

Induction of Lucid Dreams Including the Use of the Dreamlight

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I would like to talk in a somewhat broader context today than just on the use of the DreamLight. I will give you a sense of why I have been working on developing this device and my view of the induction of lucid dreams in general. In case there is anyone present who doesn't know what a lucid dream is — it is a dream in which you know you are dreaming while it is happening.

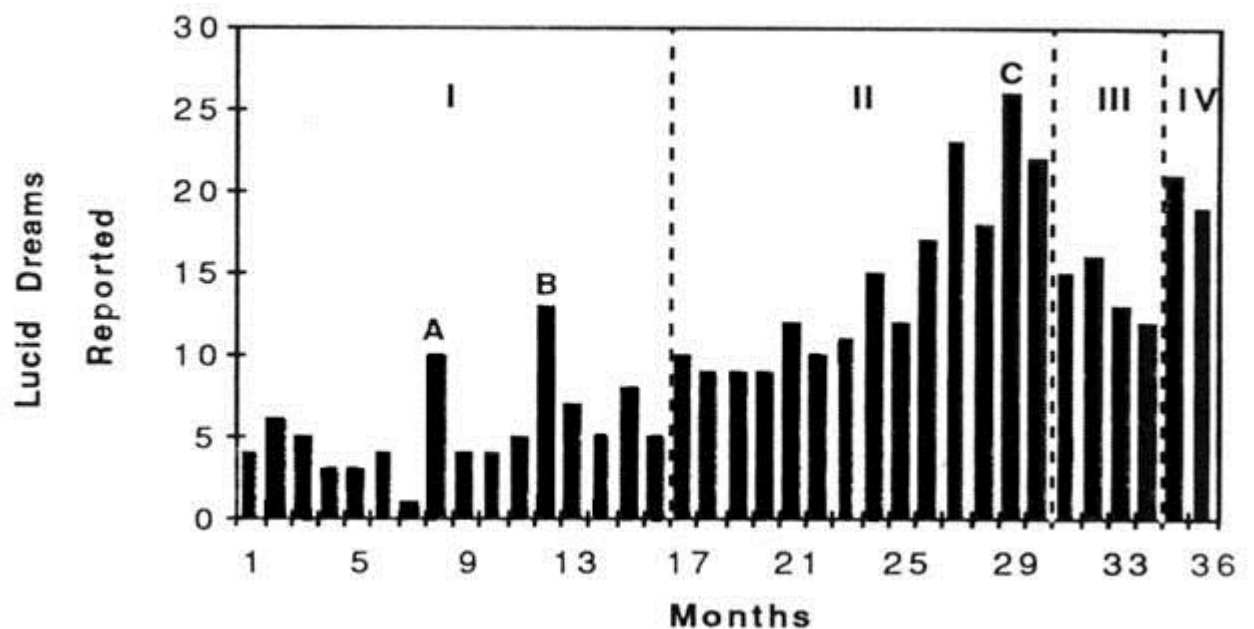


Figure 1

Monthly rate of lucid dreaming reported by the subject during the 3-year experimental period. During the first 16 months (I), lucid dreams were induced by autosuggestion. The increased frequency of lucid dreams in the months labeled A and B was associated with enhanced motivation, as discussed in the text. During the next period (II), the subject developed the mnemonic method for induction of lucid dreams (MILD). By the last 2 months of this phase (C), he was able to induce lucid dreams at will. For the next 4 months (III), he discontinued regular practice of MILD; the resulting extinction is clearly evident. During the last 2 months (IV), the subject used MILD to produce lucid dreams for polysomnographic recordings.

I started my own journey into the field of lucid dreaming about ten years ago when I was at Stanford University and needed a topic for my Ph.D. dissertation. I settled on lucid dreaming, a fascinating phenomenon that had not, as far as I knew, been researched yet. I had had a few experiences with lucid dreaming, enough to give me a great deal of personal interest in it. I began some experiments with inducing lucid dreams in myself and was motivated to have lucid dreams in the laboratory so I could study them for my dissertation.

When I started out trying to induce lucid dreams, all I had to go on was the idea from Patty Garfield's abstracts and books that she had been able to increase her frequency of lucid dreaming by autosuggestion, just by telling herself "I'm going to have a lucid dream tonight." I found that when I simply reminded myself before going to sleep, "I want to have a lucid dream tonight," I would have lucid dreams approximately once a week. However, notice on this chart of my lucid dream frequency during the three years of my dissertation project, at Point A I reached ten lucid dreams per month, a considerable leap from the periods around it.

The explanation for this sudden improvement is that that was the time when I was writing my dissertation proposal, in which I was claiming that I was going to be able to learn to have lucid dreams for this study. In other words I was extremely motivated to have lucid dreams, and it made a big difference in my success. But, as soon as I finished the proposal, my lucid dream frequency dropped back down to where it had been, because of the difficulty of maintaining such a high level of motivation. At Point B on the chart, where you see a similar sudden increase in the number of lucid dreams I was having, I was in the laboratory at Stanford starting my dissertation research. Again, my motivation soared.

But, you notice, in addition to the two outstanding high points due to motivational factors, there is a general increase in my lucid dreaming rate as time passes. It looks like I was somehow learning how to do it, and at about this point marked Part Two I began to realize what it was I was doing when I was doing it right. I had begun with the idea of using a sort of autosuggestion: "Tonight I will have a lucid dream." However, I had no idea of how I was going to do it, and so it was difficult to convince myself that I really was going to have a lucid dream. When I discovered what I was doing when I succeeded, it turned out to be a very simple thing. It was that I was setting the intention *of remembering to do something later*. Once I got the mental set right, my lucid dreaming rate started increasing more, and I developed the method I call Mnemonic Induction of Lucid Dreams, or MILD.

MILD involves using visualization to see yourself in a dream recognizing that you are dreaming — to help remind yourself to do something, i.e. realize you are dreaming, in

your next dream period. The procedure is to wake up from a dream and using that same dream you just awakened from, visualize yourself back in the dream, see yourself becoming lucid, and tell yourself, "Next time I'm dreaming, I want to recognize I'm dreaming." I found that with practice when I used this technique I was able to have lucid dreams on any night I wished.

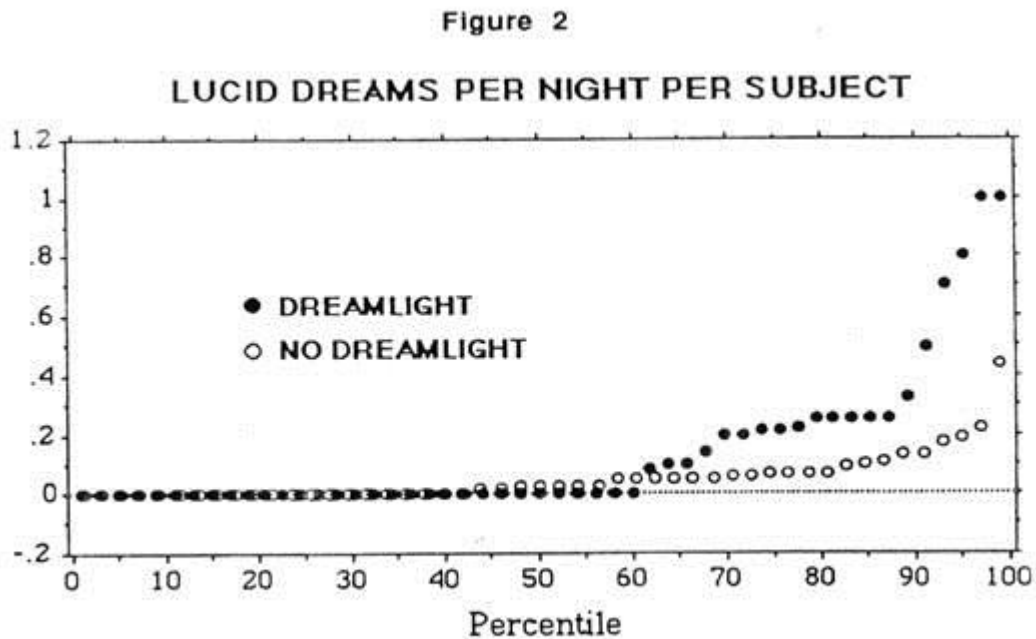
Others have had similar results with related methods, showing that once your mental set is correct, becoming lucid in dreams is not a difficult process. However, it is no trivial condition: "Once your mental set is correct..." The method we are using to attain that mental set is remembering to do something in the future. If you think of this in terms of the waking state, how do you remember to do things in the future? You write yourself notes, or leave yourself reminders. If you want to take something with you when you are going out the door, you put it by the door so that it is there to remind you when you need to remember it. The problem is, how can we remind people at the time they need to be reminded, namely, while they are dreaming, that they want to recognize that they are dreaming? How do we get a cue into a dream?

One example of what we have used is goggles with flashing red lights worn by the sleeper. When the person is in a REM period, dreaming, we apply this flashing light, and if the light is incorporated into the dream and if the dreamer recognizes the light correctly, he will realize that he is dreaming. The light can be incorporated into the dream in different ways. This slide shows the polygraph record from a case of lucid dream induction by this method — this is actually Daryl Hewitt recorded in our laboratory. The bottom channel shows the light stimulus being turned on, and in the eye channel you see his lucidity signal, after which he dreams on lucidly.

Now, I want to show you the device we have been using for home studies (called the DreamLight) and report our results with it so far. It consists of a mask you wear over your eyes while you are sleeping, which picks up eye movements with an infrared eye-movement detection device, and when enough eye movements occur that the computer in the box believes you are in REM sleep, the lights in the mask flash. Meanwhile, back in your dream the light may appear somehow, perhaps in a transformed way — if you recognize it you will realize you are dreaming. Or, if your mind is not prepared... for example, I might think there was something wrong with the projector here, and say, "Turn that thing off, please!" If my mind is prepared, and I'm really ready to remember it, then I'll say, "Ah hah!" That is the DreamLight. That means I'm dreaming right now." And then I can remember, "Oh, yes, I went to sleep wearing the DreamLight."

We did a study with the DreamLight and 49 subjects who attended eight weekly group meetings. During the course of the group, they had the opportunity to use the DreamLight several times. The average number of nights the DreamLight was used per subject was six nights, and each subject also contributed an average of thirty nights of data from nights when they did not use the DreamLight. On those non-DreamLight nights

they may have been using other induction techniques, such as MILD or a modification of the reality testing procedure recommended by Paul Tholey.



This slide [Figure 2] shows the frequencies of lucid dreams per night per subject during the study. You can see that lucid dreams are more frequent on nights when the subjects used the DreamLight, even though there is a smaller sample of DreamLight nights than non-DreamLight nights. In fact, if you take the average rate of lucid dreaming on non-DreamLight nights, and multiply that expected rate by the total number of nights the DreamLight was used, that gives you the expectation of how many lucid dreams subjects would have had on the same number of nights using the DreamLight — if it had no effect. But, you can see a striking difference between this expected number of lucid dreams and the actual number observed for the DreamLight nights. Using the expected baseline lucid dreaming rate, only 2 of the 49 subjects would have had lucid dreams on DreamLight nights, rather than the observed 19.

There were three techniques that we were using in this study: the DreamLight, reality testing and MILD. For each subject we did a correlation between the number of times that they had lucid dreams and their use of the DreamLight or not (this was a dichotomous variable) and then the number of times they tested reality on the day before, or the number of times they did MILD during the night. Then we averaged the correlations coefficients for however many subjects there were in each comparison. Not everybody did all the techniques, so there were fewer than 49 correlation coefficients. Only subjects who had had at least one lucid dream could be used, so we have N's of 34 to 36.

The averages of the correlation coefficients across subjects are shown on this slide [Table I]. The T-tests test the significance of the difference of each average correlation coefficient from zero. If there is no relationship for a given technique between the technique and lucid dream frequency, half the subjects would have a positive correlation, and half would have negative, and the average correlation would be nonsignificant.

Table 1
Group Averages of Correlation Coefficients of Lucid Dreaming Rates (LDPERD) with Three Lucidity Induction Techniques

Variable	<i>r</i>	(95% C.I.)	<i>N</i>	<i>t</i> ^a	<i>Z</i> ^b
DL	.098	(.095)	34	2.10 (p < .022)	3.09 (p < .001)
RL	.036	(.102)	36	0.71 (p < .24)	0.52 (p < .30)
MILD	.124	(.087)	36	2.91 (p < .003)	3.10 (p < .001)

^a T-test of $H_0: r = 0$.

^b *P*-values for individual Pearson correlations were converted to signed *Z*-scores and their total divided by the square root of *N* to yield a combined *Z*-score (Rosenthal, 1978).

The DreamLight shows a small, but significant correlation coefficient of about +.10 — it is statistically significant, and a majority of subjects had positive correlations between DreamLight use and lucid dream success. In the last column, the *Z*-score, takes into account the fact that people contributed different numbers of nights of data — somebody who used the DreamLight fifteen nights, which was the maximum number, had more data for the DreamLight nights than somebody who used it on only two nights. We wanted to weigh the data according to how many nights of data there were for each subject, so we took the *p* values (the probability) for each of the correlation coefficients, converted them to standard scores, and then used a standard statistical method to determine the overall probability of the occurrence of that collection of standard scores. Again, we have a significant relationship shown for use of the DreamLight and lucid dream frequency.

Now, let's look at the results for reality testing. This is a modification of Tholey's variant of this idea, wherein one asks, "How do I know I'm not dreaming right now?" throughout the day, and then does a visualization while repeating to oneself, "All right, I think I'm not dreaming right now, but later on when I am dreaming, I'm going to remember to do this [a reality test]". It is a bit of a combination between reality testing and a mnemonic intention exercise. Although there were two or three subjects who had a significant positive relationship between lucid dream success and frequency of reality testing, overall the group showed no relationship. About half the group had positive correlations and half negative, with no statistical significance. So, we found no

support for the usefulness of reality testing for inducing lucid dreams in this particular group.

MILD, on the other hand, showed the largest overall effect — the largest group correlation was between lucid dream frequency and the practice of MILD ($r = .12$, $p < .001$). This success may have to do with the fact that people had more of a chance to work with MILD than with the DreamLight, but, nevertheless, there was a significant relationship both for the probabilities and for the actual correlation coefficients. Thus, we found clear evidence that use of the DreamLight and use of MILD were both effective in increasing the rate of lucid dreaming.

Having looked at the rate of lucid dreaming for four conditions, with DreamLight, reality testing, MILD, and no technique, we know that the DreamLight was effective and so was MILD. How did people do on nights without the DreamLight or MILD? This baseline lucid dreaming rate was 3.7%, meaning that on those nights, if we had 100 people in the group, we would expect them to have a total of about 4 lucid dreams among them. In the condition in which the DreamLight was used without mental preparation with MILD, the rate went up to 5.5%. Using MILD without the DreamLight produced a rate of 13%, and the combination of MILD with the DreamLight resulted in the highest rate of 20%. Our interpretation of this is that using the DreamLight without doing MILD mean using the DreamLight with insufficient mental preparation, so that when the light flashes, even if you see it, you won't know what it means. It will be just a meaningless bit of dream content that you need to explain away.

Thus it is clear that, in this case, a reminder is not going to help you unless you are ready to remember it already. There is a saying, "A word to the wise will suffice, but for a fool a thousand explanations will never serve." Of course, we can be either wise or foolish depending on our preparation and what we bring to any task. Some people have had the impression that the DreamLight is some sort of machine that will force people to have lucid dreams, and some have expressed the concern, "Well, what if you are not really ready to have lucid dreams, then what will happen?" The answer is, very probably nothing. You'll have a dream in which you dream about the room light flashing, or something else you can explain away, but you won't become lucid unless your mind is prepared. Whether or not there is a developmental aspect — some psychological development that has to occur before you can have lucid dreams, I really don't know. We have no evidence bearing on that question.

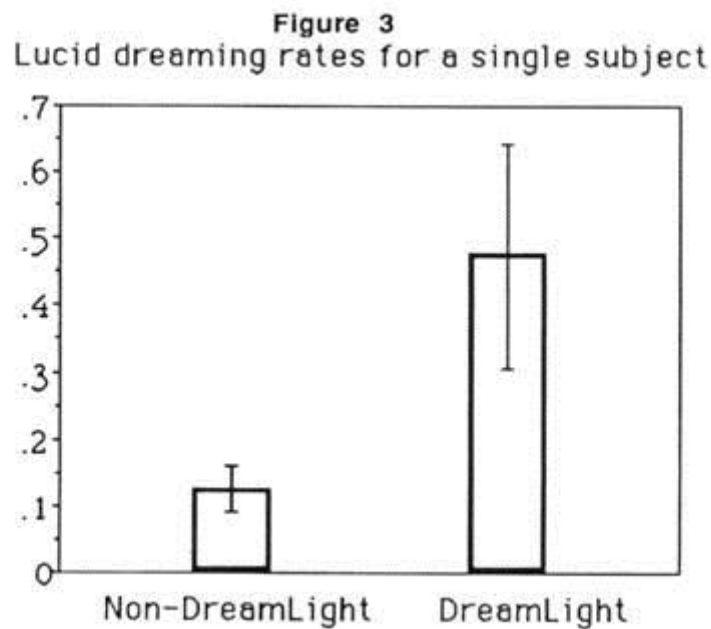
We do know that the mental concentration you put into it on the night before— especially the night before and perhaps the day before as well — you try to have a lucid dream is crucially important. If you are trying to remember to do something in the dream state, then, obviously, preparing your mind right before bed and during the night each time you wake up during the night will be by far the most effective. It may not make any difference if right now, for example, you all very strongly prepare your minds, "I'm going to have a lucid dream tonight. I'm going to remember to do this," because if tonight when you go to bed you don't think about it, this preparation will be diluted by the day's subsequent experiences, and will have little, if any, effect. Thus, in order to

maximize our results with the DreamLight lucid dream induction tool, we will be focusing on the preparation immediately before bed, and during the night.

I would now like my associate, Lynne Levitan, to describe a bit of the phenomenology of what happens with the light incorporations. The study I just described was one in which people used the DreamLight for one to fifteen nights, but we have some people who have used the DreamLight in various incarnations over the past several years, and had a great deal of success with it. I'd like you to get a bit of an impression of what this is like.

LYNNE LEVITAN

I've used the DreamLight about 130 times in the last three years, in several different versions, of course, since we started working on it. You can see by this slide [Figure 3] that I clearly have more success at having lucid dreams when I'm using the DreamLight. By the way, these results include no information on mental preparation, and I think the general assumption we can have regarding this data set is that I wasn't really paying much attention to mental preparation.



I have data here for 101 nights I used the DreamLight. On 59 of the nights I had incorporations. On 40 of the nights I had lucid dreams, so we can consider that on 19 of those nights I could have had a lucid dream, but I was stupid,

Table 2 shows some categories that we came up with to classify the various ways in which the light could be incorporated. The first category here with the greatest percentage is "light emanating from a dream object." This red light that you saw here

actually comes into the dream and becomes part of the dream. If you don't have any idea that you are wearing the DreamLight, it's just part of the dream. It is interesting to look at the various ways that the light can incorporate. A classic one is the sun — you are outside and the sun gets in your eyes. It is very bright. Also, it can be as reflections of the sun. The main thing about the incorporation is that it is very bright. You see a bright reflection from a mirror, or I even saw a bright reflection from a photograph of the sun in my eyes — in some cases I thought it was just the sun in my eyes, but usually I realized, "Oh, that's the DreamLight," probably because it was so bright. A case in which I failed was: I was at a concert, sitting in a stadium on the bleachers, and it seems there was an arc lamp sitting right in front of me flashing into the audience. Now I don't know why anyone would put an arc lamp facing up into the audience, but I never figured out it was the DreamLight until I awoke. One theme I've heard others report, too — the TV malfunctions and flashes in your eyes. In this case I have here there was a Star Trek episode on television, and the enemies had devised this exciting new weapon that produced something I called the "retinal flash." Another common case for me in this category is the popping of flashbulbs — someone is taking pictures. And, I've seen slide projectors projected directly in my eyes.

Table 2
Effects produced by the DreamLight in a single subject

24 (28.2%)	Light emanating from a dream object
23 (27.1%)	Light superimposed on the dream scene without a dream source
19 (22.4%)	Unaltered incorporations of the light stimulus
13 (15.2%)	Psychedelic/geometric patterns and pulsations
6 (7.1%)	Alteration of the ambient light level

The second most common category, light superimposed on the scene without a dream source, is pretty mundane. You simply see light in your eyes, and it is pretty obvious that it is the DreamLight. Interestingly, though, it is not always red. I've seen it as white or green. One time I saw it as four red dots hanging in front of my left eye — the interesting thing about that was that the mask I was wearing at the time only had two LEDs, rather than the usual four, so clearly my mind was still constructing away.

The third category is unaltered incorporations of the light stimulus. We don't have any statistics on this, but my guess would be that this is the easiest type to recognize, because it looks exactly like you are wearing the mask — except you are walking around you suddenly you see this stimulus hanging in front of your face. On the other hand, strange things happen like you see the light and take off the mask, in your dream, and you say, "Oh no, I'm not asleep, but it's still flashing!"

The fourth category is interesting — you see the light as psychedelic or geometric patterns. I've seen absolutely glorious brilliant patterns in concentric circles, and just

fascinating geometric shapes covering the entire field of vision. I've seen traffic lights and flash bulbs turn into psychedelic displays.

The final category is alterations of the ambient light level in the dream. I had an interesting case of this. I was walking down a street on a very dark night when suddenly it was as bright as day and I was floating about a hundred feet above the street. I said, "Well, I must be dreaming!" Mother curious case of this was that I was talking to Fariba [Bogzaran] in a room when she said, "I think we need some more light in here," and suddenly the room was filled with light. Now, how she did that, I have no idea!

LaBERGE

Thank you, Lynne. Unfortunately, due the time limitations we have to be moving on, but I think we have time for one question here.