

# Differences in lucid dream reports and non-lucid dream reports: A single-case analysis

Michael Schredl

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

**Summary.** Lucid dreams are dreams in which the dreamer is aware that s/he is dreaming. Skilled lucid dreamers often choose pleasurable activities like flying or having sex; thus, lucid dreams should be more bizarre and more positively toned than dreams in general. Although, some dream content analytic findings confirmed this, there also conflicting results. The present study analyzed all lucid dreams (47 pre-lucid, 34 lucid dreams without control, and 91 lucid dreams with control) recorded by a male dreamer over a time period of 32 years. As expected, the pre-lucid and lucid dreams showed more positive emotions and included more erotic and flying themes, but also less verbal interactions than the matched non-lucid control dreams. An exploratory analysis indicated that the three subgroups, pre-lucid dream, lucid dreams without control, and lucid dreams with control showed different patterns compared to the matched non-lucid dreams, e.g., the lucid dreams with control showed the highest bizarreness. Regarding emotions, only the lucid dreams with control showed a clear increase in positive emotions compared to non-lucid dreams, whereas only minor differences were found for pre-lucid dreams and lucid dreams without control. An important methodological advantage of the present study was that all pre-lucid and lucid dreams of the dreamer were included, and the non-lucid dreams were randomly selected; therefore, possible selection biases, e.g., reporting fun lucid dreams or bizarre non-lucid dreams were minimized. Thus, these findings – even though only based on a single participant – can help to elucidate the discrepancies reported in the literature dealing with dream content of lucid dreams.

**Keywords:** Lucid dreaming, dream series, bizarreness, dream emotions, verbal interaction

## 1. Introduction

Lucid dreams are characterized by the fact that the dreamer is aware of the fact that s/he is dreaming while dreaming (LaBerge, 1985). Within lucid dreams, one can differentiate between lucid dreams without having control and lucid dreams with control, e.g., doing something like jumping in the air and fly away, change something, or deliberately waking up (Schredl et al., 2018). Another category are the so-called pre-lucid dreams, the dreamer has a critical attitude towards the dream reality, even may ask the question ‘Am I dreaming’ but then did not realize that s/he is dreaming (Green, 1968). Although about 50% of participants reported of having at least one lucid dream during their life time (Saunders et al., 2016), the frequency of lucid dream reports in unselected student samples keeping a dream diary outside a lucid dream induction study is relatively small: 0.3% to 1.4% (Schredl & Noveski, 2018; Zadra et al., 1992). The frequency of pre-lucid dreams is even lower: 0.6% to 1.0% (Schredl & Noveski, 2018; Zadra et al., 1992).

As lucid dreamers who are in control of the dream, choose typically pleasant activities like flying, sexual activities (Schädlich & Erlacher, 2012; Stumbrys et al., 2014), one would expect that lucid dreams be more positively toned

than non-lucid dream. Whereas anecdotal evidence (Green, 1968; LaBerge, 1985) and a number of studies (LaBerge et al., 2018; Mallett et al., 2021; Schredl et al., 2022; Thomas et al., 2015; Voss et al., 2013) corroborated that more positive emotions occur in lucid dreams, Gackenbach and Schillig (1983) reported that lucid dreaming can also be associated with more negative than positive emotions. Research into lucid nightmares that are characterized being aware of the dream/nightmare but unable to control the dream action and/or deliberately wake-up from the dream (Schredl & Bulkeley, 2020) also highlighted the fact that not all lucid dreams are positive. In two surveys (Stumbrys, 2018, 2021), 7% to 10% of lucid dreams were experienced as negative. Negatively toned lucid dreams (lucid dysphoria) are also a discussion topic in lucid dream platforms like Reddit (Mallett et al., 2022). Another series of studies (Bulkeley, 2014; Gackenbach, 1988; Schredl & Noveski, 2018) did not find differences regarding positive and negative emotions between lucid and non-lucid dreams. There might be some methodological aspects that might explain the inhomogeneity of these findings, for example, how was the lucid dream selected, e.g., self-selected like in the study of Schredl et al. (2022), or sample characteristics, e.g., persons with frequent nightmares were included in the sample as nightmare frequency is related to more frequency lucid nightmares (Stumbrys, 2018).

Similar, the findings regarding the relationship between dream bizarreness and lucidity are inconclusive: Although lucidity levels were positively correlated with dream bizarreness in one study (Mallett et al., 2021), several studies (Gackenbach & Schillig, 1983; Schredl et al., 2022; Voss et al., 2013; Yu & Shen, 2020) found no differences in relation to bizarreness between lucid, ordinary, and vivid dreams. The idea why lucid dreams might be more bizarre than non-

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

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lucid dreams is based on two ideas: (1) bizarre dream elements might trigger lucidity (Hoffman & McCarley, 1980) and (2) lucid dreamers engage in activities like flying or walking through walls that are not possible in waking life (Schädlich & Erlacher, 2012; Stumbrys et al., 2014). However, there might be again methodological issues that might have affected the results of the studies reported above, e.g., the selection of the control dreams, e.g., dreams that are especially unusual/bizarre might have been self-selected by the participants as these dreams were also posted online – like the lucid dreams (Schredl et al., 2022).

An interesting and new content analytic finding has been reported by Schredl et al. (2022): Lucid dreams included a lower number of persons and less frequent verbal interactions than non-lucid dreams of the same length and reported by the same participant (within-subjects design). This was interpreted as the result of the dreamer's deliberately choosing dream actions that might not involve a lot of other persons, like flying or sexual activities. To summarize, the differences between lucid and non-lucid dreams are still not fully understood.

The aim of the present study is to investigate the content differences between pre-lucid and lucid dreams versus non-lucid dreams in a dream series reported by a single participant. The main advantage to previous studies is that all pre-lucid and lucid dreams of the participant could be included (no selection bias) and the non-lucid control dreams, matched for dream length, were randomly selected but occurred closely in time to the corresponding lucid dream. Given the relatively high number of pre-lucid and lucid dreams, it was possible to study three subgroups separately: pre-lucid dreams, lucid dreams without control, and lucid dreams with control in an exploratory fashion. We hypothesized that lucid dreams with control are more positively toned than the matched non-lucid dreams. Given the relationship between dream bizarreness and lucidity and the fact that selection issues were minimized in this study, we also expected lucid dreams more bizarre than non-lucid dreams as lucid dreamers quite often deliberately want to engage in bizarre activities like flying.

## 2. Method

### 2.1. Participant

The male participant living in Germany (Caucasian descent) kept an unstructured dream diary from the age of 22, beginning in September, 1984 through December 2019. Overall, 12,769 dreams were recorded in that period. The mean dream length of all dreams was  $137.60 \pm 85.37$  words. Prior to attending a workshop on lucid dreaming given by Paul Tholey and Brigitte Holzinger on February 22, 1996, the dreamer did not use any lucid dream induction methods. After the workshop, he started performing reality-checks on a quite regular basis asking himself the question "Am I dreaming or am I awake?" about five to ten times per day (Tholey, 1983). After several months, this lucid dream induction technique was successful but only used very infrequently after that and discontinued after about a year. The dreamer experienced no nightmares in the study period.

### 2.2. Measurements

Dream content analysis was based on scales that have been used in previous studies (Schredl et al., 2022; Schredl, Sa-

hin, & Schäfer, 1998; Schredl, Schäfer, et al., 1998; Schredl et al., 2019). The judge received the instructions that the rating system is aiming at coding the whole dream as a unit, e.g., most intense positive emotion within the dream, interactions were only coded if the dreamer is involved. Similar, only the emotions of the dreamer were coded. The scales applied in this study were the following: bizarreness (four-point scale: 1 = realistic, 2 = realistic but unusual, 3 = one bizarre element, 4 = two or more bizarre elements), positive dream emotions (four-point scale: 0 = none, 1 = mild, 2 = moderate, 3 = strong), negative dream emotions (four-point scale: 0 = none, 1 = mild, 2 = moderate, 3 = strong), number of dream persons, number of males and females, verbal interaction (0 = not present, 1 = present), physical interaction (0 = not present, 1 = present), problems (0 = no problems, 1 = minor problems, 2 = major problems) and death (0 = not present, 1 = present). The death scale included themes like death, suicides, murders, corpses and cemeteries. Four aggression subscales (verbal vs. physical, dreamer as aggressor (outgoing) vs. dreamer as the recipient (receiving) were applied. A score of outgoing aggressions (verbal and physical combined) was derived (Present/not present); in a similar way the aggressions towards the dreamer (verbal and physical combined) were derived. Total aggression was coded as present if at least one of the four forms of aggression was present in the dream. Schredl et al. (2004) reported that the interrater reliability coefficients of these scales were high: For example, after the training, the total aggression scale showed an exact agreement of 96% between the two raters; the interrater reliability coefficient (Spearman rank correlation) for negative emotions was also high:  $r=.711$ . Similarly, the interrater reliability (Pearson correlation) for total number of dream persons was excellent:  $r=.964$  (Schredl et al., 2004).

### 2.3. Procedure

The dream reports were hand-written upon awakening. After a period of typically a few years, the reports were typed and entered into a database by the dreamer himself (Alchera 3.72, created by Harry Bosma, [www.mythwell.com](http://www.mythwell.com)). During this process, the participant rated each dream for lucidity according to the following definitions provided by the Alchera software: pre-lucid (not really a lucid dream but on the threshold), awareness of the dream (aware of the dream but not controlling anything), and aware plus control (dreamer can actively influence the dreamscape). The data were exported into a Microsoft Excel spreadsheet and data analysis was carried out using the SAS 9.4 for Windows software package (SAS Institute, Cary (North Carolina), USA). The present data set is an expansion of the study of Schredl (2013). For each pre-lucid and lucid dream a non-lucid dream was matched (comparable dream length (word count)). In order to avoid serial effects, it was randomly chosen (for two dreams) whether the search direction is a dream before the lucid dream or a dream that occurred after the lucid dream. The first dream that fitted the match criterion ( $\pm 10\%$  of words) was included into the analysis. Given the large number of non-lucid dreams, the time interval between lucid and non-lucid dream was in general smaller than  $\pm 6$  months. Only in seven cases, the time interval was longer due to problems finding non-lucid dreams that were long enough and close to the lucid dream. As this was balanced (for each subsequent pair of lucid dreams, the first or second lucid dream was match with a dream before or after

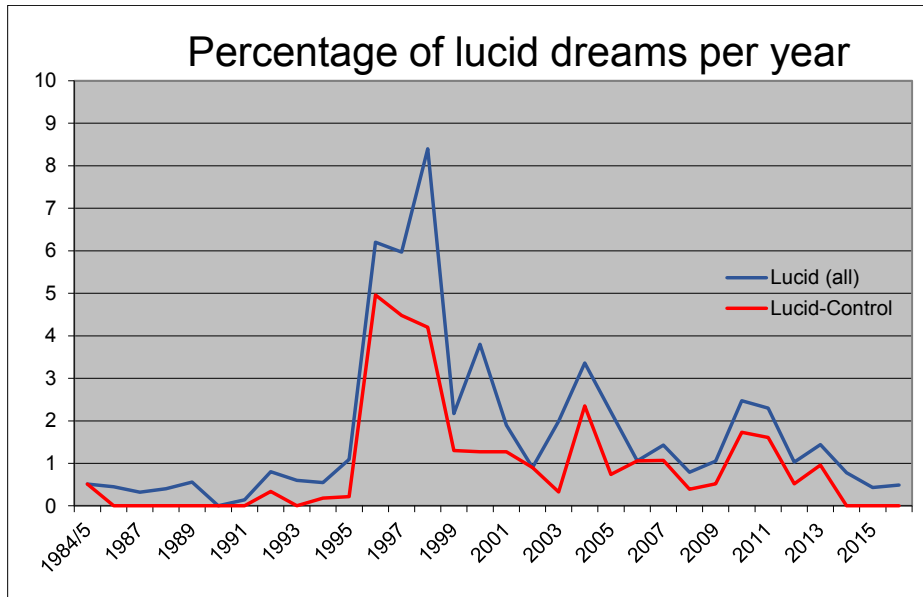


Figure 1. Frequency of pre-lucid and lucid dreams per year.

the lucid dream), 50% of the control dreams occurred before and 50% after the lucid dream. The dreams were coded by one external judge, after he was trained with a set of 50 dreams stemming from another study

To compare the characteristics of lucid and non-lucid dream reports, effect sizes were computed using the webpage (Lenhard & Lenhard, 2016) using algorithms based on the formulas given by Cohen (1988). For computing effect sizes based on differences in percentage, see also: Appendix D in Domhoff (1996). Values of around 0.5 are medium effect sizes and values of 0.8 and greater are representing large effect sizes. So far, only one statistical method that is appropriate for analyzing dream series have been published (Klingenberg, 2008). The particularities of dream series are that they typically involve gaps (nights with no dream recall) and the dependent variable is binary. Using the SAS 9.4 for Windows software package, the statistician (second author of Schredl & Reinhard, 2012) used the GLIMMIX procedure with a power covariance structure to implement an autoregressive Generalized Linear Mixed Model (AR-GLMM) with a logit link and serial correlation according to the formula developed by Klingenberg (2008). As no similar algorithm was found for ordinal scales, the ordinal scales (bizarreness, positive and negative emotions, occurrence of problems) were categorized into a binary format: For bizarreness, the

categories “1 = realistic” and “2 = realistic but unusual” were grouped against the categories “3 = one bizarre element” and “4 = two or more bizarre elements”. The dream emotions scales were divided into two categories (no or mild emotions vs. moderate and strong emotions). The three-point scales for problems was grouped as none/minor vs. major problems.

### 3. Results

Overall, 172 pre-lucid and lucid dreams have been recorded (1.35% of all dreams). There were 46 pre-lucid dreams, 33 lucid dream with awareness but without control, and 91 lucid dreams with awareness and control. The distribution of pre-lucid and lucid dreams over the study period are depicted in Figure 1. The majority of lucid dreams occurred after starting practicing the induction technique in 1996. After discontinuing the training, lucid dream frequency declined (cf. Schredl, 2013).

The averaged dream lengths between the pre-lucid and lucid dream reports were almost comparable to the matched non-lucid dream reports – with a minimal effect size difference (see Table 1). A large effect size difference was found for bizarreness, for statistical testing see Table 2. The number of dream persons was slightly smaller in the pre-lucid

Table 1. Comparison for 172 pre-lucid and lucid dreams and 172 matched non-lucid dreams.

Variable	Pre-lucid and lucid dream reports Mean ± SD	Non-lucid dream reports Mean ± SD	Effect size
Word count	230.09 ± 118.87	228.63 ± 117.73	0.012
Bizarreness	2.70 ± 0.58	2.03 ± 0.75	1.100
Positive dream emotions	1.22 ± 0.88	0.81 ± 0.80	0.488
Negative dream emotions	0.95 ± 0.79	1.01 ± 0.83	-0.065
Number of dream persons	4.36 ± 2.77	4.78 ± 3.28	-0.140
Number of male individuals	1.23 ± 1.27	1.67 ± 1.45	-0.323
Number of female individuals	1.61 ± 1.19	1.53 ± 1.35	0.065

and lucid dream reports but were almost comparable to the matched non-lucid dream reports.

Using the dichotomization described in the method section, the statistical analysis showed that pre-lucid and lucid dream reports were more often bizarre than non-lucid dream reports (see Table 2). Similar, pre-lucid and lucid dream reports included more moderate and strong positive emotions compared to non-lucid dream reports, whereas the difference for moderate and strong negative emotions was not statistically significant (see Table 2). Major problems were less often found in pre-lucid and lucid dreams. Verbal interactions were more prominent in non-lucid dreams, whereas physical interaction were more prominent in pre-lucid and lucid dream reports. Interestingly, there was no significant differences for the occurrence of aggression (at least one of the four types) between pre-lucid and lucid dreams compared to non-lucid dreams, but the dreamer was more often aggressive in non-lucid dreams compared to the pre-lucid and lucid dreams. On the other hand, the occurrences of aggression towards the dreamer did not differ. As expected, erotic content and flying was found more often in pre-lucid and lucid dreams compared to non-lucid dreams. Unfortunately, the difference for flying could not be tested as the algorithm did not converge but the effect size for the difference is very large.

In an exploratory fashion, four variables were studied whether they show any differences between the relatively small subgroups of pre-lucid (N = 46), lucid dream with awareness but without control (N = 33), and lucid dreams with control (N = 93). Figure 1 depicts effect size differences between the subgroups and their matched non-lucid dreams, e.g., for the pre-lucid group (N = 46), the matched group of non-lucid dreams consisted also of 46 dreams. Even though bizarreness was much higher (large effect sizes) in pre-lucid and lucid dreams without control compared to the matched non-lucid dreams, the lucid dreams with control showed a further increase in bizarreness with a very large effect size compared to the non-lucid dreams. Whereas the differences in positive emotions between pre-lucid dreams and lucid dreams without control were relatively small, lu-

cid dreams with control were much more positive than the matched non-lucid dreams. Erotic content was very prominent in lucid dreams with and without control but not in pre-lucid dreams (see Figure 2). On the other hand, flying was a major feature of all three dream groups compared to the non-lucid dreams.

#### Dream example (pre-lucid flying dream)

*“I’m in a very large department store. .... The floor is covered with furs, a pleasant feeling when walking. At the end of the fur department, the pelts have slipped a bit as they have no grip on the floor. Running fast, I get the idea to jump off and float a bit. It works quite well, I can levitate up to the ceiling (about 5-6 meters high, more like an old-fashioned house). However, I think that I am awake and am constantly amazed that flying is possible while being awake. I’m also very cautious as I fly towards a crowd of people to draw attention to myself. It’s not so strange for the people though, they don’t pay much attention to me. Another man, more of a bad guy, is supposed to be caught, but I suspect he wants to fly away. Flying was great fun.”*

#### 4. Discussion

The results of the present study demonstrated that pre-lucid dream and lucid dreams showed distinct differences compared to matched non-lucid dreams. The pre-lucid and lucid dreams were more bizarre and included more positive emotions, more erotic themes and flying, as well as less verbal interactions. The exploratory analyses indicated that pre-lucid dreams differ from lucid dreams (e.g., pre-lucid dreams include rarely erotic topics), and lucid dreams with control differ from those without control (control is associated with more positive emotions and more bizarreness). Thus, these findings – even though based on only a single participant – might help to elucidate the discrepancies regarding dream content of lucid dreams in the literature.

Table 2. Comparison for 172 pre-lucid and lucid dreams and 172 matched non-lucid dreams.

Variable	Pre-lucid and lucid dream reports	Non-lucid dream reports	Effect size	Statistical Test <sup>1</sup>	
				t =	p =
Bizarreness (3/4 vs. 1/2)	69.19%	17.44%	1.103	11.0	<.0001
Positive emotions (2/3 vs. 0/1)	48.26%	24.42%	0.502	4.9	<.0001
Negative emotions (2/3 vs. 0/1)	26.16%	30.81%	-0.103	-0.8	.4189
Major problems (Yes/No)	23.26%	28.49%	-0.120	4.3	<.0001
Death themes (Yes/No)	7.56%	6.98%	0.054	----- <sup>2</sup>	
Verbal interaction (Yes/No)	63.77%	81.40%	-0.402	-7.2	<.0001
Physical interaction (Yes/No)	47.67%	31.40%	0.334	-3.1	.0024
Total aggression (Yes/No)	18.60%	26.74%	-0.195	1.8	.0775
Aggression (Dreamer is aggressive)	11.63%	22.67%	-0.296	-2.7	.0072
Aggression towards the dreamer	13.37%	17.44%	-0.113	-1.0	.2995
Erotic content (Yes/No)	52.91%	19.77%	0.708	7.1	<.0001
Flying (Yes/No)	59.30%	2.91%	1.415	----- <sup>2</sup>	

Note. <sup>1</sup>Glimmix procedure for binary time series with gaps (Klingenberg, 2008), <sup>2</sup>algorithm did not converge or produced implausible results

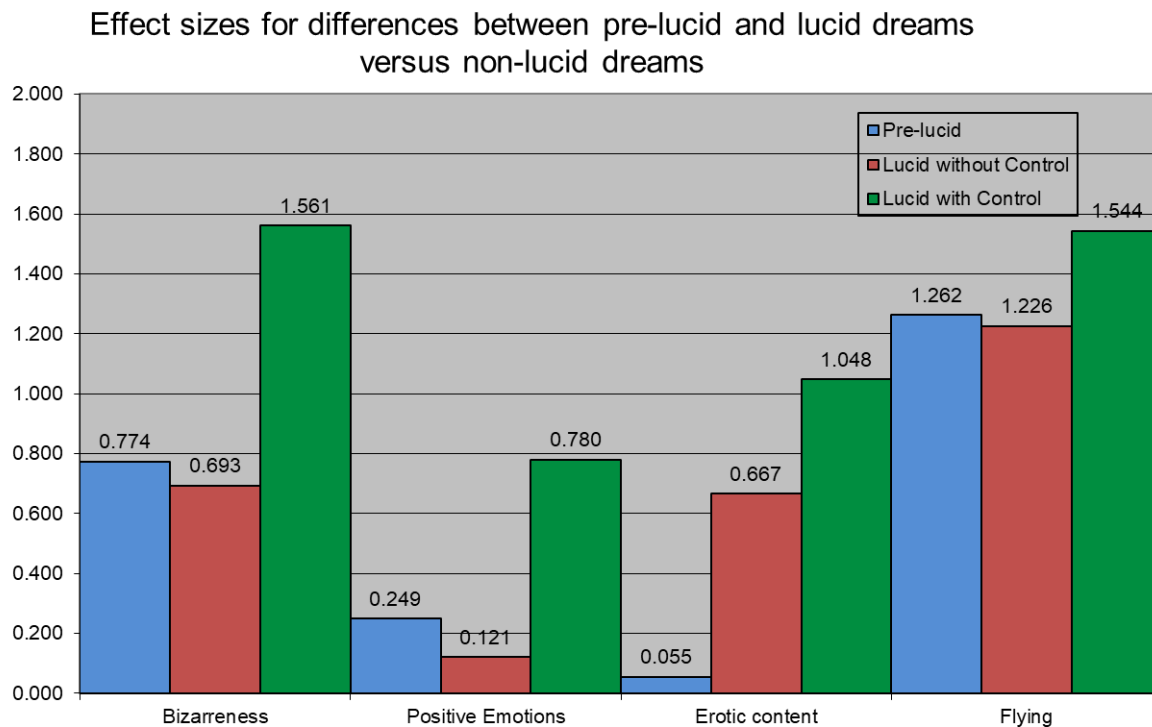


Figure 2. Effect sizes for differences between pre-lucid and lucid dreams versus non-lucid dreams.

The major limitation of the study is, of course, that all lucid dreams were reported by a single dreamer. For example, as the dreamer is male and did not experience any nightmares in the study period, no lucid nightmares (lucid dreams with strong negative emotions) were in the dataset of this study. One might expect that lucid dreams without control might show more often negative emotions in persons who experience nightmares and also lucid nightmares (Stumbrys, 2021) compared to the present nightmare-free dreamer. However, this topic did not affect the comparisons presented in this article, as the non-lucid control dreams were selected randomly and, thus, are representative for the non-lucid dreams of this dreamer (the lucid dreams as well as the non-lucid dreams did not include nightmares). On the other hand, a major advantage of the present analysis was that there was no selection bias for lucid dreams nor non-lucid dreams, that is, all pre-lucid and lucid dreams remembered by the dreamer were included into the analysis and the matching procedure provided a strict protocol for the random selection of the non-lucid dreams. Taking a look at the death themes, for example, the current study did not reveal any differences between lucid and non-lucid dreams (almost zero effect size for the difference) whereas Schredl et al. (2022) reported more death themes in the non-lucid dreams, i.e., this might be explained by a selection bias as the participants themselves chose what kind of dreams (lucid and non-lucid) they posted on the public website, maybe selecting for especially interesting, weird or dramatic (death themes) dreams. Another issue that should be considered is that almost all lucid dreams have been reported after the dreamer applied the induction technique of reality checks, i.e., most of the lucid dreams did not occur spontaneously. In order to learn more about the difference between spontaneously occurring lucid dreams and lucid dreams that are a result of practicing an induction technique,

studies in unselected samples, that is, not selected for having trained to induce lucid dreams, like the study of Schredl and Noveski (2018), have to be carried out. However, the sample sizes have to be large as in this study only 22 of 1612 were lucid dreams (Schredl & Noveski, 2018), and the participants should be asked whether they had applied an induction technique (unfortunately not done in the Schredl and Noveski study). Applying an induction technique is not uncommon, as about 50% of the infrequent and frequent lucid dreamers of another study (Neuhäusler et al., 2018) had applied one or more induction technique to increase their lucid dream frequency.

The reports of the present study were evaluated by one external judge, that is, no interrater reliability coefficients could be computed for this specific dream sample. However, previous studies with similar dream content analytic scales (Schredl et al., 2004; Schredl, Sahin, & Schäfer, 1998; Schredl, Schäfer, et al., 1998; Schredl et al., 2019) demonstrated that, after training (as it has been done in the present study), these types of scales showed high interrater reliability. There is no reason to assume that this would be different in the present dream sample.

The last methodological issue that has to be addressed is the statistics as this is a single case analysis. Unfortunately, statistical procedures addressing time series of ordinal data (e.g., four-point emotion scales) with varying time lags between the observations (due to dream recall and having a lucid dream) are not available for this research design, solely a statistical test for binary data obtained within such a design has been published (Klingenberg, 2008). Even though, a time series analysis (Schredl, 2000) applied to a series of one hundred dreams showed that all autocorrelation coefficients are non-significant and, thus, indicate that the variation from dream to dream is very large and, thus, represent “almost” independent observations, the proper statistical

method should include an estimate for the variance based on repeated measuring. Thus, it would be very helpful for future researchers if statistical test procedures for time series with time gaps and ordinal-scaled respective interval-scaled dependent variables would be developed and published by statisticians. In addition, in some cases in the present data (see Table 2) even the published algorithm did not converge or produced implausible findings. In the present paper, the focus was on effect sizes for evaluating the differences between pre-lucid and lucid dreams in comparison to the matched non-lucid dreams as these numerical values offer some insight into the magnitude of these differences.

The finding that lucid dreams with control contain more positive emotions compared to non-lucid dreams corroborated previous findings (LaBerge et al., 2018; Schädlich & Erlacher, 2012; Schredl et al., 2022; Voss et al., 2013). However, the negligible difference regarding positive emotions between lucid dreams without control and the matched non-lucid dreams might explain why other studies (Bulkeley, 2014; Gackenbach, 1988; Schredl & Noveski, 2018) did not find any differences regarding dream emotions. For future studies in this field, it seems crucial to differentiate the degree of lucidity within the dream material, especially if the dreamer experiences control or not (cf. Mallett et al., 2021).

Regarding dream bizarreness, all lucid dreams (including the pre-lucid dreams) were more bizarre compared to the non-lucid dreams but there was a marked higher bizarreness in lucid dreams in which the dreamer had control – in line with the findings of Mallett et al. (2021) showing that a higher degree of lucidity was associated with more bizarre dream content. Thus, the lack of a difference regarding bizarreness between lucid and non-lucid dreams reported by Schredl et al. (2022) might be explained by selection biases, that is, participants selected intense, bizarre non-lucid dreams for putting them online. Again, this is a strength of the present study as possible biases due to active selecting specific dreams for the study have been ruled out.

The high percentage of flying dreams and dreams with sexual activities are in line with the surveys showing that these activities were preferred by many lucid dreamers (Stumbrys et al., 2014). The high percentage of flying dreams in pre-lucid dreams might support the idea that bizarre elements like flying can trigger the questioning of the current state of consciousness, being lucid or not; even though it does not always result in the realization of being lucid (see dream example in the result section). On the other hand, the slightly higher percentage of flying in lucid dreams with control also supports the second line of thinking, that is, the dreamer deliberately chooses to carry out bizarre actions like flying or going through walls within the lucid dream (cf. Stumbrys et al., 2014). On the other hand, erotic dream content is not associated with pre-lucidity, but were considerably higher in lucid dreams without awareness compared to non-lucid dreams, and highest in lucid dreams with control, indicating that the male dreamer preferred this activity in his lucid dreams. It would be very interesting to study other dreamers with other preferences, e.g., athletes who want to improve their motor skills (Erlacher, 2012).

Similar to the study of Schredl et al. (2022), lucid dream reports include fewer verbal interactions than non-lucid dreams. This would suggest that lucid dreamers choose actions that often include having fun by themselves, e.g., flying, or only include a small number of dream characters,

e.g., having sex (Stumbrys et al., 2014). This result represents an interesting starting point for future research.

Despite the differences, lucid dreams also showed similarities compared to non-lucid dreams, e.g., negative dream emotions, total aggression, and number of dream persons. Based on the finding that outgoing aggression is rarer in pre-lucid and lucid dreams as well as the occurrence of verbal interactions, one might speculate whether the dreamer did not talk things through in the dream but changed the dream scenario, for example, in one dream he transformed three attacking adolescents into refrigerators. This might stimulate a more in-depth analysis how lucid dreamers deal with different kinds of threats and problematic situations.

Within this study, the dream content analysis unit was the whole dream report and, thus, in the case of lucid dreams might include non-lucid parts as well as lucid parts. In order to take a closer look at the negative dream elements in lucid dreams, it would be very interesting to study long dream reports that include substantial non-lucid dream parts and a substantial lucid dream parts and compare these parts of the same dreams with each other. One might hypothesize that the negative emotions might be more often present in the non-lucid parts compared to the lucid parts. This might also explain the conflicting findings regarding dream emotions (see above), as some studies might have analyzed lucid dreams that were characterized by lucidity throughout most of the dream whereas other findings are based on lucid dreams with a sizable proportion of dream scenes without lucidity.

To summarize, this single case analysis showed that pre-lucid and lucid dreams differ from non-lucid dreams and also that several factors might have an effect on the differences between lucid and non-lucid dreams: First, the degree of lucidity is of importance, e.g., positive emotions are only prevailing if the dreamer is in control of the dream but not in lucid dreams without awareness. Thus, one would expect more positive lucid dreams in highly skilled lucid dreamer (cf. Schredl et al., 2018). Second, the intentions of the lucid dreamer (in this study, the dreamer had a focus on flying and sexual activities) might also affect characteristics of lucid dreams. It would be interesting to compare spontaneously occurring lucid dreams (dreamer without specific intentions) and lucid dreams of persons with different intentions of how they want to benefit from lucid dreams, e.g., improving motor skills or dreaming lucidly as spiritual practice, regarding the content of their lucid dreams.

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