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## A PSYCHOLOGICAL THEORY OF THE OUT-OF-BODY EXPERIENCE

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**ABSTRACT:** A psychological theory of the out-of-body experience (OBE) is presented. It suggests that altered states of consciousness (ASCs) in general and OBEs in particular are best understood in terms of "models of reality." Two central proposals are that (1) the cognitive system builds many models at once but at any time one and only one is taken to represent external "reality" and that (2) this is the most complex, stable, or coherent model. Normally the chosen model is built largely from sensory input, but when deprived of sensory information, under stress and so on, this can break down, allowing other models to take over. In an attempt to regain input control, the cognitive system may build the best model it can of the surroundings it thinks it should be seeing. This has to be built from information in memory and imagination. Memory models are often more abstract and schematic than perceptual models and may take a bird's-eye view. The theory suggests that if such a model becomes more stable than the input model, it takes over as "reality." The imagined world then seems real, and an OBE has occurred. The phenomenology of the OBE is discussed in light of this theory, and some testable predictions are made. Other ASCs are briefly considered.

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In a recent review of psychological models of the out-of-body experience (OBE), Rogo (1982) argues that none of the models are sufficiently developed to provide a valid alternative to paranormal or esoteric models. In particular, he argues that none of them can explain much of the phenomenology of the OBE. In an attempt to rectify this situation, I would like to present a psychological theory of the OBE that may go some way toward meeting Rogo's objections. I shall try to present it as clearly and in as much detail as possible so that it can more easily be open to criticism and empirical test.

I shall start by treating the OBE as one of many possible, more or less discrete, altered states of consciousness (ASCs). However, there is no generally acceptable theory of ASCs that provides even the hope of an explanation for the OBE.

We might first ask what is altered in an altered state, but even this is very hard to answer. Theories of consciousness do not provide much help. They tend to be highly reductionistic, very vague, or aimed at aspects irrelevant to ASCs (e.g., Underwood & Stevens, 1979, 1981; Valle & von Eckartsberg, 1981). Research specifically on ASCs has also often been mainly reductionistic, relating reported

states to measurable physiological variables, drugs given, or other induction procedures (see, e.g., Davidson & Davidson, 1980). This is important work, but limited. For example, if we know that EEG patterns are altered in an OBE, this is useful but does not tell us anything about what the OBE is like. If different ASCs are associated with the same EEG patterns, it is also clear that the EEG is useless as a means of identifying or defining the state. Similarly, reducing an ASC to simple learning or habituation processes (e.g., Neher, 1980) is interesting, but again limited. Rather different is Tart's (1980) "systems approach to ASCs." He discusses the processes that might be involved in the maintenance and disruption of discrete states of consciousness, but he has not applied these ideas to a detailed theory of the OBE.

To get closer to understanding the OBE as an altered state, we need to be very careful about the level of explanation at which we begin. Any problem can be tackled at different levels of explanation. In the case of much of cognitive psychology, there are now explanatory models at several levels and hopes of integrating them into fuller theories (see, for example, Marr, 1982). Such success has not come solely by starting at the bottom and working up. Indeed, Dennet (1983) has argued that starting at the top has usually been more productive, although both are necessary. I suggest that in the case of the OBE in particular (and ASCs in general) we have not been starting in the most fruitful place. We need to look to a much higher level of explanation than we have been doing. I suggest that a productive level of explanation to begin at is the "model of reality" that a person holds at any given time.

I hope to show that by starting in this way we can understand how the OBE may come about under certain circumstances, why it takes the form it does, and why it is a relatively discrete ASC. In addition, I think this approach has implications for other ASCs, but I shall not discuss these in detail here.

I shall now explain what I mean by a model of reality. People are self-modeling systems. Indeed, one of the main tasks of the brain is to construct models of ourselves in our environment. These include the temporary models that are built in perception, as well as long-term models that are built up in memory over a lifetime. And of course each interacts with the other.

Perception is a model-building process that uses information from memory and the constructive powers of imagination to provide workable models of a complex and rapidly changing world. It is essential to realize, as psychologists have long been realizing, that little about the outside world is "given" or obvious. All the incoming

information has to be transformed, analyzed, and used to construct models of what is "out there." Models are constructed at many different levels, from the primitive models in the periphery to the more complex, integrated central models. The latter contribute to memory, both in the remembering of specific events and in the building-up of generalized models of the world, or cognitive maps.

The same can be said of our perception of self. We have long-term models of the kind of persons we see ourselves to be (self-image) and what our bodies are like (body image), and we have a constantly changing model of our own bodies (also referred to as the body image). For the coordination of movements and perception, it is obviously essential that we have such an effective and rapidly updated model of our own body. This is built up from somatosensory information, visual, and other sensory input and memory.

The body image has usually been discussed independently of the processes of perception, but I think it is important to realize that the end product of our normal perceiving processes is a model of what is out there with our own body firmly placed within it. I am not just seeing my keyboard and screen before me, and the room beyond, but I am also implicitly aware of my own position relative to these things. "I" am in my constructed world.

The position of this "I" is most interesting. I have equated it with the body because that is mostly how it seems. We more or less take it for granted most of the time that we sit somewhere in our heads; for most people, somewhere behind the eyes. But of course we must realize that this, too, is a construction. It is a very useful construction to have because it gives us the most economical and comprehensible model of the perceived world. Since, for humans, vision is predominant, it makes sense that we seem to be looking out of our eyes, but of course when we are listening intently for something or doing some very fine or skilled task with our hands or with a fine tool, we may find this habitual position changing. The body image may even extend to the edge of our car! Whatever the model of self we have at any given time, we must bear in mind that it too is a constructed part of our model of reality.

Superficially, it seems obvious that when we build perceptual models of the world, we are modeling what is "really" there; in other words, we are building models of reality. But, in fact, this may not be obvious at all. I do not mean to allude here to philosophical issues involving the status of any world out there. Rather, I wish to point out that, as far as the brain is concerned, it is not necessarily obvious what is real and what is not. After all, the brain is constantly engaged in all

kinds of modeling processes. Some models are better or more stable than others, some are based more on sensory input, and some on internal processes of thinking. With all this mass of activity going on, the brain has to decide which of its models represents external reality—a mistake could be very costly.

It is very interesting to speculate about how this might be done. The longer I do so the more difficult and interesting the question becomes. Might we take each object or thought one by one and decide on some criterion whether it is real or not? This would be extremely inefficient, aside from the fact that there is no obvious, or even best, way of dividing the world into objects in the first place. And this is even more problematic for "thoughts."

Perhaps we might simply distinguish things on the basis of whether they are derived from sensory input or not. However, this is no easier. Any model constructed from sensory input is not just that and nothing more. Certainly, at the most peripheral levels a great deal of analysis is done without recourse to stored information, but even things like the crucial analysis of depth involves learned depth cues, and any modeling of objects involves recalled information about previous objects seen. The model that results from perception is not just the result of sensory input.

Also, imagined models are not always entirely imagined. We may start a train of thought because of something we see, or we may elaborate perceptions in our imagination and be quite sure that they are "thoughts" and not "reality." If both thoughts and perceptions involve varying mixtures of sensory input and recalled information, then this cannot be used as the criterion for reality. So what is?

I suggest that we will get on better by looking at the problem from the higher level of complete integrated models of the world. At any one time, there are probably several such models being constructed. For example, at the moment I have a model (to which I am paying little attention) of the room around me and myself sitting at the keyboard. I also have a complex mental structure representing the paper I am trying to write and all the many things I hope to say. From time to time, I also have thoughts about what I am going to have for lunch and whether I have left the heating on or not. These may be brief, but they are quite complex and involve images of the kitchen or the rest of the house, or tins of baked beans, or whatever. Now, all the time, although I am concentrating on the writing, I have no trouble in knowing which model represents the world out there, and I do not confuse one model with another.

I suggest that it is between these kinds of complete models that the

brain makes its decisions about reality. This strategy immediately benefits from the fact that such models are internally coherent but have relatively little connection with each other. Unlike vaguely conceptualized "objects" or "thoughts," we can see that at this higher level the models are fairly distinct. So let us suppose that it is at this level that the brain makes its decisions about what is real.

It is interesting to note that in the extremely complex task of perception, or for that matter any cognitive task, the brain is generally helped if it can impose constraints on its processes. For example, in vision, knowing that objects generally do not have discontinuities in both depth and illumination at the same place aids in the perception of edges. Assuming that the rigidity of moving objects aids movement perception, and knowing about the trajectories of falling objects helps in tracking rapid movement. On a much higher level, a useful constraint is the assumption that there is only one external reality. So it is a sensible strategy for the brain to assume that there can be only one model of reality. Accordingly, it chooses the best candidate and, if you like, accords that candidate "reality status." Other models can be labeled thinking, imagining, or whatever.

I suggest, and this is central to the theory, that at any given time one, and only one, model is held to represent reality.

The system must then choose which one. I suggest that this is normally a very easy choice. One model, the one derived largely from sensory input, is relatively complex, stable, and coherent as compared with any of the others. It is constantly fed by new input that is either consistent with the model or can be made so with relatively little difficulty. It also behaves in ways that we have learned to associate with reality. In the case in which we are "lost in thought," we still do not normally confuse that thought with external reality. If we have any doubt about which model should be "real," we need only attend to sensory input, and more detail will confirm and extend the input-based model but not the others.

Note that I have not specified the precise criteria for selecting reality models, but only indicated the kinds of thing they might be (such as stability, complexity, and so on). If the theory proves to be useful, the criteria used will have to be investigated. For the moment I shall assume that the criterion is one of stability; that the most stable model is taken to represent the external world.

Note also that I am assuming a system in which models are built at many different levels. If the system is functioning effectively, there should be no incompatibility between the higher level models, built on expectation, memory, and so on (and involving a lot of top-down

processing) and the lower level models built up from the analysis of input (from bottom-up processing). In fact, the former should be good models of the latter. When the two do not coincide, the models will be unstable and unlikely to gain reality status.

It is then important to consider how the system copes with such discrepancies when they arise. Minor discrepancies will arise all the time because we live in a rapidly changing world. The model appropriate to a moment ago, or that based on expectation of change, will rarely be an entirely adequate model of the current situation. Also, errors will creep in either from high-level modeling (wrong guesses, unjustified expectations, and so on) or from noisy input.

The system then has the choice of either ignoring the input concerned or updating the model so as to incorporate it. Either action may be appropriate, depending on the source of the discrepancy. At any time, there may be a criterion in force that defines just how much discrepancy is going to be allowed between the model and the input. In other words, how much checking of aberrant input or updating of the model will be carried out? When there is plenty of capacity to spare, the criterion will be strict and almost all discrepancies quickly eliminated so that the reality model is as good a reflection of input as possible. Under less favorable circumstances, greater discrepancies may be allowed.

We have now reached the stage of being able to see how the cognitive system might sustain a stable, input-driven, model of reality that is not confused with the many other models that may be being constructed at the same time. We may now consider what happens under conditions that are less than ideal; particularly, what happens if there is a lot of noise in the system or if sensory input is greatly reduced.

First, let us consider the case of excessive noise. The system is very good at coping with a certain amount of noise. There is a lot of redundancy that allows for internal checking at many levels. If noise results in a wrong decision about some input, then often this will produce discrepancies of the sort already mentioned. The error can usually be identified by checking against other input or against models at other levels. If it is identified as being due to noise, then it can be ignored. However, if the whole system is very noisy, then it may become very difficult to correct errors. It may then be necessary to shift to a laxer criterion and to allow more discrepancies to go uncorrected. After all, the system cannot expend all its capacity on correcting them when this gets harder and harder to do.

This strategy may let one get by until things improve. However, it

may mean increasing oddities in the model. These may be of the sort I often experience, like briefly thinking I see my cat asleep before I realize that it is only a pile of papers. Or they may be more severe and reach the extent of being hallucinations. At the extreme, the higher level models may lose touch entirely with the input and cease to be an effective model of reality. This situation may be expected, for example, when someone is badly deprived of sleep, taking certain drugs, under extreme stress, or close to death. If this happens the input-driven model of reality has broken down.

A similar extreme may be seen with reducing sensory input, for example, in sensory isolation experiments, in very boring environments, or in sleep (a special case to which I shall return). Somatosensory input, which is necessary for maintaining the current body image, may be reduced simply by keeping still for a long time. Or it may be distorted by habituation (Neher, 1980), so that erroneous, as well as inadequate, information is available. In such cases, the input-driven model must necessarily become impoverished. It may need to rely more than usual on information from memory to keep it stable. And, most important, correcting errors becomes harder if there is less input against which to check them. The result is that greater discrepancies may arise between model and input (that is, between lower and higher level models). Again, there may arise a situation in which the current reality model does not represent the input at all well. What does the system do now?

Obviously, it is important to get back to a good input-controlled model as soon as possible; otherwise, effective behavior cannot be maintained. To do this, one may try out various alterations to the current model in the hope that one of these may reduce the discrepancies and get the model back to input control. If this works, one probably will not notice anything aniss. However, what if it does not? The attempt to alter the model may shift it yet further away from a reasonable representation of the outside world. In this case, the system has to do something more drastic.

If the model is allowed to degenerate further, one of the other models going on at the time, for example, my speculations about what to have for lunch, may actually become more coherent, stable, and complex than this degraded input-based model. It would then take over reality status, and I would be hallucinating baked beans. This is obviously not a useful strategy for an organism that wants to survive!

An alternative is to start from the beginning again and build a new input-controlled model. Normally, this would be easy and could start from the results of input processing. In a sense, this is happening all

the time as the models are constantly updated. However, in this case, we have very noisy or inadequate input; so we cannot do this. The alternative is to build a model only from the top down, and this means relying heavily on information from memory. It is here that, finally, we come to the OBE.

Suppose that the system builds the best model it can of what it thinks it should be seeing. It can go on the last effective model it had before the breakdown occurred, add to that the changes based on movements known to have occurred, or actions taken, and construct a new model with the aid of information from memory. This new model may be a fairly good approximation of, for example, me sitting at my desk, but it will differ in important ways from any normal input-driven model.

It is important to note the ways in which memory models differ from perceptual ones. The processes of perception involve building successive representations of the outside world. Marr (1982) describes these as progressing from a viewer-centered to a more object-centered representation. The retinal image from which visual perception starts is viewer-centered in the sense that all objects are represented as seen from that specific viewpoint. However, moving up the system, the effect of the processing is to make the representation more and more independent of that location. Round objects seen at an angle are represented as ellipses in the retinal image, but as circles higher up the system, and so on. In the end, you "see" round plates and square tables. Indeed, you "see" rectangular rooms even though you see them from the inside.

Memory models can be seen as taking this process even further (see, for example, Bartlett, 1932; Neisser, 1976). When you remember scenes, on the whole they are represented in a version that preserves the essential features of the objects seen, without preserving all the detail of each view. This is a far more economical and useful way of storing the information. Sometimes a bird's-eye representation is used. As Siegel (1977) has suggested, try remembering the last time you were at the seaside. Do you see yourself as though from above as a spectator, or do you reconstruct what you saw at the time? You may in fact do either, but there is no doubt that many memory representations involve viewpoints never actually experienced. They may be kind of all-round views in which you look from no particular place at all or they may in some other way be generalized versions of the many views actually seen. This makes sense because it would take far too much storage (and quite unnecessarily) to remember all the different



complex views you ever saw. A generalized or schematic model may contain all the essential information and be far more useful.

These features of memory models are found in research on cognitive maps (see, for example, Liben, Patterson, & Newcombe, 1981). The cognitive map is the memory model we all have of locations we know well. It is not at all like a map on paper of course. For example, try to imagine taking the route from your home to work, or to the shops. You can do this in several ways. You may see everything passing by as you see it when you actually travel, but of course this is extremely slow and laborious and involves a lot of processing. You may instead prefer to fly or float above the streets and see them pass below you. Most people can do this easily. Although they have never actually flown this way, their memory representation is such that this is a surprisingly easy way of presenting the information. In fact, if you have a well-structured cognitive map, you may be able to, as it were, see the whole thing at once as you fly. Finally, you may simply imagine yourself first in one place, and then, instantaneously, find yourself at the other.

In trying this exercise, you will learn much about memory representations. You will probably find that there are lots of errors both of omission and commission. Buildings you don't know very well will have a convincing looking number of windows, but stop to count them and you will find you cannot. You will see signs or advertisements along the streets but may not be able to read them. If you check against the actual street you may find you have added likely looking side roads or smoothed out curves. All this is a result of your building up the best representation you can on the available information.

Also, if you try looking through the buildings, you will find they can be transparent. If you know what the inside looks like, you can probably see it without having to imagine going in through the door. Indeed, you may be able to pass happily through the walls and floors of your cognitive buildings. Finally, of course, you may manipulate these images within the constraints of your ability to imagine. If you have good imagination you may remove buildings, plant trees, turn building sites into parks, or anything you like to think of. This is the world of the imagination. It is quite different from the world of perception.

Now this is the stuff out of which our lost perceptual modeler must build the new model of reality. Let us suppose that I am to reconstruct a model of myself sitting at my desk and typing. It is

possible that I will be able to construct a sufficiently viewer-centered image to mimic an input-driven model. If there is also enough input, then the two may coincide, and "reality" will have been restored. If this happens I may not even notice, or I may just feel that things seemed momentarily a bit funny. However, it is more likely that if I have very little input to go on (as we are assuming) and I build my model from memory, it will be something like a cognitive map seen in a bird's-eye view. In other words, I will see myself sitting at my desk and typing, but I will see myself from above or behind, just as in my memory representations.

This model will not be an adequate representation of the input (or the results of the bottom-up processing). However, it may be fairly stable and complex. If there is just a little sensory input, some of this may even be incorporated and help to stabilize the erroneous model. Auditory input is particularly effective here because it can provide a link to what is happening without being anything like as position-dependent as visual input is. The model thus created may be good enough to be considered as reality by the system. It may be more stable and convincing than any other current model. So, just like the normal input-driven model, it becomes "reality." This is, I propose, an OBE.

I believe that this interpretation of the OBE makes sense of a great deal of what we know about the experience. First, one of the most persistent problems is in accounting for why the OBE seems so real. If it is "just imagination," it shouldn't seem like reality. But of course, in the case I have described, the out-of-the-body (OB) model has achieved reality status because it is the best possible substitute for the missing input-driven model. Everything seems real because it *is* real, in exactly the same sense as anything ever seems real.

Second, it accounts for why sensory deprivation, relaxation, illness, and certain drugs so often precipitate OBEs. On this theory, it is essential that the input-driven model be incapacitated before the OBE model can take over. At the most extreme, of course, this can happen near death. There may also be other reasons for adopting an OB perspective during extreme fear, illness, or when near death. Reinterpretation of pain as belonging to a different body is one. The denial of death (Ehrenwald, 1974) or the desire to be something more than just a perishable body are others. Under suitable conditions, these factors may tip the balance toward the OB state. The theory can also make sense of the training techniques that emphasize relaxation, control of imagery, and concentration (see Blackmore, 1982). If an OBE is to be induced voluntarily, it is not enough just to want to be "out of body." It

is necessary to shift the balance of stability away from the input model and toward some internally generated one. Relaxation and immobility may reduce somatosensory input; good imagery control helps to build an alternative viewpoint; and concentration helps one to keep attending to that rather than flipping back to input.

Third, this interpretation explains the many features that the OB world has in common with the cognitive map (see Blackmore, 1978): the ability to move through solid objects, the errors of omission and commission, and the stylized nature of many things seen out of the body. Most interesting to me is that it accounts for the thought-responsive nature of the OB world. Occultists, magicians, and astral travelers have long described the astral world as a thought-created world and one responsive to imagination (e.g., Muldoon & Carrington, 1929). On this theory, this is just what we should expect. Indeed, one can even make sense of seemingly obscure features like Muldoon's three traveling speeds in the astral. They match pretty closely the three ways of traveling through the cognitive map which I described earlier.

The thought-created nature of the OB world gives rise both to its vast potential and to its limitations. For example, odd features of the OBE, such as the difficulty of turning on lights, may be explained in terms of the limitations of imagery. It may be difficult to effect all at once the sudden increase in complexity of the model required for a change from darkness to light.

In these ways, I think we can see that a lot of the phenomenology of the OBE does begin to make sense.

We may now ask why the experience seems to be relatively discrete. According to this theory, it is because intermediate states are unstable. If the OB model of reality has a viewpoint very different from normal, it is unlikely to shift back to input control and is therefore highly stable as long as the conditions allow. On the other hand, if the viewpoint is only slightly away from normal, there is a good chance of its getting close enough to fit with sensory input and so to shift back. Such intermediate states are therefore highly unstable, and it is this which produces the apparent discreteness of the OBE.

If at any time during an OBE, sensory input adequately reasserts itself, it will be obvious to the system that the new input-based model is preferable. The temporary memory model will be dropped or rapidly modified, and the experience will suddenly end with a flip back to the normal viewpoint. This is commonly, though not invariably, what happens at the end of OBEs. Remember that the cognitive system is always trying to maintain an input-controlled

model of reality. This is why OBEs are relatively rare, do not usually last long, and are hard to bring about voluntarily.

The reader may now be asking whether this theory is any improvement over previous ones. I suggest that it has a theoretical advantage over the ecsomatic theories. It seems to make sense of much of the phenomenology of OBEs, while fitting in with what is known about cognitive processes, and without the terrible logical problems confronted by the ecsomatic theories (see Blackmore, 1982). For this reason alone, I would argue that it is to be preferred.

I believe it also has advantages over other psychological theories. The most important of these is Palmer's (1978) theory. Very briefly, Palmer posits that the OBE is triggered by a change in a person's body concept, which in turn threatens his self-concept. The threat activates unconscious (primary) processes that seek to reestablish the sense of self-identity. The OBE is just one of the forms this reestablishment may take.

The theories agree to the extent that the OBE may be triggered by a change in body concept—according to the present theory, this is one aspect of the breakdown of the input-controlled model. However, they diverge considerably at this point. The main problem with Palmer's theory, as I see it, is that his appeal to primary processes fails to specify why the new self-concept should involve viewing the world from a location outside the body; in other words, an OBE. It cannot (at least in its present form) answer questions such as why the viewpoint is often above the body or why the OB world is like it is. In other words, as Rogo suggested, it cannot account for the phenomenology of the OBE. As I have already explained, I believe the present theory can at least begin to do this.

That being the case, the final test is the predictions that the theory makes. I shall give a few examples of testable predictions from it and try to point out where these differ from the predictions of other theories. Undoubtedly others could be derived.

The OB world is supposed, on this theory, to be the best construction that imagination and memory can produce. A general prediction, therefore, is that the OB world should resemble constructions from memory. This is not central to any other theory of the OBE but is compatible with any of the "psychological theories."

This general prediction may apply to almost any aspect, but one specific example is that of viewpoint. According to this theory, we should expect two things. First, we should expect most OBEs to start from viewpoints that are most easily constructed in imagination. It is known that many OBEs begin with a viewpoint above and slightly

behind the head (e.g., Crookall, 1961; Green, 1968; Muldoon & Carrington, 1951). However, no detailed study has been made of this feature of OBEs or of which viewpoints are easiest to imagine. A comparison of these two would provide a simple test.

Second, people who have had OBEs might be expected to be better at creating these different-viewpoint images than are people who have not. In a previous experiment (Blackmore, 1983), I tried to find out whether OBEers more often remembered scenes as though from above, rather than eye level, and whether they could easily switch from one to the other. There was no evidence that they were more likely to recall scenes from above, but they did claim to find it easier to switch viewpoints. A better test of this hypothesis would be to use the actual present scene, that is, to test people's ability to switch imagined viewpoints within the room they are actually in. We would expect the easiest viewpoints to be those commonly adopted in OBEs, and that OBEers should find the task easier than others. If this were found, it could not provide evidence against any of the other theories; but it is at least a specific test derived from this one.

Other aspects of the same general prediction concern the effects of thought on the OB world. Those things that are easy or difficult to do in imagination should correspond to those that are easy or difficult when "out of the body." An example already given is that of turning on electric lights. This requires a fast and detailed increase in imagery, which may explain why it is so difficult in both lucid dreams and OBEs. But turning off lights, or turning on other electrical appliances, need not involve so much imagery and should be easier in OBEs. Other examples might be performing skilled actions of various kinds or watching the behavior of falling, breaking, or fast-moving objects.

There has been much debate about whether psychological theories of the OBE in general predict better imagery among OBEers (see, for example, Irwin 1981a, 1981b; Palmer, 1981). This theory does predict such a relationship, but with reservations. First of all, it leads to slightly different predictions in the case of spontaneous OBEs as opposed to deliberately induced ones. For the former, the prevailing conditions may be more important, whereas in the latter, imagery and other skills play much more of a role. Note that this dichotomy is not the same as that between natural and enforced OBEs, proposed by Crookall (1961) and tested by Alvarado (1981).

Let me clarify this. According to the theory, two things are needed for an OBE to occur: the breakdown of the input-controlled model and the construction of, and replacement by, an imagery-based one.

Factors that promote either of these are conducive to an OBE. A spontaneous OBE usually occurs when sensory input is low or the system is very noisy. If these conditions are powerful enough to destroy the input-controlled model, then it will not matter too much how good the imagery is in the alternative model. So imagery, while it may be helpful, is less likely to be a determining factor in whether the switch of models occurs.

In a deliberate OBE, on the other hand, it is necessary to make both changes deliberately, that is, to ignore or block out the good input-controlled model and to substitute for it an entirely imagery-based model. In this case (unless one is extremely good at blocking out input), good imagery will be essential.

I would therefore predict that any correlation of OBEs with imagery skills should be greater for deliberately induced OBEs. Irwin (personal communication, 1981) has tried to find this difference in some of his data, but unsuccessfully. I intend to look for it in future studies, but the problem is the rarity of self-induced OBEs. This prediction would not, as far as I can see, be made by any other theory of the OBE.

Still on the subject of imagery, it is not at all clear which aspects of imagery are most relevant. Vividness and control of imagery have generally not been found to be related to having OBEs (see, for example, Blackmore, 1982), but these may not be the most relevant aspects. For example, spatial imagery skills may be more important (Blackmore, 1983; Cook & Irwin, 1983). On this theory, the complexity or detail of imagery may be more important than vividness. More specific predictions about imagery would follow if we could specify precisely the criteria used for selecting reality models. If they were, in fact, stability, complexity, and coherence, then we should expect those aspects of imagery to be the ones important for having OBEs. This is obviously an area for further investigation.

The other skill necessary for deliberately inducing OBEs is the ability to ignore or block out sensory input. In common with other theories, the present one predicts that people who can do this should more easily have OBEs; but again, it predicts that this is more important for deliberate than spontaneous OBEs. This may well relate to Irwin's (1981a) finding that OBEers tended to have a higher absorption score than did non-OBEers. It is the ability to remain absorbed in an alternative model that makes it more likely to gain reality status.

To summarize these predictions briefly, I suggest that, generally, features of the OBE should correspond to those of models built from

memory and imagination. For example, common OB positions should correspond to those positions from which it is easiest to visualize scenes. Tasks that are easy to perform in imagination should also be easy in the OB state and vice versa. In addition, people who are likely to have OBEs should be good at visualizing scenes from alternative positions. Those who can induce OBEs voluntarily also need to be good at ignoring sensory input and have vivid and well-controlled imagery. Although some of these predictions are common to other theories, others are more specific, and their investigation could provide a basis for testing the theory presented here.

Finally, I would like to mention, briefly, some other ASCs. The theory I have outlined predicts, in general, that whenever the input-controlled model is inadequate, some other, internally generated, model may take over as reality. This occurs commonly in sleep. During NREM sleep there may be so little processing going on that every model is weak and unstructured, but in REM sleep one is in the curious position of being without adequate sensory input or even the need for an input-based model. Nevertheless, there is sufficient arousal for complex models to be built. According to the theory, whichever model is the most complex, coherent, or stable will take over reality status and seem absolutely real at the time. On your awaking, the input-controlled model is reinstated, and you may look back and wonder how on earth this crazy model ever seemed real! This is surely the common experience of dreaming. It prompts the question of why OBEs usually continue to seem real even after they end. I think the answer is that the OBE involves a self that is continuous with that of normal waking. With respect to memory, thinking skills, and so on, you seem to be just the same person as usual. In these respects, "you" do not change when the OBE ends. In a dream, by contrast, you do not typically have access to much of your normal memory about who and where you are and do not think in the same way. The dream is, in this sense, quite discontinuous with waking life.

In this light, it is interesting to consider what happens if, during sleep, you manage to access some of that normal memory and build a model that says that you are asleep and dreaming. This may take two forms. One is a model of yourself as a body lying in bed, and this is then equivalent to an OBE. The other is the realization that you are dreaming so that you, modeled after your usual waking self, can use and manipulate the dream. Both of these are very hard to sustain because there is so little sensory input to stabilize them, and they

demand concentration and large amounts of information from memory, which may not be readily available during sleep. I have suggested elsewhere (Irwin & Blackmore, in press) that this approach may be a productive way of looking at lucid dreaming and the related experiences of flying dreams and false awakenings. These states are similar in many ways to the OBE and on recollection seem more "real" than ordinary dreams do. However, while the OBE is always in danger of giving way to an input-driven model, these dream states are more likely to give way to other (less lucid) dream models.

Finally, and more speculatively, this approach may have implications for understanding mystical states of various kinds, and states achieved through mental discipline and meditation. For example, in several kinds of meditation, one learns to ignore sensory input almost totally while maintaining sufficient arousal for complex modeling. One of the hardest things to do must be to maintain a reality model of nothing at all when the system is madly trying to make models from input. If you can do this, you have great control over models of reality and hence great potential.

In some kinds of open meditation, one attends to sensory input but in quite a different way from normal. One does not evaluate or elaborate on input in the same way, or build it into complex structures to make sense of it. The result is that you can be acutely aware of far, far more than normal, but at a much simpler level of elaboration. In both these cases, I think we may get closer to understanding what the state is like if we ask what the model of reality is like rather than looking at physiology or other bodily changes.

Similarly, there are some states of realization that I think can be approached in this way. What if you achieve a state in which your model of reality is a model of the whole world with yourself as nothing special within it, or a model of yourself as a grain of sand, or a hair on the head of an infinite God, or indeed a model so simple that it defies verbal description? I suggest that if any of these becomes reality, in a condition of alert wakefulness, a person is going to be changed by the experience. Again, we must look at the level of the model of reality if we are to see why.

I believe this approach can also shed new light on the traditional higher worlds and other planes, even the astral planes of occult lore. Many adepts of various disciplines and many spontaneous OBEers have described "other worlds" with remarkable consistency. This consistency is often used as evidence that these worlds have independent existence or are of "real substance" (Rogo, 1983). I suggest instead that these worlds reflect the possible models of reality that



we, with our particular kind of cognitive system, are capable of constructing. The potential for such worlds is constrained by the constraints of that system, and it is by understanding this that we shall be able to understand these other worlds of the imagination. There have been many attempts at building maps of these spaces, or maps of consciousness (e.g., Fischer, 1975; Metzner, 1971; von Eckartsberg, 1981).<sup>1</sup> This theory may be able to provide a new map by understanding just how some models of reality are closer to others whereas some are far apart, and which can be reached by which routes.

These further speculations may not help us at all in understanding the OBE. Indeed, they are premature when the theory has not even been tested in its simplest applications. However, I present them as part of my case that we should look at ASCs in general, and OBEs in particular, in terms of a person's model of reality.

#### REFERENCES

- ALVARADO, C. S. (1981). Phenomenological differences between natural and enforced out-of-the-body experiences: A reanalysis of Crookall's findings. *Theta*, 9 (4), 10-11.
- BARTLETT, F. C. (1932). *Remembering*. London: Cambridge University Press.
- BLACKMORE, S. J. (1978). *Parapsychology and out-of-the-body experiences*. London: Society for Psychical Research.
- BLACKMORE, S. J. (1982). *Beyond the body*. London: Heinemann.
- BLACKMORE, S. J. (1983). Imagery and the OBE [Abstract]. In W. G. Roll, J. Beloff, & R. A. White (Eds.), *Research in parapsychology, 1982* (pp. 231-232). Metuchen, N.J.: Scarecrow Press.
- COOK, A. M., & IRWIN, H. J. (1983). Visuospatial skills and the out-of-body experience. *Journal of Parapsychology*, 47, 23-35.
- CROOKALL, R. (1961). *The study and practice of astral projection*. London: Aquarian Press.
- DAVIDSON, J. M., & DAVIDSON, R. J. (1980). *The psychobiology of consciousness*. New York and London: Plenum Press.
- DENNETT, D. (1983). Artificial intelligence and the strategies of psychological investigation. In J. Miller (Ed.), *States of mind*. London: The British Broadcasting Corporation.
- EHRENWALD, J. (1974). Out-of-the-body experiences and the denial of death. *Journal of Nervous and Mental Disease*, 159, 227-233.

<sup>1</sup> The term *map* is used here in two different senses. First there is the *cognitive map*, which refers to a hypothetical internal representation of the physical world. Second, there are *maps of consciousness or of experience*, which are built (usually by psychologists) to describe variations in experience. The two should not be confused, as they have been, for example, by von Eckartsberg (1981).

- FISCHER, R. (1975). Cartography of inner space. In R. K. Siegel & L. J. West (Eds.), *Hallucinations*. New York: Wiley.
- GREEN, C. E. (1968). *Out-of-the-body experiences*. London: Hamish Hamilton.
- IRWIN, H. J. (1981a). Some psychological dimensions of the OBE. *Parapsychology Review*, **12** (4), 1-6.
- IRWIN, H. J. (1981b). Letter to the Editor. *Journal of the Society for Psychical Research*, **51**, 118-120.
- IRWIN, H. J., & BLACKMORE, S. J. (in press). Out-of-body experiences and dream lucidity: Two views. In J. Gackenbach & S. La Berge (Eds.), *Lucid dreaming: New research on consciousness during sleep*. New York: Plenum.
- LIBEN, L. S., PATTERSON, A. H., & NEWCOMBE, N. (Eds.) (1981). *Spatial representation and behavior across the life span*. New York: Academic Press.
- MARR, D. (1982). *Vision*. San Francisco: W. H. Freeman.
- METZNER, R. (1971). *Maps of consciousness*. London: Collier-Macmillan.
- MULDOON, S., & CARRINGTON, H. (1929). *The projection of the astral body*. London: Rider.
- MULDOON, S., & CARRINGTON, H. (1951). *The phenomena of astral projection*. London: Rider.
- NEHER, A. (1980). *The psychology of transcendence*. Englewood Cliffs, NJ: Prentice Hall.
- NEISSER, U. (1976). *Cognition and reality*. San Francisco: W. H. Freeman.
- PALMER, J. (1978). The out-of-body experience: A psychological theory. *Parapsychology Review*, **9** (5), 19-22.
- PALMER, J. (1981). Letter to the Editor. *Journal of the Society for Psychical Research*, **51**, 35-36.
- ROGO, D. S. (1982). Psychological models of the out-of-body experience. *Journal of Parapsychology*, **46**, 29-45.
- ROGO, D. S. (1983). *Leaving the body*. Englewood Cliffs, NJ: Prentice Hall.
- SIEGEL, R. (1977). Hallucinations. *Scientific American*, **237**, 132-140.
- TART, C. T. (1980). A systems approach to altered states of consciousness. In J. M. Davidson & R. J. Davidson, *The psychobiology of consciousness* (pp. 243-269). New York and London: Plenum Press.
- UNDERWOOD, G., & STEVENS, R. (1979). *Aspects of consciousness* (Vol. 1). London: Academic Press.
- UNDERWOOD, G., & STEVENS, R. (1981). *Aspects of consciousness* (Vol. 2). London: Academic Press.
- VALLE, R. S., & VON ECKARTSBERG, R. (Eds.) (1981). *The metaphors of consciousness*. New York and London: Plenum Press.
- VON ECKARTSBERG, R. (1981). Maps of the mind. In R. S. Valle & R. von Eckartsberg (Eds.), *The metaphors of consciousness*. New York and London: Plenum Press.

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