

Frequency of sport dreams in athletes

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Summary. Empirical studies largely support the continuity hypothesis of dreaming. For example, it has been shown in past research that sport students dream more often about sports than psychology students do, presumably reflecting their engagement in sport activities and sport theory. The present study tested the hypothesis whether frequency of sport dreams is related to the amount of time spent on waking sport activities for elite athletes. As expected, the amount of time spent with sport activity was directly related to the frequency of sport dreams. Secondly, the amount of competitions was also related. The findings also indicated that other factors such as emotional involvement associated with competitions might be of importance in explaining the relationship between waking activities and dream events. Future studies using longitudinal designs will shed more light on this relationship and will help derive a more precise formulation of the continuity hypothesis.

Keywords: dream content, continuity hypothesis, sport activities, athletes, competitions

1. Introduction

The continuity hypothesis in dream research suggests that the dream content reflects waking activities (Schredl, 2003). Schredl and Hofmann (2003), for example, demonstrated that the amount of time spent in different waking activities (e.g. car driving) is related to the occurrence of the corresponding activity in dreams. I.e., the continuity hypothesis is largely supported by studies investigating different types of waking life experiences, e.g. divorce, stress, life events (overview: Schredl, 2003). For the topic of sports, several pilot studies (Carpinter & Cratty, 1983; Heishman & Bunker, 1989; Meyers, Cooke, Cullen, & Liles, 1979) and single case studies (e.g. Domhoff, 1996) in athletes indicate that the continuity is also present for athletic activities, i.e., that frequent practicing during the day is reflected in the heightened occurrence of sport dreams. Up to now, only two studies (Erlacher & Schredl, 2004; Schredl & Erlacher, 2008) investigated the relationship between daytime sport activities and dreams in a systematic way.

In the first study, Erlacher and Schredl (2004) demonstrated in a dream diary study that sport students dream more often about sports (active participation and general sport themes) than do psychology students, reflecting sport students' engagement in sport activities and sport theory. In the second study, Schredl and Erlacher (2008) showed that the percentage of sport dreams for sport students was directly related to the amount of time spent with waking sport activities. As the group factor was still significant after

controlling for amount of practicing sport, it was hypothesized that sport students talk and think about sports more often and may be more emotionally involved in sports than psychology students. Systematic research in sport related dreams in athletes is still lacking.

The present study was designed to test whether frequency of sport dreams is related to the amount of time spent on waking sport activities – this would be predicted by the continuity hypothesis. We explored whether other factors like number of competitions, membership in a national supported team system (more professional), and duration of sport career have also an effect on the frequency of sport dreams.

2. Methods

2.1. Participants

The sample included 632 German athletes (379 men and 253 women). Their mean age was 21.9 years ($SD = 6.8$), ranging from 14 to 55 years. The athletes were recruited through personal contacts or through their coaches and volunteered to participate in a questionnaire study about sleep and dream habits. Because the participants were involved in various sports, each athlete was categorized as belonging either to team sports ($n = 225$) or to individual sports ($n = 407$). Team sports include sports that are predominantly played with a team and require the athlete to interact with other athletes (e.g. basketball, soccer). Individual sports include sports in which the athletes predominantly act alone to optimize a physical measure (e.g. athletics, swimming), to obtain high qualitative grades (e.g. dancing, figure skating), or to participate in a face-to-face situation with or without contact (e.g. karate, judo, tennis).

The athletes had been practising their sport for an average of 11.5 years ($SD = 5.9$) and were practising an average of 11.0 h ($SD = 6.4$) per week. A total of 368 athletes belonged to the German national supported team system

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Table 1: Mean and standard deviations for different parameters for the athletic sample.

	Total sample ¹		Without membership in national supported team system ²		With membership in national supported team system ³	
	M	SD	M	SD	M	SD
Years active	11.5	5.9	12.2	6.8	11.0	5.1
Practice hours per week	11.0	6.4	7.3	4.2	13.5	6.4
Number of competitions/games during the last 12 months	17.8	15.8	12.1	11.3	21.1	15.1

Note. ¹n = 632, ²n = 264, ³n = 368

(bundesgeförderten Kadersystem). This system is divided into the A-team (national team), B-team, and C-team (talent team members) (cf. Barkhoff & Heiby, 2004). The remaining 264 athletes had no membership in a supportive organization; however, they were ambitious athletes with a long history of sport, a high number of hours of practice per week, and involvement in competitions (see Table 1). The study was done in accordance with the institutional ethical.

2.2. Materials

For this study, we developed a questionnaire titled “Competitive Sports, Sleep, and Dreams”, which contained questions about dreaming and athletic performance. In addition to demographic data, the first part of the questionnaire included questions about the participants’ sport. We asked athletes about the number of hours they practice per week, for how many years they have been practising their sport and how many competitions or games they had during the last 12 months. Next, we measured participants’ dream recall frequency using a 7-point scale ranging from 0 (never) to 6 (almost every morning) developed by Schredl (2002a). Its retest reliability is high ($r = .85$; Schredl, 2004). 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). Then participants were asked how often they dream about their sport using an 8-point scale ranging from 0 (never) to 6 (several times a week). 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). After that, we asked athletes during which period the number of sport dreams increases. The answer categories were “over periods of competition”, “over periods of intensive training”, and “over periods without training or competition”. For the next question the athletes had to estimate if they had the impression, that their dream about sport somehow influenced their performance and they were asked to report an example illustrating the dream content.

2.3. Design and Analysis

Following the informed consent from the athletes to participate in the study, the questionnaire was administered to the athletes with the assistance of the officials and one of the authors. All athletes were asked to fill out the questionnaires at their own pace and return the questionnaire to one of the

authors. Because this is an explorative study, the focus was on a descriptive level and two-tailed tests were performed for all parameters. Statistical analyses were done with the SPSS for Windows (Version 17.0) software package.

3. Results

Table 2 presents the frequency of sport dreams for the athletes. Scale values were transformed into their absolute frequencies. The mean sport dream frequency was 1.67 mornings per month ($SD = 3.54$ mornings per month) and the mean dream recall frequency was 1.59 mornings per week ($SD = 1.87$ mornings per week). Dividing the mean number of sport dreams per month by the mean number of recalled dreams, one can roughly estimate that 23.7% of recalled dreams were sport dreams.

We performed a logistic regression analysis with the frequency of sport dreams as the dependent variable and with simultaneous entry of all variables (cf. Table 3). Dream recall frequency, number of hours practicing per week and the number of competitions or games they had during the last 12 months were statistically significant variables. Additional inclusion of nightmare frequency showed a significant influence for this variable (standardized estimate = 0.178, $chi^2 = 15.952$, $p < .001$).

Of all 632 athletes, 299 (47.3%) stated that they experience more sport related dream “during periods of competition”, 195 (30.9%) “during periods of intensive training”, and

Table 2: Frequency of sport dreams (N = 632)

Category	Frequency	Percentage
never	69	10.9 %
less then once a year	75	11.9 %
about once a year	58	9.2 %
about 2 to 4 times a year	136	21.5 %
about once a month	127	20.1 %
about 2 to 3 times a month	89	14.1 %
about once a week	53	8.4 %
several times a week	25	4.0 %

Table 3: Summary of logistic regression analysis for variables predicting the occurrence of sport dreams.

Variable	Standardized estimate	Wald χ^2	p
Age	-0.108	4.078	.043
Gender	-0.001	0.001	.979
Sport group (individual vs. team sport)	0.045	0.880	.348
Squad membership (yes vs. no)	0.025	0.295	.587
Years active	-0.009	0.028	.867
Practice hours per week	0.153	8.651	.003
Number of competitions/games during the last 12 months	0.117	7.155	.008
Dream recall frequency	0.410	95.212	<.001

Note. Adjusted $R^2 = .197$; $N = 632$

65 (10.3%) “during periods without training or competition”. And 77 of 632 athletes (12.2%) stated that they had the impression, that a dream about sport somehow influenced their performance. A total of 53 athletes gave an example. The majority of 40 examples were positive (e.g. “I had a good action in the offense. I jumped high and far into the penalty area and hit the goal. The next day I was motivated and self confident in the game”), only 5 were negative (e.g. “I had a dream were I was very uncertain, this uncertainty was present in the next days competition in a 110-m-hurdle sprint.”) and 8 were mixed with positive and negative accounts.

4. Discussion

The findings of the present study indicate that the amount of time spent with sport activity is directly related to the percentage of corresponding dreams in athletes. Secondly, the amount of competitions was also related.

For interpreting the results, a methodological issue must be considered. A rough questionnaire measure was utilized to assess the frequency of sport dreams. This retrospective technique might be biased by memory effects which have been demonstrated by Schredl (2002b). The questionnaire study of Schredl and Erlacher (2008) yielded comparable figures for the percentage of sport dreams compared to the diary study (Erlacher & Schredl, 2004), emphasize the validity of retrospective measures of sport dream frequency. Additionally, the results do indicate that it is important to control the analysis for dream recall frequency because this is the most influential factor on the frequency of sport dreams. This seems plausible because the chance of recalling a sport dream is heightened by overall higher dream recall.

For the athletic sample the absolute frequency of sport dreams seems to be low with respect to the median frequency in Table 2, indicating that nearly half of the athletes dream about their sport two to four times per year or less. The low frequency of sport dreams in the athletic sample might be due to the questionnaire approach (cf. Schredl, 2008). But, the ratio of dream recall to sport dreams indicate that almost every fourth recalled dream was a sport dream (23.7%). This figure is comparable high to the percentage of sport dreams in sport students (17.3%; Schredl & Erlacher, 2008).

In this study we asked for dreams about the athletes sport but did not specify it to active participation or general sport themes. For the study by Erlacher and Schredl (2004), the dream content analysis showed that dream reports with the dream-ego participating in sport activities are less frequent (26%) than dream reports with thematically contained sport activity (38%). One might speculate that the missing definition of a “sport dream” in this study might have different interpretations in the athletes and lead to difficulties to answer the question. Therefore, in further studies a clear definition about a sport dream should be provided.

Furthermore, it would be interesting to compare the frequency of sport dreams to a sample without sports activity. For example, in the study by Erlacher and Schredl (2004) 14% of the dream reports by the psychology students contained sport activities thematically. Thus, it could be that “normal” people also have sport dreams (e.g., after having seen a whole day of football games, or during Olympic Games). In future studies it would be interesting to experimentally study the dream content of participants watching sport an participants practicing sport. However, in past studies it was shown, that watching a movie or film has a low effect on dream content, in contrast to real life events ;especially if they are stressful situations (cf. Schredl, 2008). Such studies would help to answer the question, if it is the “own” physical activity which is responsible for the dream content, or is it the mental content of the daily activity. For example, already Pötzl (1917) could show that the presentation of subliminal stimuli (e.g. pictures) before sleep can influence the dream content (Pötzl, 1917), however, this early findings could not be replicated (Schredl, Dombrowe, Bozzer, & Morlock, 1999).

The findings of Erlacher and Schredl (2004) as well as Schredl and Erlacher (2008), that sport students report more often sport dreams than other students, and the continuity hypothesis have been confirmed in athletes. It was shown that in elite athletes waking life experiences directly affect dream content. This finding is also supported by the result that about 50% of the athletes reported to have more sport dreams during periods of intensive training.

The lack of other factors like membership of a national supported team or number of active years on sport dream frequency might be explained that there is no significant additional influence of theoretical courses and thinking about

sports which might be more often in members of national supported team system than in non-members on dreams – in addition to the time spent with practicing. The additional effect of the number of competitions on sport dream frequency might be point to the importance of emotional factors (e.g. worries about performance) which are connected to competitions. This line of thinking is also supported by the result that about 30% of athletes reported to have more sport dreams during periods of competitions and the effect of nightmare frequency on sport dream frequency. It will be interesting to carry out longitudinal studies in order to test whether upcoming important games or competitions increase the probability of sport dreams. Another option is to measure the emotional involvement in sport activities psychometrically (e.g. competitive state anxiety) as well as the amount of time preoccupied with these activities and relate these measures with the incorporation rate of sport themes into subsequent dreams.

Whereas the negative effect of dream on subsequent waking have been well documented (Köthe & Pietrowsky, 2001), it would be interesting to study systematically whether positive dreams enhance performance because examples of positive effects on performance were reported quite often by the athletes. It might even be possible to deliberately practice during dreams especially lucid dreams (Erlacher & Schredl, in press).

To summarize, the study clearly demonstrated an effect of time spent with sport activity on the incorporation rate of sport dreams in athletes. The findings also indicate that other factors such as emotional involvement and associated worries might be of importance in explaining the relationship between waking and dreaming. Future studies using longitudinal designs will shed more light on this relationship and will help to derive a more precise formulation of the continuity hypothesis. In addition, investigating the question whether sport dreams are markers for procedural memory consolidation taking place in REM sleep (cf. Stickgold, 2003) is of theoretical as well as practical interest. Future studies should test whether having sport dreams are related to higher performance gains in sport students.

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