

Applications of lucid dreams: An online study

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Summary. In a lucid dream the dreamer is aware of the dream state and can influence the dream content and events. The goal of this study was to investigate some applications of lucid dreaming. Our survey included 301 lucid dreamers who filled out an online questionnaire. The most frequent application (81.4%) was *having fun*, followed by *changing a bad dream or nightmare into a pleasant one* (63.8%), *solving problems* (29.9%), *getting creative ideas or insights* (27.6%) and *practicing skills* (21.3%). Women used lucid dreams significantly more often than men for both work on nightmares and problem solving. Our results show that lucid dreams have a great potential for improving one's life in different ways. More research is needed to illuminate the possibilities of lucid dreaming, especially in the fields of nightmare treatment and practicing motor skills.

Keywords: lucid dreaming, application, nightmare treatment, sports, motor skills, creativity, problem-solving

1. Introduction

A lucid dream is a dream in which the dreamer is aware that he or she is dreaming *while dreaming* (LaBerge, 1985). In a lucid dream the dreamer has the possibility to deliberately take influence on the dream content and events (e.g., LaBerge & Rheingold, 1990). For philosophers and researchers – mainly in the fields of psychology and sports sciences – lucid dreaming is a REM sleep phenomenon and a means for further investigating the dreaming mind and consciousness as well as neural simulation of actions constrained by sensory input and muscle atonia. Thus, in research, lucid dreams constitute on the one hand a research subject and, on the other hand, can be used as a means to investigate the dream state by asking lucidly dreaming subjects to perform certain tasks and to communicate from the dream by producing previously arranged eye movements that can be identified objectively in EOG recordings (Erlacher, Schredl, & LaBerge, 2003). While lucid dreaming is becoming more prevalent in research (e.g., Stumbrys, Erlacher, Schädlich, & Schredl, 2012) and philosophy (e.g., Windt & Metzinger, 2007), we also find a rising interest in the subject by the media and by individuals all over the world who, for example, actively use web forums on lucid dreaming. This interest surely has become even greater since “Inception”, but even beforehand people wanted to learn more about lucid dreams and how to achieve awareness within the dream. Schredl and Erlacher (2011) reported that 51% of the participants in a representative German population sample (N=937) had a lucid dream at least once, while 20% were

frequent lucid dreamers with at least one lucid dream per month (cf. Snyder & Gackenbach, 1988).

When the subject of lucid dreams is introduced a question that often arises is the one about the application of lucid dreams. Lucid dreaming is a learnable skill (e.g., LaBerge, 1980). There are many books, both novels (Castaneda, 1993; Jay, 2009) and non-fiction books (e.g., LaBerge & Rheingold, 1990; Tholey & Utecht, 1997; Waggoner, 2009) that not only provide information on how to learn lucid dreaming but which, furthermore, describe a plethora of lucid dream applications. Even some movies, directly or indirectly, provide inspiration regarding the special experience of dreaming lucidly. Still, people who are not familiar with the subject ask about the benefit of lucid dreaming for individuals: Why do people want to learn how to have lucid dreams? What do people use lucid dreams for? Is there any additional value when compared to “normal” dreaming or day dreaming? Is it worthwhile to practice repeatedly to achieve lucidity?

Some studies have already addressed the (potential) applications of lucid dreams. Lucid dreaming, as a technique to overcome nightmares, was investigated in various studies: Brylowski (1990) and Abramovitch (1995) demonstrated in single case studies that the introduction of lucid dreaming as a treatment for nightmares was effective. Zadra and Pihl (1997) confirmed this finding in a five case study as well as Spoormaker, van den Bout, and Meijer (2003) in a study with eight subjects. Spoormaker and van Den Bout (2006) showed that both individual and group sessions with a lucid dreaming treatment were effective, although lucidity itself was not necessary to reduce nightmare frequency.

Similar to mental practice, lucid dreaming can be used to consciously rehearse motor skills in the dream state. Based on qualitative data (N=6) Tholey (1981; 1990) demonstrated that motor skills can be learned and improved in lucid dreams. In a pilot field study Erlacher and Schredl (2010) showed that lucid dream practice can enhance performance in a coin tossing task. Erlacher, Stumbrys and Schredl, (2011) reported that within a sample of German athletes (n=840) 9% used lucid dreams to practice their motor skills. Furthermore, the majority of those athletes subjectively experienced an improvement of their skills in waking performance due to lucid dream practice.

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A different application of lucid dreaming was addressed by Stumbrys and Daniels (2010): They showed in an exploratory pilot study that lucid dreams can contribute to problem solving when dealing with creative tasks rather than with logical ones.

Although a variety of applications of lucid dreams exists, according to research as well as in books, forums and other media, we are not aware of any study that empirically explored the frequency of these applications within a sample of lucid dreamers. The goal of this explorative study was to fill this gap by showing the magnitudes of a variety of applications within a sample of lucid dreamers.

2. Methods

2.1. Design and procedure

Since this is an explorative study, we did not construct any hypotheses. The survey was conducted via an online questionnaire which was open from February till June 2006 and from December 2006 to November 2007 at www.klartraumforum.de which is a German Internet forum for lucid dreamers and people interested in lucid dreaming. Furthermore, the questionnaire was advertised from June 2005 on the <http://www.dreamviews.com/forum.php> and <http://ld4all.com/forum> forums in English and Dutch. Therefore, on klartraumforum.de, besides to a German version, Dutch and English versions of the questionnaire were provided.

2.2. Material

The online questionnaire consisted of the following questions (answers were saved without identifying information). After asking the participants about their age and gender, the dream recall frequency during the last months was acquired on a seven-point Likert scale (Schredl, 2004) with the options: 0 - never, 1 - less than once a month, 2 - about once a month, 3 - about 2-3 times a month, 4 - about once a week, 5 - several times a week or 6 - almost every morning. Afterwards a lucid dream was defined as follows: "Lucid dreaming means realizing in a dream that one is dreaming. A person can change anything he or she would like to change in the dream, but can also choose to do nothing and consciously watch the dream pass by." Participants were asked to state the frequency of their lucid dreams during the last months on an eight-point Likert scale with the options: 0 - never, 1 - less than once a year, 2 - about once a year, 3 - about 2-4 times a year, 4 - about once a month, 5 - about 2-3 times a month, 6 - about once a week, 7 - several times a week. In order to obtain units of mornings per week for the dream recall frequency (DRF), the scale was recoded using the class means: 0→0; 1→0.125; 2→0.25; 3→0.625; 4→1.0; 5→3.5; 6→6.5. A similar recoding was done for the lucid dream frequency (LDRF) in order to obtain units of mornings per month, scales were recoded using the class means: 0→0; 1→0.042; 2→0.083; 3→0.25; 4→1.0; 5→2.5; 6→4.0; 7→18.0. In the next section participants were asked if they had used their lucid dreams for specific purposes. The construction of the 5 predefined categories was based on the studies mentioned above which investigated specific applications for lucid dreams as well as suggestions made by LaBerge and Rheingold (1990). The questions were presented in the following way: "Have you ever used your lucid dream(s) to..."

- ... change a nightmare or bad dream into a more pleasant one (e.g., by confronting your attacker, etc.)?
- ... practice a particular movement to improve your skills in daily life (e.g., playing tennis, a musical instrument, etc.)?
- ... come up with new and creative ideas or insights? (e.g., drawings, paintings, texts, music pieces, etc.).
- ... solve a particular problem (work-related problem, academic problem, conflict with others, etc.)?
- ... have fun (e.g., fly, dance, laugh, have sex, etc.)?

For each of these questions participants were asked to first provide the number of such dreams they had had (999 maximum) and second to write down a short example. Furthermore, we asked for other lucid dream experiences as well as for problems occurring when trying to do something particular in a lucid dream with open-ended questions. Finally, participants were asked for permission to publish their dream examples in an anonymous way (optional).

2.3. Participants

The final sample consisted of $n=301$ lucid dreamers. After the deletion of spam entries 355 participants remained, 54 of which were deleted because they had stated they had not had any lucid dreams during the last months or because they had skipped at least one question regarding the applications of lucid dreams. Of the final sample ($n=301$) 133 participants were female (44%) and 168 male (56%). They were between 11 and 63 years old with an average age of 25.8 ± 10.4 years and a median of 22 years. 69 (23%) subjects were younger than 18. About two thirds ($N=205$, 68.1%) of participants answered in German, 55 (18.3%) in English and 41 (13.6%) in Dutch.

2.4. Statistical analyses

The results are presented mainly on a descriptive base. For group comparisons a Chi-square Independence test was used (level of significance: 0.05). All analyses were conducted with MS Office Excel 2003.

3. Results

Regarding the frequencies of dream and lucid dream recall, the participants recalled 4.4 ± 2.3 dreams per week and 5.4 ± 6.8 lucid dreams per month. In the following the results of the defined categories are presented. Table 1 illustrates the frequency of participants who used a lucid dream at least once for the respective category.

Having fun. The application that was most often chosen by participants ($n=245$, 81.4%) was "having fun" (fun), such as flying, dancing, laughing, sex. Within this group, the frequency of lucid "fun dreams" ranged from 1 to 500 per participant (the five highest values were excluded from analyses as outliers: 4x999 and 1x666): the average frequency was 32.9 ± 74.7 (median=7). Here are two examples of fun dreams:

"I am standing on top of green mountains. I make it windy [...] and then I jump about 30 m onto the next cliff with a great feeling of happiness and bliss. I run very fast and [...] dive into the sea. I breathe like a fish and have lots of fun. I feel totally free and I let myself drift into a turquoise-coloured bay [...] I am swayed by the water and the sun is shining on me. Everything is refreshing and relaxing"

Table 1. Comparison of the frequency of lucid dream applications

Application	
Having fun	81.4%
Changing nightmares	63.8 %
Problem solving	29.9 %
Creativity	27.6 %
Practicing skills	21.3 %

"One of the nicest things was that lemon cake which I enlarged to the size of a house. The best thing was that it really tasted like lemon cake!"

In general, in the examples of fun dreams that were provided, flying was mentioned by more than half and having sex by about a quarter of participants. Other things mentioned regularly were exploring, eating, having super powers (other than flying), and creating nice sceneries, dancing and relaxing.

Changing nightmares. The second most chosen category was "changing a bad dream or nightmare into a pleasant one" (nightmare) by $n=192$ (63.8%) participants. Per participant ($n=192$), the frequency of this application ranged from 1 to 300 per participant (the six highest values were excluded from analyses as outliers: 3x999, 1x666 and 2x500) and was 14.3 ± 32.8 on average (median=4). As in several examples, in the following dream the lucid dreamer gets rid of her persecutors:

"I was being chased by ninjas and I couldn't get rid of them, so I turned around and told them to leave me alone. I then ran away again and they didn't follow."

Problem solving. Ninety participants (29.9%) stated they have used lucid dreams to solve a particular problem (problem solving), such as work-related or academic problems or conflicts with others. Within this group, the frequency of lucid "problem solving dreams" ranged from 1 to 100 per participant (the five highest values were excluded from analyses as outliers: 3x999, 1x666 and 1x500). The average frequency per participant was 12.0 ± 25.8 (median=3) per participant. Here is an example of a lucid dream which was used to support daytime studying:

"Once when I had to take this difficult test with a huge studying demand and I was running out of time, I tried to find a solution in a lucid dream. There I used a particular studying technique with cards which actually helped in reality [i.e., waking life]"

Creativity. Almost the same number of participants ($n=83$, 27.6%) – compared to the previous category – stated they have used lucid dreaming to come up with new and creative ideas or insights (creativity), such as drawings, paintings, texts, music pieces. Per participant ($n=83$), the frequency of this application ranged from 1 to 100 (the two highest values were excluded from analyses as outliers: 1x999 and 1x500) and was 11.6 ± 20.9 (median=3) on average. The following dream constitutes an example of creative lucidity:

"I am composing. In the dream every musician of the band is me and as soon as I feel like a particular note, I just play

it. It is not like in waking life where you have to record all instruments consecutively on separate soundtracks [...] – you can just listen and play"

Most examples in this category dealt with writing, painting/ drawing or composing music. Some lucid dreamers reported they have actively sought for these creative ideas while dreaming lucid, others, on the other hand, were unintentionally inspired, for example, by vivid dream images.

Practicing skills. The least chosen category ($N=64$, 21.3%) was "practicing skills" (practice), like improving a particular movement or skills such as playing tennis or a musical instrument. Within this group, the frequency of lucid "exercise dreams" ranged from 1 to 100 (no outliers) and was 16.4 ± 26.0 (median=5) per participant. The following example was provided by a dancer:

"I am dreaming of ballet movements: leg positions, jumps, complex turns and combinations of jumps, etc. I practice the same turn again and again and then I almost have the sensation of feeling my body."

3.1. Frequencies per participant

When all frequencies of dreams per participant (i.e., how often the participants have used a certain application) are compared among the five categories, the medians follow the order of the frequency of applications within the sample (i.e., if they had ever used a lucid dream for the respective application) with one exception: The participants who use their lucid dreams to practice skills have more practice dreams than the participants who use their dreams to overcome nightmares, for problem solving and creativity have the respective dreams of the latter categories. The order of the medians is: *having fun* (7), *practicing skills* (5), *changing nightmares* (4) and *problem solving* as well as *creativity* (3).

3.2. Age and gender differences

In order to find potential differences between the ages regarding the application of lucid dreams, three age groups were differentiated: group 1: adolescents (11-17 years; $N=69$), group 2: young adults (18-25 years; $N=120$) and group 3: mature adults (26-63 years; $N=112$). Comparing these three groups, it can be found that there is no significant difference between ages concerning *having fun*. Interestingly enough, in all other categories frequencies of application increase with age, at least as a tendency. For *changing nightmares* the difference is significant among all the groups (group 1 vs. 2: $\chi^2=7.84$, $p<.05$; group 2 vs. 3: $\chi^2=7.34$, $p<.05$), for *problem solving* even highly significant between all the groups (group 1 vs. 2: $\chi^2=8.41$, $p<.01$; group 2 vs. 3: $\chi^2=9.57$, $p<.01$). For *creativity* only the difference between adolescents and the oldest group became significant ($\chi^2=4.9$, $p<.01$). Figure 1 illustrates the differences among the three age groups.

When comparing the applications of lucid dreams between female and male participants, it can be found that female lucid dreamers use lucid dreams significantly more often than male ones for both *changing nightmares* (75.2% of all females vs. 54.8% of all males; $\chi^2=13.41$, $p<.001$) and *problem solving* (39.8% vs. 22.0%; $\chi^2=11.25$, $p<.001$). There is a tendency for males to use dreams more often for fun than females (84.5% vs. 77.4%; $\chi^2=2.46$, $p=.12$).

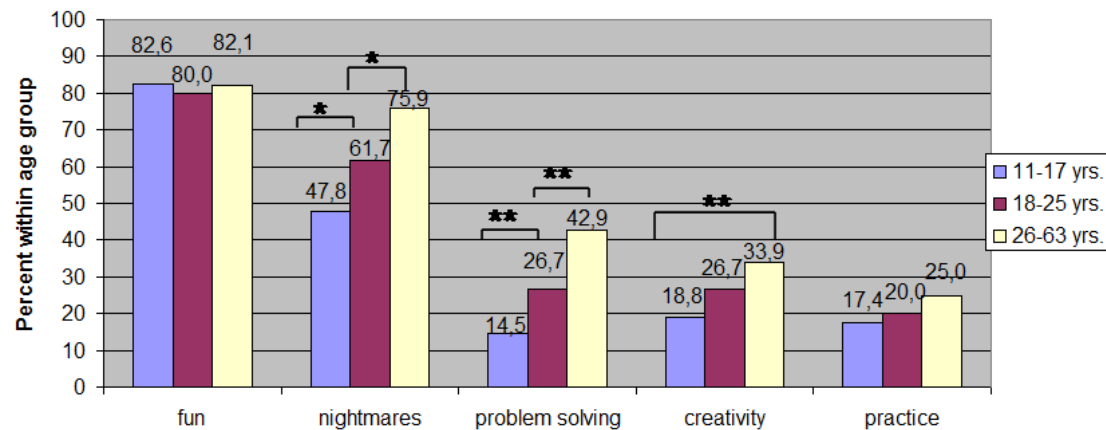


Figure 1. Comparison of lucid dream applications between different age groups (* $p < .05$; ** $p < .01$).

3.3. Open-ended questions

Regarding all open-ended questions (other applications, problems with achieving a certain goal within a lucid dream), unfortunately no thorough content analysis could be conducted. Due to technical problems with the online questionnaire many answers were cut off. Furthermore, many of the (partial) answers did not directly relate to the respective question and there was a high variance in the type of answers which made it difficult to retrieve valid information. However, it was possible to get an impression about applications that were not or not entirely covered by our five pre-defined categories. With regard to the mentioned data problem, we suggest generalized additional categories, based on recurrent answers (the quantity of which cannot be reported reliably):

- self-help/ self-healing [apart from changing nightmares and problem solving], e.g., dealing with psychological issues; physical healing; personal and/or spiritual growth, meditation/ relaxation, obtaining positive energy from the dream
- experimenting/ seeking information [apart from problem solving], e.g., experimenting with the dream itself; experimenting with the dream body; asking questions to the dream or dream characters; conscious observation of the dream
- meeting particular dream figures, e.g., meeting deceased persons, meeting certain dream figures (that only exist in the dream world)

4. Discussion

In this study it was shown that lucid dreaming is mainly used for *having fun*. This category was selected by more than 80% of the participants. About two thirds (64%) of participants stated that they have used lucid dreams to change a nightmare or bad dream into a more pleasant experience. This result should be considered with respect to lucid dreaming as a nightmare treatment. However, in this study, we did not ask the participants about their success with this technique and, for example, if their nightmare frequencies were influenced by the lucid dreaming technique. Because of the fact that many participants selected the nightmare category it can be assumed that some people actually learn how to dream lucidly, because of their (recurrent) nightmares. More than a quarter of the individuals use lucid

dreams for creative purposes and to solve problems. In this context, another interesting result is that women seem to use “problem-oriented” (changing nightmares as well as solving problems) lucid dreams more often than men.

In our sample, almost as many women (77.4%) use lucid dreams to change nightmares as women who use them for fun (75.2%). Also, nearly twice as many women used lucid dreaming for problem solving, compared to men. Regarding the application of lucid dreams as a means against nightmares, the difference between men and women in our sample could be explained by the generally higher frequency of nightmares in women (c.f. Schredl, 2003). It is furthermore possible that people (women) who (successfully) use lucid dreaming to change nightmares also discovered them as a tool to work on other problems. This assumption is supported by our data which show a highly significant dependence of the two categories nightmares and problem solving for the whole sample and for women, but not for men. However, there are two different explanations: First, it is possible that the nightmares actually (partly) deal with the women's problems and that they therefore categorized some dreams as nightmare-changing dreams as well as problem-solving dreams. Second, these women have a general problem-solving attitude and use their lucid dreams to deal with both nightmares and problems.

More than a fifth of our sample (21.3%) practiced skills in their lucid dreams, like sports or playing an instrument which is more than twice as high as the percentage of lucid dreamers who stated they practice their sport skills within a sample of German athletes (Erlacher et al., 2011). However, in the present studies, more skills were included in the question, not only sports. Also, our sample consisted only of lucid dreamers who naturally show a great interest in all kinds of possible lucid dream applications. On the other hand, it is also noteworthy that the frequency of dreams per participant within this group is higher than for the other categories (except for fun), which implies that some of the participants practiced skills repeatedly or practiced different skills within several dreams. Future research should investigate further the potential of lucid dreaming for practicing motor skills.

Another noteworthy result is that all age groups use lucid dreaming to have fun about equally, while adolescents use lucid dreams less frequent for solving problems, changing nightmares and being creative. In accordance with this is the finding that very young teenagers in our sample (under the age of 16) did not use lucid dreams at all in order to solve problems. It would be interesting to investigate how

the applications of lucid dreams correlate with a) age (or certain stages in life) b) experience with lucid dreaming (which is not necessarily connected to age, but also to lucid dreaming frequency, the length and quality of the lucid dreams and previous experiences and successes with lucid dream applications).

Our study has some limitations. First, it should be considered that participants were recruited via internet forums about lucid dreaming – our sample is therefore selective. It is possible that lucid dreamers who are not active in forums use lucid dreams in different ways. Second, we did not present the defined categories in randomized order – an influence of the order of questions is possible, although it is unlikely that there would be a significant influence. Third, apart from technical problems, our open-ended questions appear to have been too unspecific, at least for our rather young sample. It seems like many participants were excited about the topic and tried to put as much and varying information into the provided fields as possible, regardless of the actual question.

For future studies it would be interesting to investigate the impact of lucid dreaming on people's lives and emotions, especially in those individuals who have used lucid dreaming more or less regularly for particular purposes. To know more about the effects of lucid dreams for individuals regarding nightmare treatment or practicing skills, could lead to more professional applications of lucid dreams. A different and also more general issue arises from the variance of focus and will, even of (degrees of) lucidity, within a lucid dream and across lucid dreams. Even for experienced lucid dreamers it is sometimes hard to differentiate between things they actively sought or determined in a lucid dream and things that were rather "created by the dream". Apart from that, we cannot tell from our data whether the participants actually set goals before going to sleep or if the idea (to fly, to dance, to change the nightmare, etc...) rather emerged within the dream or was even caused by the dream content itself. Future studies should address/ consider the following questions: When is someone actually actively/consciously using a lucid dream for a particular purpose? How lucid, how focused, how aware ought this person to be? Also, should we differentiate between degrees of success with the task? Do lucid dreamers decide rationally what to do before going to sleep or do they act rather intuitively in their lucid dreams or both?

However, the above mentioned ideas and questions are of great interest for research in general as well as for the development of (new) specific practical application techniques of lucid dreaming in sports, psychotherapy, rehabilitation, etc.... It is a challenge for future studies to assess the topic qualitatively on the one hand, to learn more about the phenomenal individual lucid experiences, and/or to ask in well-defined ways in order to investigate quantitative differences regarding lucid dream applications.

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