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A Theory of Lucid Dreams and OBEs

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INTRODUCTION

Lucid dreams have much in common with out-of-body experiences, or OBEs. Harvey Irwin has described, elsewhere in this book, the empirical evidence for similarities and statistical relationships between the two experiences. I believe these relationships are important: so much so that any theory of one experience must also be able to account for the other.

Existing theories of the OBE leave much to be desired and mainly fall into one of two categories. On one hand, there are the "ecsomatic" theories, which postulate that a soul, astral body, spirit, or whatever leaves the body temporarily in an OBE and permanently at death (see e.g., Crookall 1961; Muldoon & Carrington 1929; Rogo 1978). On the other hand, there are psychological theories of the OBE that deny that anything leaves the body and posit that the experience is one of the imagination (Blackmore, 1982a; Irwin, 1985; Palmer, 1978). Rogo (1983) has recently exposed some of the drawbacks and limitations of existing psychological theories. They provide little insight into the phenomenology of the experience and lead to few testable predictions.

As far as lucid dreams are concerned, neither theory has much to contribute. The first type may say that lucid dreams are astral projection during sleep or even that all dreams are actually "out of the body." But this is hardly an explanation and provides no testable predictions. The psychological theories can offer no improvement beyond the obvious point that dreams are also products of the imagination. Neither type of theory really makes sense of the special relationship between lucid dreams and OBEs. Therefore this relationship provides a chal-

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lenge to existing theories of the OBE and indeed to theories of altered states of consciousness (ASCs) in general.

I propose to offer a framework for ASCs that provides a new approach to understanding both OBEs and lucid dreams. Although it is speculative, it leads to new questions and testable predictions.

There are several notable similarities and differences between OBEs and lucid dreams that I think should be explicable on a theory of the phenomena.

1. As noted by Irwin, the same people tend to report both experiences. The correlation appears to be reliable, but small.
2. The two experiences can be initiated in very different ways (see Blackmore, 1982a; Green, 1968a,b; Gackenbach & LaBerge, 1986), but one way of achieving an OBE is through the lucid dream.
3. Consciousness is often reported as extremely clear in both.
4. In both, perception can be described as clearer and more vivid than in normal perception (Blackmore, 1982c; Gackenbach & Schillig, 1984; Green, 1968a,b).
5. Both are sometimes described as being profound and life-altering experiences (e.g., Blackmore 1982a; van Eeden, 1913).
6. People often strive to have more of them.
7. The simplifications, distortions, and additions found in the experienced world can be similar in both experiences (Blackmore 1982a; Monroe 1971; Muldoon & Carrington 1929).
8. In both, imagining or thinking about changes in the environment can bring about those changes.
9. Flying is common in both (van Eeden 1913; Muldoon & Carrington 1929).
10. In both, there are oddities of lighting such as self-illumination of objects and the difficulty of switching lights on (Fox 1962; Green 1968b).
11. There is an interesting difference. Lucid dreamers are (by definition) aware that they are dreaming and therefore assume that the surroundings are not real, whereas OBErs are often convinced that their surroundings *are* real.

Two other phenomena seem to be linked with OBEs and lucid dreams. These are the flying dream in which one dreams of being able to fly, float, soar or swoop in the air, and the false awakening in which one dreams one has woken up. The comparison is interesting. In a false awakening, one dreams that one is awake; in a lucid dream, one dreams that one is dreaming.

The false awakening is like an OBE in that one seems to be in the normal world, but without the usual physical restraints. One also has a duplicate body, apparently lying in bed or getting up, but unlike some OBEs, there are not usually two bodies at once. In false awakenings, as in OBEs, the lighting is often eerie or strange, and electric lights unresponsive. Unlike the other experiences, false awakenings are often unpleasant or at least mildly wierd.

Irwin has detailed the evidence suggesting that the same people tend to report OBEs and lucid dreams. There is less research on these other experiences, but what little there is suggests that they are related (Blackmore 1982a). For example, in surveys Blackmore (1982b, 1984a) found that the same people tended to report OBEs, lucid dreams, and flying dreams.

These are just some of the features that need explanation and which I shall deal with in the following account.

MODEL BUILDING

Man is a self-modeling system. Indeed the main task of the cognitive system is constructing models, or representations, of our world and of ourselves in it. I suggest that a better understanding of lucid dreams and OBEs is initially to be gained by seeking explanations at the level of these models, rather than at physiological or other lower levels of explanation.

Two types of models are of particular relevance here. First, there is the stored mental representation of the world; the "cognitive map." This is a long-term model in memory that incorporates much of our knowledge about the places we have experienced. It is this that enables you to imagine your own town on a map of the world, your own house in its position in the town, or your bed positioned in your house. Its structure is inferred from behavior that displays knowledge of places, although only parts of the information are used at any one time.

Of course, it is not like a map on a piece of paper but is a mental representation with properties that reflect this. For example, it is often wrong, that is, judged by comparison with the physical world. Much is left out or systematically simplified. For example, you may be able to "see" objects in your image but not to count them; to "see" writing but not to read it (Liben, Patterson, & Newcombe 1981).

In addition to this stored information (and based partly upon it), there is an immediate and ever-changing model of self in the world. This is constructed in perception and continually updated. The process of perception is not a passive process of observing the world "as it really is." After all, there is no world "as it really is." Rather, perception is a process of analysing features of the visual image (or input from other senses) and constructing models, or hypotheses, about the outside world on the basis of this analysis. The process starts with a viewer-centered representation of the world, as in the visual image, and progresses to derive a relatively more object-centered representation that is less dependent on the exact viewing position (see, e.g., Marr, 1982). In this way,

you end up perceiving plates as round, oranges as spherical, tables as square, and rooms as rectangular, regardless of your position relative to them. However, you never let go of the fact that you are perceiving these things from the position of your body.

Memory plays a crucial role in perception, to the extent that the processes of memory and perception cannot be separated. Information from memory is used all the time in the construction of perceptual models. So when I see the keyboard in front of me, I am using a lot of information about keyboards I have seen in the past as well as sensory input, in constructing my model of what I see, feel, and hear. When I glance up at the far wall,I seem to see it in detail because memory and guesswork fill in the gaps. I can even imagine the room beyond, as well as the parts in view, because of the information in my cognitive map. This makes for efficient and stable perception and accounts for the well-known importance of expectation in perception. There is nothing new in this, I am only emphasizing the fact that perception is a process of constructing representations or models of the world.

As well as input from outside, there is somatosensory input from the body that is integrated into the "body image." This is essential to carrying out coordinated actions. Errors and distortions of the body image are associated with derealization, depersonalization, and some types of psychosis. They also occur in epilepsy and migraine (Critchley 1950).

The body image and perceptual representation are usually discussed quite independently, but here they are best treated together. After all, I am always aware that someone is perceiving. I not only see the keyboard, but I am conscious of myself sitting at it. My model of the world naturally includes a model of myself in it, and that self has a specific location. The perceptual model and body image together form one representation that one may call the "model of reality."

It is this "model of reality" that we take to be the real world with ourselves in it. If we argue (following Yates, 1985) that the contents of awareness are a model of the world, then normally it is this "model of reality" that is primary in our consciousness.

Let us consider what this "model of reality" is like. First "we" always seem to have a specific position. Most people will tell you "they" seem to be either in their head, behind their eyes, or perhaps in the forehead (Blackmore,1987). This is not to say that any "thing" is located at this spot, but rather that, in the process of building perceptual models, it is helpful to construct them from a perspective coincident with the body. In our imagination we can "see" from any position we like. With eyes closed different people can do this with greater or lesser ease, but, with our eyes open, it is very hard, and we are almost inevitably governed by the actual viewing position. Because vision is the predominant sense in humans, it makes sense that most of us, most of the time, seem to be somewhere in the head looking out through the eyes. This is part of our model.

It is interesting to compare this with other models we build, both viewer and object centered. For example, we may recall a scene from memory, or construct an imaginary scene, in many different ways (Siegel, 1977). It may be "seen" as though from eye level in a view comparable to a perceptual experience. Alternatively, we can "see" it from another location, often directly above and looking down, a position from which we have never actually seen it. This may be a particularly useful way to represent detailed layouts. It involves a complex transformation from any original input, but this is the sort of transformation the cognitive system does all the time. It is very good at it. The result is a flexible and economical representation. Finally, we may model the scene without "seeing" from any specific location at all. Rather, we seem to be "in" the whole scene at once. This provides a kind of 360-degree vision and an identification with the imagined objects. This kind of abstract representation may preserve essential information about the relationships of objects in the scene, without having to reconstruct any of the features of directional viewing. Some people are more used to using this kind of representation than others.

To summarize: We create all the time a model of self in the world. It is continuously built up from and checked against sensory information and backed up by memory. The result is that we seem to be a person located inside a body, perceiving a stable external world. In other words, we have an effective "model of reality."

REALITY

We take it for granted that what we see is "really" there. However, this is not necessarily obvious as far as the brain is concerned. In building plausible models of external "reality," it must make decisions about what is noise, what is imagination, and what is genuinely "out there." It is important to note that the separation of information based on input and that from memory is not trivial. Information from external and internal sources is amalgamated very early in perceptual processing. In vision, it may even occur in the retina. Clearly, this information is used to construct successive representations through the system, and no tagging of what began where would be feasible. Yet in the end, at the highest levels of representation, it must be clear what is "really" out there and what is imagination. My fingers have to touch the keys on the keyboard, not the plants in the garden of my imagination.

I suggest, and this is the central proposition of my theory, that this decision is taken at a very late stage in processing. At any time, the cognitive system constructs many high level models, but one, and only one, is taken as represent-

ing "reality." In other words, it makes the sensible assumption that there is only one "reality." This provides a useful constraint to apply to the modeling process. The chosen model is assigned the status of "reality"—its contents seem "real." Any other models being worked on at the same time can be rejected as failed models of reality or accorded the status of "imagination" or "thinking." In this way, we can be perceiving a stable external world, imagining something else and planning our next activity, all at once without getting confused as to what is "real." I suggest that only one model is assigned reality status at once and that there must always be one such model. So how is this model chosen?

Most of the time, the choice is easy. One model is complex, detailed, stable, and constantly being confirmed by sensory input. Others are attempts at modeling the same thing but are not so good at predicting input and are abandoned. Still others are not directly related to input at all. The former is labeled *reality* and behavior based on it; the second type is rejected; and any others are labeled "thinking" or "imagining." It is not essential to the theory that any particular criteria be used for selecting the "model of reality." However, I have argued elsewhere (Blackmore 1984b) that stability is the most likely candidate. In other words, the most stable model at any time is taken to represent "reality."

Updating reality models is obviously a crucial process, but it is expensive in terms of processing. Just how good a model is made may depend not only on the complexity of the input but on all sorts of internal constraints on available processing capapcity. A criterion may be involved here, of the sort familiar in signal detection theory. With a strict criterion, even slight descrepancies between the existing model and new input are unacceptable and force updating and improvement of the model. This means a lot of processing, but it provides a very accurate model of "reality." With a lax criterion, larger discrepancies are accepted. This means more errors in perception are likely, for the sake of savings in processing. At the most extreme criterion, the model could shift away from input entirely, as increasingly large discrepancies are ignored.

Changes in criterion may be deliberate, in order to devote attention to something else. For example, external events may go unnoticed when you are reading or thinking hard. Or changes may be enforced by unavoidable constraints. Tiredness may force a laxer criterion to save processing. Increasing arousal may shift it to be stricter. Other factors may push the criterion in either direction, and this determines to what extent the model of "reality" is input-controlled.

Interestingly, the capacity for absorption (Tellegen & Atkinson, 1974) may be seen as an ability to shift to a laxer criterion. We should therefore note that OBErs have been found to have a higher capacity for absorption (Irwin 1981).

Altered States of Consciousness

The reason I have dwelt at such length on "models of reality" is because they may help us to understand altered states of consciousness (ASCs). I propose that we look at ASCs as alterations in the type of model being constructed. This means aiming at a higher level of explanation than is traditional in accounts of ASCs. If this can ultimately be reduced to lower level explanations in terms of physiology or neuronal processes, all well and good, but we need to start at the level of "models of reality." This means we must ask questions relevant to these models—questions like what will happen to the model when taking drugs or going to sleep, when sensory input drops, or when processing capacity or arousal change. In trying to answer these questions I believe we gain insights into the lucid dream, the OBE, and other ASCs.

In sleep, both arousal and sensory input are reduced. In certain drug states, a lot of noise is mixed with input, and some techniques of meditation or isolation deliberately reduce sensory input while maintaining arousal. What effect would we expect these changes to have on the "model of reality"? According to the theory so far outlined, we would expect interesting results in all these cases. Changes in sensory input and changes in arousal are expected to have different results. So let us first consider changes in sensory input.

If for some reason sensory input falls, it will become harder and harder to make a detailed and accurate model of "reality." With insufficient input, ambiguities may arise so that more than one model can be fitted to the input. If a strict criterion is in force, the ambiguities will be unacceptable, and different models may be tried out in the attempt to reduce discrepancies. These attempts to find a match may be successful, and a good model be reinstated. However, if there is insufficient input, the modeling may take off on a wrong tack and get so far away from the "correct" model that it is hard to reconstruct it.

This may also happen if there is too much noise. It will be impossible to fit the input to the model without some discrepancies. One way of coping would be to shift to a laxer criterion—allowing greater discrepancies between input and model, but the danger is, of course, that the model will drift away from input control.

However, assuming that arousal is high enough, there must still be models of various kinds. And (according to the theory), one of these must still be labeled *reality*. This model could be of something quite bizarre, with resulting hallucinations; it might be something of particular significance as in mystical and religious experience, or it might be something more closely approximating the normal physical world. The kind of model that takes over will depend on the circumstances and demands at the time and will in turn determine the kind of experience that ensues.

I have already made explicit the assumption that experience depends en-

tirely upon the current "model of reality." However, this raises awkward questions like why is one model in the system "in awareness," whereas others are not? In other words—what is the awareness? A somewhat radical approach solves such problems. Assume that all mental models are conscious, or rather, that consciousness is what it is like being a mental model (see Blackmore, 1986a). In this view, all representations constructed at any stage in processing give rise to awareness. Why then am "I" apparently conscious of some and not others? Because "I" am only a model like everything else. Any models that form part of the model of self at the time are in "my" awareness. Others are only in their own awareness, which may be fleeting and ephemeral. Looked at in this way, we can see that in normal states of consciousness, there is one overriding model of self in the world or "model of reality." But, in extreme ASCs, this may break down entirely, to be replaced with other "models of reality", or even with chaos, or stillness. In this sense, ASCs can and do profoundly affect the self. In some ASCs, one can even gain insight into the constructed, or illusory, nature of the self. So to understand ASCs, we must always ask, what is the "model of reality" like?

Out-of-the-Body Experiences

There are many circumstances that can induce a change from the normal "model of reality." For example, accidents, acute stress, certain drugs, sensory deprivation, sleep deprivation, and so on may disrupt the normal waking state. In such circumstances, one may be deprived of adequate information about the world and unable to maintain a good input-controlled model. Nevertheless, there are very good reasons for trying (in spite of the difficulty) to maintain a model of self in the world and to keep trying to get back to input control. The dangers of slipping off into hallucinations are obvious.

So, what is the best strategy? It may be to try to build the best approximation to "reality" that is possible on the evidence available. This means using information from memory and the cognitive map as well as what is available from the input. The model may not have a terribly good match with external facts but will be the best the system can manage. If the problem does not last long, you may never notice the lapse from input control, but, if it continues, more and more of the details will have to be constructed from memory instead of from sensory input. As we have seen, representations in memory are less viewer-centered. So if the system tries to reconstruct a model of self, doing whatever you knew yourself to be doing and wherever you remember you were, then this representation may not be from the eye-level viewpoint. Like many representations from memory,it may be from a bird's eye view or not really from a specific location at all. If a model like this is built, then your apparent viewpoint will not coincide with actual bodily position. *In other words, an OBE has occurred.*

I suggest that an OBE occurs when it is not possible (or perhaps desirable) to construct a predominantly input-controlled model of reality from the normal viewpoint. A model is still constructed and still seems real. It includes all the likely facts known about one's position at the time, along with any derived from the limited sensory input still available. There is a body image as usual, and the model includes a version of the world around you. The only difference is that it is largely memory- or imagery-controlled, not input-controlled and "you" are in the wrong position.

This explains why everything seems so real in an OBE. It is "reality" in exactly the same sense as the contents of any other model that has been assigned that status. This erroneous model may go on for some time having that status because it will be rich, detailed, and convincing in spite of its lack of fit with input. It may even incorporate some input without switching back to the "correct" position. For example, auditory input is less specific as to location than is visual information. This may explain the incorporation of correct details in OBEs near death or in accidents, when hearing is the last sense to be lost even when a person is behaviorally unconscious.

With time, the new model may begin to break down, and some other model may gain the ascendant. If this is a fantasized scene, one will be hallucinating, and indeed this does follow some OBEs. With deliberate control of the imagery, it is possible to shift to other ASCs and even to transcendent or mystical experiences. Alternatively, sensory input may reassert itself. In this case, a new correct model will be constructed, will take over from the incorrect one, and the OBE will end abruptly. There cannot be two "reality" models at once, and so the switch will be sudden.

If the incorrect (OBE) model is highly discrepant from input (that is, predicts it badly), then input cannot easily be incorporated, and the OBE may continue for a long time. If it is only slightly wrong, a match is more likely to occur by chance or by modifying it. A model that is only slightly out of coincidence is therefore unstable, whereas a very different one is more stable. This may account for the apparent discreteness of the OBE.

Other features of the OBE are also explicable. The common position looking from above and behind oneself may be a result of the fact that this is a convenient position from which to imagine scenes. For instance, try imagining your own bedroom or recall the last time you were walking in the countryside. Where are "you" in this scene? You may well find that you imagine at least some scenes from a bird's-eye perspective.

The fact that the out-of-body world is often more abstract and stylized than the real world reflects its origin in models constructed from memory. The kinds of "errors" often reported in OB vision are exactly what is expected. They are the same errors that are found in using cognitive maps. For example, Green (1968b) cites the case of a man who rose through the roof of his house and saw a chimney stack that, when he checked the next day, he found was not there. In my

own experience (Blackmore 1982a), I saw tiles of quite the wrong type and color on the roofs of Oxford. I floated over a "star-shaped island with 100 trees" and saw coastlines greatly simplified as compared to the real thing. I suggest that this is exactly what we should expect and that people only report that all the details were accurate because they see what they are expecting, and, on the whole, they do not bother to check the facts afterwards (Blackmore 1984a).

Many writers have puzzled over the existence of clothes, carriages, or railways in the out-of-body world—or the problem, as Tart (1974) puts it, of where the pajamas come from. But this is no problem if the OB world is truly thought created.

More generally, all the effects of thought on the OB world are predictable. Several adepts have noted that movement is effected by thought (e.g., Fox 1962; Monroe 1971), and Muldoon and Carrington declare that "thought creates in the astral. . . . In fact the whole astral world is governed by thought" (1929 p. 46). Clearly, these writers would not agree with my interpretation, but it does fit extremely well with their descriptions. A constructed model like this can only be affected by thought. This fact provides the freedom to fly or to do anything you can think of, but it also provides the limitations of thought. For example, the difficulty of turning on lights may reflect the difficulty of constructing a complete change in the scene all at once. Similarly, other oddities of behavior such as things falling slowly or sounds coming a long time after events are seen may also result from limitations of processing. Even something like Muldoon's three traveling speeds (Muldoon & Carrington, 1929) makes sense because these may result from the different ways one can, by thought, move viewpoint in a constructed model. I believe that an exploration of the limitations of change in modeling will provide great insight into the nature of the out-of-body world.

Lucid Dreams

We may now come to lucid dreams. As one falls asleep, both sensory input and arousal fall. The input-controlled model of reality gets less and less input and less and less demands on it. Other trains of thought may temporarily become stronger and even briefly take over "reality" status (producing the familiar experience of realistic hypnagogic imagery), but, as arousal drops and sleep ensues, all the models become weaker. The input-controlled model disappears, and only vague trains of thought remain. This state may persist through NREM (or ordinary) sleep. If one is woken, one may report some kind of thinking or nothing at all.

In dreaming sleep arousal increases, but hardly any sensory input is processed. This means that, although complex models may be constructed, they cannot be based on input. Therefore, no good input-controlled model is available. However, we have postulated that the dominant model at any time will

seem real. The model that now takes on reality status (and seems real) is therefore whichever one happens to be the most convincing at the time. This could be anything at all that imagination can create, and I suggest that this is why dreams are both so bizarre and yet so convincingly real. You are effectively stranded in a mental world without a stable model of who and where you are. This is surely the familiar experience of dreaming. You have lots of adventures, see all sorts of things, but you are not aware of your name, the date, or the fact that you are dreaming. Indeed, "you" are whatever self is constructed in the dream. Although the waking "you" may not remember it very clearly, to the dream self, the dream seems real.

Of course, if memory in dreams were as accurate and efficient as it is in waking, then presumably it would be possible to remember who you are; that you had gone to sleep, and so on, and so to construct a self much like the waking one with a reasonable reality model. However, memory is not that good in ordinary dreams—perhaps just because arousal is still too low.

We may then wonder whether, under some circumstances, it should not be possible to become aware of these things. According to this theory, this would mean building a model of self as a dreamer, asleep, knowing the relevant facts about your name, the day, where you went to bed, and so on. If such a model could be created and were sufficiently stable and coherent, then it could achieve reality status. Possibly, it would be easier to recall on waking because the constructed self would be more similar to the normal waking self.

So how could this come about? It may be that, in the course of ordinary dreaming, something occurs that raises the idea of dreaming. This may be, for example, a recurrent dream motif or theme. It may be a dream of going to bed or lying down. It may be that something so bizarre happens that you question its status. Whichever it is, the result is the same. That is, a model is tried out that says that this is a dream and that you are asleep. However, this model does not usually stand much of a chance. There is so little sensory input that it cannot be confirmed by normal reality testing, and it may have no other advantages over other trains of thought. Indeed, it is probably a lot less interesting than the lion chasing you, the cliff you are about to leap off, or the fact that your Rolls Royce will not start. In this case, it fails to achieve reality status and is dropped. At best, it is a prelucid dream.

However, this sort of model might gain the advantage if enough information from memory were available. If you could only remember who you are and that you are dreaming and keep these facts stable in the new model, then it might be possible to maintain it long enough for it to achieve reality status. The result would then be a shift of reality status to the new model and the realization that you are actually dreaming. In other words, a lucid dream would occur.

It can be seen that memory is crucial here in providing stability for the lucid model. If we suppose that the efficiency of memory is a function of arousal (at least at these low levels of arousal in sleep), then this theory would predict that

lucid dreams will occur when arousal is relatively high. There is, in fact, mounting evidence that this is the case (see Gackenbach & LaBerge, 1986).

Once lucidity is established, several possibilities open up. First one can continue with the previous dream imagery but maintain the realization that it is a dream. This is very hard because the dream imagery will typically involve a model of yourself as involved in the action, rather than as someone who is dreaming it. So there is always the danger that this "action" model will take over again and lucidity be lost. However, concentrating on rational thoughts, such as "I know I am dreaming," will help, while allowing yourself to get involved in the action, and consequent emotions will hinder the maintenance of lucidity. These effects have been described,for example by Fox (1962) and Hearne (1978).

Second, you may choose to create a model of yourself lying in bed asleep and dreaming as though from the position of a spectator. Such a model is unlikely to be an accurate one in the absence of sensory input, but it will be plausible. You will seem to be a second self, looking at your body in bed. This is exactly the same situation as in the OBE already described. The only difference is that you are aware that it is a dream. If you realize what is happening or have recalled prior intentions, you may then fly or do anything else you want in your thought-created body. It has already been noted that lucid dreams can provide a stepping stone to the OBE (Rogo 1983). This route may be easier for people who find it especially hard to ignore sensory input, but the danger is always that it will lapse back into ordinary dreaming. This will happen if the new model of self as dreamer is not sustained and one of the other dream images takes over "reality,"

A final alternative is that the search for sensory input to back up the new model may result in your waking up, achieving the sensory input in the process, and so ending the state.

A rather different kind of model that may be created during dreaming is one of yourself in bed but looking from the position of the body as you do when waking up. This may be easier to construct than other eye-level views because of its familiarity. If this achieves reality status, you may not realize it is any different from normal, and, in this case, a false awakening has occurred. This approach to the false awakening suggests that it should more often occur in familiar surroundings, when the eye-level view is a very well-known one, and to people who habitually use eye-level views in imagery.

In this way, lucid dreams, false awakenings, and OBEs can all be seen as the natural result of our normal modeling process coming up with models of reality that are not predominantly input-driven.

We can now answer at least some of the questions about the relationships between lucid dreams and OBEs. As Irwin concluded, they are not phenomenologically the same. According to this analysis, they are both ways of entering a world of thought and memory unconstrained by sensory input and the restrictions of the body, but they are bounded by different constraints. The lucid

dream depends on a unstable model, just as the OBE does. However, in OBEs, there is likely to be too much sensory input, and the model is likely to slip back into normal (or correct) perspective. On the other hand, in lucid dreams, there is likely to be too little sensory input and too little information from memory, and it is more likely to drift into dream imagery. This means that for sustaining an OBE, the most important factors are those that block sensory input, whereas sustaining a lucid dream requires more arousal and better memory. This explains why the two experiences are related but not more closely so.

We should now ask whether this theory leads to any testable predictions for the OBE or lucid dream.

First, one would not predict a simple relationship between imagery and OBEs. As explained elsewhere (Blackmore, 1984b, 1986b), in a spontaneous OBE, the external circumstances do the work of cutting off sensory input, and an OBE may even be avoided in people whose imagery is good enough to restore the normal model. However, for a deliberate OBE, good imagery is needed to construct the alternative viewpoint. This makes sense of data showing variable relationships between OBEs and imagery (Blackmore,1982b; Irwin, 1981). Further research is needed to test whether people having deliberate OBEs have better imagery, as predicted. As for the lucid dream, the ability to recall information across different states is more important than imagery. Indeed, no correlation between imagery skills and lucid dreams has been found (Blackmore 1982b). State-specific recall has yet to be tested,but clearly dream recall is a kind of corollary of recalling waking from dreams and indeed lucid dreaming and dream recall are highly correlated (Blackmore 1984).

We can now see that deliberate OBEs have more in common with lucid dreams than spontaneous ones do. For this reason, a higher correlation between lucid dreams and deliberate, not spontaneous, OBEs is predicted. Also, dream control skills would be expected to correlate with having deliberate but not spontaneous OBEs. Both these predictions were confirmed in a recent survey. A higher proportion of people reporting deliberate OBEs also reported lucid dreams and various dream control skills (Blackmore 1986b).

Final predictions concern the use of viewpoints in imagery, OBEs, and lucid dreams. According to the theory presented here, it is the change of imaginary viewpoint that is essential to the OBE. We should therefore expect OBErs to be better at using a bird's-eye, or observer, viewpoint in imagery, to use it habitually in recall, and to be better at switching viewpoints. Because viewpoint is not important to the lucid dream, we should not expect such relationships. These predictions were confirmed in three studies (Blackmore 1985, 1987). OBErs more often used observer viewpoint in recall of dreams, though not in recalling waking situations. They reported more vivid imagery from different viewpoints and were consistently better at switching viewpoints in imagery. Lucid dreamers did not use observer viewpoint more often, but they were better at switching viewpoints. This may reflect a skill or kind of control that is useful

in having lucid dreams. It was also predicted and confirmed that unpleasant dreams should more often be recalled in observer perspective.

Selfless States

This theory can also be applied to other altered states of consciousness. There are many other states in which the normal sensory-based model is given up and other models are created almost entirely out of information from memory. The world experienced in these states should therefore reflect the properties of mental constructions and mental limitations rather than the physical world. In all these states, one is free from the restrictions not only of sensory input but of bodily actions. One is constrained only by imagination. This is why flying is possible, and in fact anything you can imagine is possible. I think it is a reflection of most people's lack of imagination that most OBEs involve such mundane scenes and even replica bodies. Of course, in many OBEs, there is still some sensory input and therefore some restriction. The lucid dream is freer in this respect but is still limited by the fact that arousal and access to memory are only just high enough. And even in lucid dreams there is typically heavy dependence on a model of self.

One can see that in some types of meditation, where sensory input is ignored and arousal kept high, one can enter a state that is further along the continuum of unrestricted states than either the OBE or the lucid dream. With training and practice in the skills of concentration and modeling, the potential for altered states is vast (as mystics have long tried to tell us).

Finally, there is really no need for the system to construct a ''self'' at all, with all its attendant cravings and illusions. A selfless model, a selfless state of consciousness is quite possible. Indeed, there is a whole world of ''models of reality'' that we have hardly begun to explore. Lucid dreams and OBEs are just first steps.

REFERENCES

Blackmore, S. J. (1982a). *Beyond the body: An investigation of out-of-the body experiences*. London: Heinemann.

Blackmore, S. J. (1982b). Out of body experiences, lucid dreams, and imagery: Two surveys. *Journal of the American Society for Psychical Research, 76*, 301–317.

Blackmore, S. J. (1982c). Have you ever had an OBE?: The wording of the question. *Journal of the Society for Psychical Research, 51*, 292–302.

Blackmore, S. J. (1984a). A postal survey of OBEs and other experiences. *Journal of the Society for Psychical Research, 52*, 225–244.

Blackmore, S. J. (1984b). A psychological theory of the OBE. *Journal of Parapsychology, 48*, 201–218.

Blackmore, S. J. (1985). Lucid dreams and viewpoints in imagery: Two studies. *Lucidity Letter, 4*, 34–42.

Blackmore, S. J. (1986a). Who am I? Changing models of reality in meditation. In G. Claxton (Ed.), *Beyond therapy*. London: Wisdom.

Blackmore, S. J. (1986b). Spontaneous and deliberate OBEs: A questionnaire survey. *Journal of the Society for Psychical Research, 53*, 218–224.

Blackmore, S. J. (1987). Where am I? Perspectives in imagery and the out-of-body experience. *Journal of Mental Imagery, 11*(2), 53–66.

Crookall, R. (1961). *The study and practice of astral projection*. London: Aquarian Press.

Fox, O. (1962). *Astral projection*. New York: University Books Inc.

Gackenbach, J., & LaBerge, S. (1986). An overview of lucid dreaming. In A. Sheikh (Ed.), *International Review of Mental Imagery (Vol. 2)*. New York: Human Sciences Press.

Gackenbach, J., & Schillig, G. (1984). Lucid dreams: The content of conscious awareness of dreaming during the dream. *Journal of Mental Imagery, 11*(2).

Green, C. E. (1968a). *Lucid dreams*. London: Hamish Hamilton.

Green, C. E. (1968b). *Out-of-the-body experiences*. London: Hamish Hamilton.

Hearne, K. M. T. (1978). *Lucid dreams: An electrophysiological and psychological study*. Unpublished doctoral dissertation, University of Liverpool.

Irwin, H. J. (1981). Some psychological dimensions of the out-of-body experiences. *Parapsychology Review, 12*, 1–6.

Irwin, H. J. (1985). *Flight of mind*. Metuchen, NJ and London: Scarecrow Press.

Liben, L. S., Patterson, A. H., & Newcombe, N. (Eds.). (1981). *Spatial representation and behaviour across the life span*. New York: Academic Press.

Marr, D. (1982). *Vision*. San Francisco: Freeman.

Monroe, R. A. (1971). *Journeys out of the body*. New York: Doubleday.

Muldoon, S., & Carrington, H. (1929). *The projection of the astral body*. London: Rider & Co.

Palmer, J. (1978). The out-of-body experience: A psychological theory. *Parapsychology Review, 9*, 19–22.

Rogo, D. S. (1978). *Mind beyond the body*. New York: Penguin.

Rogo, D. S. (1983). *Leaving the body*. Englewood Cliffs, NJ: Prentice-Hall.

Siegel, R. K. (1977) Hallucinations. *Scientific American, 237*, 132–140.

Tart, C. T. (1974). Out-of-the-body experiences. In E. Mitchell (Ed.) *Psychic exploration* (pp. 349–373). New York: G. P. Putnams Sons.

Tellegen, A., & Atkinson, G. (1974). Openness to absorbing and self-altering experiences (Absorption), a trait related to hypnotic susceptibility. *Journal of Abnormal Psychology, 83*, 268–277.

van Eeden, F. (1913). A study of dreams. *Proceedings of the Society for Psychical Research, 26*, 431–461.

Yates, J. (1985). The content of awareness is a model of the world. *Psychological Review, 92*, 249–284.