Neurophenomenology and Category Theory II

Clearly most people believe that the human brain is still active during sleep states and I now consider sleep states.

Current fairly acceptable views include those of Domhoff and Hobson. Metzinger has also widely expounded his views. In the first section I consider mainly Domhoff's views insofar as they relate to the present work, in the second section mainly some of Hobson's views (and mention fascinating experiments to confirm the applicability of the A series), and in the third section I consider some of the views of Metzinger and others. I give yet more possibilities, including those in lucid dreaming

Section I

Domhoff (2002) uses the Hall/Van de Castle system of dream content analysis. This is a reasonable approach. On his site he does not give much detail on case histories and he only gives one case ('Jeff') of lucid dreaming. We know or believe that there are many other cases of lucid dreaming though interest in the subject is perhaps currently not as great as it has been.. This suggests that for our purposes a slightly more detailed appreciation of cases and circumstances may be required.

Our point here is not that we wish to resuscitate the ideas of Freud or Jung although as usual we keep all historical ideas in mind, but our point is that since past present and future all need to be considered, not necessarily along a sort of one-dimensional historical path, we must bear in mind the past, the present, and the future of dreams as well. We must also bear in mind their conceptual relevance at past and future times. There is surely nothing irrational or bizarre about this. Fortunately Domhoff's dream content analysis at least contains the principles of how this can be done. But for case histories containing future events we are rather short of details so far. The 'body/mind/spirit' websites contain some examples but the study of statistics by for example Susan Blackmore (2006) and many others suggests that many of these results unduly emphasise favourable predictions. [It is essential not to hold out any workable theory as a hostage to fortune because of the unduly optimistic ideas of statistically impaired enthusiasts!]

We are not trying to predict the future, merely to present an acceptable and scientifically viable explanation of the world as it is. If we consider human beings, taken individually clearly each has an autobiographical memory however complete or inaccurate, a present time and a future time. The present time is roughly defined well enough although there sometimes seem to be lacunae, for example Libet's 'missing half-second', the doubts about free will given by Wegner (2002) and others, and so on. The future time is something which remains in the hands of such ideas as those of Bierman (2002), Hameroff and philosophers. For the moment, Bierman's fMRI interpretations remain unconvincing to the general scientific community as do Hameroff's. As for me, I have many times stated that we have no good evidence whatsoever yet of a quantum brain effect following the Penrose/Hameroff model. Bierman's comments have yet to be proved and they may well be. Philosophers, on the other hand, reasonably place the future at our disposal. With little doubt, for example, the sun will rise tomorrow and Newtonian physics will, within stated limits imposed by relativity and other factors, hold for the indefinite future. It does seem as if, from the standpoint of individuals, past time remains in our autobiographical memory, present time is with us and future time is 'philosophically' with us, perhaps in less practical detail and with less certainty than past or present. The difference between past and future could be taken as to some extent quantitative rather than qualitative and we are all 'sure' of events in the past which in fact never happened (Newhousenews, 2006). We are just as 'sure', or even 'surer' of the sun rising tomorrow or of the Laws of Nature being unchanging at least till next week or of the Second Coming of Christ (if we believe the Christian Book of Revelations). Is there a difference between such certainties ?

Specifically, in certainties relating to past and certainties relating to future? With regard to the Second Coming, perhaps we can place that in a 'belief' bracket along with 'Noah's Ark' (this being a highly selective and personal belief bracket) but tomorrow's sunrise looks about as close to a certainty as yesterday's sunrise (for most people in practice). In fact, as I pointed out about 25 years ago, yesterday's sunrise is far from certain. That implies that maybe we all suffer from a form of universal anosognosia or are subject to some odd mental effects. This is a more likely philosophy to most people than solipsism is. Indeed, as David Deutsch (1997) pointed out as a joke (that way it sounds a little shallow), a solipsist philosopher might sometimes say at a gathering: "It's good to see so many solipsists together".

Those matters are far from simply metaphysical. We do not want to need to go 'metaphysically' (and we recall that Karl Popper refers to metaphysics as 'nonsense' - perhaps he had an extreme attack of logical positivism?) to the limits defined, for example, by Bostrom (2006). But, just as we saw in an earlier post, in view of mesoscopic results we cannot live forever with Copenhagen, so too we cannot live with a very simple mental picture of time and reality. And we need to look and examine time and reality. But it is probably not a good idea to assume that the new answers must necessarily come from quantum physics.

However one step that is immediately available is to apply a form of concept analysis using the Hall/Van de Castle system and try to establish past and future correlations between the dream analysis results and the appropriate case histories. This inevitably is going to involve more difficulties than we might expect if done adequately, for various reasons, some of which I will try to explain later in this piece.

Section II

I will move to a consideration of Hobson's (2002) work.

Hobson (2002) makes the important observation (H5) (references as (H..) refer here to page numbers in Hobson (2002)) that percepts and feelings make an important contribution to dream content and this often disregards time place and person. So colour, size and dimension are often less important contributors. Maybe in this sense, abstract paintings are more 'real' than physical appearances. So it looks as though dream descriptions or features could come closer to an A series description than to a B series description. Indeed dreams almost look like what we would expect from a foray into time-travel in a MWI. It is thus not too surprising that dreams have often and indeed are often believed to have precognitive qualities. (H6) reasonably instances other cases like linguistics and poetry where form and content. are at the very least complementary. (H7-8) Here he mentions three types of dreams and this attempt at dream classification may be important. The report 3 (H10) refers to the bizarre phenomena which all dreamers encounter, more usually in REM (as opposed to NREM sleep) and he, and indeed I, feel that these phenomena seem to demand an explanation in some real terms. (H11) He also claims that some brain functions increase, and some decrease, during sleep. This seems unarguable and it is clearly advantageous to find out which ? and why? (H12) Hobson has 116 volumes of his own dreams and some of these must be of value in interpretations etc.

He also says (H17-18) that some dreams are 'without interpretation', presumably for example along the lines of Freud or Jung and I certainly accept this as a working hypothesis.

(H20-21). He states that dreams are not precognitive Up to a point his arguments hold water. He says that some 'precognitive' dreamers will score a few hits, for example, but many more possible so-called 'hits' will not work. This is probably true, and is an argument often advanced reasonably against precognition and similar notions, but later in this essay I will show that the circumstance fits

in even better with A series reasoning. This also applies exactly to a precognitive style dream Hobson (2005b) later discloses, as do his arguments and my own.. With the A series we are simply trying to describe the universe as it is, and hopefully to factor in enough elements to allow our theories to be disproved.. So we take his point about his views on precognition, and remember that they amount to the view of a sincere experienced man who has recorded more dreams than most. But that in itself does not disprove 'precognition'. On balance, therefore, he has not discovered precognition and does not expect to. Logic suggests that either there is an ultimately verifiable reason for this or that precognition never occurs. So we are left with a new phenomenon (strange 'hits') and an explanation. The explanation is that they are 'only chance hits' and 'overall they average out'. I doubt if there is any really satisfying statistical proof for this statistical averaging but it sounds fairly plausible without good reason to the contrary, and any advanced statistics student could presumably do a fair justification of his idea, as distinct from a good proof. Bearing in mind Occam, that should be enough unless there are other answers. I will have another possible explanation for his phenomenon.. Fortunately it will not disprove the A series (which has been solidly argued for, for many years) if it is wrong and it may not even help us with equities, cards or horse racing, but it could eventually prove that the A series is a worthwhile concept . We can at least hope for that, no mean feat.

(H22-23). At this point Hobson genuinely tries to compare the dream state with waking psychosis, an interesting analogy and possibly even creating a potentially more revealing and less dangerous topic of research than some induced brain stimuli such as the valuable rTMS. There are, of course, many differences from approaches like rTMS.:One obvious difference (for say rTMS) is that both induced changes in rTMS are normally more specifically directed to particular parts of the brain and, within limits, they are more immediately controllable for specific ends. Another difference is that many people clearly dream for a lifetime without any obvious ill effects, and this would be unlikely for any invasional treatment I can think of carried out over a lifetime of patient study, at least at the present state of the art.. At any rate (H23) applies a 'mental state examination' and it surprises him that it has not been done before. One interesting fact that we may note already is that (H30) dreaming is hyperassociative. The nervous system also appears (after Helmholz) to create its own image of the expected consequences of movement.

On (H31) we note that he lectures the Freudian school for trying to make too much from hyperassociations but then promptly proceeds to do the same thing himself on (H33) by attempting to suggest a 'brain/mind isomorphism.'. The meaning of 'isomorphism' (or for that matter 'mind') is apparently not clearly defined at this point and seems to have as yet no accurately defined practical mathematical meaning here. But bearing in mind for example the great hopes, unresolved for 50 years, that computer specialists and linguists have had for machine translation, this is less of a criticism than a simple clarification of the fact that we are still working in as yet uncharted territory, and it is good that he seems to realise this by implication.

He says that his 'isomorphism' means that just as there is an awakening of the mind during sleep there is a similar though not identical awakening of the brain during sleep. (H34) particularly underlines by examples the possible likely benefits of his present approach. He obviously sees that there are problems as by (H55) he refers to the 'hard problem' and (H61) is bringing out some key questions as to the differences in brain activation during sleep. These differences during sleep are all important to any study which utilises sleep.

There are further important implications (H68) to any experiments involving sleep in that he seems to be able to actually initiate dreams and to enhance REM sleep by chemicals.

(H75-76) He claims to be always at the centre of dreams but surely he must be in some way conscious to know that a dream is his own. That is, for all he knows the mind is having completely

'unconscious' dreams (or brain patterns tantamount to dreaming) where he is not at the centre of the dream though he as yet does not know this. But his claim is more than an assumption, really a reasonable working hypothesis at least until contradicted by better OEG or fMRI evidence. The claim is perhaps an important one since (H77) he goes on to claim that dreams help to self-organise behaviour and even more relevantly, to bring about a sense of self, so again we are coming near the hard problem (if any). It is relevant to our A series as well as by now it looks as if the A series may be deeply involved with the self and any sense of self that the brain or mind may have. Different people seem, as we have already seen here, to have their own different senses of past, present and future.

(H85-6) makes it plain that sleep deprivation can literally kill, and not in some 'hysterical' way, but by means such as a breaking down of thermoregulation, and the effect has been clearly exhibited by rats. So there is undoubtedly a mind-body nexus of some sort and (H87) suggests that, roughly speaking, sleep 'tidies up' the mind and at the very least performs some operation in some way analogous to disc scanning and defragmentation on a computer. That would seem to be proved by the rat experiment just referred to.

It is believed (H90) that unpleasant phenomena like nightmares are caused by the limbic brain.. (H92) carefully distinguishes night terrors, usually found in NREM sleep from unpleasant dreams or nightmares. Inhibition dampen the motor system during normal sleep so that we do not sleepwalk

(H101) Going to sleep enables brain activation processes analogous to delirium and Alzheimers.. (H109-133 including Fig 9) shows the part of the brain involved in REM and NREM sleep. We should also in mind later work (Dolan et. al. (2005), Cosmides et al. (2004), Vogeley (2001), Franklin (2005)) but even with the use of more modern methods (e.g. PET instead of fMRI), roughly the same brain areas are still important as in Hobson's Fig 9 as far as I know. In particular the dorsolateral prefrontal cortex tends to be de-activated during sleep and the anterior cingulate and some other regions activated in REM sleep.(H113) fills in some details and tries to show (reasonably well) why dreams are what they are. So we tend to conclude that the multimodal sensory cortex and the deep frontal white matter are ESSENTIAL for dreams.

Obviously, perhaps, what is important is that white matter connections within the brain are what count and the above areas act as staging posts or relays. Now it is well known (H119) that direct temporal lobe stimulation can obtain dreamlike states and furthermore Stickgold's work (H120) relates dreaming to memory. It is also well known that Stickgold (2005) has made it clear by his famous Tetris experiment referred to in his review mentioned above, that dreams can be manipulated beforehand. Thus dreaming relates clearly to memory. Also experiments can clearly allow us to alter dreams before they occur, and we roughly know why. Now if our personal observations extend in some way into the future as well as into the past by means of the A series, it may be also possible to create dreams for us from the future. I suspect that this is too gross a way to look at the problem or situation but it needs to be carefully tried by clearly devised experiments. No reason why people cannot be persuaded to dream of Tetris prior to being instructed in it, I suppose. But I am here reminded of Isaac Asimov's spoof article on 'thiotimoline', a fictitious compound which was said in the article to have carbon bonds extending into the future. As Asimov said, it was not doing to be possible to 'fool' the substance by later setting up the experiment in the future in such a way that the substance could never move to a position where it had already been pulled by its bonding (the bonds being extended to the future). On such matters I refer to my earlier article of 7th October 2005, where I quote Norman Swartz (1993). Also the literature contains a large number of philosophical articles on the so-called 'grandfather' paradox which in essence is very similar. We need a carefully designed experiment which will not confound or conflict with the subjects pre-dream conceptions and then carry out some exercise like teaching the subject Tetris AFTER the experiment. Tetris itself for this use may have problems (e.g. most people know it already) and in

my experience, people who do these kinds of experiment go in there with a firm idea that the experiment will (or possibly will not) give useful results. It is going to be necessary to be both utterly fair and thoughtfully calculating in the extreme in designing and carrying out the experiment, not an easy task. Obviously if a relatively simple experiment like the above does not work, a more complicated strategy my be employed bearing in mind our physical knowledge of the subject. In particular it is not immediately clear that a simple visual notion like dropping items would transfer in exactly this manner, as really a more conceptual though non-ambiguous concept might work better.

(H121-2) Pursuant to the above, REM sleep (and possibly also NREM sleep) seems to help with or to consolidate learning. Further just as there seems to be a 'forward sleep window' relating the amount of REM (and possibly NREM) sleep to learning, so too there may be a 'backward sleep window' relating REM (and possibly NREM) sleep before learning to the subsequent learning. The A series certainly extends to the past, as far as we can see, but whether a direct and easy extension to the future can be found could be another matter, but the comments in Section 1 seem to make it clear that such an extension is there, in some way.

Dreams also seem (H123) to have a strongly emotional character, and whilst we may not want to go as far as Revonsuo with regard to taking anxiety as being a prime function of dreams, clearly many dreams that are particularly noticed and frequently appear to be repetitive are anxiety dreams. This interesting feature could also be made part of an A series experiment. (H123) also mentions that, during a dream there seems to be a 'timeless' quality, i.e. we normally do not remember during a dream, for example, that someone in the dream has just died. This is a curious and interesting feature of dreams (if it turns out to be more or less universal) and certainly ties in with the present approach. Indeed times, places and people all (Hobson says) tend to be plastic. And subjects (we might almost say 'process subjects' as in exam dreams for example) tend to be more important than clear previous fact. Sleep clearly helps to concretize certain tasks (H124-5) as has been showing by the subject carrying out the task before and after sleep. Subsequent to the sleep, the task is frequently carried out better and/or more successfully. It could be that this effect also can be shown to work in a retro experiment as discussed in the previous paragraph. (H125) These effects could be highly replicable if carefully set up and even proved further by brain imaging experiments!

In this regard there is the added bonus for the idea of A series involvement that disrupting REM or NREM sleep patterns prior to a task tends to make a subsequent relevant task reach less efficiently performed. We know that already, without the need for an experiment simply to prove the fact. So the idea of A series involvement is beginning to look a natural part of phenomena, rather then a gratuitous half-baked addition. There is thus some ground for optimism.

(H129-131) suggests important tests for a more precise model of dreams of the future. i.e. if we can correlate somehow autobiographically to past processes, as Hobson has attempted to do, perhaps we can also correlate to future learning process (such as even learning Tetris, though as explained that is probably not ideal)..

(H136) is still trying to come up with answers which will resolve the binding problem. Dreams may well provide many clues not only to the binding problem, but to the hard problem. (H139) touches on qualia and dreams and how self-activations of the brain relate to qualia. At this point he finally starts talking about lucid dreaming (H140-3) which I suppose can be taken as a cross-over position between sleep and dreams - which of course should elucidate a lot of things including the hard problem and the binding problem. In fact on (H147) Hobson gets to the point of saying "The ultimate reality of consciousness (probably) includes, and is strongly based upon, our brain's capacity to create a virtual reality, so close in all its formal details to aspects of waking consciousness as to fool us, almost every time". I am not clear of the full meaning or implications of

this strong statement but it may well be one reasonable intimation or interpretation of the facts of the matter.

Section III

I am not in this section suggesting that anything other than Lucid Dream (LD) detection can be carried out (or considered) along with the measurements described herein. I obviously have other reasons, e.g. along the lines, though certainly not identical lines, to the work that both Jeffrey Gray and myself have both done on synaesthesia and functionalism, but I will return elsewhere to such matters. And there is still more news on my synaesthesia experiments, as by now I have done quite a lot of experiments on claimed synaesthetes, and some on hypnosis also.

I also make the point that Hobson, Domhoff and particularly Metzinger (apparently a lucid dreamer) all inevitably have their own views which do not completely coincide and overlap. This section of the work is basically the section based on Metzinger's work. We bear in mind Hobson (2005a) "lucid dreaming is a valid and potentially useful state of consciousness".

There are nowadays many differing kinds of apparatus which can detect whether dreaming is occurring. these help in the induction of lucid dreams and may at some point be usable to tell when a lucid dream occurs. Some principal methods at the moment are changes in the peripheral arterial tone signal (e.g. Watchpat100), IR detection (LaBerge's NovaDreamer and others), and EOG/EEG measurements.

The classic approach is possibly EOG with or without EEG. We are currently going to use OpenEEG project. Amplifier boards made up by Olimex in Bulgaria are under $200 for a two-electrode set and the open source software allows a lot of flexibility. Often in the past EEG and OEG measurements have been done simultaneously but by the look of graphs like those in the Hobson (2005) paper we will get away for now with just EOG. However with the OpenEEG system we can expand at small extra cost if we have to. Also, we can even study lucid dreams without any equipment at all. To get started we are working without dream detection equipment until the apparatus is built. Most work has so far been done this way.

Overall Metzinger (2004) seems to have written a long, fascinating book. He has a great knowledge of lucid dreaming and many of his ideas and concepts may well be incorporated in its further studies, without acceptance of all his ideas. For this reason, I have referred to the individual pages in 'Being No One' in brackets as (M...) in the following. I also refer to his paper (Metzinger 2003) "Phenomenal Transparency and Cognitive Self-reference" as (MA...)

As he points out (M57) "Simulations are always embedded in a global representational context". Leaving aside LD. he points out (M172) that there seems to be a graduated variation between LD and non LD. ie from completely phenomenally opaque to not so opaque for the global representational content. On (M256) it seems that the flashing of LEDs during or approaching REM sleep is likely to influence the dream (which for example could then be about flashing police car lights) as well as perhaps to introduce lucidity.

Perhaps somewhat naively, I refer here to Block's inverted earth model and the phenomenon of tracking also (http://plato.stanford.edu/entries/qualia/) ["The suggestion that tracking is teleological in character, at least for the case of basic experiences, goes naturally with the plausible view that states like feeling pain or having a visual sensation of red are phylogenetically fixed (Dretske 1995). However, it encounters serious difficulties with respect to the Swampman case mentioned above. On a cladistic conception of species, Swampman is not human. Indeed, lacking any evolutionary

history, he belongs to no species at all. His inner states play no teleological role. Nature did not design any of them to do anything. So, if phenomenal character is a certain sort of teleo-representational content, then Swampman has no experiences and no qualia. This, for many philosophers, is very difficult to believe."]. [also "The general topic of the origins of qualia is not one on which philosophers have said a great deal."] We may here be led to issues of cladistic parsimony also.

So at this point we are really speaking, from the point of view of some explanation of what's going on, of the relevance of cladistic parsimony to an interpretation of what goes on in terms of the mathematical physics which we may represent as the alternative worlds of the lucid dreamer. In short we could say that there are a number of lucid dream worlds, at this point analogous to the many worlds of quantum theory but not in our case NECESSARILY an infinity (denumerable or otherwise) of them. We can look on this very simply as rather analogous to the 'many worlds' of a Boltzmann gas: and the crux may become - what are our results this way and what do we thus achieve. We seek merely results, not a TOE nor even a 'best at this time' model. But we would like an intelligible explanation and a way to proceed. We seem to be coming up with the use of further parameters or worlds to get an interpretation or results for lucid dreaming. In short a really useful A series explanation of the world, incorporating such factors could be more difficult to derive than it looked at first, but it is interesting enough and not out of sight. And we are certainly not stuck with representationalism as a sole cure or set of guidelines to our situation.

Further, on the matter of the principle of parsimony: It cannot be denied that dreams exist and most believe that lucid dreams also exist. This means that we are almost mathematically obligated to create a useful set of parameters to describe them, a set of state spaces or some other construction. So there is no question of reasonable Occam's razor suggestions at this point. These state spaces or whatever they are can also be contacted by any meaningful physical world so they cannot be ignored either. Given the existence of an A series, these states extend into the future as well as the past but anyway this would be the case for the B series, which is likely to be far less liberal and flexible in potential interpretations IMO however, constrained as it is by Newton and relativity in its present form. As and when we think we understand more details, more detailed descriptions can follow. This gives us more genuine scope than forcing newly described phenomena into an old outline.

Metzinger tries (M256-7) to work out how outside stimuli (or possibly other sources) could effect the course of dreams, and then tries to explain the likely reasons for dreams, in the normal terms of neuroscience. He claims his conclusions may show a parallel with Anton's syndrome and the Charles Bonnet syndrome, interesting but I remain to be convinced.

However he then suggests (M260) ways to extract further information from dreams, e.g. by training colour perception.

I would have thought that further explanation of at least lucid dreaming might be obtained by operant conditioning, either in dream state or conscious state or both, going further than the efforts of LaBerge.

He then, also on (M260) goes further by suggesting a subset of three nonadaptive states, pathological consciousness, machine consciousness and lucid dreaming. In this way, it seems to me, he is almost placing human consciousness in the same bracket as a so-called 'machine consciousness'. Indeed, (M27) he raises the idea that consciousness could supervene on properties which have to be individuated in a more teleofunctionalist sort of way than simply occurs on classic biological properties.

To extend the analogy, (M41), he compares a thirsty blindsight patient to a null Turing machine. An interesting and fair comparison.

Further (M199) he says truly conscious entities should be expected to have embodied goal representations which are emotionally grounded. It seems to me that he is looking for 'tracking'.

(M325) actually says we are not things, but processes, and at this point the apparently essential concept of time (probably A series time at that) arises. For time we need consciousness. I'm afraid that here he pre-empts some comments which might have been made to the effect that this could require some kind of autobiographical memory by referring (correctly) to cases of Cotard's syndrome! He also mentions the dangers of dynamic self-consciousness.

He states (M362) that what is needed is a computational model of phenomenal self-consciousness that directly correlates with content and with causal role. To me at this time it all looks as if it could be more A series than B series.

Damasio (M382) has taken the view that consciousness and emotion are inseparable, but wakefulness can be separated from consciousness. Metzinger says (M383) that conscious feelings are historic entities. **In essence he is saying that they are not fungible, as I see it.**

Metzinger claims (M580) that you can only refer yourself linguistically to your own self-model. Maybe that is good enough for a machine representation anyway leading to a mathematical or physical discussion or model, leaving aside any problem in actually obtaining machine consciousness.

A state space (M619) topologically equivalent to the consciousness of human beings could be useful to determine what consciousness is like. Metzinger suggests that such a thing could be obtained by hardware directly. It could also be approached mathematically through software and psychological experiments of simulation IMO. In fact it could even be vaguely like what Vaughan Pratt (2005) has already tried to do for Chu Spaces in ratmech.pdf.

Metzinger points out that dreams may not be entirely the result of some 'internal randomisation' process, whether or not they have a good reason to occur. He looks at dreams as high-level Rorschach tests (M261). The 'internal fairy tale'.

He sees dreams as not epistemically blind, empty artifacts but as an exclusively internal reality-model.

Necker cubes (MA360) maybe illustrate entry into "parallel universes"- or could be set up as a model of an array of objective states, somehow coalescing into one rather like the Boltzmann statistics. To say the effect is quantum, or indeed even to define it as I imply above, could if we are not careful pre-empt the nonexistence of the A series and hence lead to problems. I DO THINK THE PROCESS MUST BE CORRECTLY CATEGORY-THEORETIC at this point.

Metzinger refers to the effect as 'sensory opacity' (MA353). He also compares it with the sensory opacity in lucid dreaming. So it seems to me that, whether neurological or not, we cannot necessarily liken it to neurological effects like say the Capgrass syndrome [at least immediately, clearly and in the same way] which do not evoke the same characteristics AFAIK. We could read (MA360) for further clues. As Metzinger seems to say, the effect is at a different [nearer 'in brain' than 'outside brain'] level than drug-induced hallucinations, and to my mind, is simply a characteristic, like lucid dreaming, of normal states of consciousness.

As I have tried to point out above, these effects may well exhibit the A series behaviour more accurately than the B series behaviour of the brain.

(MA360) With say LSD rather than LD (lucid dreaming) "Typically, the subject will immediately have doubts about the veridicality of her experiential state, cognitively "bracket" it and take back the "existence assumption," something which effortlessly goes along with visual experience in standard situations. (Metzinger's) claim is that what this subject becomes aware of are earlier processing stages in her visual system. Visual pseudo-hallucinations – the breathing patterns on the wall – are such earlier processing stages." Thus Metzinger claims LD are (probably) more internal than LSD say. But he does add "Of course, complex hallucinations, which are fully transparent and in which the experiential subject gets lost in an alternative model of reality, do exist as well (see, e.g., Siegel and West 1975)."

"More importantly, however, the paradigmatic examples for fully opaque state-classes are deliberately initiated processes of conscious thought. In these cases we really experience ourselves as deliberately constructing and operating with abstract representations, ones that we have generated ourselves and which can, at any time, turn out to be false. We are cognitive and epistemic agents at the same time, as thinking subjects actively trying to achieve an expansion of knowledge. In particular, we are introspectively aware of earlier processing stages, namely the formation of thoughts. COGNITIVE REFERENCE IS PHENOMENALLY OPAQUE.(my caps)". TO MY MIND THIS SUGGESTS THE IMPORTANCE OF LD. We must bear in mind that Metzinger apparently is a lucid dreamer and probably therefore in some ways an enthusiast of the idea as he experiences LD himself, FWIW. We could argue that it is therefore natural that he describes LD in the following words: "The best and most basic example for an almost fully opaque, global phenomenal state is the lucid dream (see LaBerge and Gackenbach 2000; Metzinger 1999, 2003).".

Ironically, bearing in mind his current essay "Being No one" we find this raises the question as to whether Metzinger is a drug abuser, as R.P. Feynman seems to have been at about the time that he seemed to have claimed, perhaps abnormally, synaesthesic ability. However my own personal experience, as neither a normally lucid dreamer (nor a drug abuser at any time), is that his LD story seems to hang together anyway. I have few dreams, lucid or otherwise but it sounds OK as a fair hypothesis. And it seems a little more easy to satisfy Popper's principle in the LD case than it does for say the Perky effect and many other psychological experiments when you get to long term plausibility.

Phenomenal transparency and cognitive self-reference. We can therefore consider the many worlds of lucidity as in some ways existing per se and hence deal with them in some sense mathematically, but in some ways they may exhibit the A series more clearly than the B series, or at least one version of it.

How do we proceed ?

Well, Hobson (2005a) takes a slightly different line but we can tie in with it: He says

"As a first step we would need to quantify the phenomenal characteristics of, let us say, three distinctively different states of consciousness: waking, dreaming and lucid dreaming. How can the phenomenology of these three states be reduced so that it is tractable? Certainly not by focusing on such valid but unworkable aspects of consciousness as transparency. All three of the states of interest have this philosophically celebrated quality! That relegates transparency and many other Metzinger constraints to empirical uselessness.

I suggest that if we take a formal approach to the cognitive quality of the three states we can begin

to get somewhere. All of the three conscious states of interest are brain activated states but the EEG is too insensitive to distinguish between the specific activation patterns. Brain imaging can do so however.

Hence it is clear that, compared to waking, dreaming is characterized by activation of most brain regions to the level of waking. In REM sleep some brain regions are informatively more active than in waking. They include: the pontine brain stem which is hypothetically responsible for the endogenous brain activation and the pseudo-sensory stimulation that results in the visuomotor hallucinosis of dreams; the limbic system, particularly the amygdala and the temporal and deep frontal cortical regions to which it projects (which is hypothetically responsible for the hyperemotional and remote memory enhancement of dreams; one cortical region and the parietal operculum, which is involved in visuospatial integration and which may therefore help us understand the remarkably faithful simulation of the outside world in dream consciousness.

But another cortical region, the dorsolateral prefrontal region, is conspicuously less activated than in waking. This specific deactivation may constitute the physical substrate of the cognitive incapacity of non-lucid dreaming. The dorsolateral prefrontal cortex is thought by many cognitive neuroscientists to constitute the physical basis of such executive functions as; working memory; directed thought; self reflective awareness; and critical judgement. Since all of these executive functions are weakened in non-lucid dreaming it is reasonable to propose that it is the underactivation of the dorsolateral prefrontal cortex that causes us to have poor recent memory within and after dreaming and to believe uncritically that we are awake when we are in fact asleep; and to fail to think logically or direct our thoughts when we are dreaming. These journal features can be defined and measured as first person data."

Jackendorff (by Gray(2002)):
"We should also not lose sight of Jackendorff's important 1987 book. This gives a searching analysis of the level at which informational structure enters consciousness. Jackendorff proposes an 'intermediate-level' theory of consciousness. Roughly, this holds that the contents of consciousness reflect informational structures derived from a combination (within each perceptual modality) of bottom-up and top-down processing. Jackendorff argues that one is not normally (and perhaps never) aware of sensation unaffected by conceptual interpretation (cf my comment above on the snare and delusion of sense-data), nor of pure conceptual structure, but only of an admixture of the two that optimises the fit between them. This formulation is surely in general true. It is impossible to bring to conscious awareness (or so I find; see the discussion of the square root of -1, above) the pure conceptual structure represented by, say, the string $7 + 5 + 12$ without this taking the form of either seeing or hearing the string, whether by means of externalised stimuli or 'in my head'. Mangan, in contrast, claims that there are exceptions to this rule. In particular, he claims, the pure conceptual structures that can be expressed in English as 'this is familiar', 'this is unfamiliar', 'this is right' or 'this is wrong' can be consciously experienced in the absence of qualia: as 'naked concepts', one might say."

We could also look at Fodor's work - But this 'module' approach is maybe not exactly what we seek.

At all times the Wason restricted set work of Margolis and others should be appreciated too, whether we take a view somewhat similar to Carruthers or not. (That:"The mind is a system of modules shaped by natural selection").

Well as far as we can, we shall for the moment stay with Metzinger, LaBerge and Hobson and also proceed to use operant conditioning on lucid dreams and to relate our work to the A and B series and to category theory.

Sketching out further results which might be obtained.

I will give one fairly extreme example of the possible scope of the present method, and where it actually already works. I show it working below.

This concerns precognition.

Now as far as I know precognition is an idea which is mainly disregarded by established science and considered rather outre, along with PK and ESP. I want to say, really want to say, that this disregard sounds reasonable. I bear in mind all the published work I know of in both of those two fields.

Now that does not stop me thinking about precognition.

It seems to me that precognitive results obtained by dreams seem to fall in much the same bracket as PK and ESP, at first glance. For example there is no statistical proof or other scientific proof whatsoever of any real cases of precognition.. And to my knowledge, practical proof to the extent that any lucid dreamer ever became extremely wealthy from stock market predictions is also unknown (I am not thinking there of relatively short term successes, but the equivalent of persistent and continually verifiable wins at roulette).

However we need to bear in mind that lucid dream precognition would be likely to have certain snags or problems associated with it. Generally speaking we cannot assume that the overall mental universe of the dreamer before the dream and after the dream will be the same. The dreamer may have left one universe and gone to another one, either during his dream or after it or both. If the dreamer did that, we ask ourselves whether he will return to the same physical universe after the dream or have been in it whilst experiencing the dream. To say all that is not really too bizarre, particularly as some may wish to interpret the strange worlds as simply a mathematical phase space. And certainly a 'cancellation of infinities' approach, if indeed eventually adopted to remove so called 'phase spaces' is almost a hallmark of modern theoretical physics.

Now if the dreamer is, for example, not in the same universe during the dream he will not have experienced results which will necessarily give a good or useful predictive pattern. Suppose for example he dreamt event $A(d,U(v),0)$ at time $t=0$. Now clearly if the dreamer is in Universe $U(w)$ the equivalent event which he could be expected to have precognition of for time f is $A(w, U(w), t(f))$ This is unlikely to be necessarily $A(d,U(v),0)$. And we do not know that the theory will be that simple, for example the event dreamt may be a random example of the events $A(d,U(x),0)$ where x has many values or could even be a multivalued function or averaged function of a number of values.

So how can we ever think rationally of precognitive dreams in such cases? Well, to begin with there are as above, fairly clear reasons that the above scheme will give exactly what we are finding on the ground. That is to say, no precognitive results on an obvious statistical basis that we can determine but a number of dreams rather like what Jung might have called 'great dreams' which sometimes sound like striking examples of precognition but don't cut with statisticians. [According to Jung, our subconscious reveals its message as a 'Great Dream'. Usually starting with simple images of the dreamer's personal life, the subconscious proceeds to completely take over and project selected symbols of the collective unconscious.
http://www.lifepositive.com/Mind/paranormal/dreams/dreaming.asp]

So one example of a predictive dream might well sometimes be the 'great dream' but of course we

will not have statistical evidence at the present stage. So dream research is necessary to probably sort out (1) which if any dreams are predictive (2) have they any particular qualities in common. I suspect that something less simple than the usual sorting through large numbers of accumulated statistics looking for a breakthrough would be necessary and indeed we have already got a small payoff as explained above. Any such study has certainly the positive aspect that we have indicated why it may be quite correct that positive clear cut results cannot be easily expected, and that is in line with our thinking here.

We certainly do not claim that the above is the only way forward, in fact extending the results of Section II looks far easier.

APPENDIX

A few further notes about procedure from Metzinger's book. Much other work, by authors including Revonsuo, LaBerge etc. is available.

(M304) He claims that the content of the Phenomenal Self Model (PSM) will change during the transfer from a normal to a lucid dream.

(M497) On OBEs. These are frequently accompanied by the subject seeing their own body as if disconnected from them, without multicentring or decentring the state of consciousness. The locus of consciousness is typically the etheric double. Some would say OBEs are a subset of lucid dreams.

(M529). Start of the important section. 7.2.5 of the book. At least this section till the end of the chapter needs reading.

(M534) He indicates that fixating visual objects terminates LDs, reliably.

(M536) Factors conducive to LDs.. (a) High level of physical activity during the day.
(b) Heightened affective arousal during the day.
(c) Short interruptions of sleep, including short activities of waking consciousness preceding the relevant REM phase.

The PSM seems to be anchored in the brain as there is a direct and reliable relationship between the direction of polygraphically recorded eye movements and the gaze shifts reported in the lucid dreams.

Experienced subjects can thus allegedly indicate ocularly when a LD actually starts.

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http://www.quantumconsciousness.org/views/TimeFlies.html

[According to Bierman "Dean Radin and Dick Bierman have performed a number of experiments of emotional response in human subjects. The subjects view a computer screen on which appear (at randomly varying intervals) a series of images, some of which are emotionally neutral, and some of which are highly emotional (violent, sexual....). In Radin and Bierman's early studies, skin conductance of a finger was used to measure physiological response They found that subjects

responded strongly to emotional images compared to neutral images, and that the emotional response occurred between a fraction of a second to several seconds BEFORE the image appeared! Recently Professor Bierman (University of Amsterdam) repeated these experiments with subjects in an fMRI brain imager and found emotional responses in brain activity up to 4 seconds before the stimuli. Moreover he looked at raw data from other laboratories and found similar emotional responses before stimuli appeared. Professor Bierman presented these findings to the recent Tucson conference." This is Bierman's view as of Tucson (2002). Obviously Domhoff (2000) would not seem to have formed the view that the effect occurs in dreams. Indeed. in Domhoff (2000) there seems to be included a blistering and certainly not wholly unwarranted attack on ESP, precognition, and all that.

Bierman also says: 'There's plenty of evidence that time may run backwards,' says Prof Bierman at the University of Amsterdam. 'And if it's possible for it to happen in physics, then it can happen in our minds, too.' In other words, Prof Bierman believes that we are all capable of looking into the future, if only we could tap into the hidden power of our minds. And there is a tantalising body of evidence to support this theory. ' ??? (my ???)]

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[a] http://www.newhousenews.com/archive/seeman040704.html

b) http://faculty-gsb.stanford.edu/millerd/docs/1989jpsp.htm

c) http://www.infm.ulst.ac.uk/~paul/pubs/aaai94.ps
"given any particular picture, for example an abstract evocation of the dawn, two agents would not necessarily produce equivalent propositional descriptions of it. However, it does not follow that the methods they are using to translate between representational mechanisms are incompatible. For example, two people may produce completely conflicting descriptions of a scene, and yet still be willing to accept an argument as to why the given description is valid in the context of the other agent. "

d) http://www.its.caltech.edu/~jbogen/text/mentali.htm "both the left and right hemisphere may be conscious simultaneously in different. even mutually conflicting. mental experiences that run along in parallel"

e) Then there is the classic elementary psychology experiment where a student acts as an assailant in a psychology class, apparently shooting the professor and the observing students give varied and genuinely believed accounts of the incident. Raison's reason as cited in "http://www.newhousenews.com/archive/seeman040704.html "cited in a) above, may apply. Raison even gives a personal example ""Many years ago, I was a journalist working for a newspaper," Raison said. "I was back in the composing room, and I heard a ruckus. There was a guy waving a gun around and pointing it at his ex-wife's head."
When the employees met later to discuss the incident, their stories differed widely, even on fundamentals like which door the attacker used to flee.
"It was amazing," Raison said. "It was like we all saw a different thing. I didn't understand how one person could be so wrong.""]

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