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Austrian Dream Behavior: Results of a Representative Population Survey

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This study was based on a survey of a representative sample of 1000 Austrians who were questioned about their sleep and dream behavior. About two-thirds of the respondents reported that they generally recalled at least one dream per month. Dream recall frequency decreased with advancing age, but did not differ between men and women. Fifty-five percent of the respondents characterized the affective content of their dreams: 29% reported neutral, 20% positive, and 6% negative dreams. Four percent of the sample reported suffering from nightmares. These respondents more frequently reported snoring, interrupted sleep, daytime somnolence, anxiety and nervousness, depression, high dream recall, recurrent dreams, and dreaming in color. Twenty-six percent of the total sample reported that sometimes they realized during their dreams that they were dreaming. These respondents more frequently reported family problems, high dream recall, positive dream content, recurrent dreams, dreaming in color, and nightmares.

KEY WORDS: dream recall, dream content, nightmares, epidemiology.

This study was part of a larger investigation of sleep disorders among a representative sample of 1000 Austrians (Schmeiser-Rieder, Kapfhammer, Bolitschek, Holzinger, Skrobai, Kunze, Lechner, Saletu, & Zeitlhofer, 1995). The questionnaire used to assess sleep behavior in that investigation also included items concerning dream behavior (dream recall, affective content, nightmare suffering, and awareness of dreaming while dreaming). Our analyses of these items, reported here, provide preliminary data on dream behavior in the general Austrian population.

Although there are many studies of dreaming based on small numbers of subjects, epidemiological investigations of dream behavior are rare. An exception is Borbély's (1984) survey of sleep behavior in a representative Swiss sample ($N = 1000$), which included questions about dream recall and dream content. There also

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are a number of reports concerning the frequency of the clinically important nightmare (Belicki, 1992; Bixler, Kales, Soldatos, Kales, & Healey, 1979; Hartmann, Russ, Oldfield, Sivan, & Cooper, 1987; Klink & Quan, 1987; Wood & Bootzin, 1990). Yet, to our knowledge, the present study is the first representative population survey that, in addition to nightmares, examines the percentage of people who dream in color, who have recurrent dreams, or who are aware of dreaming while dreaming. Since dreaming, nightmares, and awareness of dreaming while dreaming have implications for psychological diagnosis and treatment, the results of epidemiological studies of dream behavior are of considerable importance.

METHOD

In March 1993, we investigated the occurrence of sleep disorders among a representative sample of the Austrian population between the ages of 14 and 69. The sample was randomly selected using electoral rolls. Randomization and the interviews were carried out by the Austrian GALLUP-Institute, and the interviews were conducted with the aid of a questionnaire. The response rate for fully completed questionnaires was 70%. This data base, which includes over 1000 Austrians, was designed to be representative of the general Austrian population in sex, age, and social class.

The questionnaire, which was prepared by the Austrian Sleep Research Association (ASRA), included questions about sleep behavior, about sleep disorders and their treatment, and about dreaming. It was based on similar questionnaires that are used in sleep disorders clinics, for example the Sleep Disorders Questionnaire (SDQ; Douglass, Bornstein, Nino-Murcia, Keenan, Miles, Zarcone, Guilleminault, & Dement, 1994). The epidemiological results for sleep disorders are described in detail elsewhere (Schmieser-Rieder et al., 1995). The questions concerning dream behavior, which are the focus of the present report, included the following:

1. How often do you dream per month? (1 to 2, 3 to 5, 6 to 9, 10 to 15, 16 to 29 times, daily, no report)
2. What is the dream content like? (neutral, positive, negative, do not remember, no report)
3. Are there any recurrent dreams? (yes, no, no report)
4. Do you have colored dreams? (yes, no, no report)
5. Do you sometimes realize in your dreams that you are dreaming? (yes, no, no report)
6. Do you suffer from nightmares? (yes, no, no report)

Since responses to the dream recall question (#1) were not normally distributed, we combined reports of 1-2, 3-5, and 6-9 dreams per month into one category and reports of 10-15, 16-29, and "daily" into another. Responses to each of the preceding questions were summarized as percentages. Comparisons of percentages were assessed using chi-squared tests with the level of alpha for statistical significance set at .01.

Since our original and primary aim was to examine the epidemiology of sleep disorders in the adult Austrian population, we were not able to investigate dream

behavior in depth. The design of the epidemiological questionnaire limited us to a small number of questions about dreams, and, in response to these items, participants were asked to characterize their dream lives in general terms. Moreover, to enable efficient examination of this large sample, we were only able to undertake a retrospective survey of dream behavior. These limitations should be considered when comparing our data with the results of studies that used dream diaries or sleep laboratory procedures.

RESULTS AND DISCUSSION

Dream Recall

Sixty-eight percent of the sample ($N = 1000$) reported that they recalled at least one dream per month. Reported dream recall frequencies for the entire sample and among specific subgroups (distinguished by sex, age, occupation, shift workers, income, and residential environment) are presented in Table 1.

We found no significant dream recall differences between men and women. These findings contrast with those obtained in Borbély's (1984) epidemiological

Table 1. Dream Recall Frequency (per Month) for Various Subgroups Within the Austrian Population

	1-9 %	10-"Daily" (%)	No Dreams Reported (%)
Total Sample ($N = 1000$)	37	31	32
Men ($n = 471$)	37	31	31
Women ($n = 529$)	37	32	33
<i>Age:</i>			
<30 yr. ($n = 303$)	38	36	26
31-50 yr. ($n = 335$)	37	31	32
50 yr. ($n = 362$)	34	27	38
<i>Occupation:</i>			
Professionals ($n = 81$)	37	29	34
Civil servants ($n = 216$)	41	32	28
Manual workers ($n = 203$)	39	32	29
Farmers ($n = 37$)	45	45	10
Students ($n = 108$)	35	45	20
Housewives ($n = 127$)	39	23	38
Pensioners ($n = 229$)	30	27	44
Shift workers ($n = 49$)	48	33	19
<i>Income per month:</i>			
US\$ 1000 (ATS 12500) ($n = 187$)	40	20	30
US\$ 1600 (ATS 20000) ($n = 275$)	37	27	36
US\$ 2400 (ATS 30000) ($n = 206$)	36	38	25
>US\$ 2400 ($n = 214$)	37	39	25
<i>Environment:</i>			
5000 inhabitants ($n = 461$)	37	35	27
50000 inhabitants ($n = 217$)	39	24	37
>50000 inhabitants ($n = 322$)	33	32	36

study, where women (40.3% dream daily) reported dreaming more frequently than did men (33.3% dream daily).

Compared with the rest of the sample, people older than 50 recalled fewer dreams per month, $\chi^2 = 15.56, p < 0.001$, and people younger than 30 reported a higher rate of dream recall, $\chi^2 = 12.66, p < 0.001$. This decrease in dream recall with advancing age replicates the findings of Strunz (1993) but is inconsistent with results obtained by Borbély (1984), who found an increase in dream recall among older people (age 15-19: 10.7% dream daily; age 60-74: 17.8% dream daily) that was related to disturbed sleep.

When the various occupation groups were compared with the rest of the total sample, it was found that students recalled more dreams per month, $\chi^2 = 15.07, p < 0.001$, and pensioners recalled fewer dreams per month, $\chi^2 = 26.25, p < 0.001$. On the other hand, dream recall among shift-workers did not differ from the remainder of the sample. Compared with the rest of the sample, people with very high incomes (>30,000 ATS, 2400 US\$ per month) and high incomes (>20,000 ATS, 1600 US\$ per month) reported more frequent dream recall, $\chi^2 = 12.70, p < 0.005$ and $\chi^2 = 10.31, p < 0.01$, respectively, whereas people in lower income categories (<12,500 ATS, 1000 US\$ per month) reported lower dream recall, $\chi^2 = 11.26, p < 0.005$. Also, people from environments with less than 5000 inhabitants reported higher dream recall frequency than those from the rest of the sample, $\chi^2 = 20.14, p < 0.001$.

People who reported suffering from nightmares ($n = 41$), reported significantly higher dream recall than people in the remainder of the sample, $\chi^2 = 10.77, p < 0.005$, and, those who reported being aware of dreaming while dreaming ($n = 262$) reported significantly higher dream recall than those in the rest of the sample, $\chi^2 = 24.99, p < 0.001$.

Affective Content

Table 2 summarizes the frequency of the different affective content ratings in the total sample and in various subgroups (distinguished by sex, age, occupation, shift workers, income, and residential environment). In general, 29% of our respondents reported neutral dreams, 20% positive dreams, and 6% negative dreams. These results are similar to those of Borbély (1984): 21.3% of his subjects reported pleasant dreams and 5.8% frightening dream content.

Also, like Borbély (1984), we did not find any significant differences between men and women in these affective content ratings. However, students and people younger than 30 reported more neutral and positive dreams and fewer negative dreams than did the rest of the sample, $\chi^2 = 12.19, p < 0.005$ and $\chi^2 = 13.44, p < 0.005$, respectively. On the other hand, manual workers and shift workers more frequently reported negative dreams than did the rest of the sample, $\chi^2 = 11.72, p < 0.005$ and $\chi^2 = 17.27, p < 0.001$, respectively. Affective dream content ratings in the various income and residential environment groups did not differ.

Table 2. Dream Affective Content for Various Subgroups Within the Austrian Population

	Neutral (%)	Positive (%)	Negative (%)	Do Not Remember (%)	No Report (%)
Total Sample (N = 1000)	29	20	6	33	12
Men (n = 471)	29	21	5	32	14
Women (n = 529)	29	19	7	34	11
Age:					
<30 yr. (n = 303)	35	22	4	31	8
3-50 yr. (n = 335)	26	21	7	31	15
>50 yr. (n = 362)	27	16	6	37	14
Occupation:					
Professionals (n = 81)	32	22	4	21	21
Civil servants (n = 216)	34	22	4	28	11
Manual workers (n = 203)	28	17	10	33	12
Farmers (n = 37)	26	37	0	34	2
Students (n = 108)	40	24	1	30	5
Housewives (n = 127)	25	16	6	37	16
Pensioners (n = 229)	23	15	6	42	14
Shift workers (n = 49)	31	20	19	19	10
Income per month:					
US\$ 1000 (ATS 12500) (n = 187)	27	20	9	32	12
US\$ 1600 (ATS 20000) (n = 275)	30	16	6	35	13
US\$ 2400 (ATS 30000) (n = 206)	36	22	6	23	13
>US\$ 2400 (n = 214)	27	23	5	37	9
Environment:					
5000 inhabitants (n = 461)	30	22	5	33	11
50000 inhabitants (n = 217)	32	15	7	30	17
>50000 inhabitants (n = 322)	27	20	6	36	11

Nightmares

Four percent (n = 41) of the total sample reported suffering from nightmares. The frequency of nightmare sufferers did not differ significantly between men and women; neither were there differences between the various age and occupation groups and the total sample. On the other hand, compared to the rest of the sample, people on a low income (<12,500 ATS, 1000 US\$ per month) were more likely to report nightmares (10%), $\chi^2 = 39.95$, $p < 0.001$, as were people living in areas with more than 50,000 inhabitants (7%), $\chi^2 = 25.14$, $p < 0.001$.

In addition to more frequent dream recall (see above), respondents suffering from nightmares more frequently reported recurrent dreams than did the remainder of the sample; 66% vs. 27%, $\chi^2 = 30.68$, $p < 0.001$. Also, 55% of the nightmare sufferers reported snoring, whereas in the rest of the sample only 26% did so, $\chi^2 = 18.25$, $p < 0.001$. People who suffered from nightmares more frequently reported interrupted sleep, i.e., waking up during the night and having trouble falling asleep again; 52% versus 27%, $\chi^2 = 13.03$, $p < 0.001$; restless sleep, 39% vs. 16%, $\chi^2 = 16.03$, $p < 0.001$; problems staying awake during the day, 39% vs. 13%, $\chi^2 = 24.76$, $p < 0.001$; and daytime somnolence 53% vs. 28%, $\chi^2 = 12.74$, $p < 0.001$. Levin (1994) also found higher dream recall and poorer sleep quality in nightmare sufferers, suggesting that daytime somnolence occurs when frequent nightmares disturb nighttime sleep.

However, since we found a high frequency of snoring in people who reported suffering from nightmares, it is also possible that sleep apnea syndrome is frequent among people with nightmares and may cause daytime somnolence. Groen, den Velde, Hovens, Falger, Schouten, and Duijn (1993) similarly found a relationship between snoring and anxiety dreams, and they suggested that hypercapnia could induce anxiety dreams. In this context, it also is noteworthy that people with chronic obstructive airways disease (Klink & Quan, 1987), especially with asthma (Wood, Bootzin, Quan, & Klink, 1993), have a higher prevalence of nightmares than healthy controls. A sleep laboratory study (Gross & Lavie, 1994) of patients with sleep apnea syndrome showed that dreams reported after apneas were more negative than dreams after healthy sleep.

In our study, people who reported suffering from nightmares also frequently reported psychopathological symptoms. Compared to the rest of the sample, they more frequently reported anxiety and nervousness, 37% vs. 12%, $\chi^2 = 24.36$, $p < 0.001$; and depressed mood, 43% vs. 14%, $\chi^2 = 36.94$, $p < 0.001$. Although Wood and Bootzin (1993) found no relationship between self-reported anxiety and nightmare frequency, Belicki (1992) pointed out that it is important to distinguish between nightmare frequency and the waking distress associated with nightmares (nightmare distress). Since there is only a slight relation between nightmare frequency and nightmare distress, nightmare distress, but not nightmare frequency, may be related to psychopathology. Therefore, it is noteworthy that, in our study, we have obtained data on the frequency of nightmare distress (nightmare suffering) in the general sample, rather than just the frequency of nightmares. Our results, then, are comparable to those of Hartmann et al., (1987), who studied the personality of lifelong nightmare sufferers using the Minnesota Multiphasic Personality Inventory and found features of the schizophrenic spectrum disorders (schizophrenia, schizotypal personality disorder) among them.

Recurrent Dreams and Dreaming in Color

Twenty-nine percent of the total sample reported recurrent dreams, 64% had no recurrent dreams, and 7% did not answer or did not know. Only 25% of the men, but 32% of the women had recurrent dreams, $\chi^2 = 16.95$, $p < 0.001$, and there were no significant differences between the various age groups.

Also, 37% of the total sample dreamt in color, 47% did not, and 16% did not know or did not answer this question. There were no significant differences between men and women. Younger people reported having dreams in color more often than did older people, <30 years: 48%; 30-50 years: 35%; >50 years: 31%, $\chi^2 = 13.55$, $p < 0.005$.

Dreams with Awareness

Twenty-six percent of the total sample occasionally were aware of dreaming while dreaming, 64% were not, and 10% did not answer. Among the respondents reporting dream awareness, 21% reported that their sleep was disturbed by noise,

whereas in the remainder of the sample only 9% showed sleep disturbances as a result of noise, $\chi^2 = 48.52$, $p < 0.001$. These findings suggest that noise induces dreams with awareness, but further investigations are necessary to clarify this possibility.

Compared to the rest of the sample, respondents who reported awareness of dreaming while dreaming frequently reported family problems, 7% vs. 2%, $\chi^2 = 48.71$, $p < 0.001$, although there were neither significant differences between the sexes nor between the age groups on this variable. Those who reported dream awareness also reported more frequent dream recall (see above), pleasant dreams, 31% vs. 16%, $\chi^2 = 43.09$, $p < 0.001$; and nightmares, 9% vs. 4%, $\chi^2 = 50.17$, $p < 0.001$. They also frequently reported recurrent dreams, 58% vs. 19%, $\chi^2 = 266.02$, $p < 0.001$; and dreams in color, 65% vs. 27%, $\chi^2 = 192.06$, $p < 0.001$. There was no relationship between dream awareness and insomnia symptoms or daytime somnolence.

Lucid dreams have been defined as those in which the person has clear awareness of dreaming and of the capacity to take action in the dream (Gackenbach & LaBerge, 1988). Thus, dreams without awareness, dreams with awareness, and lucid dreams indicate different levels of dreamer self-reflectiveness. The highest level, the ability to control dream content, may be more difficult to attain than dream awareness (cf. Purcell, Mullington, Moffitt, Hoffmann, & Pigeau, 1986) and is probably more rare in the general population.

We considered people who affirmatively answered the question "Do you sometimes realize in your dreams that you are dreaming?" as respondents with dream awareness. Dream awareness is a pivotal aspect of lucid dreaming, but not lucid dreaming in its full extent (cf. Holzinger 1994). Nonetheless, the present study confirms that people with dream awareness differ from the general population. Like nightmare sufferers, they report higher dream recall frequency, and they are more likely to report pleasant dreams, dreams in color, and recurrent dreams.

In our study, a survey of dream behaviors in the general population of a European country has been presented. The obtained results suggest the need for further examination of some largely unexplored relationships. For example, it may be important to clarify in polysomnographic studies the relationship between nightmares and snoring. Also, it may be useful to clarify the linkage between nightmares and lucid dreaming, especially since full understanding of that relationship could have significant implications for therapy.

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