result from a combination of encoding and decoding problems. But the model is useful in that it suggests the wide range of speech disorders that exists. At any point along this chain, a breakdown (of

varying severity) may occur. The widely used distinction between 'expressive' disorders (on the left of Figure 1) and 'receptive' disorders (on the right) is valuable as far as it goes, but it is plainly too general. An immediate further distinction needs to be made in terms of disorders at the encoding stage (the types of *dyspraxic* speech) and those at the transmission stage (the types of *dysarthric* speech). Likewise, immediate sub-classification of other stages, with associated behavioural descriptions, is essential if satisfactory differential diagnosis is to proceed.

The speech therapist has long had to carry the weight of diagnosis, assessment and remediation on her shoulders. Given the increasing demands of a broader based training and a heavy caseload—300 000 patients in need of therapy in the UK, *ie* around 3000 per therapist, according to the Quirk Report (*Speech Therapy Services* HMSO 1972)—a review of resources is urgently needed.



Prehistoric cave painting. Konda-Iringi, Tanzania (Picturepoint)

The full analysis of a 30min sample of patient speech (necessary before properly structured remediation can proceed) takes at least a morning. No therapist has time to perform this analysis for more than a fraction of her patients. An analogous situation would be that requiring the medical profession to function as normal while performing their own pathological analyses. Precisely this situation faces the speech therapist, who lacks a language pathology laboratory and who has to process samples herself. Under the circumstances, can one wonder that patient service is less than adequate.

One hopes that the situation will improve; but improvement will take place only if pressure can be brought to bear on a broader front than that which the paramedical service alone can provide.

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