

EDITORIAL

New approaches to pain¹

In the past two decades there has been considerable expansion of pain research in neurophysiology, neuroanatomy, neurochemistry, and also in the behavioural sciences. Many pain clinics or centres have been established in cities and larger towns and national societies, such as the British Intractable Pain Society, have been founded. At an international level the International Society for the Study of Pain was founded in 1973. It held its Second World Congress in Montreal in September 1978 and promotes the publication of research in its journal, *Pain*, first published in 1975. Research and therapy are dominated by scientists and clinicians who are primarily interested in biological aspects of pain, but behavioural scientists, particularly psychologists, have made substantial contributions to our knowledge of psychosocial aspects of pain and, in particular, of chronic pain.

Merskey's widely quoted operational definition of pain (1975), which has been modified by Fordyce (1978) to include a reference to behaviour, states, 'pain is an unpleasant experience which we primarily associate with tissue damage, or describe in terms of such damage, or both . . . and the presence of which is signalled by some form of visible or audible behaviour'. This reveals the complexity of an experience which involves psychic factors, biological or organic factors, and the possibility of differing behavioural responses, to which it must be added that environmental factors play an important part in varying the nature of the experience and associated behaviour. Therefore, it is better not to attempt to see pain from one conceptual viewpoint only and this has been expressed succinctly by Pilowsky (1978) who wrote: 'it seems certain . . . that any attempt to fully understand pain will require us to tolerate life in a house of many paradigms'. The main conceptual models at present used to explain the generation, modulation and experience of pain, are founded upon neurophysiology, neuroanatomy, neurochemistry, perceptual psychology, behavioural psychology, studies of personality and psychodynamic theory. In medical and surgical practice the neurobiological model is dominant and among doctors little is known or understood of the contribution of psychological theories and therefore few attempt to distinguish between them, except in a small number of specialist centres. Thus, it is worthwhile considering briefly the contribution of the models mentioned in order to appreciate their respective roles in the understanding of pain, its assessment and treatment.

There have been two major advances in the work on neurobiological aspects of pain. First, Melzack & Wall (1965) proposed a neurophysiological model for pain modulation which represented an important conceptual advance, and since then earlier specificity and pattern theories of pain have been incorporated into a general theory explaining the physical basis of pain generation and modulation reviewed and expanded by Melzack & Dennis (1978). Secondly, the isolation by Hughes *et al.* (1975) from brain tissues of hitherto undetected endogenous substances involved in pain relief, the opiate peptides, has stimulated considerable research into the part played by them in pain control, and also their relation to mood, behaviour, and the symptoms of narcotic withdrawal (Kosterlitz & Hughes, 1977). In fact, it has been suggested that the peptides may not only modulate pain but may also be 'euphorogens'.

Reynolds showed for the first time in 1969 that electrical stimulation of specific areas in the periaqueductal grey tissue, a part of the brain where morphine receptors abound, relieves pain, and that it also alters mood to produce either pleasure or dysphoria. If the morphine antagonist, naloxone, is given following relief of pain by electrical stimulation, pain returns, and a similar effect is obtained by administering substances which antagonize 5-hydroxytryptamine synthesis such as *P*-chlorophenylalanine, or tetrabenzine which reduces levels of monoamine transmitters (Nathan, 1977). The former

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point is interesting because it has been proposed that the descending pain modulation pathways are serotonergic, and that low levels of brain serotonin are associated with persistent pain as well as with depression. This may have some bearing on the fact that the tertiary tricyclic antidepressants, imipramine, clomipramine and amitriptyline raise levels of serotonin in the brain and will relieve pain in addition to elevating mood. In contrast, secondary amines, nortriptyline and desipramine, do not elevate serotonin levels and do not relieve pain either. Monoamine oxidase inhibitors elevate brain 5-hydroxytryptamine and there is anecdotal evidence that at least one of them, phenelzine, will relieve chronic pain in a proportion of patients with neurotic depressive disorders and little or no evidence of an organic cause for pain. Finally, dopamine blockers, such as phenothiazines, will also reduce the degree of analgesia produced by electrical stimulation and it is known from clinical experience that small doses of these drugs increase pain levels. In contrast, there are drugs which facilitate the action of or increase the level of dopamine, such as apomorphine and levodopa respectively, and these increase the degree of analgesia produced electrically (Nathan, 1977).

One of the main contributions of experimental psychology to pain research has been the development of methods of measurement, a subject reviewed in detail by Wolff (1978) and one which is central to all clinical and laboratory pain assessment studies. It is accepted that pain is a subjective, private experience which varies in severity as a result of the influence of several factors, including the individual's cultural background and the immediate environment (Wolff & Langley, 1975), and his or her personality characteristics (Bond 1979*a*; Sternbach, 1974), sex, age, birth order and upbringing (Merskey & Spear, 1967). Thus, it is not surprising that there are considerable variations in pain intensity and behaviour in any given disorder both between individuals and within the same individual from time to time.

The earliest approaches to clinical measurements of pain involved the use of semantic scales, an area which is still being explored and extended, notably by Melzack (1975). Visual analogue scales (VAS) are very popular in clinical research. They were first introduced by Hayes & Paterson (1921), but relatively neglected until their value in psychiatric practice was emphasized by Aitken (1969). They are extensively used in psychiatric research and their value lies in the fact that they are very simple, reliable and valid subjective measures of personal experience (Luria, 1975). The measures obtained may be used to construct pain profiles from which the effects of treatment or environmental change on pain can be determined (Bond & Pilowsky, 1966). Chapman (1977) has pointed out that measurement along the single dimension of severity is inadequate because pain has motivational, affective, sociocultural and conceptual/judgemental aspects too, which are all measurable elements of suffering. In his view sensory decision theory, which stresses the role of the observer as a modulator of the subject's experiences and reporting, should be adopted as the model for a method of measurement. However, the use of this technique has been confined to laboratory work and protagonists of the VAS technique argue that their preferred method of assessment of pain inevitably takes account of all its dimensions, though accepting that it does not measure them individually, which is another issue. In the view of Wolff (1978), the VAS is the best method available at present for clinicians wishing to assess pain. Alternative methods of pain assessment include one in which naturally occurring pain is compared with artificially induced pain (Sternbach *et al.* 1974) and some developed by anaesthetists. The latter are indirect methods, such as the one based upon measurements of the vital capacity of the lungs and another based upon the power of analgesic drugs to control pain, using morphine as the standard (Loan & Dundee, 1967).

Psychologists have also contributed to our knowledge of pain thresholds, two of which have been identified. The first is the point at which the initial quality of the stimulus, irrespective of its nature, changes and pain is experienced, and the second is that at which pain cannot be tolerated. The interval between the thresholds is a measure of tolerance for pain. Although both thresholds depend on physiological factors, the upper one is much more variable, being influenced by cultural and environmental factors, personality characteristics, the meaning or significance of pain to the sufferer, and his or her age and occupation (Merskey & Spear, 1967).

Vigilance, that is the paying of attention to particular events or classes of events, is an important concept in psychology and is an integral part of the learning process (Chapman, 1978), which leads

to consideration of the paradigm developed from learning theory. Thus, the tendency to attend to certain aspects of life, for example signals of somatic change, rather than others, is an important feature of many chronic pain problems and, in Chapman's view, the hypervigilant patient with chronic pain exhibits learned behaviour reinforced over a period of years by the attention of family members, doctors, and others. Thus, beliefs, attitudes and expectations play an important part in the perception of painful events.

Learning theory provides a very attractive explanatory model to students of the behaviour of people in pain and one which is readily understood and accepted by biological scientists because it is mechanistic rather than mentalistic and, as a result, a theory from which clearly defined methods of treatment can be derived. Fordyce (1976), a leading exponent of the use of learning theory in the assessment and treatment of chronic pain problems, emphasizes that concentration of treatment upon 'pain behaviours' which have replaced 'well behaviours' of everyday life in patients with chronic pain may lead to modification of the former or their elimination if a system of positive and negative reinforcers is used. The main difficulties likely to be encountered in treatment arise from the chronicity of patients' problems, as most have had pain for more than a year and a substantial number for far longer than this. As a result, imperceptibly, over months and years, adaptive patterns of behaviour are lost by the patient and the behaviour of family members usually alters too, perhaps quite radically, with considerable changes in roles and status, sometimes aided and abetted by the unwitting activities of well-meaning doctors who advise less activity and responsibility on the part of the patient: thus, it becomes very difficult for patients and relatives alike to relinquish their hold on pain which has become 'an old friend' (Dudley Hart, 1979). Some patterns of behaviour give rise to identifiable stereotypes; for example, Sternbach (1974) describes the home tyrant, the litigant, and several others!

Operant conditioning, at times combined with medical or other psychological treatments, is the technique used most often in therapy, but the reversal of maladaptive pain behaviour is not easily accomplished and may even be impossible. The basic rules governing the selection of patients, methods of treatment, and difficulties associated with them, have been described in detail by Fordyce (1978). As yet, however, there are relatively few reliable reports of the use of behaviour therapy in the literature and those available so far point to a modest degree of success, with treatment chiefly centred upon helping patients to live life as normally as possible despite continued pain, though with increased physical and social activity it may well lessen in severity.

The 'model' of behaviour exhibited by others in pain influences our own behaviour when we suffer it, and this issue has been reviewed recently by Craig (1978). Craig & Coren (1975) found that experience of pain and distress is altered appreciably by social communications operating independently of drugs and surgery. Craig & Neidermayer (1974) and Craig *et al.* (1975) have shown that in laboratory experiments the tolerance of subjects for pain is reduced in the presence of a trained model who appears intolerant, and that willingness to report pain is reduced in the presence of a tolerant model but without altering sensitivity to the stimulus. These observations have interesting implications for those who suffer pain after surgical operations, or indeed anyone who is in a group where pain is a common experience, and Craig (1978) quotes the effect of social modelling among patients treated by acupuncture, receiving dental care, or undergoing paediatric surgery.

There are many studies of the relation between personality and pain (Bond, 1979*b*). In general terms they reveal that, when considering the basic dimensions of neuroticism and extraversion as defined by Eysenck & Eysenck (1964), individuals who have raised levels of neuroticism experience higher levels of pain than those with low levels (Bond, 1971); that levels of neuroticism tend to rise during illness, especially when pain is present, and fall when pain is relieved (Kissen, 1964); and that extraverts are more likely to express their pain and distress than introverts though, at experimental level, they have higher levels of tolerance for pain (Eysenck, 1961; Barnes, 1975). It is well known that there is a close relation between anxiety and pain, and one of the cardinal rules of pain relief is that every attempt should be made to reduce the anxiety of those in pain. Other dominant personality traits, for example hysterical, hypochondriacal and obsessional traits, colour the behaviour of the individual in pain (Bond, 1978), sometimes to such a marked extent that the diagnostic

skills of physicians or surgeons prove to be inadequate. Depression and pain often occur together either where the latter is chronic, or where pain is the leading symptom of a depressive disorder in the absence of organic change, as in the case of patients with 'atypical' facial pain (Webb & Lascelles, 1962; Lascelles, 1966).

Psychodynamic concepts derived from Freudian psychology offer yet another paradigm for the analysis and treatment of pain problems (Pilowsky, 1978). Development of this area of interest owes much to the seminal papers of Szasz (1957) and Engel (1959), who describe the personality characteristics of the 'painful person' and the 'pain prone person' respectively, although Freud had commented almost 80 years ago that pain could feature in an illness as an hysterical conversion symptom. All have emphasized the role of pain in the maintenance of psychic equilibrium and its various uses in this context, for example as a means of manipulating others, expressing hostility, and a way of coping with guilt. It is clear that pain may play a central but varying role in interpersonal relationships, and that the way it is used and its significance to the sufferer is largely determined during the years of personality development when each individual's concept of what constitutes 'sickness behaviour' develops. Pilowsky has argued that the terms hysterical and hypochondriacal are often used inaccurately to describe abnormal illness behaviour and he and Spence have sought to eliminate this problem by the development of an illness behaviour questionnaire (Pilowsky & Spence, 1975) based on the work of Mechanic (1977) on illness behaviour and Pilowsky's (1967) work on the dimensions of hypochondriasis. When used among attenders with chronic pain at a typical pain clinic, results from the questionnaire reveal that the dominant characteristics of pain patients compared with pain-free psychiatric patients are a greater conviction of physical illness, preoccupation with somatic events, denial of emotional and social difficulties and, in some, difficulties in expressing anger. It appears that the last characteristic is probably an important factor in the genesis of depression in pain patients (Pilowsky *et al.* 1977).

To conclude, there is ample scope for further studies of the psychological and social aspects of pain and the effects on it of treatments designed to alter emotions and behaviour. It is to be hoped that more psychiatrists will take up this fascinating and challenging area of research and clinical work.

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