

# The Incidence of Lucid Dreaming within a Japanese University Student Sample

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**Summary.** The present study investigated the incidence of lucid dreaming within a Japanese university student sample. From 153 Japanese students 47% reported experiencing a lucid dream at least once and 19% were frequent lucid dreamers (frequency equal or higher than once a month). Dream recall frequency was significantly related to lucid dream frequency. In the Japanese sample the incidence of lucid dreaming was not related to that of nightmares after controlling for dream recall frequency. Compared to other countries, the Japanese sample showed significantly lower prevalence rates. This result might be explained by differences in the verification process of lucid dreaming (e.g., definition) and participants (e.g., psychology students). Representative samples are needed to gain a clearer picture of cross-cultural differences. The results, thus, indicated that lucid dreaming is a known phenomenon in Japan. Due to the long cultural history of dreams and dreaming in Japan it would be interesting to investigate groups with strong relationships with those roots (e.g., monks) to learn more about a possible lucid dream culture, comparable to Tibetan Buddhism (e.g., dream yoga).

**Keywords:** Lucid dreaming; incidence; prevalence; frequency; nightmares; cross-cultural comparison

## 1. Introduction

The phenomenon of lucid dreaming is an interesting topic within dream research (Schredl, 1999). A lucid dream is defined as a dream in which the dreamer – while dreaming – is aware that she/he is dreaming (LaBerge, 1985; Schredl & Erlacher, 2004). After realizing that they are in the dream state lucid dreamers are able to consciously influence the action occurring in such dreams (cf. Erlacher & Schredl, 2008). Although in the early period of sleep research it was assumed that this state of consciousness reflects brief waking periods in the night (e.g., Hartmann, 1975), Hearne (1978) and LaBerge (1980) have demonstrated – using the technique of eye movements signaling in the sleep laboratory – that lucid dreaming is a REM sleep phenomenon.

The incidence of lucid dreaming has been measured in questionnaire surveys in terms of prevalence and frequency (Gackenbach, 1991). For prevalence (How many people have ever had at least one lucid dream) a representative survey in Austria ( $N = 1000$ ) found that 26% of the participants stated that they had experienced a lucid dream at least once (Stepansky et al., 1998). For university student samples, the figures are markedly higher and range from 71% to 92% (cf. Table 1). Similar high percentages were found for selected samples, e.g., members of a parapsychological association (70%, Kohr, 1980). Snyder and Gackenbach (1988) reported seven further surveys with prevalences ranging from 47% to 100% (e.g., members of a dream seminar).

The high variability in lucid dreaming prevalence can be explained by sampling procedures (e.g., random vs. representative samples) and additional verification of the lucid dream wherein the participant provides a recent lucid dream example which is then rated by a trained judge as being either lucid or non-lucid. A further factor might be the presence of a definition of lucid dreaming or an example of a lucid dream within the questionnaire to avoid a misunderstanding of the phenomenon by the potential participants. In general, the prevalence becomes smaller for representative samples with a verification of the lucid dream and a definition or an example within the questionnaire (Snyder & Gackenbach, 1988).

For self-reported ratings, Snyder and Gackenbach (1988) classified participants in frequent lucid dreamers with one or more lucid dreams per month and infrequent lucid dreamers with less than one lucid dream per month (but a least one lucid dream). For this classification in several surveys (cf. Snyder & Gackenbach, 1988) the percentages of frequent lucid dreamers range from 17% to 38% (cf. Table 3).

Thus far, only a rare number of studies have measured the frequency of lucid dreaming by counting the number of lucid dreams in a dream diary. The percentage of lucid dreams from the total amount of recalled dreams within a dream diary ranges from 0.3% to 0.7% for non-lucid dreamers (Zadra, Donderi & Pihl, 1992). In a study by Barrett (1991) 1.910 dreams collected in dream diaries from 191 participants were analyzed. In this sample 0.7% of the analyzed dreams were lucid dreams. For lucid dreamers the percentage of lucid dreams from the total amount of recalled dreams is 17.3% (Zadra et al., 1992) and for participants which practice meditation 6.5% (Reed, 1978).

In contrast to dream recall frequency for which stable gender differences of medium effect size have been demonstrated (meta-analysis: Schredl & Reinhard, 2008), large-scale surveys (Gruber, Steffen & Vonderhaar, 1995; Schredl & Erlacher, 2004; Stepansky et al., 1998; Watson, 2001) did not reveal differences in lucid dreaming frequency between the sexes.

Several studies (Belicki, Hunt & Belicki, 1978; Blackmore, 1982; Hearne, 1978; Schredl & Erlacher, 2004; Wolpin et al.,

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1992; Watson, 2001), on the other hand, showed a substantial relationship between lucid dream frequency and dream recall frequency. In addition, a significant correlation between lucid dreaming frequency and nightmare frequency was reported (Glicksohn, 1989; Spadafora & Hunt, 1990; Stepansky et al., 1998). This also seems plausible since a substantial portion of lucid dreamers reported that nightmares triggered lucidity within their dreams (Galvin, 1990; Wolpin et al., 1992). These above mentioned studies, however, have not controlled for dream recall frequency which might mediate the relationship between nightmare frequency and lucid dreaming frequency. In the study by Schredl and Erlacher (2004) dream frequency was controlled and still significant correlations were found.

Cross-cultural studies revealed several differences for a variety of dream aspects (e.g., dream recall frequency and dream content) (Domhoff, 1986; Tedlock, 1992; Yamanaka, Morita, & Matsumoto, 1982). For lucid dreaming the main focus so far has been on western cultures (LaBerge, 1988) but also on Tibetan Buddhism (Gillespie, 1988) and some native cultures (e.g. Senoi; Dentan, 1988). Regarding surveys on the incidence of lucid dreaming mainly Western cultures have been studied. With the exception of a recent study from Yu (2008) there are no surveys for Asian cultures. In this study 92% of Chinese university students reported experiencing a lucid dream at least once; this data will be included in the cross-cultural comparison. In a pilot study by Watanabe (2003) lucid dreaming was recorded in the sleep laboratory for several Japanese participants but no data regarding the frequency of lucid dreams in these participants was provided.

The aim of the present study was to measure the frequency of lucid dreaming within a Japanese university student sample and compare these figures with samples stemming from other countries (England, Germany, China, USA). The purpose is to shed light on cross-cultural differences in lucid dreaming.

## 2. Method

### 2.1. Participants

The sample included 153 participants whose mean age was  $19.1 \pm 1.1$  years. There were 93 women and 61 men. 85 of the 153 participants were recruited from an environmental science class at Toho University and 69 were recruited from an educational class from the Tokyo Gakugei University. Both universities were located around Tokyo. Participation was voluntary and not paid.

### 2.2. Measurement instruments

For measuring lucid dreaming frequency, an eight-point rating scale was presented within a self-developed dream questionnaire ("How often do you experience so-called lucid dreams (see definition)?" 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

Table 1. Lucid dreaming frequency for the Japanese and German Sample.

Categories	Relative frequency	
	Japanese (N = 153)	German (N=439)
never	52.6%	18.0%
less than once a year	11.0%	7.5%
about once a year	5.8%	10.9%
about 2 to 4 times a year	13.0%	26.7%
about once a month	8.4%	16.2%
about 2 to 3 times a month	7.8%	10.3%
about once a week	1.3%	8.0%
several times a week	0%	2.5%

= about 2 to 3 times a month, 6 = about once a week, 7 = several times a week). In order to ensure a clear understanding of the phenomenon, a short definition was also presented: "During lucid dreaming, one is – while dreaming – aware of the fact that one is dreaming. It is possible to deliberately wake up or to control the dream action or to observe passively the course of the dream with this awareness." For the importance of a clear definition see Snyder and Gackenbach (1988). Furthermore, an example of a lucid dream was presented within the questionnaire. Nightmare frequency was measured by a similar eight-point scale ("How often do you experience nightmares?"). In order to obtain units in frequency per month, the scales were 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).

Dream recall frequency was measured by a seven-point rating scale (0 = never, 1 = less than once a month, 2 = about once a month, 3 = twice or three times a month, 4 = about once a week, 5 = several times a week and 6 = almost every morning). The retest reliability of this scale for an average interval of 70 days is high ( $r = .83, n = 39$ ; Schredl, 2002). In order 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). A translation of the three scales was made by one of the authors (F.G.). The Japanese version of the three scales can be obtained from the first author.

### 2.3. Procedure

Participants were recruited at the Toho and the Tokyo Gakugei universities. The university students received the questionnaires at the end of a class session and were asked to fill out the questionnaire and return it at the following class session. For comparison with the German university student sample the data

Table 2. Comparison of the frequency for dream recall, nightmares and lucid dreaming between the Japanese and German Sample.

	Japan (N = 153)	German (N = 439)	Effect size $d =$	Statistical Test $F = p =$
dream recall frequency	$3.72 \pm 1.63$	$4.44 \pm 1.19$	0.51	25.8 <.0001
nightmare frequency	$3.40 \pm 2.10$	$3.56 \pm 1.68$	0.08	2.0 .1585
lucid dream frequency	$1.42 \pm 1.81$	$2.91 \pm 1.93$	0.79	44.0 <.0001

Note. ANCOVA (factors: group (depicted), gender, interaction; age; covariate: dream recall frequency)

Table 3. Cross-cultural comparison incidence of lucid dreaming within Student samples for five different countries.

study	Blakemore (1982)	Palmer (1979)	Schredl & Erlacher (2004)	Yu (2008)	present study
country	Dutch	United States	German	Chinese	Japanese
sample size	189	268	439	348	153
Question	Have you ever had a 'lucid dream', that is one in which, at the time, you know it is a dream?	„a special sort of dream in which you knew during the dream that you were dreaming and felt that you possessed all your waking faculties“	How often do you experience so-called lucid dreams?	Have you ever known during a dream that you are dreaming?	How often do you experience so-called lucid dreams?
Definition/Example	Partially	No	Yes	No	Yes
scale	5-point	4-point	8-point	5-point	8-point
Prevalence	73 %	71 %	82 %	92 %	47 %
Frequent LD	38 % <sup>2</sup>	29 % <sup>1</sup>	36 % <sup>1</sup>	17 % <sup>3</sup>	17 % <sup>1</sup>

Note. <sup>1</sup>frequency equal or higher than once per month; <sup>2</sup>categories: “>5 times” and “at will” dreamers; <sup>3</sup>categories: “frequently” and “very frequently”

from Schredl and Erlacher (2004) was used. In both surveys the same questions were applied. Statistical analyses were carried out with the SPSS 15.0.1 software package for Windows. Since the self-developed scales were ordinal prior to transformation, Spearman-Rank correlations were computed.

### 3. Results

#### 3.1. Frequency for lucid dreaming, dream recall and nightmares

Table 1 depicts the relative lucid dream frequency obtained from the Japanese student data. The prevalence for lucid dreaming in this sample is 47%. The majority of the participants are infrequent lucid dreamers, 17.5% are frequent lucid dreamers (frequency equal or higher than once per month) in the terminology of Snyder and Gackenbach (1988). The average lucid dreaming frequency was  $0.37 \pm 0.81$  lucid dreams per month. No significant gender difference was found, Mann-Whitney-U-Test,  $z = -1.819$ ,  $p = .069$ .

For dream recall frequency, the participants reported that they recall dreams on average on  $2.04 \pm 1.94$  mornings per week. The percentage of lucid dreams from the total amount of recalled dreams for the self-reported ratings is 4.2%. The mean nightmare frequency amounted to  $2.05 \pm 3.95$  nightmares per month. The correlation coefficient between lucid dreaming frequency and dream recall frequency was  $r = .300$  ( $p < .01$ ). Nightmare frequency and lucid dreaming were also significantly related ( $r = .20$ ,  $p = .01$ ). However, this correlation coefficient was reduced and non-significantly different from zero if dream recall frequency was partialled out,  $r = .072$ ,  $p = .38$ .

#### 3.2. Cultural Differences in lucid dream variables

In Table 1 the relative frequencies of the lucid dream frequency scales for the Japanese and German samples are shown. Compared to the German university student sample the Japanese sample reported significantly fewer dreams and fewer lucid dreams, whereas for the nightmare frequency no difference was found (see Table 2). The comparison of lucid dreams and nightmare frequency was statistically controlled for dream recall frequency.

Table 3 shows the prevalence and frequency values for the present study and those of four further studies with university students from different countries (Dutch, United States, Germany, and China). The prevalence rate of the Japanese student sample was significantly lower in comparison with those of the four other countries (see Table 4).

### 4. Discussion

Within the Japanese university student sample the study revealed a prevalence of 47% for participants who stated that they have experienced a lucid dream at least once and 19% were frequent lucid dreamers (frequency equal or higher than once per month). The prevalence rate is markedly lower than that of student samples from other countries. Furthermore, lucid dream frequency was significantly related to dream frequency but no correlation between lucid dream frequency and nightmare frequency was found when dream frequency was controlled for.

To explain the high variability in prevalence of lucid dreaming between the Japanese sample and the other countries, first, some methodological issues may be of importance. Interest-

Table 4. Differences for the five countries in the prevalence of lucid dreaming.

study	Japanese	Dutch	United States	German
Dutch	0.538 ***			
United States	0.493 ***	0.045 n.s.		
German	0.754 ***	0.216 *	0.261 ***	
Chinese	1.057 ***	0.519 ***	0.564 ***	0.303 ***

Note. \* < .05; \*\* < .01; \*\*\* < .001

ingly, the greatest difference in prevalence rates was found for the two Asian samples (Japanese: 47%, Chinese: 92%). As was already pointed out in the introduction the lack of a clear definition and an example may lead to overestimating the lucid dreaming frequency (Snyder & Gackenbach, 1988). This factor could explain the marked difference between the two Asian samples since for the Chinese survey (Yu, 2008) no definition or lucid dream example was provided for the participants.

For comparing to the German sample the same questions were used, but a marked difference for the prevalence of lucid dreams was still present. The fact that the German sample consisted of psychology students who are often high dream recallers (Schredl, 1999) can not explain the lower frequency of lucid dreams in the Japanese sample because the effect was still significant. One might speculate that cultural aspects, different attitudes towards dreams (not actively influencing them) might play a role in explaining the difference. It will be interesting to study the attitude towards dreams in a Japanese sample, especially eliciting whether it is culturally common to have influence over dream action – like reported for Western lucid dreamers (LaBerge, 1988).

In comparison to the representative sample from Stepansky et al. (1998) the prevalence rate for the Japanese students is still twice as high. In further studies, therefore, it would be interesting to conduct a survey with a representative Japanese sample.

In the present study the frequency of lucid dreaming was calculated as the ratio of the lucid dream frequency to the dream recall frequency. In comparison to the German sample (10.6%) 4.2% of the total recalled dreams were lucid dreams for the Japanese sample. However, the calculation was a crude measure for lucid dream frequency and it would be interesting to gain data from dream diary studies in order to calculate a more precise measure for the ratio of lucid dreams to total dream recall. The percentage of lucid dreams from the total amount of recalled dreams in diary studies ranges from 0.3% to 0.7% for non-lucid dreamers and, for lucid dreamers, the figure is 17.3% (Zadra et al., 1992).

In general, the prevalence rate for the Japanese student sample is still high and it can be assumed that the phenomenon is known to most Japanese people. Englehart and Hale (1990) showed in a study that Japanese students reported nightmares less often than students from the United States, but this wasn't supported by the present findings. Regarding the correlation between nightmares and lucid dreaming (see introduction) one might also expect less frequent lucid dream reports, but in contrast to the findings from Schredl and Erlacher (2004) nightmares were not correlated with lucid dream frequency after controlling for dream recall frequency. One might speculate that nightmares which are quite a common trigger for lucid dreaming in Western countries might not have the same effect in Japanese persons.

As stated above, it would be interesting to study the attitude towards dreams in Japan. In addition to the possibility of influencing dreams, the attitude towards nightmares might also be of interest. It might be the case that Japanese people are not familiar with actively confronting nightmare anxieties; a procedure that has reduced nightmare frequency considerably in those instances where it has been applied (Krakow & Zadra, 2006).

The effects of gender and dream recall frequency on lucid dreaming revealed the same pattern for the German and the Japanese sample, underlining the similarities between Western and Asian cultures. One might have expected more differences since Japan has a different cultural background than Western countries. Dreams, for example, have a long history in the Japanese culture, reaching back to 10,000 BCE, where dreams were considered part of reality (Koyama, 1995) and, thus, the attitude

towards dreams in Japan might differ considerably from that in Western countries. It would be interesting to study Japanese groups with strong cultural roots like Buddhist monks. In Tibetan Buddhism lucid dreaming plays an important role, for example in the exercise of dream yoga (e.g., Varela, 2001). In addition, Gackenbach (1990) pointed out the parallels between meditation and lucid dreaming and reported a correlation between meditation frequency and lucid dreaming frequency. Since in Japanese ZEN Buddhism meditation plays a major role one would expect high lucid dream frequency for this group.

To summarize, the present findings revealed a prevalence rate of 48% of participants who experienced at least one lucid dream and 19% of the Japanese university student sample were frequent lucid dreamers (frequency equal or higher than once per month). In a cross-cultural comparison the prevalence rate is smaller than in other countries. Representative samples are needed to gain a clearer picture of cross-cultural differences. Future studies should focus on specific Japanese groups to learn more about a possible lucid dream culture in Japan.

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