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In recent years a conjunction of factors have brought questions surrounding the phenomenology and pharmacology of altered states of consciousness back onto the scientific agenda. These factors primarily involve the re-classification of psychiatric disorders that took place in 1980 with the publication of DSM III, which contained a number of syndromes that could be characterized in terms of altered states of consciousness, and also the recognition of the phenomenon of awareness under anaesthesia. These issues are outlined against a historical background, in which there had been at the end of the last century a primary psychopathological focus on the question of consciousness that was, however, increasingly neglected during the course of this century until its recent return to prominence.

Key words: consciousness; phenomenology; pharmacology; awareness

The background

In the early 1890s, individuals who had what we would now consider psychological problems, but who were not grossly deluded, clearly dangerous or delirious, were liable to be labelled as neurotic. The term neurosis covered a variety of conditions involving disturbed behaviour characterized by lassitude, fatigue, symptoms of anxiety, convulsive episodes and some of the aberrations of behaviours that are now found in the obsessive–compulsive disorders (see Janet, 1925).

Neurosis, at this time, implied that there was a physical disorder of the nerves, which had not yet been discovered but which would be discovered and would be found to be responsible for the behaviours in question. It was assumed that further advances of the biological sciences would uncover the nature of this disorder (Healy, 1990a).

The commonest neurosis was hysteria, which as a diagnostic label was, along with the synonymous diagnosis of neurasthenia, probably applied, as of 1890, to upwards of 75% of neurotic individuals (Drinka, 1984).

At the time, under the influence of Charcot, Magnan and Morel, hysteria was thought to stem from an aberrant or degenerate nervous reflex (Harrington, 1987). In conjunction with associationist models of the mind, this led to the equation that a particular sensory input might have an aberrant reflex output resulting in ideas or thoughts or feelings that were more loosely associated than usual. These 'loosened associations' were thought to underpin perverse behaviours, such as lying or aberrant sexual behaviours (Masson, 1984), as well as the creativity characteristic of artists (Drinka, 1984).

In 1889, Pierre Janet (Janet, 1889) and later in 1893 and 1895 Joseph Breuer and Sigmund Freud (Freud and Breuer, 1895) put forward the proposal that in the neuroses generally, and in hysteria in particular, there was no dysfunction of the nervous system but rather that these clinical entities were psychological rather than neurological disturbances. As Breuer and Freud put it '*hysteria is a disorder of reminiscence*' (Freud and Breuer, 1895).

In both Janet's work and in that of Breuer and Freud (1895) it is clear that these authors were concerned with the occurrence of recurrent intrusive imagery from which afflicted subjects appeared to be in some way dissociated.

'I inform the patient that . . . I shall apply pressure to his forehead and . . . that, all the time the pressure lasts, he will see before him a recollection in the form of a picture or will have it in his thoughts in the form of an idea . . . and I pledge him to communicate this idea to me whatever it may be . . . I am rather of the opinion that the advantage of the procedure lies in the fact that by means of it I dissociate the patient's attention from his conscious searching . . . The conclusion which I draw from the fact that what I am looking for always appears under the pressure of my hand is as follows. The pathogenic idea which has ostensibly been forgotten is always lying ready "close at hand"'. (Freud, 1895).

Both Janet and Freud in the early 1890s were concerned with the question of consciousness and alterations in its state. Janet coined the term dissociation to refer to a splitting that appeared to occur *within* consciousness in individuals following trauma. Freud in his *Project for a scientific psychology* (Freud, 1895/1945) was critically concerned with the question of consciousness and its

biological foundations (Sulloway, 1980). His belief was that if the biological foundations of consciousness could be mapped out then the pattern of symptoms in and the nature of hysteria would become more clear. While wishing to reduce consciousness to its biological substrates, Freud was nevertheless at this time very much a psychologist of consciousness.

As of 1889, Janet had already claimed that hysteria was a consequence of exposure to a trauma of some sort. In 1896, Freud claimed that this trauma was the specific one of sexual abuse (Freud, 1896). What happened next is the subject of a considerable amount of dispute and research at present (Sulloway, 1980; Masson, 1984). What is clear is that within 2 years Freud had abandoned this position and was no longer to claim that hysteria was the consequence of trauma.

In shifting from the traumatic view of hysteria to a psychoanalytic view, Freud moved from a psychology of consciousness to a focus on depth psychology and a concern with the nature of the unconscious. Rather than look for traumas, whose occurrence could be established but which did not appear to be universally present in the histories of his patients, Freud posited a universal trauma with his notion of the Oedipus complex. With the triumph of psychoanalytic thinking and that of the other depth psychologies, the emerging psychology of consciousness as represented by Janet and William James (James, 1892/1985) withered on the vine and interest in the occurrence of actual adversity in childhood diminished.

The demise of hysteria

There was a further shift in psychiatric opinion that Freud's seachange did something to bring about. Where hysteria had been the commonest clinical condition in the late 19th century, it went out of fashion as a diagnosis during the first half of the 20th century. There are a variety of reasons why this should have happened.

First a number of conditions were carved out of the corpus of hysteria, from obscure neurological disorders such as syringomyelia (Klawans, 1990) to other common neuroses such as the anxiety neuroses.

A second reason was that the implication of the notion that trauma, whether sexual abuse or, on a more spectacular scale, shell shock which became visible for the first time in World War I, might precipitate mental illness was unsettling in its implications for nervous illness generally and as regards legal and financial compensation in particular (Stone, 1985; Healy, 1993).

A third reason was that with the conversion of Freud from a psychology of consciousness to psychoanalysis, a focus of consciousness was lost. There also developed an understanding that one could be deceived by stories of trauma, and in particular by stories of child abuse coming from psychiatric patients, and that one had to treat such stories with caution. The status quo was in this case served well by a body of theory that argued that what was being recounted were childhood fantasies rather than childhood realities.

During the course of the 20th century the question of consciousness slipped off both psychiatric and psychological agendas. There were a number of reasons for this. One was the fact that any investigation of consciousness must employ introspection among its methods. With the rise of logical positivism and both methodological and radical behaviourism, such a focus was deemed intrinsically unscientific (Healy, 1990a).

A further reason, however, must have been the advent of psychoanalytic concern with the dynamic unconscious. Far from dealing with the very clear and immediate, albeit private, manifestations of altered consciousness, the psychoanalytic focus on a dynamic unconscious could only proceed by inference. Furthermore, the rules of inference were dictated by an *a priori* theory, the logic of which appeared to escape all but the converted (Healy, 1993). In the furore about the existence of unconscious realities of the type proposed by the analysts, the baby of consciousness got thrown out with the bathwater of mentalism generally.

Finally, in 1907, Eugene Bleuler coined the term schizophrenia as an alternative to the Kraepelinian term dementia praecox (Bleuler, 1907/1950). Under the influence of both Freud and Jung, Bleuler conceived of schizophrenia as a disorder which centrally involved a loosening of associations. As initially conceived, therefore, the disorder resembled contemporary conceptions of hysteria, which were also couched in terms of aberrant associations consequent on a set of disordered nervous reflexes of some sort. The two terms, schizophrenia and hysteria, therefore, had a very similar domain of reference, although a classic case of hysteria as outlined by Charcot or Janet, clinically bore very little resemblance to classic cases of schizophrenia, as outlined by Kraepelin or Bleuler.

As the usage of the term hysteria declined in frequency in the early years of the century so the usage of schizophrenia became increasingly frequent. This culminated in a situation in the 1940s and 1950s in the United States where upwards of 90% of admissions to American Mental Institutions were being diagnosed as having schizophrenia (Cooper *et al.*, 1972).

The impact of operational criteria

Quite obviously this situation could not last. The glaring discrepancy between the frequency of usage of the terms schizophrenia in the United States and in Europe led eventually to the international pilot study of schizophrenia (Cooper *et al.*, 1972). This established that there was a differential frequency in diagnosis and set in

train the process which culminated in the creation of operational criteria, as embodied in the research diagnostic criteria (RDC) (Spitzer, Endicott and Robins, 1978) and DSM III (American Psychiatric Association, 1980).

DSM III, in addition to providing diagnostic criteria for schizophrenia and other disorders, also created several categories of disorder that had not been in common use in the previous 50 years. These categories include borderline personality disorder, schizotypal personality disorder, multiple personality disorder as well as disorders such as delusional disorder. Individuals meeting criteria for any of these disorders would formerly have been automatically diagnosed as having schizophrenia.

One aspect of the creation of these disorders that was surprising was that it was considered at the time that these categories would be used rather sparingly. In actual fact, as things have transpired, categories such as borderline personality disorder and multiple personality disorder, in the United States in particular, have been pressed into extensive use (Healy, 1993).

A further category that was created was that of post-traumatic stress disorder (PTSD). This disorder is characterized by recurrent intrusive thoughts or images, which are typically reminiscences of prior traumata of one sort or another. These are accompanied by recurrent waves of emotion and a range of dissociative phenomena; the whole state being characterized in DSM IIIR in terms that could have come straight from Janet or the 1895 Freud:

'Commonly the person has recurrent and intrusive recollections of the event or recurrent distressing dreams during which the event is re-experienced . . . there are dissociative states, lasting from a few seconds to several hours, or even days, during which components of the event are relived, and the person behaves as though experiencing the event at that moment. There is often intense psychological distress when the person is exposed to events that resemble an aspect of the traumatic event' (American Psychiatric Association, 1987).

Initially it was felt that the category of PTSD would also be used rather sparingly. It is now recognized, however, that a range of events that fall short of natural disasters such as earthquakes or social disasters such as hijackings, kidnappings or multiple deaths in crowd tragedies etc. can precipitate PTSD. For example, rape would appear to be an event that gives rise to a classic PTSD (Wolbert-Burgess and Holmstrom, 1974).

A significant implication of the creation of the category of PTSD was that, for the first time, it was conceded that individuals who did not have some primary endogenous disturbance, some constitutional weakness, could develop significant psychological problems as a consequence of events happening in their environment. Previously it had been held that in the case of individuals who developed a war neurosis, no matter how horrific the events they were exposed to, the occurrence of a neurosis must indicate a prior failing in the individual. As a consequence it could be argued that the occurrence of such a neurosis could not entail legal or financial implications. The switch in thinking, with the creation of PTSD has had very clear legal and financial implications (Healy, 1993).

It has also now been recognized that individuals exposed to abuse during childhood show a very classic PTSD (Briere and Runtz, 1988; Edwards and Donaldson, 1989; Chu and Dill, 1990). This abuse may take the form of sexual abuse but a very similar picture appears to happen in situations of physical violence or the witnessing of physical violence (Pynoos and Nader, 1988) or in conditions of cruelty to children where the child has perhaps been locked away in a bedroom or an outhouse for what may be several days and often without access to food or toilets (Eth and Pynoos, 1985). It also happens when there is psychological maltreatment of a child and indeed in recent years there is a trend toward seeing this latter form of trauma as being potentially more destructive to subsequent mental health than any other (McGhee and Wolfe, 1991).

1895 revisited?

With the creation of the categories of PTSD and borderline personality disorder we appear to have returned very much to the position of 1895, where workers were seemingly moving toward the notion that some disorders, which were then termed hysteria, were set in train by traumata and that the cardinal features of these disorders consisted of altered states of consciousness with recurrent intrusive imagery and thoughts and dissociations from painful memories.

The individuals who are receiving these recently created diagnostic labels, and in particular those being diagnosed as having multiple personality disorder and borderline personality disorder, would seem likely to have been diagnosed as having schizophrenia during the 1960s. Given the similarity between these newer concepts and that of hysteria as used by Janet during the 1890s (Janet, 1907) and given the evidence from both Freud and Janet that hysteria in this form had its origin in trauma, it follows that the broader concept of schizophrenia as existed during the 1960s to 1970s should show some evidence of having a traumatic aetiology also.

In recent years, there have been a number of studies of this issue, which have revealed that upwards of 50% of individuals who have been diagnosed as having schizophrenia in recent years, have a history of significant trauma during childhood (Rosenfeld, 1979; Carmen, Rieker and Mills, 1984; Herman, 1986). Given that in recent years the diagnosis of schizophrenia is likely to

have been used somewhat more carefully than before, it seems quite likely that at least an equal number of individuals during the 1960s with a diagnosis of schizophrenia would have had a similar history of trauma in the clinical background to their disorder.

More recently, studies have looked at the incidence of trauma in individuals with borderline personality disorder, individuals who would formally have been diagnosed as having schizophrenia, and have found that there are histories of significant trauma in upwards of 80–90% of those so diagnosed (Herman, Perry and Van der Kolk, 1989).

Borderline personality disorder appears to be a particularly interesting concept for a number of reasons. First, most individuals with this diagnosis, and with the more severe diagnosis of multiple personality disorder, would be particularly likely to have been diagnosed as having schizophrenia in previous years as this concept had its origins in the concept of borderline or pseudo-neurotic schizophrenia (Kroll, 1988).

To bring this point home further, there is considerable overlap between current DSM IIIR criteria for borderline personality disorder and for schizotypal personality disorder. For example in studies of individuals who engage in self-harm behaviours, a large proportion of individuals will commonly meet criteria for both borderline and schizotypal personality states (Markar *et al.*, 1991; Kavoussi and Siever, 1992).

Second, current criteria for borderline personality disorder, which stress the liability to impulsive activity and to intense but brief relationships with a devalued self-image and recurrent deliberate self-harm, resemble in many respects the classic descriptions of hysteria. For example, we can compare these criteria with the description of hysteria given by Sydenham, in 1681:

'The very slightest word of hope creates anger. They have melancholy forebodings. They brood over trifles, cherishing them in their unquiet bosoms. Fear, anger, jealousy, suspicion and the worst passions of the mind arise without cause. There is no moderation. All is caprice. They love without measure those whom they will soon hate' (in Diethelm, 1971).

Given the findings that borderline states are associated almost invariably with a history of childhood trauma and that the occurrence of a particular form of PTSD, characterized by both the ordinary symptoms of PTSD but also by downstream effects consequent on interference with the developmental cycle (Wolfe, Gentile and Wolfe, 1989; Pynoos and Nader, 1988; McLeer *et al.*, 1988; Kiser *et al.*, 1988), there would appear to be further grounds for proposing that many cases of 'schizophrenia' in recent decades have in actual fact been a different disorder, albeit one that may appear quite schizophreniform.

In support of this argument, there are good grounds for claiming that current DSM IIIR criteria for borderline personalities have erred in not including transient psychotic disturbances as a diagnostic criteria for these states (Kroll, 1988). A not uncommon clinical presentation of individuals with borderline personality syndrome is to casualty departments or some other such crisis centres in transient psychotic states. These often appear to have a dissociative character with individuals having prominent depersonalization, derealization and deja vu experiences as well as possible out of body experiences, a range of hallucinatory phenomena along with marked state-dependent amnesia and other amnestic disorders (Kroll, 1988).

Very typically such crises are predicated on some trigger or reminder of prior trauma and are susceptible to some interpretation in terms of a reliving of prior traumatic episodes (Kroll, 1988; Healy, 1993). Very often accompanying self mutilatory episodes or overdoses are aimed at aborting such reminiscence.

A further feature of these disorders is that they often respond well to treatment with minor tranquillizers as opposed to classic episodes of schizophrenia which are more likely to respond to neuroleptic therapy (Kroll, 1988).

The phenomenology of altered states of consciousness

One might have thought that the classic gold standard for the diagnosis of schizophrenia—Schneider's first rank symptoms—would permit a discrimination between true schizophrenia and some of these other transient schizophreniform states. However, there is a considerable degree of confusion here as well as opportunities for what may be quite important research.

In a review of the usage of Schneider's first rank symptoms, Koehler compared the descriptions of first rank symptoms given by four sets of authorities, Mellor, Taylor and Abrams, Wing and co-workers and Fish (Koehler, 1979). He found a considerable degree of divergence on the understanding of what experiences reported by individuals truly constitute first rank symptoms.

Broadly speaking, he distinguished between experiences of influenced thinking, feeling, willing and physical functioning from experiences of alienation of thinking, feeling, willing and physical functioning. The latter experiences were more likely to be seen clearly as first rank experiences by all authorities, whereas the former tend to be diagnosed as first rank symptoms in clinical situations but are less likely to be seen as such by a critical interviewer.

Recently there have been a number of reports that 'first rank symptoms' are even more common in conditions

such as multiple personality disorder (Kluft, 1987; Ross *et al.*, 1990) than they are in schizophrenia itself. Are these latter 'first rank symptoms' really Schneiderian first rank symptoms in the rigorous sense of experiences of alienation or are they something different again?

More importantly, perhaps, there has always been a body of thought which has espoused a dimensional rather than a categorical approach to the schizophrenias and their symptomatology (Claridge, 1987; Roberts and Claridge, 1991). According to this approach, first rank type of symptoms probably occur throughout the population in general but are more common or more pronounced in certain conditions and, in particular, in classic schizophrenia. The question then arises as to whether they are the result of some unitary psychopathogenetic mechanism or not.

A consideration of borderline personality disorder and multiple personality disorder as dissociative disorders opens up a further possibility which is the following. In situations of stress and anxiety many normal individuals, but even more so individuals with borderline or multiple personality syndromes, are likely to dissociate. This may lead to the experiences of depersonalization, derealization, at interviews for example, when one's behaviour may seem to be on an automatic pilot of some sort. Less commonly found are out of body experiences and a range of amnestic and hallucinatory phenomena. Such experiences are readily interpreted in terms of first rank symptoms.

Arguably there is quite a different phenomenal experience involved in such states compared with classic first rank symptoms. However, these experiences apparently come on an individual without being consciously willed; their phenomenal quality is also of something that is done to the individual. This is difficult to distinguish conceptually from passivity experiences. Furthermore the language in which such experiences are naturally described will tend to blur the distinctions between them and first rank symptoms even further. At present, clinically, there is little effort being put in to establishing how such distinctions can be made more reliably.

Dissociation and/or alienation

In recent years there have been a number of proposals as to the locus of the pathology in schizophrenia that have been somewhat different to earlier proposals regarding dopamine dysfunction (Healy, 1991). In particular, there have been proposals by Trimble (1990) and Frith (1987) suggesting that the pathophysiology of schizophrenia might lie in either temporal lobe or frontal lobe dysfunction. The significance of these two proposals lies in the fact that both sets of authors have sought to tie down in their proposals how temporal or frontal lobe malfunctioning could give rise to the kind of experiences that appear to constitute first rank symptoms.

Trimble notes that a number of temporal lobe disorders may give rise to experiences which have marked similarities to first rank experiences (Trimble, 1990). In favour of a temporal origin for the first rank symptoms is the fact that post-mortem studies and other studies of individuals with schizophrenia indicate some evidence for abnormalities of temporal lobe functioning (Roberts, 1991; Crow, 1990).

In contrast, Frith (1987) and Frith and Done (1988), as well as Healy (1990b) have proposed that frontal lobe malfunction may give rise to schizophrenia and have noted the occurrence of syndromes such as the environmental dependency syndrome and the phenomenological similarity between the experience of environmental dependency and experiences of alienation as are found in classical first rank symptoms.

In favour of a frontal lobe basis for first rank symptomatology, there is considerable evidence of frontal cortex malfunctioning in individuals with schizophrenia (Bellack *et al.*, 1990; Cohen *et al.*, 1987; Goldberg *et al.*, 1987; for review, see Robbins, 1990; Healy, 1990).

A possible way to reconcile these different hypotheses would be to suggest that both temporal lobe malfunctioning and frontal lobe malfunctioning may give rise to phenomenologically different experiences but that while different these experiences may often be expressed in terms that are confusingly similar. One abnormality might then give rise to the experiences typical of schizophrenia proper, while the other might underpin the altered states of consciousness found in the transient psychoses that occur in the borderline states.

In favour of a temporal lobe origin for the types of experience found in borderline personality syndrome is a considerable body of evidence as reviewed by Mesulam (1981) indicating that temporal lobe malfunctioning may give rise to multiple personality type pictures, illusions of possession, depersonalization and derealization, as well as out-of-body or near-death type of experiences. There is also some evidence to suggest that on neuropsychological testing, individuals with borderline disorders perform poorly on tests of temporal lobe functioning (O'Leary *et al.*, 1991).

In contrast, there has been a proposal put forward by Williams (1992) that the cognitive neuropsychology and phenomenology of the borderline and schizotypal states could be explained in terms of Frith's 1988 model of how frontal lobe malfunctioning might give rise to the first rank symptoms of schizophrenia.

In favour of a frontal lobe origin for the experiences of alienation found in schizophrenia, there is the phenomenal quality of the environmental-dependency syndrome described by L'Hermitte and colleagues

(L'Hermitte, Pillon and Serdaru, 1986; L'Hermitte, 1986), which results from disturbances of frontal lobe functioning. In this state, affected subjects apparently lose free will and experience their actions as being controlled by the environment, so that for example a dirty comb put beside someone will lead to their picking it up and combing their hair in public even though their hair may not need combing and if it did they would never ordinarily comb it in public or with either a dirty comb or someone else's comb. This behaviour may happen even if they have been told not to comb their hair.

The pharmacology of altered states of consciousness

In a recent review, Good has suggested that DSM IV should contain a category of substance-induced dissociative reactions (Good, 1989). These pharmacologically induced alterations of consciousness can happen with a wide variety of agents. They occur typically with low doses of a compound and come on fairly immediately after the initial ingestion of the drug.

The reactions may take the form of depersonalization or derealization experiences, as well as deja vu, hallucinatory experiences and a variety of state-dependent amnesias, explosive outbursts, automatic behaviours and frank confusion.

Tricyclic antidepressants and steroids appear to be among the more common triggers for such reactions although, as mentioned above, they have been reported after a wide variety of agents.

Benzodiazepines

A further precipitant of dissociative experiences is benzodiazepine withdrawal (Tyrer, 1990). This is of interest as it would appear that quite frequently some of the transient psychotic states that occur with borderline personality disorder, that appear to have a marked dissociative character, respond in emergency/casualty situations to benzodiazepine administration, as well as, if not better than, they do to the administration of neuroleptics (Kroll, 1988). Furthermore, as will be mentioned below, the emergent disturbances that occur with the dissociative anaesthetics respond to benzodiazepines (Domino, this issue).

Following up on this point, given the likelihood that there has been an extensive intermingling of diagnoses of a variety of dissociative disorders and schizophrenia, such that all have ended up labelled as being schizophrenic, it perhaps will come as little surprise that there is an extensive literature on the usefulness of benzodiazepines in the management of schizophrenia (Wolkowitz and Pickar, 1991). In a survey of the clinical trials conducted of benzodiazepines alone in schizophrenia or as adjuncts to neuroleptic therapy, from 1961 through to 1989, these authors found that between one third and one half of individuals diagnosed as having schizophrenia appeared to have a significant response to such agents.

The dissociative 'anaesthetics'

The agents that most reliably produce dissociation, however, are drugs of both the LSD and phencyclidine (PCP) class. The phenomenology of the states produced by both these groups of agents appear to be largely similar. This involves depersonalization and derealization reactions, jamais vu and deja vu experiences, distortions of time and space and automatic behaviours (Hansen *et al.*, 1988).

Interestingly a common feature of experiences with LSD when it was being given during the late 1950s and early 1960s, for individuals many of whom were labelled as having schizophrenia, was that a proportion of subjects apparently remembered or relived prior traumatic material (Leuner, 1963: McKellar, 1989; Browne and Healy, 1992). This appears equally true of agents such as ketamine today (Hansen *et al.*, 1988). At the time, under the influence of psychoanalysis, these 'memories' were interpreted as fantasies or remembered fantasies rather than as potential evidence pointing to the occurrence of trauma during childhood.

LSD and the 5-HT system

Despite the phenomenological similarity of LSD- and PCP- or ketamine-induced states, the pharmacology of these two sets of compounds appears to be quite different. In the case of LSD, there were clear indications from the 1960s that both indoleamine and phenylethylamine hallucinogens had effects on the 5-HT system (Davis, 1987; Glennon, 1990). These led to Aghajanian's (Aghajanian and Haigler, 1974) influential hypothesis that LSD disinhibits 5-HT inhibition. The proposal was that the 5-HT system inhibits or gates sensory inputs and that the removal of such inhibition leads to a flooding of sensory information into the system that is disorienting and leads to psychotomimetic effects (Davis, 1987).

The focus on the 5-HT system, however, did not lead to any clear locus for action of the hallucinogens within this system until recently. It now appears that these agents must effect a part of their actions through the 5-HT_2 receptor as 5-HT_2 antagonists, such as ritanserin and ketanserin, appear capable of blocking a number of effects of both LSD and mescaline (Davis, 1987).

In this regard it may be significant that clozapine, which appears to be particularly efficacious in otherwise treatment-resistant psychotic disorders, has significant

5-HT_2 antagonist properties. All neuroleptics have such effects (Glennon, 1990) but clozapine appears to be more potent in its actions as a 5-HT_2 antagonist, relative to its effects on D-2 receptors, than the others (Meltzer, 1991).

Furthermore, it is of interest that agents such as ondansetron, which is a 5-HT_3 receptor antagonist, appear to ameliorate benzodiazepine withdrawal states, at least in animals (Costall, Naylor and Tyers, 1988). It would seem highly likely that such agents, in so doing, may also reverse the tendency to dissociate that appears part and parcel of such states.

Phencyclidine and the NMDA system

In contrast, the locus of action for PCP, ketamine and their analogues appears to be on the NMDA receptor system (Domino, this issue; Javitt and Zukin, 1991). At present there is a considerable amount of difficulty in producing competitive antagonists for this system. Without such antagonists it will be difficult to pinpoint the precise behavioural effects of NMDA receptor activation as opposed, for instance, to complementary or downstream activation of other neurotransmitter systems. Given the behavioural effects of PCP and ketamine, one might predict that NMDA antagonists, were they available, might prove therapeutic for the altered states of consciousness, whether dissociative reactions or transient psychoses, found in borderline and post-traumatic states.

In recent years, despite the effectiveness of neuroleptics in the management of schizophrenia, there have been increasing doubts about the validity of the dopamine hypothesis of schizophrenia (Carlsson, 1990; Javitt and Zukin, 1991; Healy, 1991). Briefly, neuroleptics are neither clearly therapeutic nor uniformly effective in ameliorating the clinical features of schizophrenia. Furthermore amphetamine-like compounds do not invariably make the clinical picture worse; they may even lead to improvements (Javitt and Zukin, 1991; Lieberman, Kane and Alvir, 1987).

One way to account for these discrepant observations, while maintaining a dopamine hypothesis of schizophrenia, would be to appeal to the undoubted heterogeneity of the clinical states that are diagnosed as schizophrenia; to construct a case something on the lines of that outlined above. The favoured alternative, at present, would appear to be to appeal to a glutaminergic/NMDA model in place of a dopamine model, accounting for the efficacy of neuroleptics by modulatory interactions between the glutaminergic and dopamine systems (Carlsson, 1990; Javitt and Zukin, 1991). Proponents of this latter tack claim that there is a greater phenomenological similarity between PCP-induced psychotic reactions and schizophrenia than there is between amphetamine-induced paranoid reactions and schizophrenia (Carlsson, 1990; Javitt and Zukin, 1991).

A further possibility opens up in the light of any consideration of the transient psychoses found in borderline states, such as that outlined above, which is that disturbances in glutaminergic systems in either the frontal or the temporal areas of the brain underpin schizophrenia or these transient psychoses and disturbances of dopamine systems, again in either temporal or frontal areas of the brain, are implicated in the other state.

The re-emergence of consciousness

At present there appears to be a renewed willingness to tackle the issues raised by consciousness and its alterations and in particular to consider what role these might play in psychopathology, that might ultimately lead to a resolution of some of the issues touched on in this paper.

The question of consciousness is clearly on the agenda for cognitive neuropsychologists, with a range of testable models to account for its manifestations currently on offer (Humphrey, 1984; Shallice, 1988, 1989; Marcel, 1989; Frith, this issue). There are programmes of empirical research in train, aimed at sampling streams of consciousness (Singer, 1988).

Cognitive therapists have also begun to take into account the images and thoughts that flit through consciousness (Williams, 1984; Scott, Williams and Beck, 1991). Today's cognitive therapy, with its emphasis on 'catch the thought/image' in many ways resembles Freud's pre-analytic 1895 techniques.

The renewed interest in consciousness and its vicissitudes is not simply of interest to any consideration of schizophrenia and the transient psychoses but rather is of far more general interest. For example, discussions of and research on anxiety in recent years and clinical trials of anxiolytics have focused on the muscular tension in the state, as well as autonomic symptoms and, more recently, cognitions or worries. There are at present no scales to rate the occurrence or severity of dissociative symptoms in the various anxiety states. What scales there are were developed for the investigation of the symptoms found in borderline disorders and multiple personality disorder (Bernstein and Hutson, 1986; Riley, 1988) and, accordingly, these are not entirely suitable for the investigation of dissociative phenomena in the more regularly occurring forms of anxiety.

A good case can be made for suggesting that an appropriate dissociative experiences checklist, which might include some of the questions listed in the appendix at the end of this manuscript, should be administered in all clinical trials of new anxiolytics. One could predict, on the basis that benzodiazepine withdrawal gives rise to dissociative experiences and 5-HT_3 antagonists appear effective in animal models at least in alleviating benzodiazepine withdrawal, that these compounds might

have particular effects on dissociative aspects of anxiety as opposed to the effects of benzodiazepines on muscular tension and beta-blockers on autonomic symptoms.

Whatever the effects of 5-HT_3 antagonists on dissociative experiences, the fact remains that benzodiazepine anxiolysis differs from beta-blockade-mediated anxiolysis and both differ from the type of anxiolysis mediated through the 5-HT system. At present, however, there appears to be little work being done in differentiating phenomenologically between these different forms of anxiolysis.

Pharmacopsychology

One possible way forward here is for there to be a development in pharmacopsychology as opposed to psychopharmacology. As originally conceived by Kraepelin (1892), pharmacopsychology was a discipline that would explore the constitution of the psyche, including consciousness, using pharmacological agents as probes.

In recent years, there has been a remarkable explosion in our knowledge of the physiological substrates on which psychotropic drugs act. But there remains a dearth in our knowledge of what effects any of these compounds have on psychological functioning. Even in the case of neuroleptics, regarding which some work has been done (Berger *et al.*, 1989; Cassens *et al.*, 1990; King, 1990; Medalia, Gold and Merriam, 1988; Spohn and Strauss, 1989), the greater part of what has been done has not permitted any clear distinctions to be drawn between the effects of neuroleptics from those of any underlying psychotic disorder. It remains impossible, for example, at present to distinguish neuropsychologically between benzodiazepines and neuroleptics, other than on relatively crude measures, such as indices of sedation.

All of this may be about to change. A number of workers have flagged up the possibilities of and need for pharmacopsychological as opposed to psychopharmacological studies (Janke, 1983; Russell, 1987; Warburton and Wesnes, 1984). In a recent symposium on consciousness, a notable psychologist (Gregory, 1989) has advocated testing models of consciousness with psychotropic drugs and indeed using agents, such as ketamine, to develop such models in the first instance. Domino (this issue) has outlined how it is now possible to chemically dissect awareness in a number of different ways, using ketamine and related or other compounds. Mitrani *et al.* (1977) have provided some evidence that one fruitful avenue for research here might involve looking at the differential effects of consciousness altering agents on the discrimination of long and short time intervals.

There has also been a recognition of the phenomenon of awareness under anaesthesia (Bonke, Fitch and Millar, 1990; Rosen and Lunn, 1987; Kihlstrom and Couture, this issue). It has become clear that this paradigm permits a probing of a range of psychological functions, in particular priming and implicit memory systems. It is also clear that this paradigm may provide a suitable experimental framework for an investigation of aspects of consciousness (Bonke, Fitch and Millar, 1990; Kihlstrom and Couture, this issue). Quite apart from the example of the dissociative anaesthetics, recent research clearly indicates that anaesthesia with more conventional compounds is not simply of a state of lowered or absent consciousness (Munglani and Jones, this issue).

The time, therefore, seems opportune for the initiation of a set of experimental programmes that would look at the issues surrounding the phenomenology and pharmacology of altered states of consciousness, the outcome of which can be expected to have significant effects on current psychopathological thinking (Frith, this issue).

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Dissociation checklist

The following are a set of experiences, that many people might think are strange or unusual, but most of which happen to all of us sometime and some of which happen frequently. We would like you to complete this questionnaire to get a feel of how many of these experiences happen to you and how often. Circle the number that best fits what happens to you for each of the questions.

0 = never 2 = monthly 4 = weekly
6 = several times a week 8 = daily 10 = several times a day

1) **I feel like things are not real, as though what's happening is part of a TV programme rather than real life.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

2) **I feel like I'm not real. I have to pinch myself to see if I'm really here.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

3) **When I am dozing off or falling asleep I see very vivid images. (These may be either frightening or fascinating).**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

4) **When I am dozing off or falling asleep I hear what sound like real noises or voices.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

5) **I have the experience of leaving my body and looking back at it from outside.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

6) **I have the experience of somehow looking at myself doing things stupidly or making a mess of things.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

7) **I find that I cannot remember parts of what happened earlier in the day.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

8) **I get the feeling that there are parts of my life that I cannot remember at all.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

9) **I find myself in places without knowing how I got there.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

10) **I get told by my family or friends that I don't seem to recognize them.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

11) **I look in the mirror and do not recognize myself.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

12) **I feel that there is a fog or haze between me and the real world.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

13) **I remember some things from the past so vividly that it feels as though they are actually happening again.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

14) **I go into trances.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

15) **I get the feeling that I am more than one person.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

16) **I get so absorbed in doing something (e.g. watching TV or reading a book) that I am unaware of things happening around me.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

17) **A voice inside my head comments on things I do.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

18) **I feel like things are not real, as though what's happening is staged with other people acting parts rather than living them.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

19) **On waking from sleep or a snooze I see very vivid images or scenes.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

20) **On waking from sleep or a snooze, I hear voices or sounds as though they are really there.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

21) **I wake up and do not know where I am.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

22) **My mind goes blank.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

23) **I get the feeling of having been somewhere before.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

24) **I have the experience of not recognizing somewhere or someone I should be very familiar with.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

25) **I find during the day that disturbing images flash into my mind.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

26) **I hear voices in my head.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

27) **I hear voices that sound like they are coming from outside when there is no-one there.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

28) **I feel as though everyone is looking at me—maybe waiting for me to make a mistake**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

29) **I get emotional and don't know why.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

30) **I get physically numb to the point where I can injure myself or cut myself without feeling any pain.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

31) **I get nightmares.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot

32) **I get the feeling that there is someone or something nearby, when there doesn't appear to be.**
0 . . 1 . . 2 . . 3 . . 4 . . 5 . . 6 . . 7 . . 8 . . 9 . . 10
Does it bother you? No . . . A Bit . . . A Lot