Visiting the land of dream muses: The relationship between lucid dreaming and creativity

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Summary. Dreaming is a very creative state of mind. Lucid dreamers – who can become aware in their dreams that they are dreaming – have an advantage of directly tapping into the creative potentials of the dreaming mind. This study explored the relationship between lucid dreaming and creativity. Twenty lucid dreamers were asked to accomplish a creative generation task once in a lucid dream and once while awake. Their performance was compared to a control group of 20 non-lucid dreamers who did the task once (i.e. awake). While according to the present findings, the lucid dream state did not appear to be more advantageous for creativity than waking imagination, lucid dreamers performed better on a creative task than non-lucid dreamers, which supports the notion of existing relationship between the ability for lucid dreaming and creativity. Future studies should explore the directionality of this relationship and make further comparisons of creative performance in wakefulness and the lucid dream state.

Keywords: Lucid dreaming, dreams, creativity, problem solving, creative generation

1. Introduction

Dreaming is a very creative state of mind. During dreaming the imagination is much less restricted by the external sensory input; the connections are made more easily, broadly and loosely; and every dream can be considered as a creative product similar to a work of art (Hartmann, 2010). Throughout the history, numerous artists, writers, scientists, inventors, athletes found inspiration and clues to long-awaited answers in dreams (Barrett, 2001; Van De Castle, 1994). Such creative dreams are not that uncommon. A fairly recent study showed that dreams that stimulate waking-life creativity play a considerable role in the lives of ordinary people: Dream images can be used for art or work, dreams can solve a problem, provide emotional insights or the impetus to do something (Schredl & Erlacher, 2007). Creative problem-solving dreams can be incubated by focusing on a particular problem just before sleep (Barrett, 1993; White & Taytroe, 2003).

Sleep laboratory studies show that rapid eye movement (REM) sleep, in which most vivid dreaming occurs, plays a particular role in fostering creativity. For example, Walker, Liston, Hobson, and Stickgold (2002) found that awakenings from REM sleep lead to a significantly greater number of anagram word puzzles solved as compared to awakenings from non-REM (NREM) sleep. Another study employing Remote Associates Test showed that in comparison with quiet rest and NREM sleep, REM sleep enhanced the formation of associative networks and the integration of unassociated information (Cai, Mednick, Harrison, Kanady, & Mednick, 2009). Interestingly, an fMRI study in professional jazz pianists found that the brain activity pattern during improvisational play (as compared to production of over-learned musical sequences) was quite similar to the brain activity pattern during REM sleep (Limb & Braun, 2008).

One special case of dreaming, which almost always occurs during REM sleep (LaBerge, 1990; but cf. Stumbrys & Erlacher, 2012), is so-called lucid dreaming during which the dreamer becomes aware that he or she is dreaming and can thus deliberately tap into creative potentials of the dream state. Lucid dreaming can be learned by applying various induction techniques (Stumbrys, Erlacher, Schädlich, & Schredl, 2012) or can occur spontaneously (Stumbrys, Erlacher, Johnson, & Schredl, 2014). It is estimated that over a half of individuals experienced a lucid dream at least once and over 20% have them on a regular basis – once a month or more frequently (Saunders, Roe, Smith, & Clegg, 2016). Lucid dreamers are generally active in their lucid dreams and aim to accomplish different actions, such as flying, talking with dream characters, or having sex, yet not always are able to remember their intentions or successfully execute them (Stumbrys et al., 2014).

Research shows that lucid dreamers rate themselves as more creative than non-lucid dreamers (Blagrove & Hartnell, 2000; Zink & Pietrowsky, 2013) and there is a positive correlation between the frequency of lucid dreams and creative dreams (Stumbrys et al., 2014). Further, a recent study found that lucid dreamers perform significantly better than non-lucid dreamers on a remote associate problem-solving task designed to measure insight (Bourke & Shaw, 2014), yet the evidence with other tasks assessing creative performance is somewhat more ambiguous (Snyder & Gackenbach, 1988).

The surveys of lucid dreamers indicate that creative problem solving is among the most popular applications of lucid dreams, which increases with the age and generally has a positive impact on the mood upon awakening (Schädlich & Erlacher, 2012; Stumbrys & Erlacher, 2016). Lucid dreamers can use their lucid dreams to actively generate solutions to a problem, ask other dream characters for help or use the dream space for inspiration (Gackenbach & Bosveld, 1990; LaBerge & Rheingold, 1990). For example, Bogzaran (1987), an artist and lucid dream researcher, reports a series of lu-

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cid dreams in which she becomes lucid in an art gallery, intentionally focuses on a particular artwork in her dream and then recreates that piece after awakening. A study by Stumbrys and Daniels (2010) looked whether dream characters in a lucid dream can help the dreamer with creative problem solving. Nine lucid dreamers were instructed to approach a knowledgeable-looking figure in their lucid dreams and ask to solve either a logical puzzle or create a metaphor for ten consecutive nights. While dream characters somewhat struggled with logical tasks (cf. Stumbrys, Erlacher, & Schmidt, 2011), their answers to a more creative metaphor task surpassed the answers provided by the participants themselves while awake, as well as the answers of a control group of nine non-lucid dreamers. The creative performance of lucid dreamers themselves (i.e. without the assistance of dream characters) within the lucid dream state, however, has not been explored in this study.

Thus, altogether previous research supports the relationship between creativity and the ability to lucid dream: Lucid dreamers seem to be more creative than non-lucid dreamers and the lucid dream state itself can be used as a source for creative inspiration. In the present study we aimed to extend these findings using a creative generation task. We wanted to examine whether lucid dreamers would be more successful in accomplishing the same creative task in the lucid dream state in comparison to wakefulness, as well as to compare their performance in wakefulness to a control group of non-lucid dreamers.

2. Method

2.1. Participants

The sample included 40 participants: a group of 20 lucid dreamers (11 female/9 male, age range 18-57 years, mean age 30.50 ± 10.36 years) and a control group of 20 non-lucid dreamers (10 female/10 male, age range 19-68 years, mean age 24.85 ± 10.36 years). Age differences were not statistically significant (t=-1.725, df=38, p=.093). Participants were recruited via electronic advertisements (posted on lucid dreaming-related internet discussion boards, social networking sites and via personal contacts). Allocation into the groups was based on the reported lucid dreaming frequency: Those who never had a lucid dream or were having lucid dreams less frequently than once a year were allocated into the control group, while those who had lucid dreams once a month or more frequently were assigned into the lucid dreamers group. All participants signed an electronic informed consent form and were free to withdraw from the experiment at any time.

2.2. Material

The participants were asked to estimate their lucid dream frequency on an eight-point scale (0 – never; 1 - less than once a year; 2 - about once a year; 3 - about 2 to 4 times a year; 4 - about once a month; 5 - about 2 to 3 times a month; 6 - about once a week; 7 - several times a week). This scale has been used in previous research and demonstrated a good re-test reliability (r=.89, p<.001, N=93; Stumbrys, Erlacher, & Schredl, 2013). To ensure a clear understanding of lucid dreaming, the scale included a short definition of the phenomenon: “In a lucid dream, one is aware that one is dreaming during the dream. Thus it is possible to wake up deliberately, or to influence the action of the dream actively, or to observe the course of the dream passively”.

Creativity was measured by a creative generation task developed by Ward (1994) that involves drawing an extraterrestrial creature. For the waking condition (see Procedure below), the participants were asked to imagine going to a planet in another galaxy, that is very different from Earth, and encountering an alien creature there. Then they were asked to draw that alien creature. Similarly, for the lucid dream condition, the participants once lucid in a dream were asked to go to a planet in another galaxy, that is very different from Earth, find an alien creature there, note its appearance and details, then to awaken themselves and draw that creature. For completing the drawing, a time limit of 10 minutes was set. For the lucid dream condition (see Procedure), the participants had also to indicate how similar was the depicted creature to the one that was seen in their lucid dream on a 7-point scale (1 – not similar at all, 7 – very similar). For assessing creativity, a coding scheme by Maddux and Galinsky (2009) was used. The assessment was carried out by two independent raters that were blinded to the hypotheses and conditions of the study. Firstly, the overall creativity of a drawing was evaluated on a 5-point scale (1 – not creative at all, 5 – extremely creative). Secondly, similarity to Earth creatures was assessed on 5-point scales (1 – very much, 5 – not at all) as to (a) how similar the aliens were to Earth creatures, (b) the extent to which participants seemed to consider known Earth creatures when making their drawings, and (c) the extent to which participants generally considered Earth animals when making their drawings. These scales were slightly modified from Maddux and Galinsky (2009) – the ratings were reversed so that a higher value would reflect higher creativity (in the original formulation the 5-point scales were from 1-*not at all* to 5-*very much*). Thirdly, the extent to which aliens had atypical features was examined, with the particular focus on sensory organs (Ward, 1994). The evaluation included (a) lacking a major sensory organ (e.g., one eye or none), (b) having atypical numbers of sensory organs (e.g., three eyes or two noses), (c) having an unusual configuration of the senses (e.g., eyes below the nose), (d) having an exaggerated or unusual ability (e.g., eyes acting as laser beams), and (e) having something that serves an atypical function (e.g., ears for protection) (Maddux & Galinsky, 2009). Each of these five features was assessed as either 0 (typical) or 1 (atypical) and summed up to the overall score ranging from 0 to 5. The agreement between the two raters was good (overall creativity: rho=.835, similarity to Earth creatures: rho=.819, atypicalities: rho=.868, all p<0.001).

2.3. Procedure

The information about the study with a brief online questionnaire that included the lucid dream frequency scale and demographic information was posted on various social media (e.g. Facebook, Reddit) groups and online discussion forums (e.g. World of Lucid Dreaming, LD4All, DreamViews, lucid.lt) related to lucid dreaming, as well as sent out to a pool of respondents who participated in previous lucid dream-related online studies. Based on their reported lucid dream frequency, the participants were assigned either to the group of lucid dreamers or to the control group (see Participants section above).

The study was conducted as a field experiment. The control group was asked to accomplish the creative task once

(in wakefulness), then take a photo of the drawing and send it to the researcher via email. The lucid dreamers group had to do the task twice: once in wakefulness (in the same way as the control group) and once they become lucid in a dream. To avoid possible learning effects, the order of tasks was randomised: Some lucid dreamers (n=9) at first accomplished task in a lucid dream and then in wakefulness, while the others (n=11) at first in wakefulness and then in a lucid dream. The time period between the two tasks was 1.5 – 2 weeks. The lucid dreamers were given a one-month time to do the task in a lucid dream. To increase the chances of lucid dreaming, they were allowed to use any lucid dream induction technique, except of drug intake. After awakening from the lucid dream and completing the drawing of the alien creature, they were also asked to describe their lucid dream in detail.

2.4. Statistical analysis

IBM SPSS (Version 22) software was used for statistical analysis. Spearman rho correlations (one-tailed) were employed to assess the agreement between the two external raters. Wilcoxon test (two-tailed) was used to compare the performance of the lucid dreamers group in wakefulness and in a lucid dream, while Mann-Whitney test (two-tailed) was employed for comparisons between the performance of two groups in wakefulness.

3. Results

Sixty drawings of the alien creature were assessed: 20 from lucid dreamers in the lucid dream condition, 20 from lucid dreamers in the wakefulness condition and 20 from non-lucid dreamers (control group) in the wakefulness condition (Figure 1). No learning effects for the lucid dreamers occurred as their first and second drawings in the accomplished order were rated similarly (overall creativity: 3.38 ± 1.01 vs. 3.05 ± 1.21, z=-0.846, p=.414; similarity to Earth creatures: 3.01 ± 0.90 vs. 2.77 ± 1.09, z=-1.029, p=.314; atypical features: 1.93 ± 0.96 vs. 1.60 ± 0.88, z=-1.328, p=.201). Drawings based on the alien figure from a lucid dream were not rated as more creative in comparison to the alien figures imagined by lucid dreamers while awake. In fact, the ratings from lucid dreams were slightly lower, but the differences were not statistically significant (overall creativity: 3.05 ± 1.01 vs. 3.38 ± 1.28, z=-0.897, p=.370; similarity to Earth creatures: 2.72 ± 1.00 vs. 3.06 ± 0.98, z=-1.006, p=.314; atypical features: 1.58 ± 0.68 vs. 1.95 ± 1.10, z=-1.406, p=.160). Lucid dreamers, however, significantly outperformed non-lucid dreamers in the wakefulness condition on all creativity measures (overall creativity: 3.38 ± 1.28 vs. 2.30 ± 0.97, z=-2.622, p=.009; similarity to Earth creatures: 3.06 ± 0.98 vs. 2.23 ± 1.08, z=-2.426, p=.014; atypical features: 1.95 ± 1.10 vs. 1.00 ± 0.86, z=-2.754, p=.006).

Lucid dreamers rated their depiction of the alien creature as moderately similar to the one that they saw in their lucid dream (mean similarity score: 4.65 ± 1.69). Some of them reported difficulties on depicting the creature from the dream, including the difficulty to remember its appearance after awakening and the difficulty to represent its features (e.g. appearance, characteristics, way of communication, sounds produced, body functioning, etc.). Further, not all of lucid dreamers were able to successfully travel to another planet. Some of them used other means of encountering an alien creature (e.g. opening the doors and seeing an alien creature there, turning on a TV channel with a programme about alien creatures). A few examples of alien creatures depicted from lucid dreams are presented in Figure 2.

4. Discussion

According to the results of the present study, lucid dreamers performed better than non-lucid dreamers in accomplishing a creative generation task while awake. However, the use of the lucid dream state as a source of creative inspiration was not advantageous over the waking imagination. The present study thus corroborates the earlier findings that lucid dreamers are more creative than non-lucid dreamers. Pre-

Figure 1. Comparison of mean creativity ratings

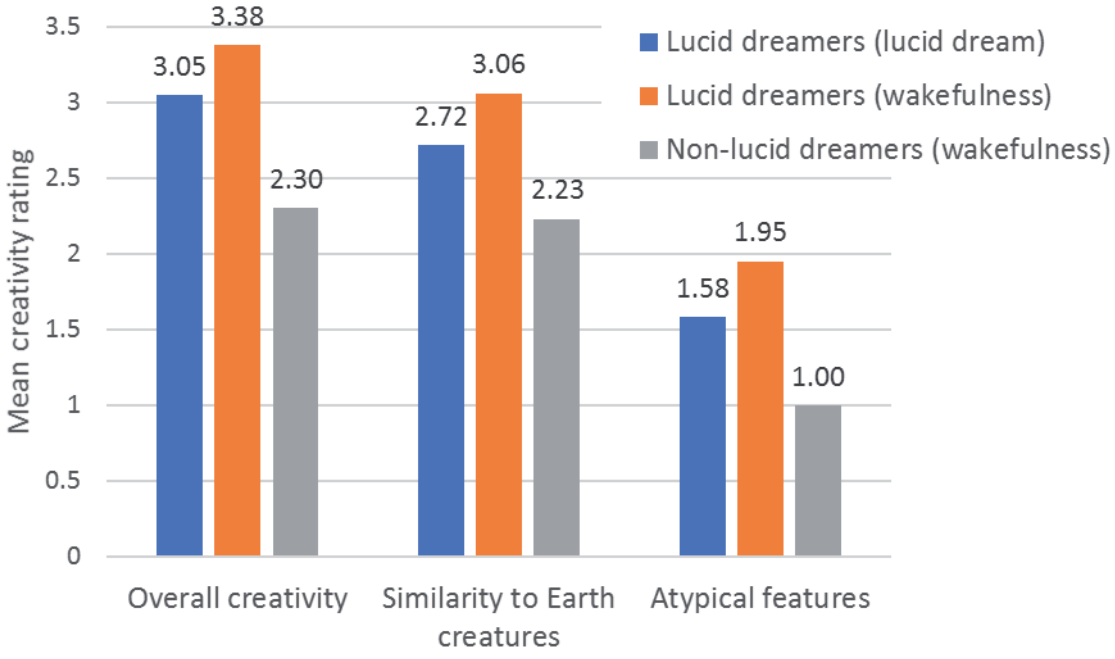
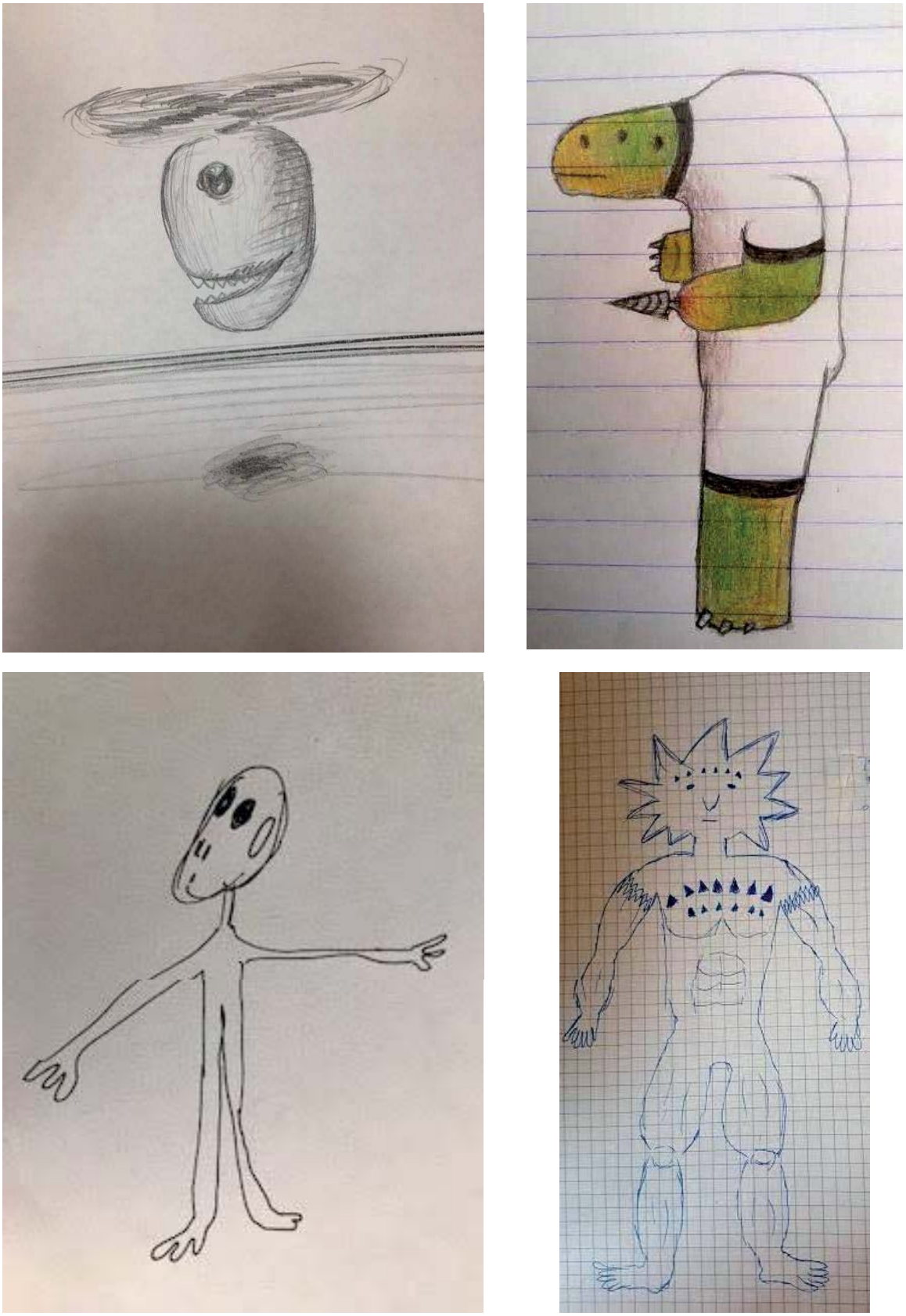


Figure 2. Examples of alien creatures depicted from lucid dreams (top row includes drawings that were judged to be more creative, bottom row – that were judged as less creative)



vious studies showed that lucid dreamers rate themselves as more creative on the adjective checklist than non-lucid dreamers (Blagrove & Hartnell, 2000; Zink & Pietrowsky, 2013) and perform better than non-lucid dreamers on a remote associate problem-solving task designed to measure insight (Bourke & Shaw, 2014). However, in contrast to a study by Stumbrys and Daniels (2010), the lucid dream state did not facilitate greater creativity: Lucid dreamers appeared to be slightly (but not statistically significantly) more creative when using the waking imagination rather than lucid dreaming for inspiration. Several factors might explain this discrepancy. Firstly, in the present study the dreamers were accomplishing the creative task themselves, while in the previous study they sought assistance from dream characters (Stumbrys & Daniels, 2010), which seem to be quite creative in lucid dreamers (Tholey, 1989). Secondly, the participants reported difficulties in depicting the alien figure from their dream and the mean similarity score between the depicted alien and the one that was seen in the lucid dream was not very high (4.65 out of 7). In future studies, employing more detailed questionnaires might be beneficial (involving, for example, a brief description of the depicted creature, a list of its characteristics, features, sensory organs, etc.). Thirdly, and perhaps most importantly, the participants had much more creative freedom when drawing an alien creature from their waking imagination – they were free to improvise, add further features as the drawing unfolds, while in the lucid dream condition they were asked to depict the creature exactly as it was seen in the dream. Future research might benefit from asking to use the dream image as a source of inspiration (in the same way as waking imagination) rather than a definite object to be drawn. An appropriate task that allows to assess creativity both in wakefulness and in the lucid dream state is another major challenge. For example, in the present study some participants reported that they felt a certain fear in a lucid dream to travel to another planet in a different galaxy and face alien creatures there. Further, two of three scales employed in the present study (overall creativity and similarity to Earth creatures) were based on subjective impression rather than on objective criteria. Finally, the question might be raised whether the alien drawing task employed in the present study (Ward, 1994) accurately measures creativity, as it is quite dependent on the drawing skills. Although the drawing skills were not assessed, only the specific features of the drawing, some participants might have had a creative imagination but could have been unable to draw this in an adequate manner.

Overall, the present findings support the existing relationship between lucid dreaming and creativity. Lucid dreamers appear to be more creative than non-lucid dreamers, yet it remains unclear whether the lucid dream state itself can be used to facilitate greater creativity and problem solving, which should be addressed in future studies. Further, whether there is a direction in the relationship, for example, if the development of creativity might increase the frequency of lucid dreams or, conversely, the application of lucid dream techniques might lead to a greater creativity, is another interesting question to be explored in future research.

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