The Phenomenology of Lucid Dreaming: An Online Survey

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In lucid dreams the dreamer is aware that he or she is dreaming. Although such dreams are not that uncommon, many aspects of lucid dream phenomenology are still unclear. An online survey was conducted to gather data about lucid dream origination, duration, active or passive participation in the dream, planned actions for lucid dreams, and other phenomenological aspects. Among the 684 respondents who filled out the questionnaire, there were 571 lucid dreamers (83.5%). According to their reports, lucid dreams most often originate spontaneously in adolescence. The average lucid dream duration is about 14 minutes. Lucid dreamers are likely to be active in their lucid dreams and plan to accomplish different actions (e.g., flying, talking with dream characters, or having sex), yet they are not always able to remember or successfully execute their intentions (most often because of awakening or hindrances in the dream environment). The frequency of lucid dream experience was the strongest predictor of lucid dream phenomenology, but some differences were also observed in relation to age, gender, or whether the person is a natural or self-trained lucid dreamer. The findings are discussed in light of lucid dream research, and suggestions for future studies are provided.

A lucid dream is a dream in which the dreamer is aware that he or she is dreaming and can often consciously influence dream content (LaBerge, 1985). Most often lucid dreams occur during REM sleep (LaBerge, 1990), but lucidity during NREM sleep is also possible (Stumbrys & Erlacher, 2012). Although lucid dreaming is considered to be a rare ability, estimates suggest that about half the general population has had a lucid dream at least once in their lives, and about one in five people have them regularly, at least once a month (Schredl & Erlacher, 2011; Snyder & Gackenbach, 1988).

Despite the fact that the phenomenon is not that uncommon, little is known about its phenomenology. The age at which lucid dreams usually originate is not clear, although pioneers of lucid dreaming report their earliest experiences from as early as age 5 (LaBerge, 1980; Worsley, 1988), and recent studies show that about one in four 6-year-old children report lucid dreams, with the prevalence increasing with age (Schredl, Henley-Einion, & Blagrove, 2012; Voss, Frenzel, Koppehele-Gossel, & Hobson, 2012). Moreover, young children seem to have lucid dreams

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more frequently, and the frequency drops at about age 16, which suggests that lucid dreaming might be a natural phenomenon occurring in a developing brain but could be lost in adulthood (Voss et al., 2012). Nevertheless, lucid dreaming can also be successfully learned through various induction methods (Stumbrys, Erlacher, Schädlich, & Schredl, 2012).

Although lucid dreams recorded in a sleep laboratory and verified by volitional eye signaling (cf. LaBerge, Nagel, Dement, & Zarcone, 1981) are usually very brief (on average only 2 min long) (LaBerge, Levitan, & Dement, 1986), experienced lucid dreamers report long and elaborate lucid dreams (LaBerge & Rheingold, 1990; Saint-Denys, 1982; Waggoner, 2009). Considering that the perception of time in lucid dreams might be similar to that in wakefulness (Erlacher & Schredl, 2004), in a natural sleep environment, without deliberate eye signaling, lucid dreams might be much longer. The length of REM periods, in which lucid dreams usually occur, increases toward the end of the night, up to half an hour on average; however, on some occasions, REM periods may last more than an hour (Dement & Kleitman, 1957a).

In lucid dreams, the dreamer might take a passive role and continue the dream without altering the dream plot or take an active role and make deliberate actions to influence the dream plot (cf. Stewart & Koulack, 1989). Because waking memories are accessible in lucid dreams (cf. Erlacher, 2009), lucid dreamers can carry out specific, intended actions in their lucid dreams, such as doing squats or practicing coin tossing (Erlacher & Schredl, 2008, 2010). A recent survey by Schädlich and Erlacher (2012) found that the majority of lucid dreamers ($N = 301$) use their lucid dreams to have fun (81%) and to change nightmares or bad dreams into pleasant ones (64%). Some lucid dreamers also use their lucid dreams for problem solving (30%), creativity (28%), and practicing skills (21%). However, it is not clear whether lucid dreamers in their home settings just do things spontaneously in their lucid dreams or plan tasks beforehand, as in lucid dream research studies or in the case of scientifically oriented lucid dream pioneers (e.g., Saint-Denys, 1867/1982; Worsley, 1988). Furthermore, it would be interesting to know what tasks lucid dreamers plan to accomplish in their lucid dreams and how successful they are with remembering and executing such intentions (including learning the reasons for unsuccessful attempts).

It is also not clear whether and how the phenomenology of lucid dreaming is related to the age or gender of a lucid dreamer or to the frequency of the experience. For example, although there appear to be no gender differences in relation to lucid dream frequency (Erlacher, Stumbrys, & Schredl, 2011–2012; Schredl & Erlacher, 2004, 2011), younger people seem to be more frequent lucid dreamers (Snyder & Gackenbach, 1988; Voss et al., 2012) but are less likely to use their lucid dreams for practical purposes such as changing nightmares, solving problems, or getting creative ideas (Schädlich & Erlacher, 2012). Lucid dreaming is a learnable ability (LaBerge, 1980), and a higher frequency of lucid dreaming is associated with a greater dream control (Wolpin, Marston, Randolph, & Clothier, 1992), and it thus seems possible to develop proficiency in lucid dreaming. Yet this ability might deteriorate without practice (Schredl, 2013). However, the relation and influence of these factors have not yet been studied systematically.

The aim of the present survey was to gather more extensive data on the phenomenology of lucid dreaming, including its origination, duration, active versus passive continuation, and the accomplishment of intentions, and this in relation to lucid dreamers' age, gender, and lucid dream frequency. Furthermore, we aimed to explore whether there are any differences in lucid dream phenomenology for those who started having lucid dreams naturally and for those who learned lucid dreaming deliberately (e.g., by applying various lucid dream induction methods).

SURVEY

METHODS

Participants

The sample included 684 participants (278 men and 406 women) who filled out an online questionnaire about lucid dreams. Their ages ranged from 10 to 74 years, with a mean age of 25.5 ± 9.7 years. There were 251 working professionals, 198 students, 185 pupils, 16 trainees, 9 housewives, 8 unemployed, and 6 in civil service (11 participants did not provide information about their occupation).

Material

In addition to biographical data (age, gender, occupation), the online questionnaire included 16 items (5

were open-ended) about dreams and lucid dreams. The participants were asked to estimate their dream recall frequency on a 7-point rating scale developed by Schredl (2004): 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;* 6, *almost every morning*. To obtain units of mornings per week, the scale was recoded using the class means: 0 → 0, 1 → 0.125, 2 → 0.25, 3 → 0.625, 4 → 1.0, 5 → 3.5, 6 → 6.5. For example, if the person checked "once a week," the value of the recoded variable was 1 (morning with dream recall per week). If the participant checked "several times a week," the recoded variable was set to 3.5 mornings with dream recall (possible range from 2 to 5). The category "almost every morning" was recoded as 6.5 mornings with dream recall per week because it could be every morning (7) or almost every morning (6). Similarly, on an 8-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*), they evaluated their frequency of nightmare dreams, creative dreams, and lucid dreams. To obtain units in frequency per month, the scale was also recoded using the class means: 0 → 0, 1 → 0.042, 2 → 0.083, 3 → 0.25, 4 → 1.0, 5 → 2.5, 6 → 4.0, 7 → 18.0. To ensure a clear understanding of lucid dreaming, a short definition was provided: "In lucid dreams, one has awareness 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" (for the importance of a clear definition, see Snyder & Gackenbach, 1988). The participants were also asked to provide an example for a creative dream and for a lucid dream (if they had one); however, these data were not included in the present analysis (for an analysis of creative dreams, see Schredl & Erlacher, 2007).

The respondents who indicated that they had a lucid dream at least once were asked additional questions about their lucid dreams. First, they had to indicate at what age their first lucid dream occurred and by what means: spontaneously, through deliberate training, or during relaxation techniques such as meditation or yoga. Participants also had to indicate the exact details as to how this happened. Then, the respondents were asked to estimate the average duration of their lucid dreams (in minutes). Furthermore, the descriptions of two possible continuations of lucid dreams were provided: passive ("one tries to continue having the dream as if not having recognized that one is dreaming") or active ("upon recognition of dreaming, one spontaneously sets new goals for actions and tries to execute them, e.g., to fly, to speak with dream characters, etc."). The respondents had to estimate in percentages (summing to 100%) how often they take a passive or active attitude in their lucid dreams. They were then asked whether they ever tried to do some actions (e.g., to fly, to speak with dream characters) in their lucid dreams that have been planned in their waking life and, if so, to provide an approximate number of such efforts and list the types of the planned actions they tried to accomplish. Furthermore, they were asked to estimate the percentage of how many intended actions in wakefulness were recalled and how many of such recalled intents were successfully completed in their lucid dreams. Finally the participants were asked what the reasons were for their unsuccessful trials (e.g., early awakening, the dream resists such intervention).

Procedure

The online questionnaire was posted on the German lucid dreaming Web site http://www.klartraum.de between January 4, 2004, and August 5, 2004. To inform prospective participants, links were posted on psychology research and lucid dreaming sites. Although the survey was anonymous, participants were asked to provide an e-mail address to minimize the risk of multiple responses to the questionnaire. Participants had as much time as they needed to complete the questionnaire.

The responses were checked for their validity, and several improbable answers were discarded from further analysis. These included cases when (a) participants were too young to recall their dreams (age of the first lucid dream 0–1 years, $N = 2$), (b) their current age was lower than the reported age of their first lucid dream ($N = 2$), (c) the indicated average duration of their lucid dreams was 0 min ($N = 2$) or longer than 60 min ($N = 11$), or (d) the sum of passive and active continuation was not 100% ± 1% ($N = 33$).

Statistical Analysis

IBM SPSS Statistics 20 software was used for statistical analysis. Because this was exploratory research, two-tailed tests were applied. An alpha = .05 significance level was used with the Bonferroni adjustment for regression analyses (.05/17 = .003) to avoid the risk of Type II errors due to multiple testing. Variance Inflation Factor statistics was used to assess multicollinearity for independent variables used in regression analyses.

RESULTS

Descriptive Data

The respondents reported that, on average, they recall 3.4 ± 2.4 dreams per week. The average frequency for nightmare dreams was 2.1 ± 4.4 per month, creative dreams 1.8 ± 4.3 per month, lucid dreams 2.8 ± 5.3 per month. Dream recall frequency significantly correlated with the recall of all other types of dreams (with nightmares, $r = .28$; creative dreams, $r = .31$; lucid dreams, $r = .34$; all ps $< .001$). When dream recall frequency was controlled for, there was an association between lucid dreams and creative dreams ($r = .22$, $p < .001$). Of the present sample, 113 participants reported that they never had a lucid dream and did not answer further questions about lucid dreams. Thus the sample for further analyses was reduced to 571 lucid dreamers. The descriptive statistics for the lucid dreamer sample are provided in Table 1.

A total of 344 participants (60.2% of lucid dreamers) had lucid dreams at least once a month and could thus be considered frequent lucid dreamers in the terminology of Snyder and Gackenbach (1988). On average, lucid dreamers had 3.4 ± 5.6 lucid dreams per month. The mean age when their first lucid dream occurred was 14.8 ± 7.8 years, and

TABLE 1. Descriptive Statistics of the Lucid Dreamers (Including Comparative Data for Men vs. Women, Frequent vs. Infrequent, and Spontaneous vs. Trained Lucid Dreamers)

	Total sample (*N* = 571)	Men (*N* = 234)	Women (*N* = 337)	Frequent (*N* = 344)	Infrequent (*N* = 227)	Spontaneous (*N* = 476)	Trained (*N* = 86)
Age (y)	25.2 ± 9.3	24.8 ± 8.8	25.5 ± 9.6	24.5 ± 8.9	26.3 ± 9.7	25.1 ± 9.5	25.9 ± 8.6
Gender							
Male	234 (41.0%)			132 (38.4%)	102 (44.9%)	171 (35.9%)	58 (67.4%)
Female	337 (59.0%)			212 (61.6%)	125 (55.1%)	305 (64.1%)	28 (32.6%)
Lucid dream frequency (lucid dreams per month)	3.4 ± 5.6	2.9 ± 5.3	3.7 ± 5.8	5.5 ± 6.4	0.2 ± 0.1	3.3 ± 5.6	3.5 ± 5.5
First lucid dream age (y)	14.8 ± 7.8	15.3 ± 7.9	14.5 ± 7.7	13.8 ± 7.6	16.3 ± 7.9	14.1 ± 7.5	17.6 ± 8.3
First lucid dream method							
Spontaneous	476 (83.4%)	171 (73.1%)	305 (90.5%)	282 (82.0%)	194 (85.5%)		
Deliberate training	86 (15.1%)	58 (24.8%)	28 (8.3%)	56 (16.3%)	30 (13.2%)		
Relaxation methods	9 (1.6%)	5 (2.1%)	4 (1.2%)	6 (1.7%)	3 (1.3%)		
Average lucid dream duration (min)	13.9 ± 13.4	11.2 ± 11.5	15.7 ± 14.4	15.6 ± 14.5	11.1 ± 11.1	15.0 ± 14.1	8.3 ± 8.3
Continuation of the dream							
Active %	56.3 ± 32.5	61.3 ± 31.9	52.7 ± 32.5	58.0 ± 31.1	53.7 ± 34.4	54.4 ± 32.5	66.0 ± 31.1
Passive %	43.7 ± 32.5	38.7 ± 31.9	47.3 ± 32.5	42.0 ± 31.1	46.2 ± 34.4	45.6 ± 32.5	34.0 ± 31.1
Tried waking intentions							
Yes	327 (58.9%)	133 (58.8%)	194 (59.0%)	232 (69.3%)	95 (43.2%)	246 (53.4%)	73 (85.9%)
No	228 (41.1%)	93 (41.2%)	135 (41.0%)	103 (30.7%)	125 (56.8%)	215 (46.6%)	12 (14.1%)
Number of intention tried (median)	5	5	5.5	10	3	5	7
Remembrance % of intentions	48.5 ± 34.8	46.6 ± 34.9	49.8 ± 34.7	52.8 ± 33.3	38.9 ± 36.1	46.3 ± 35.1	55.9 ± 32.8
Accomplishment % of intentions	44.1 ± 33.7	47.0 ± 33.7	42.1 ± 33.7	48.8 ± 32.6	33.5 ± 33.9	42.2 ± 34.2	51.2 ± 31.1

Note. *For some variables the respective sample sizes might be smaller because not all the participants provided answers to every question (exact numbers for the total sample are provided in the text).*

in most cases (83.4%) this happened spontaneously. Although spontaneous commencement of lucid dreaming can occur as early as age 3, it seems most likely to happen around age 12–14 years and much less likely to occur after age 25 (Figure 1).

Furthermore, we analyzed and grouped answers from an open-ended question about the specific circumstances as to how the first lucid dreams were initiated (Table 2). Most often lucid dreaming emerged spontaneously or from specific dream experiences, such as nightmares, recurring dreams, or some peculiarities within the dream. On the other hand, lucid dreams were often initiated by applying different induction techniques or engaging with the topics of dreaming and lucid dreaming. First lucid dreams can sometimes result from specific sleep circumstances, such as short awakening in the morning or an afternoon nap or stress, as well as when applying relaxation or similar techniques.

The respondents estimated the mean duration of their lucid dreams to be about 13.9 ± 13.4 min (N = 523). From the moment of lucidity within the dream they were more often likely to take the active role (56.3% ± 32.5; N = 521) in the development of the dream plot than the passive role (one-sample Wilcoxon signed rank test as compared to 50%; $Z = 4.527$; $p < .001$). Most of the participants (58.9%; N = 555) indicated that they had tried to accomplish some waking intentions in their lucid dreams, and the median number of such planned intentions was five per lucid dreamer (N = 306).

A total of 353 respondents provided examples of the actions that were planned in wakefulness to be accomplished in their lucid dreams. These answers have been analyzed and grouped into different categories (Table 3). Most often, actions that are impossible in the waking life, such as flying, are planned to be accomplished in lucid dreams, followed by everyday activities of the waking life, communicating with dream characters, changing or observing the dream, aggressive behaviors, spiritual experiences, or awakenings. Of all waking intentions, flying was the most popular one.

According to the responses of the participants, they were able to recall about half of the waking intentions that they had planned to do in their lucid dream (48.5%; N = 401). However, only slightly less than half of those intentions could actually be accomplished (44.1%; N = 399). The main reasons reported for unsuccessful trials were awakening and difficulties in executing the planned action in a lucid dream. Other reasons included insufficient clarity and self-doubt (Table 4).

Effects of Gender, Age, and Lucid Dream Frequency

To investigate the effects of gender, age, and lucid dream frequency on the phenomenology of lucid

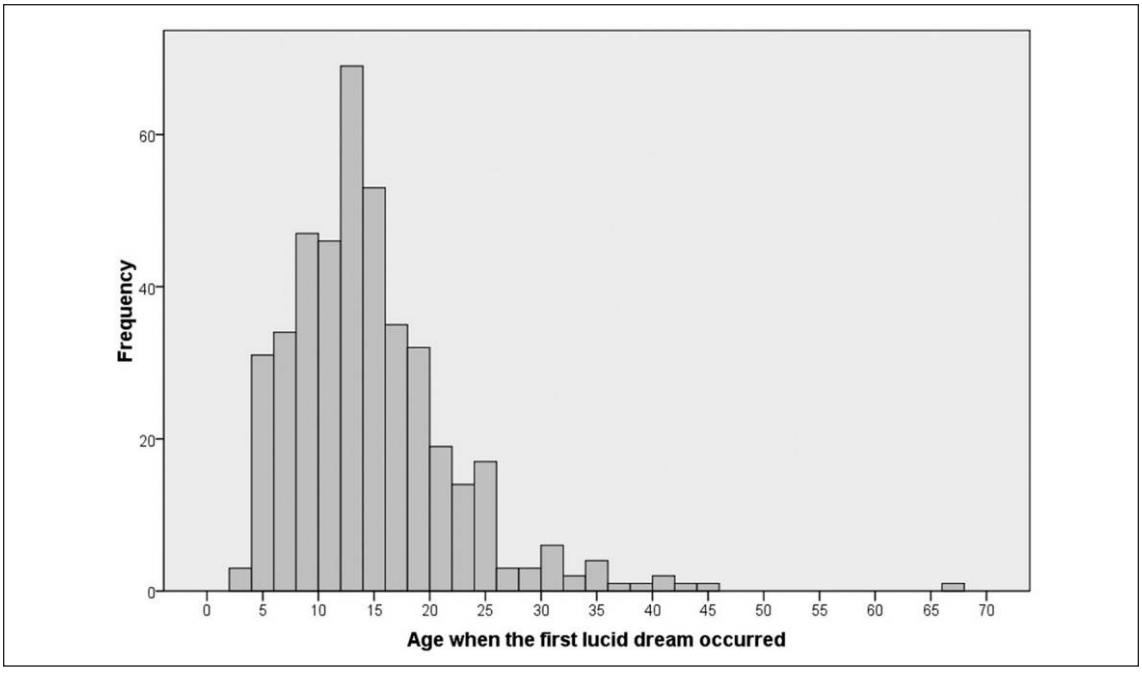

FIGURE 1. Histogram of the age when lucid dreams originated spontaneously

TABLE 2. Specific Occurrence of the First Lucid Dream

Category	Items
Spontaneous occurrence (104)	
Nightmare (98)	
Induction methods (57)	Critical reflection and reality checks (38), strong desire (16), mnemonic induction of lucid dreams (2), general technique (1)
Recurring dream (48)	
Preoccupation with the topics of dreams and lucid dreams (33)	Reading about it (14), hearing about it (8), dream diary (6), film or documentary (3), preoccupation with lucid dreams (2)
Peculiarities within the dream (29)	Bizarre dream (21), flying (5), told by a dream character that it is a dream (2), disturbing dream (1)
Stress (26)	Daily problems (17), traumatic events (8), dealing with the past (1)
Sleep specifics (25)	Short awakening in the morning (7), afternoon nap (4), daydream (4), just before sleep (3), false awakenings (2), insomnia (2), long sleep (1), external stimuli (1), fever (1)
Applied relaxation and similar techniques (14)	Meditation (4), autogenic training (2), relaxation (2), out-of-body-experience (2), self-hypnosis (1), biofeedback (1), astral travel (1), medium travel (1)
Others (8)	Intensive reading in the evening (1), alcohol (1), physical exhaustion (1), music (1), etc.

TABLE 3. Planned Actions in Lucid Dreams

Category	Items
Actions that are impossible in waking life (369)	Flying (231), magic (25), falling or jumping (24), going through walls (24), breathing underwater (18), talking with animals (10), being someone else (10), time travel (7), metamorphoses (7), meeting oneself (5), being immortal (3), being strong physically (3), being invisible (2)
Everyday activities and skills (252)	Sex (80), sport (37), being assertive (25), learning or working (18), flight (16), car driving (15), problem solving (15), eating, drinking, or smoking (13), asking or giving help (12), fast running (11), looking at hands (11), clarifying talks (8), sensations (8), languages (8), writing (8), crying or screaming (8), various trials (8), singing (7), switching the light (7), reading (5), looking into the mirror (5), reality checks (4), friendship (2), rhyming (1)
Communication with dream characters (190)	Speaking with characters (123), meeting specific characters (67)
Changing or observing dream events (107)	Changing scene or perspective (44), changing land(scape) (32), continuing previous dream (12), viewing dream scenery (12), viewing the dream (7)
Aggressive actions (91)	Fighting, killing, or weapons (72), self-aggression (12), robbery, theft, burglary, or breaking rules (7)
Spiritual and similar experiences (29)	Meditation, etc. (12), increasing clarity (7), gaining knowledge (6), meeting God (4)
Awakening (21)	Awakening (20), false awakening (1)
Other (77)	

TABLE 4. Reasons for Unsuccessful Trials

Category	Items
Awakening (192)	Early awakening (157), disturbance by external stimuli (28), precipitated awakening (5), gaze fixation (2)
Difficulties in execution (156)	Dream characters do not allow (107), actions do not work out (17), certain abilities are limited (e.g., running) (10), forgetting intention (10), distractions by dream events (6), actions lead to different results (2), dying in the dream (3), not enough time (1)
Insufficient clarity (42)	Concentration problems (19), loss of clarity (21), sleep problems (light, disturbed sleep) (2)
Self-doubt (30)	Anxiety (23), shock, stress or excitement (6), hesitation (1)

dreaming, we conducted linear and binary logistic regressions for all other dependent variables (Table 5). There were no signs of multicollinearity (all independent variables had Variance Inflation Factor values of 1.0). Younger participants had earlier experience of the first lucid dream, and their lucid dreams tended to be somewhat longer, but they attempted fewer waking intentions than their older counterparts. In comparison to men, women were more likely to be spontaneous than learned lucid dreamers, had longer lucid dreams, but were less likely to take an active role in the development of the dream plot.

The frequency of lucid dreaming seemed to be an important factor in predicting lucid dream phenomenology. A higher frequency of lucid dreaming was associated with an earlier occurrence of the first lucid dream, longer lucid dreams, higher likeliness to try waking intentions in lucid dreams, and a higher

TABLE 5. Regression Analyses With Age, Gender, and Lucid Dream (LD) Frequency as Independent Variables

	Age	Gender (M < F)	LD frequency
First LD age[a]	$B = 0.33$; $t = 9.86$***	$B = -0.83$; $t = -1.31$	$B = -0.77$; $t = -4.43$***
First LD method (spontaneous < trained)[b]	$B = 0.02$; Wald = 1.56	$B = -1.39$; Wald = 29.93***	$B = 0.13$; Wald = 3.69
Average LD duration[a]	$B = -0.18$; $t = -2.98^{+}$	$B = 4.41$; $t = 3.79$**	$B = 1.09$; $t = 3.40$*
Continuation of the LD (active)[a]	$B = -0.07$; $t = -0.49$	$B = -9.00$; $t = -3.11$*	$B = 1.02$; $t = 1.26$
Tried waking intentions[b]	$B = 0.01$; Wald = 1.82	$B = 0.16$; Wald = 0.75	$B = 0.40$; Wald = 53.02***
Number of intention tried[a]	$B = 0.54$; $t = 3.23$*	$B = -1.49$; $t = -0.47$	$B = 7.24$; $t = 7.93$***
Remembrance % of intentions[a]	$B = 0.04$; $t = 0.22$	$B = 1.38$; $t = 0.40$	$B = 4.21$; $t = 4.32$***
Accomplishment % of intentions[a]	$B = -0.12$; $t = -0.66$	$B = -6.56$; $t = -1.95$	$B = 4.63$; $t = 4.91$***

Note. *The sign "<" in the table represents the numeric direction for categorical variables (e.g., "M < F" means that the "male" category was designated a lower numeric value than the "female" category).*
[a]*Linear regression.*
[b]*Binary logistic regression.*
$^{+}p < .1$. *$p < .05$. **$p < .01$. ***$p < .001$.

number of such intentions that had been tried, as well as with better remembrance of such intentions and a higher rate of their accomplishment.

Spontaneous and Learned Lucid Dreamers

We tested an exploratory hypothesis that there might be some differences in lucid dream phenomenology for participants who deliberately trained themselves to become lucid dreamers and those for whom the first lucid dream occurred spontaneously. We conducted linear and binary logistic regressions where, in addition to age, gender, and lucid dream frequency, we also used the age of the first lucid dream and whether it was spontaneous or trained as independent variables independent variables. The results of regression analyses are presented in Table 6. Again, no signs of multicollinearity were present (for all independent variables, Variance Inflation Factor values were ≤1.2).were present.

In comparison to spontaneous lucid dreamers, trained lucid dreamers had shorter lucid dreams but were more likely to take an active role in the development of the lucid dream plot and more likely to try some waking intentions in their lucid dreams.

Most Frequent Waking Intentions

We also conducted a post hoc analysis for three activities that were most frequently reported as intended to be accomplished in lucid dreams: flying, conversations with dream characters, and sex. Binary logistic regressions were conducted using the same set of independent variables and a "1" assigned to participants who explicitly stated that they had planned a particular activity for their lucid dreams (a "0" assigned to others). The results are presented in Table 7.

Trained lucid dreamers as compared with spontaneous lucid dreamers, men as compared with women, and more frequent lucid dreamers were more likely to plan flying and sex as activities for their lucid dreams.

DISCUSSION

This survey gathered data on the phenomenology of lucid dreaming. According to the self-reports of lucid dreamers, lucid dreams most often originate spontaneously in adolescence and, on average, are of about 14 min duration. Lucid dreamers are likely to be active in their lucid dreams and aim to accomplish different actions, such as flying, talking with dream characters,

TABLE 6. Regression Analyses With Age, Gender, Lucid Dream (LD) Frequency, First LD Age, and First LD Method (Spontaneous vs. Trained) as Independent Variables

	Age	Gender (M < F)	LD frequency	First LD age	Spontaneous < trained
Average LD duration[a]	*B* = –0.10; *t* = –1.36	*B* = 3.16; *t* = 2.49	*B* = 1.05; *t* = 3.02*	*B* = –0.18; *t* = –2.01	*B* = –5.41; *t* = –3.19*
Continuation of the LD (active)[a]	*B* = –0.07; *t* = –0.42	*B* = –7.77; *t* = –2.49	*B* = 1.13; *t* = 1.31	*B* = 0.06; *t* = 0.30	*B* = 9.51; *t* = 2.33
Tried waking intentions[b]	*B* = 0.02; Wald = 2.47	*B* = –0.10; Wald = 0.21	*B* = 0.40; Wald = 42.93***	*B* = –0.01; Wald = 0.66	*B* = 1.77; Wald = 23.42***
Number of intention tried[a]	*B* = 0.66; *t* = 3.43*	*B* = –1.13; *t* = –0.33	*B* = 6.80; *t* = 7.00***	*B* = –0.22; *t* = –0.98	*B* = 2.80; *t* = 0.70
Remembrance % of intentions[a]	*B* = 0.06; *t* = 0.28	*B* = 3.92; *t* = 1.05	*B* = 4.15; *t* = 4.07***	*B* = –0.08; *t* = –0.32	*B* = 10.77; *t* = 2.29
Accomplishment % of intentions[a]	*B* = 0.01; *t* = 0.05	*B* = –6.60; *t* = –1.83	*B* = 4.69; *t* = 4.72***	*B* = –0.20; *t* = –0.82	*B* = 6.93; *t* = 1.51

Note. *The sign "<" in the table represents the numeric direction for categorical variables (e.g., "M < F" means that the "male" category was designated a lower numeric value than the "female" category).*
[a]*Linear regression.*
[b]*Binary logistic regression.*
*p < .05. **p < .01. ***p < .001.

TABLE 7. Regression Analyses for Actions Most Often Planned in Lucid Dreams (LDs)

	Age	Gender (M < F)	LD frequency	First LD age	Spontaneous < trained
Flying	*B* = 0.01; Wald = 0.46	*B* = –0.70; Wald = 11.84**	*B* = 0.25; Wald = 18.79***	*B* = –0.02; Wald = 1.70	*B* = 1.00; Wald = 13.93**
Conversations with dream characters	*B* = 0.02; Wald = 2.70	*B* = 0.02; Wald = 0.00	*B* = 0.15; Wald = 5.15	*B* = –0.02; Wald = 1.70	*B* = 0.60; Wald = 4.22
Sex	*B* = 0.02; Wald = 0.93	*B* = –1.21; Wald = 12.99**	*B* = 0.30; Wald = 9.78*	*B* = –0.01; Wald = 0.26	*B* = 1.09; Wald = 10.17*

Note. *Binary logistic regression. The sign "<" in the table represents the numeric direction for categorical variables (e.g., "M < F" means that the "male" category was designated a lower numeric value than the "female" category).*
*p < .05. **p < .01. ***p < .001.

or sex, yet they are not always able to remember their intentions and successfully execute them. The frequency of lucid dream experience seems to be the strongest predictor of lucid dream phenomenology, but some differences were also observed in relation to age, gender, or whether the person is a natural or self-trained lucid dreamer.

In the present sample, the majority of our respondents (83.5%) had a lucid dream at least once, and half of them were frequent lucid dreamers. These proportions are much higher than in the general population (51% and 20%, respectively; Schredl & Erlacher, 2011), and the participants were self-selected because of their interest in lucid dreams. Caution with regard to our findings is thus advisable. Furthermore, the data were collected via an online questionnaire, which might have had some effect on the quality of the responses. However, comparative analyses have shown that data gathered via the Internet are at least as good as data gathered via traditional methods and do not appear tainted by false responses (Gosling, Vazire, Srivastava, & John, 2004). The gathered data are based on subjective reports, which may lead to some inaccuracies (e.g., regarding the age of the first lucid dream). Moreover, the responses to open-ended questions about actions planned in lucid dreams and the reasons for unsuccessful trials should be treated with special caution because for those questions some answer examples were provided ("flying" and "speaking with dream characters" for planned actions, "early awakening" and "dream does not allow" for unsuccessful trials), which appeared to be the most frequent answers in the responses. Studies that do not provide answer examples should be carried out to corroborate whether these examples are the most often planned actions and the reasons for failures. It is also notable that the data were collected in 2004, and there might have been some changes since then in some respects. For example, because of the increasing use of meditative-type relaxation methods in the West over the last decade, there might be more people who have lucid dreams as a direct or indirect result of their meditation practices (cf. Hunt & Ogilvie, 1988). Furthermore, increasing immersion in video gaming, which has been constantly growing, can also facilitate lucid dreaming (Gackenbach, 2006).

The relation between the frequency of lucid dreams and overall dream recall, which has been found in this study, is one of the most robust findings, which has been observed in a number of previous studies and across different samples (e.g., Erlacher et al., 2011; Schredl & Erlacher, 2004, 2011; Schredl et al., 2012). Furthermore, we also observed a relation between lucid and creative dreams. This can be explained in that frequent lucid dreamers seem to have higher nonverbal creativity (Gackenbach, Curren, LaBerge, Davidson, & Maxwell, 1983), and they also can actively use their lucid dreams for creativity and problem solving (Schädlich & Erlacher, 2012).

Origination of Lucid Dreaming

At least in the present sample, lucid dreams originated spontaneously for most of lucid dreamers, and people only rarely trained themselves to become lucid dreamers. According to the self-reports, spontaneous lucid dreaming could start as early as 3 or 4 years, but

lucid dreams seem to originate most frequently in adolescence at about 12–14 years of age. This perhaps could be linked with entering the Piagetian formal operation stage, which presupposes the metacognition (Fox & Riconscente, 2008) that is associated with lucid dreaming (Kahan & LaBerge, 1994). After the age of 25, a spontaneous origination of lucid dreaming appears to be very infrequent. This might be explained by a proposed linkage between the natural occurrence of lucid dreaming and brain maturation (Voss et al., 2012). It has been shown that brain maturation continues up to young adulthood, especially in the dorsal frontal cortex (Sowell, Thompson, Holmes, Jernigan, & Toga, 1999; Sowell, Thompson, Tessner, & Toga, 2001), which has been linked to lucid dreaming (Hobson, Pace-Schott, & Stickgold, 2000; Stumbrys, Erlacher, & Schredl, 2013).

Quite often lucid dreams originate from nightmares, for example, when the dreamer realizes that the situation is not real or notices some recurrent scenario. Although no direct relation between the frequency of lucid dreams and nightmares has been found in the present study, it was observed in previous research (Schredl & Erlacher, 2004). One possible explanation of this difference is the specifics of the present sample, which included more frequent and slightly older lucid dreamers in comparison to the study by Schredl and Erlacher (2004). It has been shown that frequent lucid dreamers can successfully deal with nightmares by changing them into more pleasant dreams, and this application increases with age (Schädlich & Erlacher, 2012).

Noticing a recurring dream or peculiarities within the dream seems to be another important trigger for the initiation of lucidity during dreaming. This is also supported by the fact that the most popular method for the first lucid dream induction was critical reflection and reality testing, the technique that has been shown to be one of most effective methods for lucid dream induction (Stumbrys et al., 2012). Sometimes even the preoccupation with the topic or a strong desire can give rise to the first lucid dreaming experience. In some cases, lucid dreaming can be triggered by some stressful experiences; the relation between lucid dreaming and stress has been observed before, yet it is inconclusive because stress could both facilitate and impede lucid dreaming (Wolpin et al., 1992).

Phenomenological Aspects

The estimated average duration of a lucid dream seems to be about 14 min, although some lucid dreamers reported that their lucid dreams usually last for 1 hr or longer. Considering the fact that perception of time in lucid dreams is similar to that in wakefulness (Erlacher & Schredl, 2004) and dreamers can estimate the dream duration quite well in accordance with the length of the REM period (Dement & Kleitman, 1957b), this estimated duration differs notably from the average 2-min duration of lucid dreams recorded in the sleep laboratory and verified by volitional eye movements (LaBerge et al., 1986). One possible explanation is that eye signaling itself might disrupt REM sleep and facilitate wakefulness. Another explanation could be that lucid dreamers in the sleep laboratory are more agitated because of the pressure to have a lucid dream, and achieving this goal can increase emotional arousal, which may lead to an awakening (cf. LaBerge & DeGracia, 2000).

From the onset of lucidity within the dream, lucid dreamers more often take an active rather than passive role in the development of the dream plot, and most of them tried to accomplish some waking intentions in their lucid dreams. However, according to their reports, lucid dreamers could recall only about a half of their waking intentions in lucid dreams; variability in waking memory recall during lucid dreams has also been demonstrated previously (Erlacher, 2009). Furthermore, less than half of the remembered waking intentions were reported to be successfully accomplished in lucid dreams, which gives an overall 21.4% success rate (for waking intention to be successfully remembered and accomplished). This poses a difficulty for researchers conducting experiments in lucid dreams (e.g., Erlacher & Schredl, 2010). On the other hand, more frequent lucid dreamers show higher success rates and therefore could be better candidates for such research.

Awakening and difficulties in executing an action in dream environment seem to be the two main obstacles in accomplishing intentions in lucid dreams. Sometimes lack of clarity and self-doubt also hinder the execution of intentions. Thus lucid dreamers should be advised to try to be confident and concentrated during their lucid dreams and keep their sleep environment isolated from potential external stimuli that can disrupt their dreams.

Of all planned activities, flying was reported to be the most frequent in lucid dreams. The relation between flying and lucid dreams been observed before, and that lucidity usually precedes flying rather than being triggered by it (Barrett, 1991). In the present sample, only five respondents reported that their first lucid dream was initiated by flying, and 231 reported that they flew in their lucid dreams. Most of the planned actions in lucid dreams can be subsumed under the Schädlich and Erlacher (2012) "having fun" category, which supports their findings that lucid dreams are used mostly for having fun, especially for experiences that are impossible in wakefulness (see Table 3).

Communication with dream characters is also a very frequently planned activity for lucid dreams. This might be explained by the fact that it is often described in popular books on lucid dreaming (e.g., LaBerge & Rheingold, 1990). Previous research has shown that dream characters in lucid dreams can be ingenious, and despite their troubles with logical tasks such as doing arithmetic, they can provide an insight for the dreamer when dealing with a creative task (Stumbrys & Daniels, 2010; Stumbrys, Erlacher, & Schmidt, 2011; Tholey, 1989).

Another popular activity for lucid dreams seems to be sex. It has been demonstrated that physiological reactions to the experience of orgasm in a lucid dream are comparable to waking orgasmic patterns (LaBerge, Greenleaf, & Kedzierski, 1983), which could explain why sexual activities are quite desirable in lucid dreams.

Factors Predicting the Phenomenology

The strongest predictor of lucid dream phenomenology seems to be lucid dream frequency. As expected, those who are more frequently lucid in their dreams appear to be much more proficient with lucid dreaming. Their lucid dreams are longer, they are more likely to try different things in their lucid dreams (including flying and sex), and they can better remember and accomplish their intentions. This is in line with previous research showing that such dreamers exert more dream control (Wolpin et al., 1992). The fact that there were no differences in lucid dream frequencies between spontaneous and learned lucid dreamers suggests that even those who do not have lucid dreams can deliberately develop their lucid dreaming ability (cf. LaBerge, 1980) to a similar extent, but their lucid dreams might be somewhat shorter. Despite this fact, learned lucid dreamers are more likely to try things (including flying and sex) in their lucid dreams; this could be linked to their greater motivation for lucid dreaming.

We found that lucid dreams of younger people are somewhat longer, possibly because the maturing brain might be more prone to lucid dreaming (Voss et al., 2012). Some gender differences were also observed. Compared with men, women were more likely to be spontaneous than learned lucid dreamers, had longer lucid dreams, but were less likely to take an active role in the development of the dream plot, when lucid dream frequency was controlled for. Women also planned flying and sex as activities for their lucid dreams less often. Most of these differences might be explained by the fact that men are more likely than women to engage in risk-taking behavior (Byrnes, Miller, & Schafer, 1999). Yet, considering the more spontaneous nature of lucid dreams in women and their longer duration, women might be more natural lucid dreamers. This might be linked with the fact that women have a higher nightmare frequency then men, especially in adolescence and young adulthood (Schredl & Reinhard, 2011), and this tendency seems to be a frequent trigger for the origination of lucid dreams. Women also have a higher overall dream recall frequency, with the differences largest in adolescence (Schredl & Reinhard, 2008). Furthermore, women have more nocturnal awakenings (Schredl, 2010), and after a brief awakening it is possible to reenter the dream state without losing conscious awareness and dream lucidly (Levitan, 1991).

Conclusions

In summary, our findings, based on the self-reports of lucid dreamers, suggest that lucid dreaming most often originates spontaneously in adolescence at about 12–14 years of age and is quite often triggered by nightmares. The average duration of a lucid dream is estimated to be about 14 min, although some people report that their lucid dreams usually last for 1 hr or even longer. Lucid dreamers more often take the active role in the development of the dream plot, and most of them plan to carry out certain actions in their lucid dreams. Flying, conversations with dream characters, and sex seem to be

the most popular choices. However, lucid dreamers are able to recall their intentions in lucid dreams in only about half the cases, and less than half of such remembered intentions could be successfully executed, most often because of awakening or hindrances in the dream environment. The frequency of lucid dreaming appears to be the strongest predictor of lucid dream phenomenology: Frequent lucid dreamers are more proficient with the lucid dreaming ability. Yet this proficiency can be learned, and trained lucid dreamers can achieve the same lucid dream frequency as natural lucid dreamers, but their lucid dreams are somewhat shorter. Women seem to be more natural lucid dreamers with longer lucid dreams, whereas men are more likely to acquaint themselves with lucid dreaming through training and also by trying to fly and have sex in their lucid dreams. Younger people have somewhat longer lucid dreams.

Future studies should explore in more detail the changes in lucid dream phenomenology occurring with the development of lucid dreaming as an ability. Additional differences in lucid dream phenomenology between spontaneous and trained lucid dreamers could also be explored, as could factors associated with the length of lucid dreams (including the effects of eye signaling and sleep laboratory vs. home setting). Furthermore, for practical purposes, it is important to investigate variables associated with a better remembrance of waking intentions and their execution in lucid dreams. Lucid dreamers can thus be more successful in accomplishing planned actions in their lucid dreams, especially important for sleep laboratory research. From the present results we can advise lucid dreamers to try to be concentrated and confident during their lucid dreams and keep their sleep environment isolated from potential external stimuli that can disrupt their dreams.

NOTE

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