The Neurological Boundaries of Reality

Edited by

E.M.R. Critchley

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I wish to thank all those who have helped to stimulate the ideas upon which the book is based, the many secretaries who have been concerned with its production, and in particular our publisher, Farrand Press, for the stability of support necessary for a work of unusual character. Finally I would like to dedicate it to my uncle, Dr Macdonald Critchley, Ex-President of the World Federation of Neurology, who has inspired many with an interest in higher cerebral functions.

Edmund M.R. Critchley
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Preface

What can we reason, but from what we know?
Of Man what can we?
Alexander Pope (1688-1744)
An Essay on Man

Anyone intrigued by the question implicit in the title of this book, The Neuronal Boundaries of Reality, can be presumed to possess the curiosity and intellectual vigor to read further. The more familiar lines from Pope’s “Essay on Man”, beginning “Know then thyself, presume not God to scan, the proper study of Mankind is Man”, would normally be addressed in today’s world at the Natural Sciences. Although physicists have been concerned to define the essence of the material world, and philosophers — some with remarkable penetration — have attempted to determine the meaning of reality, there has been no comparable undertaking by those whose daily concern is with patients experiencing difficulties involving the borderlands of reality.

The purpose of this book is to redress this serious omission in the writings of neuroscientists by examining in detail various aspects of human awareness. The text is intended to be read at many levels. The emphasis has been on simplicity of expression and clarity of thought. A critical examination of the boundaries of reality has meant that many cherished myths have been discarded, newer concepts have been introduced, and the work should prove invigorating for those seeking a deeper understanding of their specialty. The choice of the syntactic phrase “neuronal boundaries” is to emphasize that many apparent distortions encroaching on the borderland of reality are not necessarily aberrations and are best explained in neurological rather than psychological or psychiatric terms.

Every one of the galaxy of authors — representing psychiatrists, psychologists, philosophers and neurologists — has risen to the challenge, examining how we recognize what is real or unreal, correlating scientific knowledge, unusual experiences, examples from literature and elsewhere, and the many hypotheses advanced to provide an exciting, stimulating and thought-provoking text. "True Science then, with modesty thy guide, deduct what is". it is left to the reader to discern any central theme, and in this respect, the book can be treated as a comprehensive series of individual essays on which to browse, rather than as a sequence to be followed dogmatically.
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4. Deafness and communication

Brendan Monteiro and E.M.R. Critchley

The theme of this volume is the uncertain nature of reality and the fact that, with or without challenges to the senses, it may be difficult for people to understand the nature of their reality. Many authors have treated deafness as a disability, that brings with it a dual impairment – the so-called failure of a major sensory organ and blockade of a conventional mode of communication. The knowledge and experience of working with deaf people at a mental health centre, specifically designed for deaf people, challenge these conventional ideas and strongly support the view that deaf people form a cultural and linguistic minority. The practical problems of outlining the reality of deaf people can be appropriately addressed in specialized mental health units established to meet the needs of deaf people.

The severity of deafness – an audiological concept – can be measured accurately:

A deaf person is one whose lack of ability to hear precludes the successful processing of linguistic information through the auditory channel, with or without a hearing aid.

A hard of hearing person is one who, with the use of a hearing aid, has sufficient residual hearing to enable successful processing of linguistic information through audition.

(Report of the Ad Hoc Committee to Define Deaf and Hard of Hearing)

The other important variable is the age of onset of deafness.

Late Onset Deafness

Acquired deafness in later life is usually insidious, neither the patient nor those with whom he is in contact are initially aware of the gradual impairment of hearing. He appears not to be paying attention, appears remote or socially dulled. He may fail to grasp part of the conversation and draw a wrong conclusion from what is said. His feelings may be hurt; or he may fail to understand the feelings of others. “Partial deafness without awareness of its source is associated with changes in cognitive, emotional, and behavioural functioning, and paranoid thinking may emerge as a cognitive attempt to overcome the difficulty in hearing. Misunderstandings may provoke frustration and anger”. (Leading article; _Lancet_, 1981).

It may not be possible, in the elderly, to separate a disorder of hearing from a disorder of comprehension, and the conclusion is often made that the individual...
Deafness in Childhood and Adolescence

Wright (1969), who became deaf when he was seven, gives a moving account of his deafness and the way it affected his life. He describes the difference between his deafness and that of someone who becomes deaf at birth or at a very early age. What is crucial is the age at which hearing is lost. The deaf-born cannot pick up speech and language naturally like ordinary children. They have to be taught, a difficult and slow process, the slower and more difficult the later the teaching begins. Thus why older children and adults find it an effort. But the born deaf and those who become deaf in early childhood have the compensation that they do not feel the loss of a faculty they never had or cannot remember.

Early Onset Deafness

A child born without hearing presents the greatest challenge to the theories of evolution and development, which incorporate ideas based on the concept of sound. All mammals, all birds, and some reptiles are able to hear. Reptiles and fish can appreciate vibration. The child can be presumed to have an auditory cortex, central nervous connections for hearing, and a potentially utilizable peripheral sensory organ for hearing. We normally assume that maldevelopment has affected part of the inner ear, and, where possible, we seek a remediable cause. We do not know whether the central apparatus is functioning, or silent; whether, with the innate plasticity of the nervous system, parts of the auditory apparatus are put to other functions; or whether through lack of stimulation they remain undeveloped and in an immature state. Some of the cases of congenital deafness, such as meloba, embryopathy, hereditary incompleteness, and prematurity, also affect other anatomical sites within the nervous system and possibly involve the auditory pathways and cortex at several levels. What is known is that central disorders of language—various forms of word deafness, development dysphasia, and ideopathic language retardation—may mimic deafness unless properly analyzed.

In every case, the essential difference between people with early profound deafness and those with onset of profound deafness in later life is the acquisition of verbal language. "Verbal" is used to mean the use of words.

Speech is an innate human function, and except in extreme instances of impaired hearing, can be acquired by all normal human beings, with sufficient time and intensive effort. The acquisition is not a simple one-for-one translation of spoken sounds into their written symbols, but is a complex process of learning, involving auditory perception of sounds, intellectual understanding, and the ability to produce sounds in a socially acceptable manner. The process is facilitated by the presence of normal speech and language models, and the opportunity to practice and receive feedback.

The social and emotional consequences of deafness in early childhood can be severe. Children who are deaf may experience a sense of isolation and exclusion, as they are unable to participate fully in the social and communicative activities of their peers. They may also experience a lack of confidence and self-esteem, as they may feel that they are different from their peers. However, with the right support and intervention, children who are deaf can develop the skills and abilities necessary to participate fully in society.

In conclusion, deafness in childhood and adolescence can have significant emotional and social consequences. However, with the right support and intervention, children who are deaf can develop the skills and abilities necessary to participate fully in society.
on the Vineyard, the hearing people are bilingual in English and Island sign language thus downing the wall that separates most deaf people from the rest of us.

Currently, many deaf people perceive themselves as part of a cultural and linguistic minority. Several factors contribute to this.

Firstly, the education of deaf children has been fraught with controversy. The educators and deaf children have, in the main, subscribed to the oral/aural approach which concentrates all efforts on the acquisition of speech and prescribes sign language believing such an approach necessary for the integration of deaf people into a hearing society (2nd International Congress on the Education of the Deaf, Milan, 1880). Even today, sign language is either not discussed or grossly undervalued in the counselling of hearing parents of deaf children.

Secondly, deafness is viewed in medical terms as a disease, and even if not genetically determined is regarded eugenically as an unacceptable trait which requires isolation and eventual elimination. A pariah syndrome is added to any inferiority complex or presumed social inadequacy.

Thirdly, deafness is invisible; it has no visual characteristic. Furthermore, 85% of deaf children are born to hearing parents. These children are thus part of the culture and race into which they are born, even though they cannot gain proper access to the shared norms and experiences of a shared culture. Their parents are encouraged to view their deafness as a disability and frequently resist their integration into the deaf community because of the misguided advice they receive. Schlesinger and Meadow (1971), described the attitudes of hearing parents to their deaf children, stating that the deaf children’s parents showed some frustration and irritation with the impediments of parent-child communications while insisting that the deaf child was really no different from his hearing sibs.

Deaf children of deaf parents are a good example of people who become natural members of the deaf community. These children and their families perceive their deafness as a normal experience. They acquire sign language naturally as their mother tongue, and develop a strong deaf identity. Though sign language and finger spelling they may acquire a considerable vocabulary. They do not experience many of the difficulties faced by deaf children of hearing parents and frequently become key members of the deaf community.

Those not in the deaf community have difficulties keeping in touch with the larger hearing population. They may have few problems with integration, if they have been well taught, have adequate support at home or at work, are particularly skilled at a trade. But if for some reason integration is absent they become remote. Isolated, appear to lose touch with reality; in short, they can appear psychotic. Some deaf people are referred to psychiatrists to clarify the nature of their experiences; many do not suffer a mental illness but may have encountered a variety of problems and difficulties. Those referred to mental health services include:

1 Deaf people who have been inappropriately educated

Some deaf people are educated in schools that adopt an oral/aural approach. Some schools for the deaf still shun sign language and do not provide the

environment for deaf children to develop a deaf identity and pride in their language. The 1981 Education Act emphasized the integration of children with special needs into mainstream schools. On occasion deaf children were placed in “hearing” classrooms with some additional support or in partially hearing units where they were taught together for part of the day and “integrated” at other parts of the day.

A major disadvantage of such systems is that deaf children are relatively isolated. They are prone to develop a negative self-image, and are often on the periphery of both deaf and hearing groups. Deaf children in “mainstream” education are denied opportunities to develop sign language techniques, and can become isolated both in the linguistic and social dimensions. The problems are further complicated when such individuals live in rural communities, are completely engulfed by their hearing families and cannot maintain regular contact with the deaf community.

2 Deaf people with disabilities

The incidence of intellectual impairments, physical disabilities, blindness and other disabilities is higher in the deaf than in the hearing population. A multicentre study of 3000 deaf children in nine European countries (Martin, 1979) revealed that 29.3% had some disability, of which 9.9% were intellectually impaired.

Although deaf people with intellectual impairments have the potential to acquire sign language skills at a basic level, they often experience great difficulties in acquiring verbal language. Their ability to conceptualize and think in abstract terms is extremely limited. As a consequence of their difficulties and poor achievement, they often lack the knowledge, ability and social skills necessary to make an adjustment in either deaf or hearing communities. Such people may be referred because they lack the ability to communicate either verbally or by sign and gesture. It is imperative to develop a helpful relationship, then seeing what forms of communication are understood, and finally enlarge and develop some form of signing even if only mutually comprehensible between the person and his carers.

The Boundaries of Reality

The experience of sound for a deaf person depends upon the age of onset of deafness and the degree of deafness. Deaf people who can hear speech may have difficulties (in discriminating) and may misinterpret what is being said. Those who are born profoundly deaf form 1 in 1000 of the world’s population. It is still unclear whether they live in a silent world. They do not complain of silence or of tinnitus. They are often able to hear noises and some state they can perceive certain sounds such as the banging of doors, horns of cars. They often wear hearing aids to hear environmental sounds to help awareness and safety in their surroundings.

For those deafened after acquiring speech language, the experience of noise and sound is somewhat different, and they retain an auditory memory, as do those who have become deaf at an early age who may have a subsequent progressive hearing loss. Thus Wright (1969) describes his perceptions of “sound” when others speak. He describes "phantasmal voices" that he hears when anyone speaks to him.
provided he can see the movements of their lips and faces. Sacks (1989) elaborates on this phenomenon. This hearing (that is, imaging) of “phantasmal voices” when lips are read is quite characteristic of the post-lingually deaf, for whom speech (and “inner speech”) has become an auditory experience. This is not “imaging” in the ordinary sense; rather, an instantaneous and automatic “translation” of the visual experience into an auditory correlate (based on experience and association) — a translation that probably has a neurological basis of experientially established visual-auditory connections. As with “photism” which may be provoked in blind people by sound, so the deaf may experience “acouphenes” in response to visual stimuli.

Communication is important in all medical practice, in psychiatry it is of absolute and crucial importance. The process of diagnosis in psychiatry relies on the ability of the patient to give an account of his experiences and the psychiatrist’s ability to understand him. The clinical interview constitutes the main tool for both assessment and treatment in psychiatry (Rutter and Cox, 1981).

The diagnosis of mental disorders poses immense difficulties if psychiatrists do not have an understanding of the cultural, sociological and linguistic aspects of deafness, and cannot communicate using sign language. Historically, it has been stated that all people with early profound deafness have communication difficulties. It is now widely acknowledged that when deaf people have good facility in sign language, the communication difficulties are those of the examiner.

Communication difficulties affect the Mental State examination of deaf patients. The examiner may have difficulties establishing rapport and understanding the patient’s communication, and the patient may experience immense difficulties understanding the nature of the interview and the questions asked. The patient who experiences early profound deafness is likely to have limited verbal language and therefore the use of the written word will be misleading and could lead to misdiagnosis. Mis-spelt words, poor grammar and syntax may be regarded as evidence of intellectual impairment. Conversely, the behaviour of some deaf people (e.g. the overt expression of emotion that characterizes communication through sign language among groups of deaf people) may lead to the mistaken diagnosis of mental illness because failure to communicate effectively may lead to a lack of understanding of the causes of anger, frustration and other everyday emotions which may be mistakenly attributed to symptoms of mental illness.

Early profound deafness is, unfortunately, sometimes mistakenly equated with intellectual impairment — deaf and dumb. [Dumb has two meanings: inability to speak and of low IQ]. Aristotle, for example, believed that those who were born deaf were “incapable of reason” and, if the psychologist is unaware of the clinical, psychological, cultural and linguistic implications of deafness, then verbally loaded questions may be used, and the deaf person will invariably underscore. There are also grave problems in the interpretation of results (Denmark, 1985).

The communication issues related to early profound deafness, and especially the limitations of verbal language, can make diagnosis difficult even when they are examined by experts with the requisite communication skills (Denmark and Eldridge, 1969). A psychiatrist needs to enquire into the presence of complex symptoms: thought disorder, perceptual abnormalities, passivity phenomena, and delusional ideation representing the loss of ego boundaries. Without the requisite skills he may attribute symptoms such as withdrawal or agitation to the deafness. The difficulties of assessing the subjective experiences of deaf people who are without speech and have limited verbal language, cannot be over-estimated (Critchley et al., 1981). The examiner often has to resort to leading questions. This practice then raises serious doubts about the validity of the deaf person’s answer, especially as it is well-known that deaf people may agree with questions by giving a positive nod and in actual fact, they have not understood the question.

The diagnosis of psychotic conditions with impaired reality testing, such as schizophrenia, is particularly fraught with difficulty. The incidence of schizophrenia in the deaf population is the same as in the hearing population. Furthermore, relatives of deaf schizophrenia were found to manifest schizophrenia with the same frequency as relatives of hearing schizophrenics (Mendlewicz, 1980). Traditionally, psychiatrists have attached primary importance to the presence of thought disorder in the diagnosis of schizophrenia but this is particularly difficult to detect where the means of interpersonal communication are rudimentary. In clinical practice the diagnosis is more commonly based on the presence of clusters of symptoms such as Schneider’s first rank symptoms (1957). In the absence of coarse brain disease, certain symptoms are considered diagnostic of schizophrenia.

Thus auditory hallucinations in the form of voices are considered strongly to support the diagnosis of schizophrenia and were reported in 74% of hearing schizophrenics (Wing et al., 1974).

In practice the frequency of hallucinatory experiences among profoundly, prelingually deaf schizophrenics differs subtly from those of their hearing contemporaries (Critchley et al., 1981). The frequency of haptic hallucinations, passivity phenomena and delusions of a paranoid type was similar. Visual hallucinations, which are rare among hearing schizophrenics (2-4% see Feinberg, 1962) occurred in 10 out of 12 deaf patients; some of the experiences were classical scenic hallucinations, but others are more accurately described as visual-verbal hallucinations as though the verbal picture had been substituted for a verbal commentary. Non-auditory modes of communication familiar to profoundly deaf people, such as writing on the wall and sign language, were described among the hallucinatory experiences of three patients but invariably in association with “auditory” experiences which were described by 10 out of 12 patients. Voiced experiences, whether presenting as a running commentary on the subject’s thoughts or behaviour, as voices in discussion or as specific instructions addressed to the patient, differed widely in their clarity (Critchley, 1983). Moreover, Evans and Elliot report that nine “primary” symptoms — loss of ego-boundaries, delusional perception, restricted affect, illegality, abnormal explanations, hallucinations, remoteness from reality, inappropriate affect and ambivalence — are useful screening criteria in the diagnosis of schizophrenia.
Can Deaf People Hear Voices?

There is clear evidence that experiences analogous to auditory hallucinations may be experienced by schizophrenics who have been profoundly deaf from birth or early infancy. The frequency of pseudo-auditory experiences among deaf schizophrenics and the wide variety of possible explanations for the apparently meaningful information received may support the concept of a nuclear form of schizophrenia and are of considerable theoretical interest in the wider context of the relationship between thought processes and language.

Accepting that the speech audiogram occupies only part of the wider range of appreciation of musical and other sounds, Critchley (1963) was impressed by the insistence of deaf patients themselves that the communicated experiences did not involve speech reading or sign language. When pressed for an explanation, only one admitted that she could hear voices, another described “queer talk—no sign”, others were adamant that they heard and not lip read the experience—finger spelling the word “heard” with great emphasis. In those whose experiences had a vocal and non-vocal communication there appeared to be a primacy of auditory communication; thus God spoke but St. Theresa signed to the same patient. However, those whose life-work has been with deaf people—Basiliere, Denmark, Warren, and Wilson—continually return to the fact that it is necessary to put leading questions to patients: is it a sound, noise or voice? Does it exist inside the head? Whose voice is it? What is the voice saying? Is there more than one voice? Such questions may in themselves be suggestive of an answer or difficulty to comprehend. The following case-histories serve to illustrate both the fascination of the study of these hallucinations and the difficulties they pose in interpretation.

(a) A 41-year-old lady with early severe deafness as a result of neonatal jaundice communicated using speech and lip reading. She had no facility in sign language. Of low average intelligence, she was referred from a home for those with learning difficulties. She recounted sexual fantasies and the voices she complained of were always those of male staff at the home. She developed delusional ideas incorporating them and often declared that she was in love with them.

Comment: The case illustrates the attribution of one's own desires to hallucinatory "voices". The lady was sexually frustrated, had unfilled sexual wishes and projected these wishes on to male staff in the form of hearing voices. She complained of hearing voices that were ego-connected and fulfilled her wishes by making her think that the staff in question were communicating with her.

(b) A 31-year-old man with severe postlingual deafness—onset aged 6—communicated using a combination of speech, sign-supported English and finger spelling. He had been mistakenly diagnosed as intellectually impaired and had attended a school for educationally abnormal until, at 11, he was transferred to a deaf school. In five admissions to psychiatric hospitals various diagnoses were made, including organic disorder, mental impairment, paranoid psychoses, personality disorder. He complained of having heard voices and claimed that when others spoke, he could hear voices of God and the Devil telling him to harm himself and harm others. When communicating with God, he did not use sign language, but claimed to use telepathy. He claimed that he received clear messages from God who talked to him. There was no evidence of visual hallucinations. He could not describe the quality, pitch or tone of God's voice. A detailed diagnostic assessment revealed that he was of normal intellect and suffered personality difficulties. He responded to individual and group therapy.

(c) A 50-year-old, profoundly deaf since birth, communicated using sign language and finger spelling. He was highly intelligent but developed a paranoid psychosis. He had systematized delusions and he described hallucinatory experiences; thus he informed the interviewer that Jesus came to him at night and "spoke" to him. He denied his inability to hear Jesus' voice on account of deafness. He claimed that he could see God's lips moving and could understand the message.

To most people these three case-reports support the original observation of Basiliere (1973) that the auditory hallucinations found in 44% of deaf schizophrenics mean more than "receiving meaningful information". However, it could be that true auditory hallucinations occur only in those patients who at some point in their lives have experienced sound to some degree. The question still remains unresolved. Other case-reports emphasize the range of schizophrenic phenomena encountered among deaf schizophrenics; but that schizophrenia essentially involves the boundaries of communication is illustrated by a final case-report.

(d) A 60-year-old deaf lady of Irish origin was found suffering from a paranoid schizophrenic illness. She had psychotic symptoms. She was educated at a school for the deaf in Dublin where one-handed Irish alphabet and International Sign Language (ISL) was used. She claimed to see a person in her mind's eye who was communicating with her, using the one-handed finger spelling alphabet (as used with ISL). She was examined following treatment over a period of 6 months. The nature of her hallucinatory experiences gradually changed. She could see someone communicating with her using the two-handed British alphabet. She could not explain the nature of the change, and acknowledged that it was due to her changing her own sign language.

This case describes a fascinating phenomenon of the content of hallucinations remaining the same but the language changing with experience of a "new" language. It is interesting to speculate that hearing people, who emigrate to a new country and have to learn a new language, may experience a similar change.

The direct relationship of brain activity to perceptual experiences was first clearly seen by the French scientist and philosopher Descartes. It is immaterial whether brain events are caused by stimulation of the cerebral cortex or some part of the sensory nervous pathway (Eccles, 1973). Thus, where deafness is involved, experience shows that deaf people are the subject of various auditory phenomena, some real, some illusionary, some hallucinatory. The difficulty in eliciting the exact nature of such phenomena...
Deafness is a term which covers many clinical conditions. In assessing deaf people and considering the boundaries of their reality, it is vitally important to consider variables such as age of onset and degree of deafness. It is also important to recognize that deaf people form part of a cultural and linguistic minority. In order properly to access their experiences, it is important that professionals acknowledge this socio-cultural model of deafness and communicate effectively using sign language. The recently developed policy of employing deaf mental health professionals greatly enhances the ability to understand various experiences of deaf people. A question often posed is: Can deaf people hear voices? How can people, who do not have an intact auditory apparatus, experience auditory hallucinations? On the other hand, can the sensory deprivation of a hearing loss lead to the presence of hallucinations and pseudo-hallucinations? The study of these phenomena and the underlying factors is extremely fascinating and, at the same time, difficult to comprehend. There is a need for ongoing research and debate to shed light on one of psychiatry's most fascinating questions: "Do deaf people hear voices?"

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