

Lucid dreaming in children: The UK library study

Michael Schredl¹, Josie Henley-Einion² and Mark Blagrove²

¹Central Institute of Mental Health, Mannheim, Germany

²Department of Psychology, Swansea University, United Kingdom

Summary. The term lucid dream designates a dream in which the dreamer, while dreaming, is aware he or she is dreaming. Whereas lucid dreaming has been studied in adults, large-scaled surveys in children are scarce. The sample here included 3579 children for the ages from 6 to 18 who completed a brief questionnaire distributed in UK libraries. 43.5% reported having had at least one lucid dream. As hypothesized, incidence of lucid dreams was most strongly associated with the preference for reading fantasy/science-fiction. Whether lucid dreaming might be beneficial for children in skills training or coping with nightmares are interesting topics for future research.

Keywords: Lucid dreaming, Children, Book preferences

1. Introduction

The term lucid dream designates a dream in which the dreamer, while dreaming, is aware he or she is dreaming (Tholey, 1983; LaBerge & Rheingold, 1990). In student samples, the percentage of people who report having had at least one lucid dream in their lifetime ranges from 57.5% (Gackenbach, 1991) to 73% (Blackmore, 1982) and 82% (Schredl & Erlacher, 2004). In two representative surveys, the figures were lower: 26% (N = 1000; Stepansky, Holzinger, Schmeiser-Rieder, Saletu, Kunze, & Zeitlhofer, 1998) and 51% (N = 919; Schredl & Erlacher, 2011). Although the percentage of people who report ever having had a lucid dream is high, the actual frequency of lucid dreams – as measured by keeping dream diaries – is relatively low; less than 1% of dreams (Barrett, 1991; Zadra, Donderi, & Pihl, 1992).

Lucid dreaming research in children is scarce; even though anecdotal report of lucid dreaming can be found in the literature (Kimmins, 1973). Armstrong-Hickey (1988), for example, reported that she was a frequent lucid dreamer between the ages of 6 and 12 years. Hickey (1988) studied four children (age range from 10 to 12 yrs.) who were trained in lucid dreaming in the sleep laboratory (each child for four non-consecutive nights). She obtained six eye-signal verified lucid dreams reported by two of the children (Hickey, 1988). The proficient lucid dreamer can carry out pre-arranged eye movement patterns within the dream and these can be detected by the electrooculogram (EOG) because the muscle atonia characteristic for REM sleep does not affect the eye muscles (Hearne, 1978; LaBerge, 1979). So, REM lucid dreaming can be found in children.

One problem studying this type of dream in children is the child's understanding of dreams. Piaget (1978) found that young children tend to think that their dreams are real

experiences and after several steps in cognitive development (around the age of 9 or 10), the child understands that dreams are internally produced images during sleep. More recent studies (Wilson, 1991; Meyer & Shore, 2001), however, showed that most five-year olds do perceive dreams as internal mental processes. Yet the concept of lucid dreaming might be more difficult to understand: a study in preschool children (4 to 6 years) found that most children believe that in dreams there might be a specific form of controlling the action – while being aware that it is an ongoing dream (Qinmei, Qinggong, & Jie, 2006). The only large-scaled survey (N = 611) on the frequency of lucid dreams in children have been carried out by Lapina, Lysenko, and Burikov (1998). The percentage of children reported having lucid dreams ranged from 5% (10 years) to about 50% in (12 to 14 years); very high rates (80-90%) were found in 15 to 18-year olds. These authors found that a six-week training in different lucid dream induction methods like MILD (Mnemonic Induction of Lucid Dreams; LaBerge, 1985), reality checks (Tholey & Utecht, 1987) or re-dreaming (Garfield, 1988) in thirteen 10 to 12-year-old children resulted in a high rate of lucidity (92% of the children had at least one lucid dream).

The present aim was to examine lucid-dream frequency in a large sample of children. Furthermore, the effects of age and gender, and associations of dream recall frequency and nightmare frequency with the occurrence of lucid dreams was studied. In addition, the book preferences of these children were studied as possible associates of the occurrence of lucid dreaming. We hypothesized that reading fantasy and science-fiction stories could be associated with lucid dreaming because children who are interested in bizarre stories might recognize bizarre elements in dreams, which could trigger lucidity, or their interest in alternative worlds might be associated with an ability to recognize they are dreaming.

2. Method

2.1. Participants

The sample included 3579 children (2196 girls, 1383 boys) with the mean age of 12.0 ± 1.9 yrs. The sample sizes for the ages from 6 to 18 are depicted in Table 1.

Corresponding address:

Prof. Dr. Michael Schredl, Sleep laboratory, Central Institute of Mental Health, PO Box 122120, 68072 Mannheim, Germany.
Email: Michael.Schredl@zi-mannheim.de

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2.2. Dream questionnaire

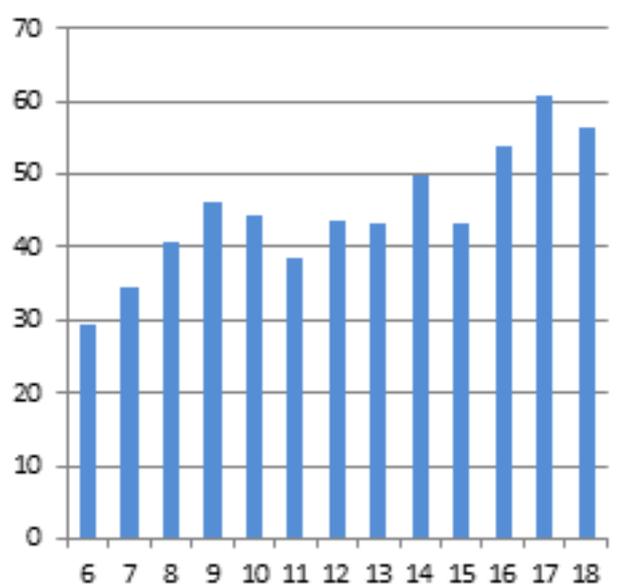
The questionnaire entitled “Dream lab: The big library experiment” was devised by the Library Association (United Kingdom) and Mark Blagrove. The first section of the questionnaire included a question about types of book that the child likes to read. The following instruction was given: ‘Please put a tick in the box next to any of the following types of books that you like to read for leisure, that is, not for school’. The categories of books were as follows: fiction (novels and stories), scary stories, history books, poetry, fantasy/science-fiction, arts and crafts, nature and science, religious books, other fact books, puzzles/joke books, sport and hobbies. The first question of the dream section covered dream recall frequency, using a five-point format: How often do you wake up and recall a dream? 4 = 4-7 times per week, 3 = 1-3 times per week, 2 = 1-4 times per month, 1 = 1-11 times per year and 0 = less than 1 time per year, or never. The same scale was given for measuring nightmare frequency including a brief definition for nightmares: “A nightmare is a vivid dream that is frightening or disturbing, and which you can remember clearly and in detail when you wake up. How often do you have such a nightmare?”

The question about having lucid dreams was formulated as follows: “Have you ever had a dream during which you knew that you were dreaming? Yes/ No / Don’t know. Additional definitions about lucid dreams were not given. For the purpose of the analysis of whether participants had ever had a lucid dream, the category Yes was used, and the categories No and Don’t know were combined.

2.3. Procedure

The dream lab questionnaire was distributed in libraries all over the United Kingdom. The text explicitly stated that one does not have to remember dreams, go to a library or read regularly to fill in the questionnaire: this was in order to minimize possible selection effects. The completed questionnaire could be returned to the library or sent to the Library Association anonymously. For the present analysis, questionnaires completed by children from 6 yrs. to 18 yrs. were included.

Figure 1: Percentage of children who have ever had a lucid dream



For testing the association of age, gender, dream recall frequency, nightmare frequency and book preference on lucid dreaming, logistic regressions was computed using the SAS 9.2 for Windows software package (SAS Institute Inc., Cary, NC, USA). Due to missing values, sample sizes vary slightly.

3. Results

In Table 1 and Figure 1, the lucid dream frequency is depicted for each age group. Of the total group, 43.5% reported having had at least one lucid dream. Many children checked the “Don’t know” category (32.7%), whereas 23.9% of the children clearly stated that they never had experienced a lucid dream in their life. The percentage for boys (45.2%) was slightly higher than for girls (42.4%) – a significant difference (see Table 2). The mean of the dream recall frequency scale was 2.61 ± 1.25 ($n = 3522$), for nightmare frequency scale 1.47 ± 1.20 ($n = 3554$).

The logistic regression showed a significant increase with age in having had lucid dreams and a significant gender effect with boys reporting more often that they had lucid dreams than girls (see Table 2). As expected, dream recall frequency was related to having had a lucid dream, as was nightmare frequency, although to a lesser extent.

In the second logistic regression, the book preferences were included (see Table 3). This analysis with threshold of p corrected in order to correct for multiple testing ($p < .005$) found significant associations with reading fantasy/science-fiction books and also fiction. The association between having had a lucid dream and fantasy/science fiction book preference could not be accounted for by any relationship between this book preference and age: The correlation between age and preference of reading fantasy/science fiction books was non-significant ($r = -.006$, $p = .738$, $n = 3579$).

Table 1: Percentage of children with lucid dreams (N = 3540)

Age group	Sample size	Frequency
6 yrs.	17	29.4%
7 yrs.	35	34.5%
8 yrs.	93	40.9%
9 yrs.	185	46.0%
10 yrs.	278	44.2%
11 yrs.	597	38.4%
12 yrs.	1063	43.6%
13 yrs.	687	43.1%
14 yrs.	338	49.7%
15 yrs.	143	43.4%
16 yrs.	65	53.9%
17 yrs.	23	60.9%
18 yrs.	16	56.3%

Table 2: Logistic regression for lucid dream occurrence (N = 3473)

Variables	SE ¹	Wald χ^2	p -value
Age	.0590	8.0	.0025
Sex (1 = male, 2 = female)	-.0514	7.1	.0076
Dream recall frequency	.1694	68.0	<.0001
Nightmare frequency	.0721	13.0	.0003

¹ SE = Standardized Estimates

Similarly, the correlation between the preference of reading fiction and age was not significant ($r = .008$, $p = .635$, $n = 3579$).

4. Discussion

Overall, the findings of the present study indicate that lucid dreaming had occurred in about 45% of the participating children; a figure which is comparable to adults (Schredl & Erlacher, 2011).

Prior to discussing the findings in detail, two methodological issues should be taken into consideration. First, the present sample is not representative. It is likely that a selection bias might have affected the results, i.e., high dream recallers may be more likely to fill in the dream question-

naire. However, as the relationship between lucid dreaming and dream recall frequency was quite small, (standardized measure of 0.169), any such overestimation of lucid dreaming frequency might not be too pronounced. The second issue is about understanding correctly the definition of lucid dreaming – an issue raised by Snyder and Gackenbach (1988). These authors recommend eliciting sample lucid dreams in order to check whether the participants have correctly understood the definition. For adults, the rate of non-lucid dreams reported as lucid dreams is below 2% (Johnson, 2007). But, as Qinmei et al. (2006) reported, this might be different for young children. So, it is necessary to replicate the current study but with the use of interview or other dream content reporting. As a considerable number of children answered with “Don’t know”, it might be helpful to use examples of lucid dreams typically reported by children to help the children understand the concept. In view of this finding, one might expect even higher prevalence rates in children compared to the present study.

Whereas in adults, most studies (Gruber, Steffen, & Vonderhaar, 1995; Stepansky, et al., 1998; Schredl & Erlacher, 2011) did not find gender differences in lucid dreaming, a small but significant difference was found in the present study. One explanation might be the connection between frequency video game play and lucid dreaming (Gackenbach, 2006) because boys more often engage in computer game playing than girls (Schredl, Anders, Hellriegel, & Rehm, 2008).

The increase in age was expected because of the wording of the question: “Have you ever had a dream during which you knew that you were dreaming?” Simply as a re-

Table 3: Logistic regression for lucid dream occurrence in relation to book preferences (N = 3473)

Variable	Frequency ¹	SE ²	Wald χ^2	p -value
Age		.0618	8.9	.0029
Sex (1 = male, 2 = female)		-.0677	9.8	.0017
Dream recall frequency		.1669	64.7	<.0001
Nightmare frequency		.0759	11.1	.0002
Fiction (novels and stories)	61.1%	.0619	8.9	.0029
Scary stories	53.5%	.0166	0.7	.4042
History books	15.5%	.0224	1.1	.2999
Poetry	28.3%	-.0059	0.1	.7909
Fantasy/science-fiction	36.3%	.0641	9.7	.0019
Arts and crafts	17.9%	.0514	5.6	.0180
Nature and science	16.0%	-.0037	0.0	.8696
Religious books	6.6%	.0186	0.8	.3760
Other fact books	15.4%	.0096	0.2	.6609
Puzzles/joke books	48.1%	-.0530	6.1	.0133
Sport and hobbies	26.9%	-.0205	0.9	.3355

¹ Percentage of the total sample reporting this book preference, ² SE = Standardized Estimates.

sult of being older one would expect this value to increase. It would be interesting to include a scale measuring current lucid dreaming frequency and compare those to figures obtained in adults. The study of Lapina et al. (1998) reported that about 30% of the adolescents (age range: 14 to 17 yrs.) experience lucid dreams once or twice a week; a percentage that is much higher than reported by adults (4.9%; Schredl & Erlacher, 2011).

That lucid dreaming is associated with dream recall frequency is also very plausible because the chance to recall a lucid dream increases with recalling more dreams. This relationship has also been found in adults, (Schredl & Erlacher, 2004). As lucid dreams can occur as a result of nightmares (Wolpin, Marston, Randolph, & Clothies, 1992), the correlation between nightmare frequency and lucid dreaming also seems plausible. An alternative explanation of this correlation might be that there are inter-individual differences in physiological arousal during sleep producing more intense dreaming; nightmares on the one hand and lucid dreams on the other. Both types of dreaming are associated with heightened arousal during sleep, (for a review see: Erlacher & Schredl, 2008). Although lucid dreaming frequency and nightmare frequency are both correlated strongly with dream recall frequency, lucid dreaming frequency and nightmare frequency are still correlated if dream recall is statistically controlled for (Schredl & Erlacher, 2011), i.e., this correlation is not explained by overall heightened dream recall.

The relationship between book preferences and lucid dreaming is very interesting. As many of the categories were not associated with lucid dreaming frequency, the significant associations with reading fantasy/science-fiction and fiction books cannot be explained by reading a greater number of books in general. These two associations also cannot be attributed to age because these two reading preferences did not correlate with age. One can hypothesize that children who experienced lucid dreaming with its potential to influence the dream action, and to things that are not possible in waking life, like flying, might, as a result, be more interested in reading fantasy and/or science fiction books. On the other hand, reading such books might get the child interested in lucid dreaming. Or the associations may be explained by an underlying personality characteristic, such as absorption or imagination (the latter having been associated with lucid dreaming frequency in adults (Schredl & Erlacher, 2004).

Whereas several studies (Blagrove, Bell, & Wilkinson, 2010; Neider, Pace-Schott, Forselius, Pittman, & Morgan, 2011) linked lucid dreaming to performance in different cognitive tasks, systematic research in children has not been reported in the literature, although the Lipina et al. (1998) study mentioned good school performance in children with frequent lucid dreams. It would be very interesting if specific cognitive abilities associated, for example, with the prefrontal cortex (Neider, et al., 2011), are related with the ability to dream lucidly. On the other hand, lucid dreaming might be used to enhance performance in motor learning – as being reported by athletes (Erlacher, 2005) and in a small field study (Erlacher & Schredl, 2010). In addition, there has been a report of lucid dreams being used for coping with nightmares (Spoomaker & Van den Bout, 2006); a technique which might be employed if imagery rehearsal therapy as the most effective nightmare treatment strategy (Simard & Nielsen, 2009) is not working.

To summarize, lucid dreams occur to about 45% of children, a figure that is comparable to that for adults. Also,

prevalence of lucid dreaming is associated with two book reading preferences (fiction and fantasy/science-fiction). The latter results indicate either a causal relationship in some direction between lucid dreaming and these book preferences, or the results indicate that there is some other variable, such as personality, that results in having a lucid dream and these book preferences. As lucid dreaming is quite common in children, empirical research linking lucid dreaming to waking cognitive abilities or studying the beneficial effects of lucid dreams should be promoted in the future.

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