Lucid dream induction using three different cognitive methods

Sophie Dyck[1,2] , Michael Schredl[1], Anja Kühnel[2]

[1]Central Institute of Mental Health, Medical Faculty Mannheim/Heidelberg University, Germany

[2]Department of Education and Psychology, Freie Universität Berlin, Germany

Summary. Lucid dreaming is a rare phenomenon, therefore, different induction techniques are used to increase the lucid dream frequency. In the present study three cognitive methods were tested: Keeping a dream diary, the Wake-up-back-to-Bed technique, and reality testing/reflection. Altogether, 110 participants completed the three-week study protocol. Although the overall effects were not significant, slight increases in lucid dream frequency due to the cognitive techniques were found. Future studies should extend the training period and increase participants' motivation by using social media technology in order to evaluate what techniques might be beneficial in a home setting for a group of participants not specifically selected for high interest in lucid dreaming.

Keywords: Lucid dreaming, cognitive methods, lucid dream induction

1. Introduction

Lucid dreams are dreams that include an awareness that the current experiences belong to a dream (LaBerge, 1985). In addition to this basic definition, additional criteria of lucid dreaming have been described as follows: The dreamer has clarity about the possibility to willingly change the content of their dream. There is clarity about memories during the dream about waking life and a clear recollection of previous lucid dreams (Tholey & Utecht, 1987).

Lucid dreaming was successfully scientifically verified by recording prearranged eye- movement patterns that the dreamer carried out while being in a lucid dream (Hearne (Hearne, 1978; LaBerge, 1980; LaBerge, Nagel, Dement, & Zarcone, 1981). In a representative German sample, about 50% of the participants reported that they experienced at least one lucid dream but lucid dream frequency is generally very low: about 0.65 ± 2.14 lucid dreams per month. The frequency in student samples is higher (Saunders, Roe, Smith, & Clegg, 2016; Snyder & Gackenbach, 1988) with 1.27 ± 2.94 lucid dreams per month (Schredl & Erlacher, 2004).

As spontaneous lucid dreams appear to be relatively rare, research has investigated possibilities to increase lucid dreaming by using special induction techniques, (see overview: Stumbrys, Erlacher, Schädlich, & Schredl, 2012). These techniques can be divided into three large groups: Cognitive techniques, external stimulation, and application of drugs. Although the methodological quality of the empirical inductions studies was relatively low, most of the techniques showed positive results in increasing lucid dream frequency, (Stumbrys et al., 2012).

Corresponding address:
Michael Schredl, Sleep laboratory, Central Institute of Mental Health, PO Box 12 21 20, 68072 Mannheim, Germany.
Email: Michael.Schredl@zi-mannheim.de

Submitted for publication: April 2017
Accepted for publication: September 2017

Cognitive methods include all paradigms that aim to increase awareness during the dreaming state, e.g., keeping a dream diary, the Wake-up-back-to-Bed (WBTB) technique, and reality testing/reflection. Keeping a dream diary is a classic technique to increase dream recall frequency, especially in low dream recallers, by focusing the participants' attention on the dream topic (Schredl, 2002). Aspy (2016) reported a significantly higher lucid dream frequency in the one-week diary compared to the participants' retrospectively estimated lucid dream frequency (2.99 ± 7.50 vs. 1.45 ± 3.88 lucid dreams per month), i.e., focusing on dreams not only increased dream recall frequency but also lucid dream frequency. However, the Aspy (2016) study was advertised as a lucid dream induction study and, thus, recruited persons interested in increasing their lucid dream frequency. In a retest study regarding sleep and dream variables, i.e., not focusing on lucid dreaming, no significant increase in lucid dream frequency was found (0.68 ± 1.20 vs. 0.55 ± 1.00 lucid dreams per two weeks) (Zunker et al., 2015). One might conclude that keeping a dream diary without applying any other induction method seems to increase lucid dream frequency only in participants who are interested in lucid dreaming.

Reality testing/reflection is a cognitive method is a training method used during wakefulness by posing the question, "Am I dreaming or am I awake", several times a day and checking the environment for possible incongruences with the physical laws of waking reality (Tholey, 1983). Despite the simplicity of this approach, this technique seems to help increase the number of lucid dreams, (Levitan, 1989; Purcell, Mullington, Moffit, Hoffmann, & Pigeau, 1986).

One version of the Wake-up-back-to-Bed technique is carried out in the following way (Erlacher, 2010): participants sleep for six hours straight, wake up (alarm clock or awakened by the experimenter in the sleep lab, if possible during a REM period), stay awake for about one hour, and then go back to sleep for about three more hours. During the hour of wakefulness, they should extract different dream symbols and repeat them while thinking "The next time I experience this I will be aware that I am dreaming" until going back to

sleep. Stumbrys and Erlacher (2014) showed a high success rate using this technique (up to 58% of induced lucid dreams carried out under supervision in a sleep laboratory). The unanswered question is, however, whether this specific version of the WBTB method can also be successfully applied in a home setting as it has been demonstrated for relatively similar WBTB paradigm in a small sample of very motivated persons (Levitan, 1991).

The present study investigated the effectiveness of increasing lucid dream frequency by applying three different cognitive methods: Keeping a dream diary, applying the Wake-up-back-to-Bed technique at home, and the "classical" reality testing/reflection paradigm.

2. Method

2.1. Participants

Overall, 110 persons (57 women and 53 men) with a mean age of 22.75 ± 4.68 years (range: 18 to 56 years) successfully participated in the present study; 84 were psychology students and 26 were from the personal environment of the first author. The students were recruited by taking part in an experimental university course, dealing with the present study. They received course credit for participating. The age and gender distributions are shown in Table 1. Age did vary significantly between experimental groups ($F = 4.3$; $p = .007$). Participants of the control group were about 3 years older than participants of the experimental groups (see Table 1). Both genders were distributed almost equally across the groups ($\chi 2 = 3.5$; $p = .316$).

2.2. Measurement instruments

2.2.1 Dream questionnaire

First, participants completed items concerning socio-demographic variables, retrospective dream recall frequency and lucid dream recall frequency. Dream recall frequency was measured by a 7-point rating scale (Schredl, 2002a): 0 = never, 1 = less than once a month, 2 = about once a month, 3 = twice or three times a month, 4 = about once a week, 5 = several times a week, and 6 = almost every morning. To assess lucid dreaming frequency, an 8-point rating scale (Schredl et al., 2011) was used (anchors of 0 - never, 1 - less than once a year, 2 - about once a year, 3 - several times a year, 4 - about once a month, 5 - several times a month, 6 - about once a week, 7 - several times a week). A brief definition was provided: "During lucid dreaming, one is, while dreaming, aware of the fact that one is dreaming. It is possible to wake up deliberately, to control the dream action or to observe passively the course of the dream with this awareness."

2.2.2 Dream Diary Sheet

The next morning, baseline data was affiliated. Participants were asked to fill in the dream diary sheet by reporting their last night's dream(s). If able to recall a dream, participants were asked to report the content as completely as possible. In addition, they were asked to answer an especially devised questionnaire measuring different aspects of lucidity within their dream as assessed by the Dream Lucidity Questionnaire (DLQ: Stumbrys, Erlacher, & Schredl, 2013). The 13 DLQ items ranged from 0 = not at all, 1 = just a little, 2 = moderately, 3 = pretty much, 4 = very much and encompassed topics like the participants' awareness of dreaming, control of changing dream content and remembrance of waking life and intention. Item 1 was worded, "I was aware that I was dreaming". In addition to the 12 original items devised by Stumbrys et al. (2013) an extra item was added: "I was sure that events in my dream would not affect reality." The total DLQ score was derived as mean of all 13 items.

2.3. Cognitive Techniques

2.3.1 Dream Diary

The following instructions were given to guide the participants: 1. Fill in the dream diary for the 3 testing weeks every morning except for the tested dream nights. 2. Sleep as usual. It is important for you to remember the dreams! Please document them immediately after waking up. 3. Write down everything you remember about the events of the night: every emotion, every conceivable thought is to be held. 4. Ask yourself specific questions: What do I feel? What do I remember? What happened in my dream? Who was there? What did that do to me? 5. Highlight all the specific dream contents that you notice when recording and stay aware of them. Select and assign them to the respective levels. 6. Do not fill in your dream diary during test nights. In these four instances fill in the dream diary sheets (see above) including the DLQ.

Table 1. Descriptive statistics for the whole sample, retrospective dream recall frequency and lucid dream recall frequency, number of dreams and lucid dreams

Experimental Group	Age (yrs.)	Gender (M/F)	Dream Recall Frequency[1]	Lucid Dream Frequency[1]	Number of Dreams[2]	Number of Lucid Dreams[2]
Dream Diary (N=28)	22.11 ± 2.73	11/17	4.29 ± 1.36	1.50 ± 1.73	2.68 ± 1.36	1.19 ± 1.10 (N=26)
Wake-up-Back-to-Bed (N=25)	21.64 ± 1.96	12/13	3.68 ± 1.35	1.80 ± 1.83	2.40 ± 1.47	1.48 ± 1.40 (N=21)
Critical Reflection (N=30)	21.87 ± 2.33	13/17	4.07 ± 1.72	2.77 ± 2.31	2.57 ± 1.10	1.50 ± 1.43 (N=28)
Control Group (N=27)	25.41 ± 8.04	17/10	3.96 ± 1.34	2.22 ± 1.83	2.78 ± 1.22	1.42 ± 1.36 (N=26)

[1] retrospective measures, [2] elicited during the four measurement point during study period

Table 2. Instructions for the Wake up, back to bed technique (Erlacher, 2010)

Instructions (WBTB)
Step 1: Six hours sleep • Set your alarm clock to six hours after your normal sleep onset time. • Try to keep in mind: "Tonight I will remember my dreams!" Step 2: "Wake up" - Stay awake for at least 30 minutes • Stand up, wake up properly and try to immediately go to your dream that you remembered. • If you cannot remember a dream from this night, try to remember a dream from the recent past. • Record the dream in the protocol provided for it. • Try to extract specific dream contents. • Then link the specific dream content to the intention to recognize that this is dream the next time it occurs. For example, by saying to yourself, "The next time I see this dream element, I will remember that I dream." • Repeat the last sentences before you fall asleep again. Step 3: "Back to Bed" • Go back to sleep for two to three more hours. • After waking-up, write down all remembered dreams.

2.3.2 Wake-up-Back-to-Bed (WBTB) technique

Participants in this group were given the following instructions: 1. Choose three nights where you can sleep without interruptions. The nights do not have to be consecutive. The nights should not overlap with the test nights where you fill in the dream diary sheets including the DLQ. 2. In your chosen nights, apply the "Wake up, back to Bed "method (see Table 2). Keep exactly to the given three steps! 3. Document your dreams following the instructions and complete the questionnaires.

2.3.3 Reality Testing/Reflection

Participants were given the following instructions: 1. During the testing period ask yourself daily (approx. 10 times) if you are awake or dreaming. 2. Ask this question especially in situations that could occur in dreams as well, (moments that are dominated by strong emotional impulses, surprising situations etc...) 3. Check whether physical laws of the waking reality apply. Does gravitation work or can you possibly fly? Do clocks operate correctly or do they run backwards or slower? 4. The frequent questioning in the wakeful state should imply that the question is automatized that you start to pose the question while dreaming and, thus, increase the probability that you become aware of being in a dream. 5. In test nights fill in the dream diary sheets and the DLQ.

2.4. Procedure

Altogether, 128 questionnaire packages were handed out. 110 evaluable questionnaires were given back to the first author. Participants were randomized into the three experimental groups, dream diary, Wake-up-back-to-Bed, and reality testing/reflection, and the control group. Participants received their questionnaire package via email.

First, participants completed items concerning socio-demographic variables, retrospective dream recall frequency and lucid dream recall frequency. The first morning at study onset, the participants completed a dream diary sheet including the DLQ questionnaire (baseline). After the first night they started their respective induction training (or did nothing specifically in the control group). After each week of the study period, thee participants again completed a dream diary sheet including the DLQ eliciting dream content and characteristics of the last night dream(s). It has to be kept in mind that of the total study period of three weeks only four nights were included in the analysis as only for those nights the dream diary sheet and the DLQ have been filled in. The completed questionnaire packages were returned to the first author at the end of the study period.

Statistical analysis was performed using SPSS for macOS Sierra 10.12.4. Spearman rank correlations between number of dreams and retrospective dream recall frequency, as well as the correlation between number of lucid dream and retrospective lucid dream frequency were computed and tested one-tailed. Analyses of variance were used to compare the age of participants, numbers of dreams and lucid dreams between test groups. ANOVA was also used to compare DLQ means in the last week of testing. Non-parametric Kruskal-Wallis Test for independent samples was used to compare retrospective dream recall frequency and retrospective lucid dream recall frequency between test groups. Chi-Squared test was used to for testing the distribution of gender. Sign test was used to compare baseline number of dreams and number of dreams in week three. Mixed models were used to check on effects of belonging to a test group and study period on DLQ means. Mixed models were also used to test the effects of group and study period on being lucid, (Item 1 of the DLQ). Dependent t-Test was used to compare means of all groups in baseline and in week three, as well as for the comparison of test groups with control group in baseline and in weeks three. Spearman rank correlations between retrospective lucid dream recall frequency and the mean of the difference between week three value and baseline value were computed.

3. Results

The descriptive statistics concerning retrospective dream recall frequency, retrospective lucid dream frequency, number of dreams and number of lucid dreams elicited during the study period are shown in Table 1. Number of dreams reported during the study on the four test nights significantly correlated with retrospective dream recall frequency ($r = .335$; $p < .0001$; $N = 110$). Number of lucid dreams reported on the four test nights correlated significantly with retrospective lucid dream recall frequency ($r = .467$; $p < .0001$; $N = 101$). Retrospective dream recall frequency ($p = .275$) and lucid dream frequency ($p = .155$) did not vary between experimental groups. Number of dreams did not significantly vary between experimental groups ($F = 0.4$; $p = .743$). Number of lucid dreams did also not vary between experimental groups ($F = 0.3$; $p = .832$).

Percentages of participants reporting a dream during the study are presented in Table 3. The results of the sign test comparing baseline versus weeks 3 values are shown in Table 3; the percentages did not differ significantly.

The distribution of DLQ item 1 for all 4 measurement points was as following: not at all ($N = 146$), just a little ($N = 63$), moderately ($N = 38$), pretty much ($N = 28$), and very much ($N = 12$). Item 1 was dichotomized: 0 = not at all vs. 1 = just a little to very much. Percentages of participants with at least with „just a little" lucidity in their dreams in relation to all participants reporting a dream for this night are shown in Table 4. Results of mixed models for the binary variable showed that neither a significant group effect

Table 3. Percentage of dreams reported in the four nights during the study

Experimental Group	Dream reports Baseline	Dream reports Week 1	Dream reports Week 2	Dream reports Week 3	Sign test (Baseline versus Week 3)
Dream Diary (N = 28)	64.3%	64.3%	67.9%	71.4%	p= .625
Wake-up-Back-to-Bed (N = 25)	56.0%	68.0%	60.0%	56.0%	p= 1.000
Critical Reflection (N = 30)	70.0%	76.7%	60.0%	50.0%	p= .180
Control Group (N=27)	55.6%	77. 8%	70.4%	74.1%	p= .125
Total Sample (N = 110)	61.8%	71.8%	64.6%	62.7%	p= 1.000

(F = 0.5; p = .470) nor were there significant time effects (F = 0.9; p = .441). The interaction was also not significant (F = 1.1; p =.355). A second mixed model compared all experimental groups versus the control group but these results did also not show any statistically significant effects (group effect: F = 0.0; p = .841; time effect: F = 0.3; p = .807; interaction: F = 0.1; p = 0.415).

Participants with pretty much and very much lucidity in their dreams (see categories of item 1 of the DLQ) resulted in the following distribution: 10.3% in the baseline testing for all groups and for the following three measurement points (week 1 to week 3): 1.8% in the dream diary group, 23.9% in the Wake-up-back-to-Bed group, 21.4% in the reality testing/reflection group, and 15.0% in the control group. I. e., results showed on a descriptive level a slight increase in the Wake-up-back-to-Bed and reality testing/reflection groups.

DLQ means for all four measurement points are shown in Table 5. The results of mixed models showed no significant effects. Neither did belonging to one of the testing groups show significant effects (F = 0.3; p = .805), nor was there a difference across time (F = 1.5; p = .226). The interaction was also not significant (F = 0.6; p =.793). A second mixed model compared all experimental groups versus the control group. These results also did not show any statistically significant effects (group effect: F = 0.1; p = .783; time effect: F = 0.9; p = .439; interaction: F = 0.9; p = 0.429).

For participants in three experimental groups that have reported a dream in baseline testing, as well as in the testing in week three, one-tailed paired t-tests results showed that combined DLQ means increased slightly with a small effect size (t = 1.7; p = .059; d = 0.272; N = 37). The increase of DLQ means from baseline testing to week three testing correlated positively but were not significant with the retrospective lucid dream frequency (r = .200; p = .235; N = 37).

4. Discussion

The findings indicated that the three cognitive methods: keeping a dream diary, the Wake-up-back-to-Bed technique, and reality testing/reflection did not significantly increase lucid dream frequency in the present sample; only for a subgroup there was a slight increase in lucid dream frequency from baseline to week three.

Interestingly, the distribution of DLQ item “I was aware that I was dreaming.” showed that a relatively high percentage of dreams (almost 50%) were rated as including some form of lucidity – a finding which is in line with Kahan (1994). As this figure is much higher than the percentage of “full-blown” lucid dreams, i.e. the dreamer is sure that s/he is dreaming and includes this statement explicitly in the dream report (Barrett, 1991; Zadra, Donderi, & Pihl, 1992), the question how lucid dreams are defined and operationalized arises (Kühle, 2015; Noreika, Windt, Lenggenhager, & Karim, 2010). As most research focused on lucid dreams uses the definition of explicitly knowing that it is a dream, it seems critical to use cut-off criteria (Voss et al., 2014) to de-

Table 4. Percentage of dreams with at least some degree of lucidity

Experimental Group	Percentage of Lucid Dreams – Baseline	Percentage of Lucid Dreams – Week 1	Percentage of Lucid Dreams – Week 2	Percentage of Lucid Dreams – Week 3
Dream Diary (N = 28)	44.4% (N=18)	33.3% (N=18)	36.8% (N=19)	50.0% (N=20)
Wake-up-Back-to-Bed (N = 25)	28.6% (N=14)	64.7% (N=17)	46.7% (N=15)	64.3% (N=14)
Critical Reflection (N = 30)	47.6% (N=21)	47.8% (N=23)	72.2% (N=18)	53.3% (N=15)
Control Group (N=27)	46.7% (N=15)	57.1% (N=21)	52.6% (N=19)	40.0% (N=20)
Total Sample (N = 110)	42.6% (N=68)	50.6% (N=79)	52.1% (N=71)	50.7% (N=69)

Table 5. Dream Lucidity Questionnaire (DLQ) means during study period

Experimental Group	DLQ mean Baseline	DLQ mean Week 1	DLQ mean Week 2	DLQ mean Week 3
Dream Diary (N = 28)	0.79 ± 0.47 (N=18)	0.78 ± 0.39 (N=18)	0.84 ± 0.82 (N=19)	0.98 ± 0.74 (N=20)
Wake-up-Back-to-Bed (N = 25)	0.77 ± 0.51 (N=14)	0.95 ± 0.71 (N=17)	1.14 ± 0.92 (N=15)	1.25 ± 0.96 (N=14)
Critical Reflection (N = 30)	0.93 ± 0.59 (N=21)	1.04 ± 0.78 (N=23)	1.14 ± 0.80 (N=18)	1.02 ± 0.85 (N=15)
Control Group (N=27)	0.81 ± 0.66 (N=15)	1.01 ± 0.74 (N=21)	0.94 ± 0.63 (N=19)	0.90 ± 0.81 (N=20)
Total Sample (N = 110)	0.84 ± 0.55 (N=68)	0.95 ± 0.68 (N=79)	1.00 ± 0.79 (N=71)	1.02 ± 0.82 (N=69)

fine lucid dreams because non-lucid dreams might include some form of lucidity even without the explicit knowledge of being in a dream. It would be interesting for future research to study dreams with some form of lucidity regarding dream content differences to non-lucid dreams and also whether brain activity during those dreams show patterns, (increased prefrontal activity), like "full-blown" lucid dreams (Voss, Holzmann, Tuin, & Hobson, 2009).

Simply keeping a dream diary had no effect on lucidity – comparable to the findings of Zunker et al. (2015). This supports the aforementioned interpretation of Aspy (2016) findings that only persons highly motivated to increase their lucid dreaming skills benefit from keeping a dream diary. The present sample was not specifically selected for high interest in lucid dreams. The small and positive correlation between lucid dream frequency before the study and the lucidity increase during the study might point in that direction, i.e. persons with some form of previous experiences might be more motivated and, thus, more likely to benefit from an induction study.

The non-significant results regarding the Wake-up-back-to-Bed technique were astonishing as previous laboratory-based research (Stumbrys & Erlacher, 2014) showed such high success rates. One explanation might be that motivation has to be very high to wake up early (after 6 hours sleep), stay awake alone working with the dream and then go back to sleep again. In the laboratory setting an experimenter makes sure that the participant sticks to the protocol and motivates her/him – if necessary. Secondly, it is possible in the sleep laboratory to carry out REM awakenings with very high chance to recall a "fresh" dream. In the current home-based study we had no control whether the participants actually carried out the technique properly and/or whether they recalled a dream upon waking up after 6 hours sleep. One possibility to increase adherence to the protocol might be the application of social media techniques, i.e. the participant has to log on to a website or using an app (Whatsapp) and document his/her process of working with the dream. As the technique requires much effort, one night per week might be practicable for most students.

As personal experience of the second author indicate that is not so easy to carry out the reality checks regularly during the day, it would be advisable to implement some social media technique to remind the person to do a reality check and eliciting the feedback of the person that s/he had done the reality check properly. This might be a way to increase lucidity also in a group that are not highly motivated in respect to lucid dreaming.

Despite the overall negative results, a subsample with complete data at baseline and after week 3 showed a marginally significant increase in lucidity, i.e. participating in an induction study has at least a small effect. In addition by using social media to help the participants to adhere to the protocol, it might be an option to extend the training period, for example to 6 weeks.

Overall, the question arises whether everyone can increase lucid dream frequency by applying an induction technique. Furthermore, some persons might profit from a specific induction technique but not from others. These questions are still unanswered as most studies (Stumbrys et al., 2012) are based on highly-motivated samples, e.g. reader of "NightLight", a magazine for persons with interest in lucid dreaming, (e. g., Levitan, 1989).

Several methodological issues have to be taken into consideration interpreting the present findings. First, the DLQ means of the present study (range: 0.84 to 1.02) are higher than those reported by Stumbrys et al. (2013) ranging from 0.35 to 0.50. This might be explained by the fact that home dreams are more intense compared to lab dreams, (Voss, Schemelleh-Engel, Windt, Frenzel, & Hobson, 2013; Weisz & Foulkes, 1970). Second, the age mean of the control group was higher by about 3 years compared to the experimental groups. As all participants were adults, it is unlikely that previous reported age-dependent prevalence rates in lucid dreaming in children and adolescents (Schredl, Henley-Einion, & Blagrove, 2012; Voss, Frenzel, Koppehele-Gossel, & Hobson, 2012) had an effect on the results of the present study and, in addition, baseline DLQ values were comparable between the experimental and the control group. Third, participants with a high lucid dream recall frequency also tend to report more lucidity in dreams during the study period, which is in line with a previous study (Gackenbach, Walling, & LaBerge, 1984). This indicates that the measurement instruments showed some kind of validity. Forth, lucidity was only measured at baseline and after three nights during the study period. Using a checklist that had to be completed every morning would have reduced error variance (for measuring dream recall frequency via dream diary see: Schredl & Fulda, 2005) and increased statistical power.

To conclude, although the overall effects were not significant, slight increases in lucid dream frequency were found by applying cognitive techniques (Wake-up-back-to-Bed, reality testing/reflection). Future studies should extend the study interval to provide the participants with more time to practice the methods. Moreover, participants' adherence to the protocol could be enhanced by using social media technology like Whatsapp. It would be interesting to study the effect of different techniques in different groups to find out whether all participants can increase their lucid dream frequency and find the best technique for specific individuals, e.g. persons with some previous experiences with lucid dreaming vs. persons without any experiences.

References

Aspy, D. J. (2016). Is dream recall underestimated by retrospective measures and enhanced by keeping a logbook? An empirical investigation. Consciousness and Cognition, 42, 181-203.

Barrett, D. (1991). Flying dreams and lucidity: an empirical study of their relationship. Dreaming, 1, 129-134.

Erlacher, D. (2010). Anleitung zum Klarträumen - Die nächtliche Traumwelt selbst gestalten. Norderstedt: Books on Demand.

Gackenbach, J., Walling, J., & LaBerge, S. (1984). The lucid dreaming ability and parasympathetic functioning. Lucidity Letter, 3(4), 3-6.

Hearne, K. M. T. (1978). Lucid dreams: an electrophysiological and psychological study. University of Liverpool: Doctoral dissertation.

Kahan, T. L. (1994). Measuring dream self-reflectiveness: a comparison of two approaches. Dreaming, 4, 177-193.

Kühle, L. (2015). Insight: What Is It, Exactly? In T. K. Metzinger & J. M. Windt (Eds.), Open MIND (pp. 1-13). Frankfurt am Main: MIND Group.

LaBerge, S. P. (1980). Lucid dreaming: an exploratory study of consciousness during sleep. Stanford University: Doctoral dissertation.

LaBerge, S. P. (1985). Lucid dreaming. Los Angeles: Jeremy P. Tarcher.

LaBerge, S. P., Nagel, L. E., Dement, W. C., & Zarcone, V. P. (1981). Lucid dreaming verified by volitional communication during REM sleep. Perceptual and Motor Skills, 52, 727-732.

Levitan, L. (1989). A comparison of three methods of lucid dream induction. NightLight: Lucitity Institute Newsletter, 1(3), 3, 9-12.

Levitan, L. (1991). Get up early, take a nap, be lucid! NightLight: Lucitity Institute Newsletter, 3(1), 1-4, 9.

Noreika, V., Windt, J. M., Lenggenhager, B., & Karim, A. A. (2010). New perspectives for the study of lucid dreaming: From brain stimulation to philosophical theories of self-consciousness. International Journal of Dream Research, 3, 36-45.

Purcell, S., Mullington, J., Moffit, A., Hoffmann, R., & Pigeau, R. (1986). Dream self-reflectiveness as a learned cognitive skill. Sleep, 9(3), 423-437.

Saunders, D. T., Roe, C. A., Smith, G., & Clegg, H. (2016). Lucid dreaming incidence: A quality effects meta-analysis of 50 years of research. Consciousness and Cognition, 43, 197-215.

Schredl, M. (2002). Questionnaire and diaries as research instruments in dream research: methodological issues. Dreaming, 12, 17-26.

Schredl, M., & Erlacher, D. (2004). Lucid dreaming frequency and personality. Personality and Individual Differences, 37, 1463-1473.

Schredl, M., & Fulda, S. (2005). Reliability and stability of dream recall frequency. Dreaming, 15, 240-244.

Schredl, M., Henley-Einion, J., & Blagrove, M. (2012). Lucid dreaming in children: The UK library study. International Journal of Dream Research, 5, 94-98.

Snyder, T. J., & Gackenbach, J. (1988). Individual differences associated with lucid dreaming. In J. Gackenbach & S. LaBerge (Eds.), Conscious mind, sleeping brain - Perspectives on lucid dreaming (pp. 221-259). New York: Plenum Press.

Stumbrys, T., & Erlacher, D. (2014). The science of lucid dream induction. In R. Hurd & K. Bulkeley (Eds.), Lucid dreaming: New perspectives on consciousness in sleep - Vol. 1: Science, psychology, and education (pp. 77-102). Santa Barbara, California: Praeger.

Stumbrys, T., Erlacher, D., Schädlich, M., & Schredl, M. (2012). Induction of lucid dreams: A systematic review of evidence. Consciousness and Cognition, 21(3), 1456-1475.

Stumbrys, T., Erlacher, D., & Schredl, M. (2013). Testing the involvement of the prefrontal cortex in lucid dreaming: A tDCS study. Consciousness and Cognition, 22(4), 1214-1222.

Tholey, P. (1983). Techniques for inducing and manipulating lucid dreams. Perceptual and Motor Skills, 57, 79-90.

Tholey, P., & Utecht, K. (1987). Schöpferisch träumen - Der Klartraum als Lebenshilfe. Niedernhausen: Falken.

Voss, U., Frenzel, C., Koppehele-Gossel, J., & Hobson, A. (2012). Lucid dreaming: an age-dependent brain dissociation. Journal of Sleep Research, 21, 634-642.

Voss, U., Holzmann, R., Hobson, A., Paulus, W., Koppehele-Gossel, J., Klimke, A., & Nitsche, M. A. (2014). Induction of self awareness in dreams through frontal low current stimulation of gamma activity. Nature Neuroscience, 17(6), 810-812.

Voss, U., Holzmann, R., Tuin, I., & Hobson, J. A. (2009). Lucid dreaming: a state of consciousness with features of both waking and non-lucid dreaming. Sleep, 32, 1191-1200.

Voss, U., Schemelleh-Engel, K., Windt, J. M., Frenzel, C., & Hobson, A. (2013). Measuring consciousness in dreams: The lucidity and consciousness in dreams scale. Consciousness and Cognition, 22, 8-21.

Weisz, R., & Foulkes, D. (1970). Home and laboratory dreams collected under uniform sampling conditions. Psychophysiology, 6, 588-596.

Zadra, A. L., Donderi, D. C., & Pihl, R. O. (1992). Efficacy of lucid dream induction for lucid and non-lucid dreamers. Dreaming, 2, 85-97.

Zunker, M., Althoff, H. K., Apel, J., Lässig, H. S., Schültke, L., & Schredl, M. (2015). Comparing questionnaire and diary measures for eliciting nightmare frequency. International Journal of Dream Research, 8, 129-134.