

# Sport dreams in a long dream series

Michael Schredl

Central Institute of Mental Health, Medical Faculty Mannheim/Heidelberg University, Germany

**Summary.** Although the frequency of sport dreams has been studied, studies looking at the relationship between sport disciplines and dream content are quite rare. The present findings are based on 11,463 dreams of an academic who practiced during several years quite intensely circus arts (juggling, unicycling, and acrobatics). The overall percentage of sport dreams (6.12%) is comparable with previous findings. Circus art dreams were unique to the dreamer (not found in a large sample of student dreams) and occurred most often during the period of intense practice. One of the most intriguing questions is whether these sport dreams reflect sleep-dependent memory consolidation processes, i.e., whether dreaming about sport is related to performance improvements.

**Keywords:** Dream series, sport dreams, continuity hypothesis, sleep-dependent memory consolidation

## 1. Introduction

The continuity hypothesis of dreaming states that waking-life experience are reflected in dreams (Schredl, 2003). Although a theoretical debate is still ongoing how to conceptualize the continuity hypothesis, e.g., focusing on concerns, preoccupations, waking thoughts, fantasy, and/or activities (Domhoff, 2017, 2018; Erdelyi, 2017; Jenkins, 2018; Schredl, 2012a, 2017), empirical research indicated that simply the time spend with a waking activity is associated with higher probability of dreaming about this activity subsequently, for example, for activities like playing music (König et al., 2018), consuming media (Moverley, Schredl, & Göritz, 2018), driving a car (Schredl & Hofmann, 2003), or reading (Schredl & Erlacher, 2008) this relationship could be demonstrated.

For the topic of sports in dreams, it has been shown that sport students dream more often about sports (26.2% of the diary dreams) compared to psychology students (8.8%) (Erlacher & Schredl, 2004). This was replicated using a retrospective method asking for the percentage of sport dreams in relation to all remembered dreams (Schredl & Erlacher, 2008). In this study, time spent with exercising sports was positively correlated with the percentage of sports dreams. This relationship was also found in athletes who overall dreamed very often about sports (23.7%) (Erlacher & Schredl, 2010a). Sports dream percentage was much lower in a population based sample: 5.94% (N = 2902, Age range: 16 to 92 years; mean age: 45.88 ± 14.38 years) (Noveski, Schredl, & Göritz, 2016). Although athletes provided dream examples indicating that they dream of their specific sport discipline (Erlacher & Schredl, 2010a), systematic studies about the types of sports within the dream as related to the sports practices in waking have not been carried out.

The present study was undertaken to study how often a very specific area of sports, namely circus arts including

juggling, unicycle, acrobatics, is present in a person practicing these arts at one period in his life very extensively. Longitudinally, it was expected that dreaming of circus arts will decrease if the dreamer ceases practicing during the day.

## 2. Method

### 2.1. Participant and dream diary

The male participant kept an unstructured dream diary from the age of 22, beginning in September, 1984. The database includes all dreams till December 2014. The dreamer studied electrical engineering and psychology, and started his research career in 1994. His main sport activities have been circus arts (juggling, acrobatics, and unicycling); the dates are depicted in Table 1. In order to increase endurance, the dreamer jogged regularly about once every two weeks starting in 1984 till 1991. The dreamer had taken up for short periods of time archery and canoeing. For the present analysis, all 11,463 dreams from the period mentioned above were included (see Figure 1). The mean dream length was 135.11 ± 85.40 words.

### 2.2. Procedure

The dream reports were originally hand-written but were then typed and entered into a database (Alchera 3.72, created by Harry Bosma, www.mythwell.com) by the dreamer himself. This database allows assigning key words to the dreams; this task was also carried out by the dreamer. Each dream was coded by the dreamer while typing the dreams for the occurrence different sport types, i.e., actively performing sports (for the different sport types see Table 2).

The Alchera software also provides a word count for each dream report. Dream reports included only dream experience related words and all redundancies were excluded. The analysis unit was a single dream report. The data were exported into an Excel spreadsheet (Microsoft) and the data analysis was carried out using the SAS 9.4 software package for Windows. For comparing percentages of different time periods, the algorithm of Klingenberg (2008) was adopted. To analyze the single binary time series we fitted an autoregressive Generalized Linear Mixed Model (AR-GLMM) with a logit link and serial correlation within the GLIMMIX procedure with a power covariance structure.

Corresponding address:

Michael Schredl, Sleep laboratory, Central Institute of Mental Health, PO Box 12 21 20, 68072 Mannheim, Germany.  
Email: Michael.Schredl@zi-mannheim.de

Submitted for publication: August 2019

Accepted for publication: September 2019

### 3. Results

Overall, in 6.12% of the dreams (701 out of 11,463) the dreamer exercised some form of sport (see Table 2). As expected, juggling, acrobatics, jogging, and unicycle were the most often carried out sports with in the dream (in addition to exercising sports without specific information about the sport discipline). Overall, the circus art dreams amounted to 3.51% of the dreams. In a sample of 1612 diary dreams reported by 425 students (for details about the sample see: Mathes & Schredl, 2014), 5.27% of the dreams were sport-related (e.g., swimming, bicycling, mountain climbing, trekking, skiing) but no dream included a reference to juggling, acrobatics, or unicycles. Similar, in the Hall and Van de Castle sample (N = 1000 dream reports by 200 students) juggling was not present (Hall & Van de Castle, 1966).

The frequency of circus arts dreams over the years are depicted in Figure 2. Based on the algorithm of Klingenberg (2008), the difference between the “light” training period (2.72%, 1986 to 1988) and the intense training period (7.09%, 1989 to 1994) was significant ( $t = 5.1, p < .0001$ ). The decrease in circus art dream percentage from year 1994 to year 1995 (6.62% to 2.41%) was also significant ( $t = -2.8, p = .0063$ ).

#### Example of a martial art dream

Although the dreamer never practiced martial arts, two dreams including this topic occurred.

*Dream 1: “I am on a street intersection or a tram track. Opposite me is a fat (very), older man who wants to teach me martial arts. We do a show fight without contact (it is not always clear to me that it will stay that way, for example, when we get ready and face each other). I fake blows, he too. Although I can do a lot, it’s clear that he is much better and I would not stand a chance if he was serious.”*

*Dream 2: “I’m participating in a weekend seminar; it’s evening and break. The room is very large, about 10 to 15 people are in different places. At a table near the wall is a small, attractive woman who makes stretching exercises, possibly related to martial arts. I also do something similar, sitting in a squatting position (I am a little surprised that I can do it) and tell her that I had some lessons in martial arts.”*

### 4. Discussion

The present findings indicate that the frequency of sport dreams in this dream series (6.21%) fell in the range of psychology students’ sport dream frequency (8.8%) and

Table 1. History of training circus arts

Year	Activities
1986-1988	Introduced to juggling by friends, regular training
1989-1994	Intensive period of training, including public performances
1995-2014	Almost complete cessation of training due to other obligations (Ph.D., professional career)

the frequency of sport dreams in population-based sample (5.84%) (Erlacher & Schredl, 2004; Noveski et al., 2016). Moreover, the content of the sport dreams clearly reflect the disciplines the dreamer was practicing during the day. The temporal distribution also reflects the effect of intense daily practice.

From a methodological viewpoint it must be noted that the presence or absence of sport in the dreams was not coded by external judges; however the percentage of sport dreams was comparable to psychology students (5.27%, unpublished analysis of 1612 recorded by 425 students; sample description in Mathes and Schredl, 2014) and the sample of Erlacher and Schredl (2004). Even though during a period of several years, the dreamer was intensely occupied with his circus arts hobby, the percentage of these dreams never reached the sport dream percentages found in sport students or athletes of about 28% (Erlacher & Schredl, 2004, 2010a).

The content of the sport dreams also supports the continuity hypothesis of dreaming (Schredl, 2003) as most of the sport dreams reflect the sport activities practiced by the dreamer in waking life. As there is a small community practicing circus arts it is not astonishing that no dreams with juggling, unicycles, acrobatics were found in a relatively large sample of students. Although taking up this sport and the phase with intensive practice shows in the time course of circus arts dream percentage over the years, it is remarkable that this hobby still show up even years after the dreamer had stopped practicing. This is comparable to former partners (Schredl, 2018), school friends (Schredl, 2012b), and war experiences (Schredl & Piel, 2006). Whereas the long aftereffect of traumatic experiences (Levin & Nielsen, 2007; Wittmann, Schredl, & Kramer, 2007) seems plausible, the occurrence of circus art dreams after 20 years without practicing is interesting. One might speculate whether these dreams are associated with memory processes which have been shown to occur during sleep (Axmacher & Rasch, 2017), i.e., in the process of consolidating new experiences it might be necessary to activate old memories in order to build association patterns. As dreams might be related to sleep-dependent memory consolidation (Klepel & Schredl, 2019; Schoch, Cordi, Schredl, & Rasch,

Table 2. Types of sports in dreams (N = 753 occurrences of sport activities in N = 701 dreams)

Type	Dreams	Percent
Juggling	308	2.69%
Sports (not specified)	183	1.60%
Jogging	80	0.70%
Acrobatics	65	0.57%
Unicycle	55	0.48%
Diving	13	0.11%
Fishing	12	0.10%
Team sports (soccer, volleyball etc.)	11	0.10%
Archery	10	0.10%
Tennis	6	0.05%
Canoeing (4), Martial arts (2), Fire-breathing (2), Surfing (1), Penny-farthing/High wheel (1)		

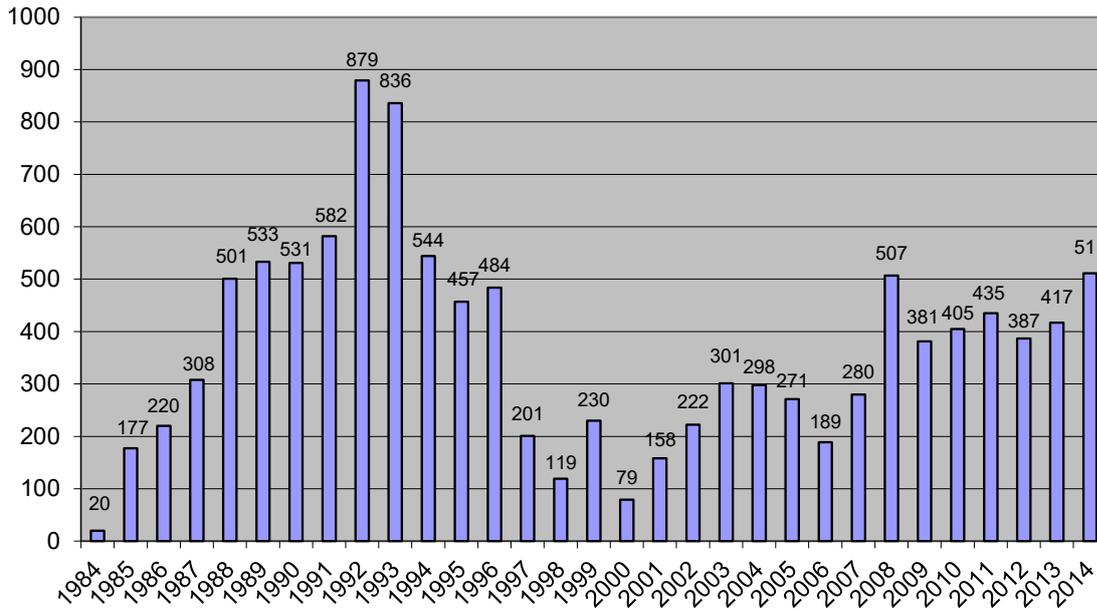


Figure 1. Number of dream per year

2019; Wamsley & Stickgold, 2019; Wamsley, Tucker, Payne, Benavides, & Stickgold, 2010), it would be interesting to study whether the occurrence of sport dreams are related to performance increases within the sport discipline dreamed about. That practicing sports during lucid dreaming can be beneficial has been reported by athletes (Erlacher, Stumbrys, & Schredl, 2011-2012) and quasi-experimental studies (Erlacher & Schredl, 2010b; Schädlich, Erlacher, & Schredl, 2017; Stumbrys, Erlacher, & Schredl, 2016). Within in this context it would be very interesting to obtain dream journals from athletes during intensive training periods and competition periods. One would expect increasing percentages of sport dreams and could study the relationship between sport dreams and performance.

Interestingly, a few sport dreams included disciplines the dreamer never practiced in waking life. This topic is

discussed as discontinuity between waking and dreaming (Hobson & Schredl, 2011). One could conceptualize these dreams also as dream-inherent creativity (Schredl & Erlacher, 2007) and the two example dreams that the dreamer is not a skilled martial artist within the dream and even lied about his practicing to impress a woman. I.e., even those dreams are not completely discontinuous. The question why we dream about things we never experienced in waking life, e.g. flying (Wiseman, 2012), is still an unresolved question in the field.

To summarize, sport dreams reflect very accurately the sport disciplines practiced by the dreamer and even intensity of practice and, thus, the findings support the continuity hypothesis of dreaming (Schredl, 2003). One of the most intriguing questions is whether these sport dreams reflect sleep-dependent memory consolidation processes, i.e.,

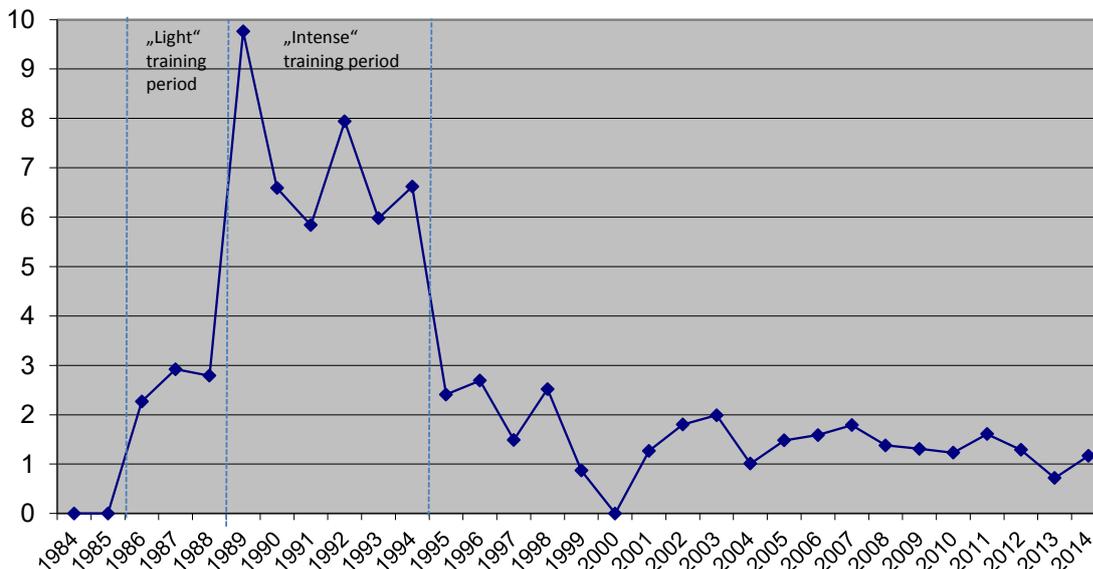


Figure 2. Percentage of dreams with circus arts (juggling, unicycle, acrobatics)

whether dreaming about sport is related to performance improvements.

## Acknowledgements

The author would like to thank Harry Bosma for programming the tool used to convert the Alchera database into the Excel spreadsheet format.

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