

Proceedings from the Second Annual Lucid Dreaming Symposium

Session 1: What is a Lucid Dream: Psychological and Physiological Considerations

Commentary

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Hartmann: Thank you very much for inviting me to this symposium. I will do you people a favor by saying very little and leaving time for discussion. I'm very fascinated by this phenomenon. I am not a lucid dreamer myself, at least not a good lucid dreamer, maybe just a touch. I do want to make just a few comments and ask a couple of questions that maybe those of you who presented data this morning or those of you who have done a lot of lucid dreaming could help me with. One general comment. The link to various kinds of pathology is important. For instance a link to narcolepsy has been mentioned. I thought of that and actually asked two of my narcoleptic patients whether or not they had lucid dreaming, as I defined it to them. They did not but they had so much of everything else, they had flying dreams, they had nightmares, they had tremendously vivid dreams, that I think they could have learned lucid dreaming.

Related to that, another comment dealing with something which I do know a little about, nightmares, as opposed to lucid dreams, which I know nothing about. This relates to a hypothesis which I believe Stephen made that out-of-body experiences are, perhaps, lucid dreams or misperceived lucid dreams. I don't believe that because of my experience with about one hundred people with very frequent nightmares, who described a lot of dissociative experiences of many kinds. Many of them described spontaneous out-of-body experiences. But none of them, at least as far as I have been able to tell from my notes, described lucid dreams. In fact, if they were really good lucid dreamers, you'd think maybe they wouldn't have that many nightmares. For what it's worth, I looked informally for that relationship. I thought, here was a group of people who are describing a great many out-of-body experiences, many very different kinds of descriptions of OBE's, but no lucid dreams. I am interested in some discussion on that.

And now one final point which really intrigues me. I could put it in terms of "why the wow?", "whence the euphoria?" Well, maybe there is none. Jayne said there wasn't as much as we think. Certainly in talking to lucid dreamers, one hears about a sense of elation and euphoria while having a lucid dream. I would like to contrast that with the fact, as I understand it at least--the cognitive condition of the lucid dream is really a partial dream. Part way from waking, let's say waking consciousness to dreaming consciousness. We're more in control than usual. In those terms it sounds as if a lucid dream would be like a vivid daydream. We are in control of the image. I can have very vivid day dreams. I can fly, have sex, all sorts of things. Yet apparently that is

not a lucid dream either physiologically or psychologically. The people who have lucid dreams frequently assure me it's nothing like a daydream. Yet I still would like to ask the question, why, for those at least who have the wow, why the wow? Isn't it something, at least looking at it from the outside, isn't it something that is partly waking and partly dreaming? You would think there would be less surprise since you are at least partly in control. Maybe the wow is just a matter of, "here is something new and interesting that I haven't experienced before." In that case it should habituate, adapt out with time. Maybe it's something else. Maybe endorphins are being released or whatever. But for me, at least, this seems to be a serious question. How come this elation. Or to put it a different way, I haven't heard a single person say, "I had a real dream and then later I found myself in this dull halfway state where I was part way in control. Ho hum." Lucid dreams just are not spoken of in that way and yet cognitively you'd think they might be. So let me leave that as a question and just stop there.

Antrobus: I second your comments. It's an interesting point about the "wow". It may have something to do with the fact that the lucid dreaming interest came out of the popular culture, to some extent, more than it did from the laboratory to start with. The interest in dreams came that way too. To some extent it's just something different to experience and the fact that it is different is partly what all the problem is about really. And why I think the solution is so hard to come by is because we start to handle this analysis by using classes of cognitive and physiological phenomenon that are available to us to start with. A lot of those come to us from the vernacular. The concepts of sleep and waking are first defined by vernacular use long before any of us even go to school. And the concept of arousal and activation is similar. Generally we use those terms before we have a professional or scientific definition to them. Then we find lucid dreaming seeming not to fit the usual definition of dreaming because dreaming means you are asleep but being aware means you are awake so that's basically the original argument. Actually I think Stephen and I exchanged words about this back in Palo Alto fifteen years ago. I think we still have the same problem here. Now we are relating the concept of lucid dreaming to activation. A good part of what we have here shows the brain in sort of a twilight state.

The alpha state, by the way, that you said was associated with greater arousal, was associated with greater arousal in the context of sleep. But if you are awake, alpha is associated with a drowsy state. So it's a transition state, or at least that's one of its characteristics. One of the things that we have to look out for is the issue of whether activation is really a unified concept or whether really there are all kinds of separate patterns of activation. The obvious first question is to look at it in a general way and then see if that's getting us into trouble. Then we may have to break things down into separate kinds of activation. As they get harder to measure, a lot of us I'm sure, will lose interest and walk out. It's like the young child who asks a question and wants a simple answer and once you get to the fourth sentence their asking for ice cream. They've forgotten the question and aren't interested anymore. I'm old enough to remember the days when we had our, I think, third sleep meeting in Chicago back in, it must have been '62, '63, and

everything was very simple then. There were simple explanations for the whole thing. It looked like it was practically all sewed up and there were no more questions to solve. Then gradually everything began to get more and more complicated. Everything had five subdivisions and everything was so complicated that a lot of people got discouraged and basically left the scene. I think that may happen with lucid dreams if you want to pursue it until we truly understand its neurophysiological basis. You've got the concept of arousal here but let's have a look at it.

You've got arousal in terms of alpha but you have the H-reflex indicating that you're in almost a strengthened REM state. But the alpha suggests that you're out of REM moving towards waking. So those two measures would appear to be in conflict. What I think that we've got to do is realize that the class of REM is a working definition of a state. It's not a God given definition of a physiological state. It is simply an interim definition of a physiological state. The processes that define REM are primarily initiated in the brain stem and we don't have access in them in the human being. We can only infer them from what the brain does to the cortex and that's quite a few legs away from what's happening in the brain stem. The activation starts in the brain stem and moves up to the thalamus and then to the cortex. And the process by which you get rid of the alpha's is not well understood at this point. If it's similar to the mechanism of theta suppression, it's a process of hyperpolarization of the neurons in the outer edge of the first layer of the cortex. The cortex is made up of five layers, all of which can make up no more than about two millimeters of thickness. The outer layer has a hyperpolarizing process which has to do with the permeability of the individual neurons that make up that layer of the cortex. They prevent discharge of the neurons and the polarization builds up and all of a sudden it breaks down. It breaks down synchronously with a whole lot of cells at one time and gives a pulse. Then this hyperpolarization builds up again, there's no output, and then there is this big discharge. When you get this happening with a hundred thousand, two hundred thousand neurons simultaneously in synchrony, you get a synchronous pulse appearing at the superficial layer of the cortex. That synchronous pulse, then, is broken down when there's discharge from the mesencephalic reticular formation which moves up through the thalamus. It changes that hyperpolarization in another complicated way and breaks it down so that the cells, now show independent activity. So the synchronous behavior goes away and those cells and this is only theory, then begin to send more individual activation down to the cells lower down in the outer layers of the of the cortex. That's, presumably, where all of the cognitive work goes. It's that basis that we use to infer that desynchrony is associated with more activation. That's the way it goes with some synchronous wave forms, but not necessarily with others. The idea that synchrony is associated with less activation has been with us since Sherrington's day. It's sort of a foundation of a lot of neurophysiological thinking.

The suppression of alpha would fit somewhat with the work on the H-reflex. That could indicate an intensification of the actual REM process. That's happening in the temporal lobe. And that's where, of course as you all know, you're linguistic material is coming from and that would be why the sleeper would construct the

actual verbalization of the experience, which is the essence of calling it a lucid dream. But to the extent that REM is like waking in many of its characteristics, that distinction still has to be worked out. It may be that I think we should give up, for this work the distinction of calling it REM sleep and look at the individual variables because so many of them are exactly the same as waking that trying to force something into waking versus a REM category, it seems to me, would not be productive. There is an advantage to using more measures rather than just sticking to one. That you have used the H reflex, I think is a brilliant idea.

By the way, I just want to add a word about the autonomic system. The autonomic system is normally inhibited in REM. That's another one that is going in the opposite way in lucid dreaming. If you're really in a REM state the afferent feedback from the autonomic system should be inhibited. So we have the notion that autonomic activation which should be distinguished from mesencephalic reticular formation activation. The activation pattern of normal REM sleep is associated with the inhibition of the autonomic system. So, again, just to conclude, I think it's important to see that the things here don't match any of the usual patterns and that instead of trying to force them into REM or waking, or even sleep versus waking, we should try to describe them in terms of the individual variables, both the cognitive and the physiological ones, and we may find that we've got a new kind of state.

Gackenbach: The work that I'm doing with the Maharishi International University is toward that end. They are arguing that dream witnessing, which may or may not be the same as dream lucidity, is a new state of consciousness, transcendental consciousness.

Hunt: I'm going to abuse the role of the chair and just ask a direct question. You asked, both of you in different ways, why the wow? I think that is a very important point in lucidity research. It's our impression in terms of some of the research I'll be reporting later today as well, that the wow isn't just because it's a different state and it strikes the subject as curious. There seems to be a quality of emotional expansiveness and elation that comes with lucidity. Our suspicion is that whatever the wow is, it's akin to the similar feelings described in long term meditative practice. There seem to be both physiological and psychological similarities between lucid dreaming, especially when it's highly stabilized, and meditative practice.

Antrobus: Well, I got the impression from Jayne's paper the other day (Editor's note: This paper is presented elsewhere in this issue of *Lucidity Letter*) that in the TM experience you have more of an inhibition of the autonomic response, it's not a wow experience at all. I don't see it.

Gackenbach: We feel that there may be a developmental relationship. Lucidity is a precursor to witnessing, and with the lucidity you have the wow. It's new, it's novel, the idea of new and novel, Ernest, I think captures it. It's new, it's novel, but that with practice, with this development of consciousness, it quiets. The wow quiets. The wow is

gone. It's not that it's unpleasant in any sense or form. But it's like with the near-death experiences, the verbal reports are of, "Oh, I'm dead." in a matter of fact but not unpleasant sense and not, "Oh! I'm dead!!", in either a horror or elation sense.

Antrobus: You don't know though. Because those were different kinds of preceding experiences. The TM experiences, the whole history of the training is quite different than it is in the lucid dreaming.

Gackenbach: Yes, there is training involved. I'm talking about the spontaneous emergence or dream consciousness.

Hartmann: Jayne, you are saying that the wow dampens out. As I see it, that would be quite different from what Harry just said. Meditators routinely report that as they get into it, as they learn, it becomes more and more that way.

Hunt: I think with long term meditative practice, at first when the person is really able to meditate very well, there is a quality of elation and wow and it has quite a bit of intensity. Years ago in a content analysis of ecstasy reports, a researcher described a kind of shift over time into what she called withdrawal ecstasy. It's a kind of calming out of the process. You could say there is still a characteristic, if you want to call it euphoric state, but it's broader, more diffuse and calmer.

The other point that I'll make very briefly, is that there should be important exceptions to all of this. Over the last few years I've run across three subjects I've encountered three subjects who have lucid dreams and hate them. These are people who are relatively controlling, relatively obsessive people, certainly not clinically so but on that side, and their complaint is that what they value about their dreams is a quality of release and an unselfconsciousness and suddenly, if they know they are dreaming when the dream is going on, they're deprived of what they like about dreams. So it does happen the other way.

Hartmann: That's interesting and very good to know. Some of the people who maybe aren't here at the ASD conference anymore, would be very glad to hear that. They would like the completely unpushed, spontaneous emerging from the depth quality. Their feeling is that lucid dreams ruin that. So I'm glad to hear that that at least occasionally happens.

La Berge: I'd like to respond to a couple of the issues brought up and thank you both for some very provocative and interesting comments. To take a more complex issue first, is what is the state of lucid dreaming. The point that John makes is that instead of saying this is REM sleep and that's all there is to it, we really have to say, "Well what are the precise properties of this state. What does it have in common with REM, with wakefulness, with whatever other states that we know of." And then really to define a state for this. Maybe it's going to turn out to be REM One A or something. We just need

more distinctions. Because there is clearly a difference in a state like lucid dreaming from the usual dream state. My picture of it is that it's a paradoxically, highly actively REM state where for some reason the person doesn't wake up. I call it sleep still, because the person is not in sensory contact with the outside world. So in other words, subjectively, if this were a lucid dream right now, I would say, "Here I am, in this world. Now, I know my body's in bed, with covers on me. I can't feel them! The clock is there but I don't hear it!" So it's not that I'm not paying attention, it's that I'm not in sensory contact. That's the only reason I would want to call it sleep at all. It's a loose term, but I think that is the general meaning of sleep. It's sleep in regard to some area. The activation of the H-reflex and actually all the autonomic measurements that we measured are pretty much in common. They are all activated. That also happens in association the phasic REM. In other words, if you have a lot of eye movement activity you also have activation of the autonomic nervous system, although you have, generally, a strong parasympathetic tone compared to non-REM sleep. So I don't think that the effects are outside of the definition of REM, as has been found so far. It's merely that it's an uncharacteristic combination at one time. The odd thing is how does it persist? Why, when you become awake in a sense inwardly, why don't you wake up? I would guess, it is because of the same phasic processes that are suppressing sensory input. The more actively you're involved in the dream the less likely you are to wake up. But it's certainly something we have to look at and see what are the differences.

Antrobus: Stephen, could I ask if you would run waking controls in your studies in the future? We've been putting people in the sleep room for thirty minutes at a time, interrupting them at random, about six to seven minute separation between intervals, and getting a standard report just as though they were asleep. The vividness of the imagery is just as sharp as a REM, and there's bizarreness. They're not that distinguishable from REM reports. They are very very similar. If you have that kind of control that might also be a worthwhile. Now you have been trying to compare it to non-REM and other REM periods that are not lucid, but if you had a real waking control you'd have another handle on this thing.

La Berge: Thank you for the suggestion. In fact we are about to do something like that. We are going to do studies of hypnagogic lucid dreaming, and certainly that's part of what we are going to do, sample from clear wakefulness as well as sleep onset.

Two other points I had to make in response to Dr. Hartman's comments. One, let's take the out-of-body experiences. I don't think that what you said that people who have nightmares have out-of-body experiences and don't have lucid dreams contradicts my concept of what an out-of-body experience is or how it takes place. Let me just ask all of you. If you had never heard about lucid dreams and didn't really know what an out-of-body experience was either and you had the following experience, what would you think happened? You're lying in bed, apparently awake and the next thing know your body may be paralyzed and then you float out of your body. That's what happens. It's not that you dream that you float out. It feels like you float out of your body. So what do

you call it? You say, "I left my body!" That's what it feels like. It takes a sophisticated person to say, "Well, that isn't what really happened. What really happened is that I was dreaming that it happened because sensory input was suddenly cut off as I went into REM sleep." Now in the laboratory in say ten percent of the eighty lucid dreams we've collected they said, "Well I left my body." Well what do they mean by that? That's what it felt like. So we talk like that, although they understand and they signalled as they would in lucid dreams. So if you have a concept of the lucid dream you can understand, "Oh yes, I'm having the dream of floating out of my body," which happens under lawful circumstances, mainly when you have just awakened from REM sleep and then go back into it. So you have a piece of that bad word, day residue, right on hand which is a body. So naturally you represent that body, I think that it's also because the sensory input is cut off that there is some differences in the weight. I mean, I think it's no accident that people typically float up. I think it's that same thing. You're lying in bed, you've got the weight of your body, and then suddenly you're asleep. There's no sensory input anymore. You have no sensation of weight. It's, maybe like picking up a milk carton that you thought had milk in it but it's empty and it flies upward. It may be a phenomenon similar to that.

The second point is, whence the wow? Well you put it another way too. I think Harry has already given an idea of whence the wow. I'll say it doesn't really habituate that much because after about a thousand lucid dreams, if I were to have a lucid dream right now it would be a feeling of some excitement. It's not regular. I mean if you're having a lot of lucid dreams it's, "Oh yes, another lucid dream." So certainly it loses the surprise factor. But there is something of a feeling of freedom, but why the surprise? Let's just try it this way. Suppose right now, Ernest, you were to discover that you're dreaming. Now, right now! Wouldn't you be astonished? That's what it's like at times. "What!? This is a dream?" Because it seems so real and vivid, nothing like a daydream. It's just astonishing.

Hartmann: Well Stephen, what I had in mind was not the astonishment, which is certainly there, but 'wow' in the sense of ecstasy or elation. If I were to discover that now I was dreaming, sure there would be a 'wow' of surprise but it would not be especially happy. I would be kind of befuddled or disturbed. I would not have a feeling of ecstasy, as far as I know.

Hunt: Excuse me, we are running short on time. Are there one or two questions from the floor that we could take briefly.

Question: I just had a quick question that I wanted to address to Dr. Hartmann. Given what we've described about lucid dreaming and your research on nightmares, I know you haven't gone a lot into the nightmare treatment, but I wonder what you think of the possibility of trying to train nightmare sufferers to lucid dream, not necessarily suggesting it in any way, but what do you think is the potential for treating nightmares?

Hartmann: Well, sure, I think it is certainly worth trying. I have not tried myself. If you remember my work with nightmares, one of the surprising things was that these people who had frequent nightmares, were creative, artistic, open, vulnerable people, they had awful sounding nightmares, but they were not, as a group, attempting to get rid of their nightmares. So I agree with several papers given at the conference a few days ago that I don't think the approach to nightmares should be, "quick, let's do something to dispose of it!" That would depend very much on the person. There are certainly people who want to reduce or get rid of their nightmares, and if they do I think this is valid and I've suggested to people, in fact I would love to have someone do a careful study on whether or not this can help.

Question: Is there one really brief question that could call for an equally brief answer?

Antrobus: Harry, I have a brief comment I'd like to make. This has not too much to do with what we're talking about actually. But it's interesting and since I've got you here, those of you who are doing research on lucidity might be interested in a new method we've developed for measuring the brightness of the imagery and the clarity of the image that is non-verbal. It's a neat technique and it gets rid of some of the problems with the number of words recalled and so on. And it's a four by four matrix of photographs that are reproductions of one single color photograph and they're scaled along one dimension in terms of brightness to extremely dark on one side and normal bright photograph and then they're scaled the other direction in terms of focus. And when you wake the subject up you say, "Just point to the photograph that is most like that image." In other words, if you're dreaming of a horse running across a bridge, say horse for the horse and then which photograph was most like the horse and then for the bridge, which one was most like the bridge? So when you point to the photograph you can get a scale value that is relative to waking perception. It's on that basis that we've been able to find that our waking imagery and our REM imagery is scaled just about the same, so you can actually separately distinguish these things without any verbal report at all, other than just the naming of the nouns that they're looking at. And I could probably arrange to have these things duplicated. They would be reasonably expensive.

Hartmann: Could I make a quick comment that is very much related to Stephen's work that we were talking about? I want to pose a question. I'm very impressed with the light induced lucid dreams and the very high percentages and I'd wonder whether or not all or maybe a lot of spontaneous lucid dreams are light induced lucid dreams. At least as I read the data, lucid dreams are far more common after seven or eight hours of sleep, at six, seven, eight in the morning, than at other times. We are in the process of rolling over a lot in the night, especially during late hours, during REM sleep. When dawn has come we are constantly giving ourselves light stimulation at that point and maybe that's involved in more lucid dreams than we know.