

DREAMS AND PSYCHOSIS
A New Look at an Old Hypothesis

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Abstract

This paper proposes a theory of psychosis based on a link between sleep and hyperarousal. It is argued that the phenomenological similarities between psychosis and dreams arise from the fact that sleep can occur, not only in states of deafferentation and low arousal, but also in states of hyperarousal resulting from extreme stress (Oswald, 1962).

It is proposed that both schizophrenic and manic-depressive patients are people who are prone to episodes of hyperarousal, whether for constitutional reasons, or for reasons of environmental stress, or an interaction of the two. Various sorts of electrophysiological evidence are adduced for this proposition, drawn from the fields of electroencephalography, studies of the galvanic skin response and studies of smooth pursuit eye movements. In addition, it is suggested that a key finding is the apparently paradoxical one that catatonic patients can be aroused from their seeming stupor by the administration of sedatives rather than stimulants (Stevens and Darbyshire, 1958).

It is proposed that a tendency to hyperarousal leaves certain individuals vulnerable to 'micro-sleeps' (Oswald, 1962) in everyday life, with the attendant phenomena of hallucination and other sorts of reality-distortion. Delusional thinking may follow as an attempt to rationalise these intrusions of dream-phenomena into daylight hours.

Various possible objections to the theory are raised and discussed, and in conclusion various advantages of the theory are put forward.

Dreams and Psychosis

1. Phenomenological Similarities between Psychosis and Dreaming

The similarities between the respective phenomenologies of dreams and psychoses have often been remarked upon:

Aristotle (*de Somniis*): ‘...The faculty by which...we are subject to illusion when affected by disease, is identical with that which produces illusory effects in sleep.’

Kant¹: ‘The lunatic is a wakeful dreamer.’

Schopenhauer²: ‘A dream is a short-lasting psychosis, and a psychosis is a long-lasting dream.’

Freud (1940): ‘A dream, then, is a psychosis.’

Jung (1909): ‘Let the dreamer walk about and act like one awakened and we have the clinical picture of dementia praecox.’

Among the phenomenological features common to both dreams and psychosis I would include the following:

(1) **Autism.**³ The dreamer and the psychotic are both preoccupied with internal rather than external events. In the most severe cases of schizophrenia Eugen Bleuler (1911) wrote:

‘...[the subjects] have no more contact with the outside world [and] live in a world of their own...This detachment from reality, together with relative and absolute predominance of the inner life we term autism.’

¹ Quoted in La Barre (1975)

² Ibid.

³ The word ‘autism’ is used here in the sense introduced by Eugen Bleuler (1911), and refers to a symptom or phenomenon and not to a diagnostic label. The latter usage, as in the phrase ‘autistic children’, has this in common with Bleuler’s usage, that individuals labelled as ‘autistic’ may display the phenomenon of autism, along with a range of other possible symptoms. Jaspers (1963, p. 328) characterises autistic thinking in Bleuler’s sense as ‘self-encapsulation in an isolated world’.

It might be objected that the dreamer *thinks* that he or she is grappling with external events during the dream; but the same could often be said of the psychotic, since one of the most characteristic features of psychosis is the experience of internal events (thoughts and experiences) as being externally imposed.

(2) Loss of autonomy in relation to mental content. The dreamer experiences the dream-world as largely autonomous and beyond his control. The psychotic may experience thought insertion and other forms of subjective loss of control of his or her mental content.

(3) Flattened or inappropriate affect. This was regarded by Bleuler (1911) as one of the two cardinal symptoms of schizophrenia, along with disorder of thought. In dreams we may commit murder with very little emotional disturbance; alternatively, we may experience 'nightmarishness' or horror before anything appears in the dream environment which could rationalise it.

(4) Disorders of meaning. Psychotics can suffer from an excess of meaning, as in paranoia, ideas of reference⁴ or the primary delusional experience. Alternatively, they may suffer from a dearth of meaning, as in depersonalisation, derealisation, or various forms of 'existential anxiety' (Cutting, 1985). Dreams may likewise present us with a general feeling of heightened significance, or specific meanings which seem odd from outside the dream, such as elements which in retrospect seem emotionally loaded in ways in which they would not be in waking life.

(5) Delusional beliefs. Jaspers describes delusions as almost the defining condition of madness. He writes: 'Since time immemorial delusion has been taken as the basic characteristic of madness. To be mad was to be deluded...' (Jaspers, 1923) In dreams our beliefs, such as the

⁴Many interesting examples of the overinvestment of external stimuli with personal meaning can be found in Strindberg's autobiographical work *Inferno*. The following is an example: 'One morning...I entered the Luxembourg Gardens...There on the ground I found two dry twigs, broken off by the wind. They were shaped like the Greek letters for P and y. I picked them up and it struck me that these two letters P-y must be an abbreviation of the Popoffsky. Now I was sure it was he who was persecuting me, and that the Powers wanted to open my eyes to my danger. I became very agitated, notwithstanding this indication that the Unseen was benignly disposed towards me.' (Strindberg, 1962, pp. 68-9)

idea that one has just been made Chancellor of the Exchequer, may be unjustified, not merely in relation to waking life, but in relation to the hallucinatory events of the dream.

(6) Disorders of thought and language. Oswald (1962) and Mavromatis (1987) give many examples of analogies between the dereistic thinking of dreams, or the hypnagogic state, and that of psychosis. Mavromatis in fact comments that 'practically all of the schizophrenic thought disturbances are encountered in hypnagogia'(p.161).

(7) Lack of insight. Again, this has been held by many to be the defining condition of psychosis, marking it off from other mental disorders such as neurosis. It is certainly a defining condition of dreams, excepting the special case of lucid dreams (Green, 1968; Green and McCreery, 1994).

It may be worth expanding on (4) in view of the centrality of delusion as a condition of psychosis. Jaspers (1923) stresses the incorrigibility of delusional beliefs in psychosis, and how this is not related to the general level of intelligence of the subject. In dreams the linkage between beliefs and evidence can be broken in a similar way. There can be a dissociation between beliefs and the 'sense-data' which might justify them within the context of the dream. For example, we identify people in our dreams without concern for the fact that they look quite unlike the people they are supposed to be. It is only on waking that we are surprised that the incongruity did not strike us at the time. In the dream our conviction that the person in question stands before us is somehow self-validating; it scarcely stands in need of any justification from the evidence of our 'senses'.

It is also possible to see an analogy between the delusory interpretation of external stimuli in psychosis and the incorporation of external stimuli into dreams, as in the classic case of Maury's guillotine dream.⁵ The dream rationalises the stimulus in a manner which to the

⁵ 'I was slightly indisposed and was lying in my room; my mother was near my bed. I am dreaming of the Terror. I am present at scenes of massacre; I appear before the Revolutionary Tribunal; I see Robespierre, Marat, Fouquier-Tinville, all the most villainous figures of this terrible epoch; I argue with them; at last, after many events which I remember only vaguely, I am judged, condemned to death, taken in a cart, amidst an enormous crowd, to the Square of the Revolution; I ascend the scaffold; the executioner binds me to the fatal board, he pushes it, the knife falls; I feel my head being severed from my body; I awake seized by the most violent terror, and I feel on my neck the rod of my bed which had

outside observer seems fanciful. Similarly, the delusory belief of the psychotic may crystallize round a kernel of fact, but one which the psychotic interprets in a highly idiosyncratic way.

2. False Awakenings

To the above phenomenological similarities I would add the following observation which I believe has not been made before: there is a remarkable similarity between the phenomenology of what Jaspers and others have called the 'primary delusory experience' and that of what Green (1968) has termed a 'Type 2 false awakening'. Green characterises this experience as follows:

In this type of false awakening the subject appears to wake up in a realistic manner, but to an atmosphere of suspense. These experiences vary in respect of the length of time which elapses before the subject becomes aware that something unusual is happening. His surroundings may appear normal, and he may gradually become aware of something uncanny in the atmosphere, and perhaps of unwonted sounds and movements. Or he may 'awake' immediately to a 'stressed' and 'stormy' atmosphere. In either case, the end result would appear to be characterized by feelings of suspense, excitement or apprehension. (Green, 1968, p. 121)

The following is a first-hand account of this phenomenon provided by a subject studied by myself:

This consists of waking up, apparently in the usual way, then realising that something is 'wrong'; the atmosphere grows tense and eerie and hallucinatory effects appear. The first few times this happened I was very bewildered for, in spite of the odd effects, it was unlike a dream and, moreover, I seemed to be exactly where I would expect to be at that time of night. The thought that I must be awake and 'seeing things' made me panic and struggle to get free. When, exhausted, I just lay still for a while, everything would suddenly 'click' back to normal. Even in retrospect I was uncertain whether I had been awake or dreaming. Gradually I lost my fear of these experiences, realising that I need only relax in order to awake. I started trying little experiments, such as moving an object during the false awakening and checking its position subsequently, and concluded that

become suddenly detached and had fallen on my neck as would the knife of the guillotine. This happened in one instant, as my mother confirmed to me.' Maury (1861, pp.133-4); quoted in Mavromatis (1987, p.24).

my apparent movements and speech did not actually occur, and that the experience was a type of dream. (McCreery, 1973, p. 118)

It is interesting to compare these descriptions with Jaspers's characterisation of the primary delusory experience:⁶

Patients feel uncanny and that there is something suspicious afoot. Everything gets a *new meaning*. The environment is somehow different - not to a gross degree - perception is unaltered in itself but there is some change which envelops everything with a subtle, pervasive and strangely uncertain light. A living-room which was formerly felt as neutral or friendly now becomes dominated by some indefinable atmosphere. Something seems in the air which the patient cannot account for, a distrustful, uncomfortable, uncanny tension invades him... (Jaspers, 1923, p. 98)

A more recent writer, Reed (1972), characterises the primary delusory experience in very similar terms:

'The experience is basically the uneasy awareness of a *change in significance*. Everything seems to be different, changed and disordered. Patients suffering from this primary delusional experience naturally find it difficult to describe. They feel a sense of frightening uncertainty, an awareness of a sinister 'atmosphere', an apprehension of disintegration.' (Reed, 1972, p. 153)

It is interesting to note that in both types of experience - the Type 2 false awakening and the primary delusory experience - the feeling of uncanniness or altered significance can be present even before any 'perceptual' experience (i.e. hallucination proper) occurs to rationalise it.

I feel the remarkable similarity between the two phenomena of the primary delusory experience and the Type 2 false awakening in normal subjects strengthens the case to be made in this paper that there is an identity, rather than mere similarity, between the two realms of

⁶ The experience Jaspers describes is said to be 'primary' because it precedes any specific hallucinatory perception or delusional belief. It is said to be 'delusory' for the related reason, that there is no specific content in the patient's experience at the time which can be said to rationalize or justify his/her feeling of heightened meaning or significance.

Cutting's term for the experience is *delusional mood*, which he characterizes as 'an uncanny and sometimes terrifying atmosphere in which aspects of the outside world are invested with new meaning.' (Cutting, 1985, p.319)

dreams and psychosis. I suggest that the specific manifestation of psychosis, the primary delusory experience, resembles the sleep phenomenon of the false awakening because psychosis is itself a sleep phenomenon.

3. Three criteria of sleep

I shall argue in this paper that when the psychotic appears like one asleep it is because he or she is asleep.

First, I should like to distinguish three separate criteria of sleep, behavioural, verbal, and electrophysiological, and establish that I shall be regarding the third of these as primary in the present discussion.

The behavioural criterion is the one most likely to be used by an external observer in everyday life when trying to judge whether or not another person is asleep. An observer is likely to judge by such cues as the eyes being closed, the observed person snoring, being unresponsive to verbal questions, etc. In most contexts such cues are a reliable indicator, but not always; for example, there is always the possibility of deception on the part of the observed person. There is also the fact, to be discussed below, that people can show electrophysiological signs of sleep when displaying none of the usual behavioural signs.

The criterion of verbal report by the observed person may also be used in everyday life. We may meaningfully ask someone, 'Were you asleep?', when they have just emerged from a state in which they displayed some or all of the behavioural signs listed above. Again, however, as we shall show below, the observed person's response is not always to be relied upon; in particular, people are liable under certain circumstances, not simply to dissimulate, but to be mistaken in their retrospective judgements about their own state, believing they have not been asleep when the third, electrophysiological, criterion, clearly indicates that they have.

For the purposes of the present paper, the third, electrophysiological criterion will be taken as the necessary and sufficient condition of sleep being ascribed to a subject. In

particular the presence of recognised criteria of sleep in the electroencephalogram (EEG) will be regarded as the primary criterion.

There are at least two advantages of an electrophysiological criterion of sleep in the present context. In the first place, the EEG is relatively immune from conscious control, except perhaps in the relatively restricted area of learned control of the alpha rhythm, and is therefore relatively immune from the possibility of deceptive manipulation. In the second place, there is experimental evidence, to be discussed further below, to show that electrophysiological data can confirm behavioural evidence of sleep when verbal reports, given in good faith, deny it. (Oswald, 1962)

In the next section I shall propose a mechanism to explain how it is that the sleep of psychosis can occur apparently in the midst of the waking state and not just at night.

4. A Proposed Mechanism for the Link between Dreams and Psychosis

In view of the phenomenological similarities between psychosis and dreaming, a number of attempts have been made in the past to propose some underlying mechanism common to the two phenomena. Feinberg (1970), for example, proposed the idea that the visual hallucinations of drug-withdrawal delirium represent the intrusion into waking consciousness of processes normally associated with rapid eye movement sleep. Hypotheses of this kind seem to have made little headway, however.

One reason for the lack of success of the sleep hypothesis seems to be empirical: studies of actively hallucinating schizophrenic patients did not appear to show the features, such as rapid eye movements, which are specific to REM sleep and which might therefore have been expected to appear in hallucinating patients. As Robbins (1988) puts it, 'The physiological correlates of dreaming and hallucinations appear to be different.'

I believe that the relative failure of the psychosis-as-dream hypothesis hitherto, at least on the electrophysiological level, is due to two separate factors. I believe (a) that theorists and researchers have been looking for sleep in the wrong place; and (b), that they have been looking

for the wrong kind of sleep. That is to say, as regards (a), they have been implicitly assuming that the sleep processes in psychosis, like those of nocturnal sleep, would arise out of a state of low arousal; and as regards (b), they have been explicitly assuming that it is REM sleep we should be looking for. I wish to challenge both those assumptions. I shall be suggesting that the sleep processes of psychosis arise out of a state of hyperarousal; and I shall further suggest that we should be looking for evidence of descending Stage 1 sleep, not ascending Stage 1 (i.e. REM).

The idea that sleep can supervene on extreme arousal as well as the more normal state of relaxation, de-afferentation and low general arousal is perhaps a relatively unfamiliar one. However, it is extensively documented by Oswald (1962), for example, who devotes a whole chapter to what he calls 'Sleep as a Provoked Reaction'. He cites both anecdotal and experimental evidence for the phenomenon. On the anecdotal level, he alludes to cases such as those of soldiers falling asleep while waiting to go into battle, or of persons falling asleep while waiting to give an important public address.⁷ The following is an interesting example, quoted by Jaspers, of the first type of situation: a soldier falling asleep as a reaction to the stress of trench warfare:

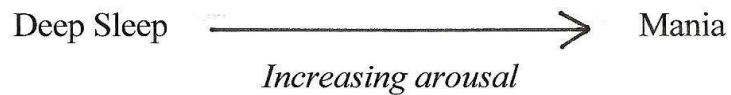
Feeling is frozen. As the firing gets louder and never ceases, it blends with an objective sense of fatalistic calm. The threatened man becomes numb, cool, objective - the senses slowly grow enveloped with a merciful stupefaction, become clouded and conceal the worst from him ... the monotony of uninterrupted droning noise narcotises him ... the eyes slowly close and right in the middle of the deadly uproar he falls asleep. (Jaspers, 1923, p. 369)

On the experimental level, Oswald (1959) was able to induce sleep in four out of a group of six volunteer subjects by administering 'powerful' shocks at regular 10-second intervals to the wrist or ankle of the subject.

⁷ We shall shortly be making a connection between hallucinations, stress and sleep, so in this context it is of interest that Green (1968) gives two cases of OBEs occurring to subjects who were in the middle of public musical performances, one a singer, and the other a pianist (pp.65 and 67). In a third case (p.64) the subject was giving a sermon in church.

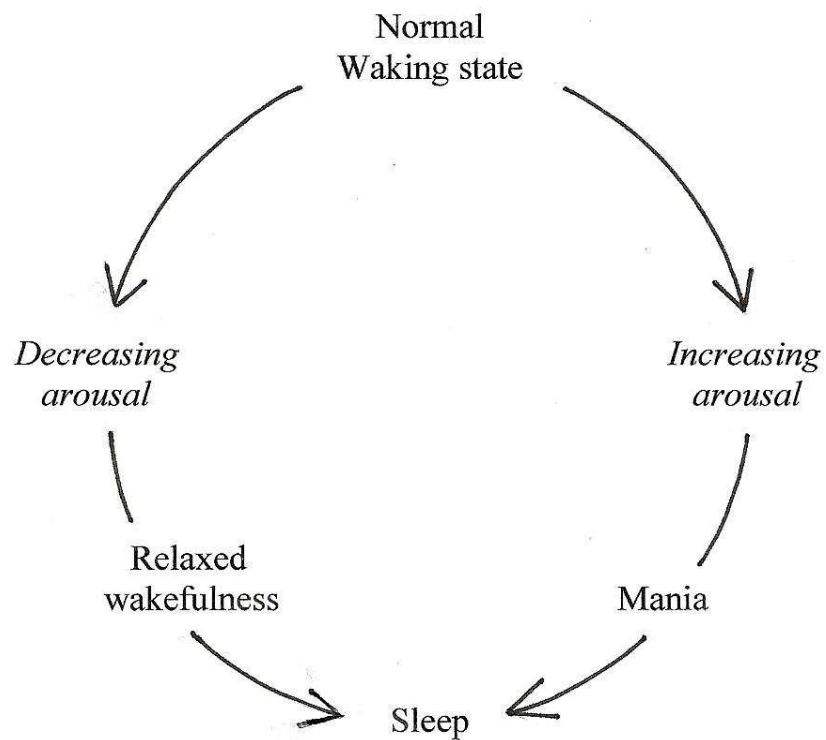
We normally think of arousal as forming a linear continuum in relation to sleep, as represented in Figure 1a.

Fig. 1
Conventional model of the relationship between sleep and arousal



However, it may be that the situation could be more accurately represented as in Figure 2, with both extremes of arousal ending in sleep.

Fig. 2
Preferred model



One reason why we do not immediately think of Figure 1b as the normal model for the relationship between arousal and sleep is perhaps because for most of us sleep is indeed a state of low arousal. However, for some people, and in certain circumstances, sleep can be a state of high arousal, higher even than waking life. Nightmares, which seem to occur in conjunction with REM sleep, are the obvious examples of this. But there is also the phenomenon of the night terror, which is associated with slow wave sleep (Parkes, 1985).

One might even question whether the REM phase of sleep should be characterised as a state of low arousal, even in the absence of nightmares, granted the similarity of the EEG to that of aroused rather than relaxed wakefulness. REM sleep seems to be a paradoxical state which shows some analogy to that of catatonia in schizophrenics, which, as we shall see below, is regarded by Stevens and Darbyshire (1958) as a state of cortical hyperarousal, despite its muscular passivity. In REM sleep likewise the behavioural inertness due to lowered muscle tone is apparently accompanied by cortical arousal, at least in comparison with other phases of sleep.

It is also interesting to note that nightmares seem to be particularly prevalent in people with a predisposition to psychotic breakdown. For example, Hartmann *et al* (1981), in a study of 38 subjects who reported frequent nightmares (at least once a week), found a strikingly raised incidence of psychopathology, both among the subjects themselves and their relatives. Four of the subjects met the DSM-III criteria for schizophrenia, nine for borderline personality and six for schizotypal personality;⁸ and 22 of them had a close relative who had been institutionalized for mental illness or had had a serious 'nervous breakdown'. The authors go so far as to suggest that a child's continuing to have frequent nightmares at the age of, say, 10 to 12, i.e. several years beyond the age at which such experiences tend to diminish, might have useful predictive value as a marker of risk for schizophrenia.

⁸ For a discussion of the theoretical construct of *schizotypy*, and its variant forms, please see McCreery and Claridge (2002).

Various studies have also suggested that the dreams of schizophrenics are particularly liable to include aggressive or threatening elements. Robbins (1988), after reviewing these studies, summarised them thus:

[...] The dreams of schizophrenics are fraught with anxiety-provoking situations. We all have these experiences occasionally in dreams, but in the schizophrenic they seem to be running rampant. It is as if the control mechanisms that protect us from being overwhelmed by anxiety have gone out of kilter. One has a sense of floodgates that do not work. (Robbins, 1988, p. 64.)

Later in this paper we shall be presenting evidence for the hypothesis that psychosis-proneness consists in a proneness to states of hyperarousal. I think that both these observations - the raised incidence of full-blown nightmares in psychosis-prone groups and the heightened arousal which seems to characterise the dreams of schizophrenics - are consistent with this view. In the present two observations we see the tendency to hyperarousal expressing itself in nocturnal sleep, rather than in the daytime sleep which I am suggesting constitutes the phenomenon of active psychosis.

The equation of mania with a state of hyperarousal is almost tautological. However, I believe a similar case can be made for a number of the manifestations of schizophrenia also. Many researchers have believed stress to play an important role in triggering relapse in chronic schizophrenics. What is also highly significant for the present model is the fact that a state of hyperarousal apparently underlies the superficially 'negative' syndrome of catatonia. Stevens and Darbyshire (1958), for example, found that their catatonic subjects became more active, behaviourally, with the administration of amobarbital, a sedative, as if their nervous systems were so over-aroused that they had 'seized up' behaviourally, and the effect of the sedative was initially to release this inhibition, before finally sending them to sleep in the normal way. They write:

'We...propose that the term catatonic "stupor" is a misnomer due to confusion of a psychic state with a behavioral manifestation. The psychic state in catatonic schizophrenia can be described as one of great excitement (i.e., hyperalertness), whether

the behavioral manifestation is one of overactivity or underactivity. The inhibition of activity apparently does not alter the inner seething excitement.'

I suggest that the psychotic phenomena associated with catatonia in such patients are indeed the phenomena of sleep, but entered from the upper end of the arousal continuum rather than the lower, as in Fig. 1b.

5. An Application of the Model to a Particular Sort of Hallucinatory Episode in the Sane

I believe the mechanism proposed in the preceding section can be seen at work in microcosm in the type of hallucinatory episode popularly known as an 'out-of-the-body experience'. As Irwin (1985) points out, these experiences seem to occur in conditions either of extremely low or extremely high cortical arousal. Green (1968b), for example, found that three-quarters of a group of 176 subjects who reported a single such experience were lying down at the time it occurred, and 12% of these considered they had been asleep at the time it started. A common form of the experience is in fact for the subject to seemingly wake and find him- or herself apparently up near the ceiling of the bedroom looking down at themselves lying in the bed. The following is an example of a case from one of my own subjects which occurred during conditions of low arousal, and in which the out-of-the-body experience may well have occurred during a brief episode of Stage 1 sleep.

The second time was two years ago. I was meditating. I used to sit with a group of friends once a week... I suddenly found myself standing at the side of my chair watching myself meditating. It was only for a minute or so and then I went back.

By contrast with this last instance, a substantial minority of cases occur under conditions that *prima facie* betoken maximum arousal, such as rock-climbing falls, traffic accidents, childbirth or musical and spoken performances before an audience. I suggest that out-of-the-body experiences under the latter type of circumstance may be regarded as a 'waking dream', triggered by extreme stress. Oswald (1962) refers to those times when a sleep state 'results from overwhelming or terrifying stimulation'(p.30), and this would seem a good characterisation of

many of the situations in which the out-of-the-body experience occurs, as in the following case from one of my own subjects:

My ex-husband and I had a row in which he tried to strangle me... I seemed to float above my body and could see myself slowly slide down the wall. Everything seemed to be in slow motion, but also I have this very beautiful serene feeling... The next thing I knew, I was waking up lying on the floor...

It is interesting to note that such transient and usually isolated episodes in non-clinical subjects may also incorporate unusual affective responses, as in the preceding case, with the subject seeming to 'view' the sufferings of the physical body with equanimity.

On the other hand the analogy between such episodes and protracted phases of active psychosis in clinical subjects cannot be pushed too far, since the hallucinations of the sane often appear to have adaptive value to the subject, unlike the voice experiences of schizophrenics, for example. Thus people who report OBEs in connection with surgical operations may report that they felt better after them than before, with reduced pain, for example.

6. Stage 1 (descending) versus REM sleep

To turn to the question of what kind of sleep is implicated in the mechanism just proposed. As mentioned above, it has previously been assumed that it is REM sleep processes we should be looking for in connection with psychosis. This was presumably because of the historical equation of REM sleep with dreaming, following the discovery of rapid eye movements and their apparent correlation with dream reports by Aserinsky and Kleitman (1955). However, subsequent research has suggested that this equation is too simplistic. Mentation, albeit of a somewhat different kind, can be reported following other phases of sleep, and there seems to be no good reason to confine the term 'dream' to the sorts of dramatic, narrative mental events which seem to be predominantly, though not exclusively, associated with REM sleep. I suggest that it is reasonable to expect descending, not ascending Stage 1 sleep, to be associated with psychotic processes, for the following reasons:

6.1 Logic. First, there is the logical reason: human beings characteristically do not plunge straight into REM phases of sleep; they go through the complete cycle of Stages 1 to 4 before reaching the first REM phase, after perhaps 45 minutes (Empson, 1989). In other words it is Stage 1 which is usually contiguous with the waking state at the start of a sleep episode in normal people. It would therefore seem natural to look first for descending Stage 1 processes in psychotics if we are looking for sleep processes to explain their symptoms.

6.2 The Paralysis Argument. Apart from rapid eye movements, REM sleep is characterised by lowered muscle tone, amounting to virtual paralysis. There seems little evidence for any corresponding phenomenon in connection with psychosis, with the possible exception of the relatively rare condition of catatonia. Paralysis is occasionally reported in connection with various types of hallucinatory episode in the sane, including false awakenings, OBEs and apparitional experiences; however, its occurrence is rare and the majority of such cases do not display it (Green and McCreery, 1994). It therefore seems reasonable to assume, both in the case of these transient hallucinatory episodes of the sane and in the case of the more chronic episodes of psychosis, that it is some stage other than REM that is primarily implicated in the mechanisms underlying the phenomena.

6.3 Phenomenology. The phenomenology of Stage 1 sleep seems to offer many parallels to that of psychosis. These have been extensively reviewed by Oswald (1962), and more recently by Mavromatis (1987).

Oswald particularly highlights the ‘derealistic thinking’ of the hypnagogic state, and quotes examples of hypnagogic mentation of his own which he considers closely parallel psychotic thinking.

Stage 1 is also a fertile ground for the occurrence of autonomous imagery and hallucinations of various kinds, even in normal people, including auditory images apparently superimposed on the external world. Schacter (1976), for example, cites the case of an experimental subject who, ‘thinking that he had been solicited, unhooked himself from the biofeedback equipment and ran into the hallway, only to realize that he had experienced an

auditory hypnagogic image'. Leaning (1925) quotes two cases in which the subject heard him- or herself being commented on in the third person, very much in the manner often suffered by schizophrenics. In the first of these cases the subject, a professional man, wrote of his hypnagogic experience:

'There was quite a company of people about me, young women I believe, who looked towards me and passed on. One of them spoke. I heard the voice distinctly, soft and clear. It said "*he isn't asleep.*" That is all...'

In the second case a lady had a hypnagogic vision after waking in the night; in it the bows of a ship appeared 'on the left hand side of the bed', twice. The subject added:

'I said it was not so strange, as a friend had left a few days before for a long voyage, and others were arriving, when quite clearly and *authoritatively* a voice spoke on my right a little behind my pillows: "There's no occasion to warn her. We've got one ship off already."

7. Psychosis as a Disorder of Arousal

As may already be apparent, it is the implication of the present model that the fundamental disorder in psychosis is one of arousal. All the other symptoms are held to be the direct result of arousal reaching dysfunctional heights.

As mentioned above, the idea of mania as a dysfunctional extreme of arousal is almost tautological. Less obvious perhaps is how the depressive phase of manic-depressive psychosis may be so regarded. However, two points may be relevant here. One is the clinical notion of 'agitated depression', which implies that even ostensibly depressive phases may mask a state of high arousal. The second is the idea that depression results from chronic over-arousal due to stress.

What of schizophrenia, the commoner form of psychosis, and the archetypal form of 'madness' to most lay people? What evidence is there for the significance of extremes of arousal in this syndrome? We have already alluded to Stevens and Darbyshire's view that one of the manifestations of schizophrenia, catatonia, is to be viewed as a state of hyperarousal, despite

the behavioural evidence to the contrary. To this I would add recent evidence from the study of schizotypy⁹ using non-clinical subjects.

A questionnaire has been developed by the Chapman laboratory which purports to measure Hypomania in normal subjects (Eckblad and Chapman, 1986). I have administered this scale, along with others measuring different aspects of schizotypy, to a population of 450 non-clinical subjects reporting at least one out-of-the-body experience and found them to score significantly higher on Hypomania than a group of 214 controls (McCreery and Claridge, 1996). This effect held good across two different methods of subject recruitment, and was mirrored in a within-group comparison of people reporting different numbers of OBEs: it was found that the more experiences they reported the higher they scored on the Hypomania scale.

What is also highly significant for the present theory is that this Hypomania scale is highly correlated in normal subjects with scales measuring various forms of perceptual aberration, such as disorders of the body-image (Chapman, Chapman and Raulin, 1978) and auditory hallucinations (Launay and Slade, 1981). In my own data these correlations were of the order of 0.6. It should be noted that there is no question of cross-contamination between these two sorts of scale, since the 'arousal' scale (Hypomania) does not contain any items concerned with perceptual anomalies, and *vice versa*.

It may also be noted that Slade and Bentall (1988) list heightened arousal as one of the factors predisposing to hallucination in their review of such factors, and they adduce experimental evidence from clinical subjects in evidence of this view.

Finally, one might add that the term 'major tranquillisers', which has been applied collectively to the most widely used current pharmacological treatments for schizophrenia, itself carries the implication that hyperarousal is a condition of at least the active phase of the disorder.

⁹ Cf. note 8, on p. 12.

8. Electrophysiological Evidence for the Model

Because previous attempts to link dreams and psychosis have postulated REM sleep as the mediating mechanism, there have so far been no direct tests of the present hypothesis that descending Stage 1 could be the relevant type of sleep. At present, therefore, we have to look for indirect or circumstantial indications of the correctness or otherwise of the present hypothesis at this stage. However, I believe a number of such indications can be found in the literature.

8.1 The EEG

The first observation I would adduce is a curious fact about the alpha rhythm which is so familiar as almost to escape remark, namely the fact that it responds in a similar way to both an increase and a decrease in arousal - by disappearing, or at least by being masked by other sorts of activity. As Oswald (1962) puts it:

The alpha rhythm is a feature of a certain level of cerebral vigilance.¹⁰ It gets faster and disappears with increase of cerebral vigilance, and gets slower and disappears with fall of cerebral vigilance. The disappearance of alpha rhythm from the EEG of a person in whom it is normally present requires us always to ask the question, "Is the individual now very alert or is he drowsy?" (Oswald, p. 35)

I suggest that this observation is at least consistent with the model of the relationship between sleep and arousal represented in Figure 1b.

Furthermore, a relative dearth of tonic alpha and a relative abundance of beta seem to be characteristic of the EEG of schizophrenics as a group. Flor-Henry (1979), for example, comments: 'Since Berger in 1937 noted the predominance of beta waves in "many mental disturbances" a very large number of studies have consistently found an excess of EEG power in the fast frequencies in the 20 to 50 Hz band.'

¹⁰ 'Vigilance' in this context refers to the ability of the brain to respond to a signal detection task. 'Cerebral' refers to the brain as a whole, in contrast to 'cortical' (see below, n.10), which refers only to the outer layer of the brain, the cortex.

A tonic EEG shifted towards the upper end of the spectrum is what one would expect in people prone to psychosis on the present model. It would be compatible with their being habitually in a state of relatively high tonic arousal such that any additional stress factor was liable to precipitate them into that domain of hyperarousal in which sleep is liable to supervene as a provoked reaction.

Another interesting observation in the present context is the fact that some studies have reported a higher than average incidence of delta activity in the waking EEGs of schizophrenics (see for example, Sponheim, Clementz, Iacono and Beiser, 1994). Although visible delta waves are most characteristic of sleep Stages 3 and 4, spectral analysis suggests that activity in the delta band may be going on all the time, even in the waking state, but masked by faster rhythms, such as alpha, since the power spectrum of the waking EEG will normally show considerable power in the 0-3 Hz band, albeit less than in the sleeping state. Moreover, short bursts of delta waves visible to the naked eye can be seen even in Stage 1 sleep in certain subjects.

I suggest that the raised incidence of delta waves in the waking EEGs of schizophrenics is also compatible with the idea that sleep processes are 'nearer the surface' in such subjects, and therefore more liable to break into consciousness under the trigger of extreme stress.

8.2 The GSR

One of the most consistent findings concerning the functioning of schizophrenics on various physiological measures is such subjects' inconsistency. That is to say, they tend to show both greater variance as a group when compared with controls and greater within-subject variance when tested on a number of different occasions. This phenomenon could be explained by reference to the idea that, unlike normal subjects, schizophrenics are liable to a qualitative change of state (i.e. from waking to sleeping and *vice versa*) even during daylight hours. Testing them as a group would randomly pick up some subjects who were temporarily in the grip of sleep processes and others who were temporarily free of them. Likewise testing the subject

repeatedly might find him or her in the grip of these processes on some days but not on others, depending perhaps on his or her prevailing level of stress at the time.

We may illustrate this idea by reference to the galvanic skin response or GSR. A number of studies, such as that of Gruzelier and Venables (1972), have found a bimodal distribution among groups of schizophrenics on measures of responsiveness and habituation of the GSR orienting response to a non-informational stimulus such as a tone, with subjects either not responding at all in the normal way, or failing to habituate as normals usually do. This pattern of either hypo- or hyper-responsiveness appears to map in an interesting way onto the distinction between negative and positive syndromes in the disorder. Dawson, Schell and Filion (1990, p. 319), for example, write: ‘...non-responders and responders have been reported to show different symptomatology, with responders generally displaying symptoms such as excitement, anxiety, manic behavior, belligerence, and inappropriate mannerisms, whereas nonresponders tend to show symptoms such as emotional withdrawal and conceptual disorganisation.’

It is interesting to compare this dichotomy between hypo- and hyper-responders among schizophrenics with the progress of the GSR as an individual subject enters the sleep state. According to Oswald, the GSR may first become less apparent (i.e. skin conductance level become less labile) as the subject falls asleep, but may then reappear as deeper stages of sleep are reached. He writes: ‘The interesting thing about the human GSR was that, having disappeared as the individual fell asleep, we found it often returned as cortical vigilance¹¹ fell even lower...not only did the GSRs return during medium or deep sleep in eight of our 19 subjects but they disappeared again as cortical vigilance rose...’(Oswald, 1962, p.34).

I suggest that this progression may map onto the distinction between the two sorts of responding (or lack of it) in schizophrenic groups.

Claridge (personal communication) has found that the same schizophrenic subject, if tested on more than one occasion, may show a hyporesponsive GSR on one occasion and a

¹¹ As mentioned in footnote 8, ‘vigilance’ refers to the brain’s ability to respond to external stimuli. ‘Cortical’ here refers more specifically to the outer layer of the brain.

hyperresponsive one on another. Such a phenomenon would be consistent with the present model, according to which the difference from one occasion to another could be ascribed to a change of state on the part of the subject from one occasion to the next. It is proposed that the hyporesponsive occasions would correspond to those on which the subject was liable to experience moments of the postulated sleep state at the time of testing.

8.3 Smooth Pursuit Eye Movements

Although the suggestion in this paper is that descending Stage 1 rather than REM sleep is the basis of psychotic symptomatology, I would nevertheless like to suggest that one eye movement phenomenon in psychotics may indeed be a further indication that sleep mechanisms are involved, namely the relative weakness of schizophrenics at tasks involving smooth pursuit eye tracking movements. Claridge (1994) has reviewed the many studies of this phenomenon and concludes that it is one of the most eligible candidates for being a marker for the disorder. Although rapid eye movements are not characteristic of descending Stage 1 in most subjects, slow rolling eye movements are, and I would suggest that whatever form of disinhibition is responsible for this phenomenon at nocturnal sleep onset may also be responsible for the poor performance of schizophrenics at smooth pursuit eye movement tasks.

9. Some Possible Objections to the Theory

9.1 Psychotics do not think they are asleep. In the first place I do not think that this is always true. I believe some sufferers do look back on their episodes of active psychosis and feel that they were like dreams, as is suggested by the following remark in a letter by the poet Clare: 'I cannot sleep for I am asleep as it were with my eyes open & I feel chills and cold come over me & a sort of nightmare...' (Quoted in Claridge, Prior and Watkins, 1990, p. 132)

In the second place, people are not necessarily very good at knowing when they are awake or asleep. To be more precise, I believe people are often not as good at making this judgement as they assume themselves to be. Oswald has drawn attention to a phenomenon he

calls the 'micro-sleep'- the fact that someone may fall asleep for short periods without subsequent awareness of having done so. The subject may strongly deny having slept although the EEG record shows unambiguous sleep patterns. For example, Oswald reproduces part of the EEG record of a man 'who was supposed to move ceaselessly in rhythmic fashion to synchronized flashing lights and rhythmic music while his eyes were glued widely open. He was not sleep-deprived, yet in a 25-minute period he ceased moving 52 times, each such occasion being accompanied by EEG signs of sleep and slowing of the heart. Questioned afterwards, he was adamant that he had stopped moving only once. He recalled having been aware, early in the 25-minute period, of luminous geometrical patterns but could recall nothing of further mental experiences' (Oswald, 1962, p.65).

Moreover, we have seen above that it is possible for a subject during a false awakening not to realise at first that he or she is asleep and dreaming. It seems to have taken the subject of mine quoted above several occurrences of the phenomenon to work out a method for identifying the state and coming to the correct conclusion while she was still in it.

The Type 2 false awakening may be of particular relevance in the present context, because it seems that one of the factors that may initially lead the subject to make a wrong judgement about his or her state is the fact that he or she seems to be seeing their bedroom in front of them when they 'wake up'; and this hallucinatory representation of the bedroom may be so realistic that even when they really wake up they may be impressed retrospectively by its imitation of the real thing. It may be that one of the reasons why psychotics lack insight into their sleeping condition is the fact that the environment before them, although in fact hallucinatory, appears by and large to resemble what they would be seeing if they were really awake in the normal way.

It is also worth drawing attention to the phenomenon of what Green (1968) has called the 'pre-lucid dream', in which the sleeping subject considers the question of whether he or she is asleep. Sometimes this leads into a lucid dream, but the subject may equally well come to the wrong conclusion and decide that he or she is awake (Green and McCreery, 1994).

Pre-lucid dreams and false awakenings differ from psychotic episodes inasmuch as the subject who makes wrong judgements about his or her state while asleep in bed in the normal way subsequently wakes up and looks back on the mistake with full insight, at least of a retrospective kind. However, Gordon Claridge (personal communication) has suggested to me, in the light of the experience of lucid dreamers, that something analagous might be attempted in the case of psychotic patients, namely that it might be possible to help them to insight into their condition by teaching them about the possibility of lucidity in nocturnal dreams, and seeing if they could apply the idea to their waking experiences.

Also of possible relevance in the present context is the report of Foulkes and Fleisher (1975) that normal subjects can under certain conditions report mental activity very similar phenomenologically to that of dreams during states that the EEG defined as merely that of relaxed wakefulness. This may be an indication of how close 'beneath the surface' of normal waking consciousness are the dreaming processes which I am suggesting underlie the phenomenology of psychosis.¹²

¹² It is interesting to note that the Russian philosopher, P.D. Ouspensky, came to a similar conclusion to that of Foulkes and Fleisher, by means of introspection concerning his own dreams. He apparently developed the ability to enter the dreaming state while retaining insight, and wrote of one of his conclusions as follows:

'At first I thought that we have dreams only in a definite state of sleep, near awakening. Later I became convinced we have dreams all the time, from the moment we fall asleep to the moment we awake, but *remember* only the dreams near awakening. And still later I realised that we have dreams continuously, *both in sleep and in a waking state*. We never cease to have dreams, though we are not aware of this.

'As the result of the above I came to the conclusion that dreams can be observed while awake. It is not at all necessary to be asleep in order to observe dreams. Dreams never stop. We do not notice them in a waking state, amidst the continuous flow of visual, auditory and other sensations, for the same reason for which we do not see stars in the light of the sun. But just as we can see the stars from the bottom of a deep well, so we can see the dreams which go on in us if, even for a short time, we isolate ourselves whether accidentally or intentionally, from the inflow of external impressions. It is not easy to explain how this is to be done. Concentration upon one idea cannot produce this isolation. An arrest of the current of usual thoughts and mental images is necessary. It is necessary to achieve for a short period "consciousness without thought". When this consciousness comes dream images begin slowly to emerge through the usual sensations, and with astonishment you suddenly see yourself surrounded by a strange world of shadows, moods, conversations, sounds, pictures. And you understand then that this world is always in you, that it never disappears.' (Ouspensky, 1931, pp.295-6.)

Ouspensky's lucid dreams (dreams in which the subject is aware that he or she is dreaming) are discussed in Green (1968a, pp. 151-158).

9.2. The psychotic's eyes are open. According to Oswald it is quite possible for short episodes of sleep lasting a few seconds to occur while the subject's eyes remain open throughout. He adduces evidence from both his own and other people's laboratories for this phenomenon. In the case of his own experiments, subjects who were exposed to repeated electric shocks, timed to synchronize with loud jazz music and with powerful lights which flashed on and off in front of the subject's faces, showed the electrophysiological signs of sleep even when their eyes were 'glued and strapped so widely open that the pupil remained exposed wherever the eye was turned' (Oswald, 1962, p. 154). More protracted episodes of sleep with the eyes open can apparently be observed in children, and adults suffering from dehydration.

9.3 The question of motor function. If one was positing REM sleep as the underlying process in psychosis there would indeed be a problem in explaining how actively hallucinating psychotics can continue to display any motor function, since nocturnal REM sleep is characterised by virtual paralysis. However, this is one advantage of positing Stage 1 as the underlying process. Oswald (1962) cites anecdotal evidence of soldiers sleeping while on the march, for example, suggesting that quite complex perceptual-motor skills may be executed in the sleeping state, especially if they are highly practised or habitual ones. There is also the fact that people can perform relatively complex interactions with their physical environment while sleep-walking. Sleep-walking appears to be accompanied by slow-wave sleep, rather than Stage 1, but the phenomenon at least reinforces the impression that some degree of perceptual-motor function is compatible with sleep in general.

It is worth noting that out-of-the-body experiences appear *prima facie* to be compatible with continuing motor function. For example, one of my own subjects, a professional flute-player, describes continuing to perform at a public concert while undergoing such an experience. She believed her motor skill was actually enhanced, though the performance was 'mechanical' and lacked any layer of interpretation.

Another relevant consideration is that the episodes of actual sleep during a period of active psychosis may be relatively brief, perhaps akin to Oswald's microsleeps. While the actual

occurrence of hallucinations would be supposed to occur during these brief episodes, some of the other symptoms, such as delusory beliefs, might be secondary results of these anomalous perceptual experiences, and might persist during full waking consciousness.

9.4 Communicability. It might be objected that one can communicate with a psychotic person, even during an active phase, whereas this is not possible with a dreamer. I think both halves of this proposition might be questioned. First, communication, particularly with schizophrenics, is often notoriously difficult. The image of a 'glass wall' between the schizophrenic and his or her non-psychotic interlocutor has sometimes been invoked to express this difficulty. The idea that the schizophrenic is asleep might indeed be a way of explaining the difficulties of communication which can be experienced with such people, especially as we are leaving open the question of how long the actual sleep episodes proper may last.

Secondly, it is not strictly true that it is impossible under all circumstances for an outside observer to communicate with someone who is asleep. It has been established that it is possible to set up a rudimentary two-way signalling system with someone who is lucid in his or her dream (Hearne, 1978; Laberge, Nagel, Dement and Zarcone, 1981), as was predicted by Green (1968). Lucid dreams are clearly something of a special case; but their example at least disproves the notion of an absolute barrier to communication with someone who is actively dreaming. Furthermore, it might even suggest how the present theory could have implications for the treatment of psychosis. Communication with active psychotics might be easier if they had insight into their dreaming state, similar to that possessed by a nocturnal lucid dreamer, and such insight might be capable of being facilitated by a therapist, as suggested by Claridge (personal communication).

10. Conclusion: Some Advantages of the Theory

10.1 The continuities between schizophrenia and manic-depression. The present proposals make sense of the close links that have been observed between the two main forms of major psychosis, manic-depression and schizophrenia. Eysenck indeed maintained that there is

only one underlying process of madness, which takes different forms in different individuals according to their position on his personality dimensions of extraversion and neuroticism (Eysenck, 1992). Regardless of whether one accepts this theoretical model, there certainly appear to be empirical links between the two main forms of psychosis. These include the apparent genetic linkage between the two, manic-depressive patients seemingly being over-represented among the relatives of schizophrenics; the frequent interchangeability of the diagnoses when a single patient is considered over a sufficient time-span, a person initially diagnosed as schizophrenic subsequently being rediagnosed as manic-depressive or *vice versa*; and the fact that psychiatry sometimes finds difficulty in assigning a patient to one category or the other even at a particular point in time, resorting to the hybrid diagnosis of *schizoaffective disorder*. There is also the striking parallelism between the positive/negative polarity in the symptomatology of schizophrenia and the mania/depression polarity in the major affective psychosis. Such empirical linkages are readily understandable if a disorder of arousal is the basic mechanism underlying the various forms of psychotic breakdown. The present theory does not of itself explain why psychotic breakdown should take different forms in different individuals, or in the same individual at different times (Claridge, Pryor and Watkins, 1989). But it does, I believe, provide a framework for understanding those different forms within a single conceptual structure.

10.2 The fluctuating and reversible nature of psychosis. The present model is also compatible with the fluctuating or episodic nature of both forms of psychosis. If the positive symptomatology of hallucinations and delusions are the end-products of an underlying disorder of arousal, it is easy to imagine how they could vary between florid and quiescent phases with the waxing and waning of the underlying tonic level of arousal in the organism, even if the reason for those underlying fluctuations of tonic arousal remain to be explained.

In addition, if schizophrenia is fundamentally a disorder of arousal, this would explain

an observation stressed by Manfred Bleuler¹³, and used by him to argue against schizophrenia being an organic rather a functional disorder, namely the apparent reversibility of the schizophrenic process, even after decades of active psychosis:

In what do the improvements consist, decades after the onset of the disease, when it has seemed that a long and unchangeable stage has been reached? Many times the patients started to speak normally and to show very natural and fine feelings towards certain visitors, certain doctors or certain nurses. Or they started to show quite their original personality on some occasions, during work, during visiting hours, during physical diseases, during festivities, or during group psychotherapy. Others became milder, friendlier, more coherent, not only on particular occasions but in their general attitude in the hospital wards or in foster-families. (Bleuler, 1968, p6)

Manfred Bleuler suggests that normality always exists *in potentio* alongside the most active psychosis:

The most complicated and the most normal intellectual and emotional life of schizophrenics is only hidden behind the psychosis, but it still continues. Neither is the schizophrenic way of life anything new in a psychotic. Hidden schizophrenic life goes on in the healthy, in dreams, day-dreams, mysticism, in autistic, archaic, and magical thinking, in the creations of artists and so on. The schizophrenic psychosis can neither be characterized by the final loss of any function nor by the production of any new morbid process. It must be characterized by a loss of equilibrium of two different, in themselves normal ways of living. One tendency is to form a fantastic inner world as a picture of conflicting, contradictory human wishes and human fears, as a picture of contradictory human nature. This form of life is hidden in the healthy and it overwhelms all obstacles in the schizophrenic. (Ibid., p10)

Manfred Bleuler's view of psychosis, based on long-term observation of severely disordered subjects, is clearly compatible with the suggestion put forward in this paper that psychotics are in fact oscillating, even in daylight hours, between true waking and the dreaming state which in normal people usually only occurs at night.

With regard to the issue he raises as to whether schizophrenia should be regarded as an organic or a purely functional disorder: it may be, of course, that the underlying lability of

¹³ Manfred Bleuler (1903-1994) was the son of Eugen Bleuler (1857-1939), and was director of the Burghölzli psychiatric hospital, Zurich, as his father had been.

arousal should be labelled 'organic' rather than functional, in the sense that it may arise from some inherited, structural peculiarity of whatever brain mechanisms subservise arousal in the central nervous system. However, the behavioural, affective and cognitive symptomatology may indeed be seen as functional on the present view, since they are only the observable by-products of a disorder of function.

10.3 The possible weakness of inhibitory mechanisms in psychotics. Thirdly, the present theory is consistent with the suggestion which has been made by several writers on schizophrenia, that a weakness of inhibitory mechanisms is in some way fundamental to the disorder. In recent years data from a number of different experimental paradigms has been interpreted in these terms, including experiments on negative priming, semantic activation without conscious identification (SAWCI), latent inhibition, and the coherence function of the EEG.

The absence of negative priming in high schizotypes and schizophrenics (Beech and Claridge, 1987; Laplante, Everett and Thomas, 1992) is interpreted by Beech (1987) as indicating that 'inhibition of distracting information is reduced in schizophrenia and high schizotypes'; and Evans (1992) has argued that weakened inhibitory mechanisms in the semantic networks of high schizotypes would account for their showing a greater priming effect from the processing of consciously undetectable words. Baruch *et al* (1988b) have found that high scorers on Eysenck's P scale showed significantly less latent inhibition, i.e. less retardation of learning to the irrelevant stimulus, than did low P scorers, a result that has been replicated by Lubow *et al* (1992). Shaw *et al* (1979) invoked a relative weakness of inhibitory mechanisms to explain coherence findings in schizophrenics.

To these findings I might add one of my own concerning the EEG of schizotypic normal subjects. I found that people who had experienced an out-of-the-body-experience in the past were more likely than controls to show a relative activation of the right hemisphere over the left when attempting to induce such experiences in the laboratory (McCreery, 1993). The median frequency of the EEG amplitude spectrum was used as the index of arousal in

this context. The result could be seen as indicating a relative dissociation of arousal between the two hemispheres in the schizotypic group (the OBErs), consistent with Claridge's (1967) theory that weakened inhibition leads to a relative failure of homeostasis in the schizotypal nervous system, and hence to relative dissociation between different arousal systems within it.¹⁴

If a relative weakness of inhibitory mechanisms is indeed characteristic of the schizotypal nervous system, this could be at least part of the explanation of the proneness to episodes of hyper-arousal which I have suggested underlies psychotic phenomena.

¹⁴ For a further discussion of data from my own research which bears on the model in this paper please see McCreery (1997, pp. 260-270), where the present ideas were first put forward.

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