

## 5. Jahrestagung der SGS 2013 in Basel

### Title:

Effects of modality, length and task complexity on time for activities in lucid dreams

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### Abstract:

#### Introduction:

Nocturnal dreams can be considered as a kind of simulation of the real world on a higher cognitive level (Erlacher & Schredl, 2008). Within lucid dreams, the dreamer is aware of the dream state and thus able to control the ongoing dream content. Previous studies could demonstrate that it is possible to practice motor tasks during lucid dreams and doing so improved performance while awake (Erlacher & Schredl, 2010). Even though lucid dream practice might be a promising kind of cognitive rehearsal in sports, little is known about the characteristics of actions in lucid dreams. The purpose of the present study was to explore the relationship between time in dreams and wakefulness because in an earlier study (Erlacher & Schredl, 2004) we found that performing squads took lucid dreamers 44.5 % more time than in the waking state while for counting the same participants showed no differences between dreaming and wakefulness. To find out if the task modality, the task length or the task complexity require longer times in lucid dreams than in wakefulness three experiments were conducted.

#### Methods:

In the first experiment five proficient lucid dreamers spent two to three non-consecutive nights in the sleep laboratory with polysomnographic recording to control for REM sleep and determine eye signals. Participants counted from 1-10, 1-20 and 1-30 in wakefulness and in their lucid dreams. While dreaming they marked onset of lucidity as well as beginning and end of the counting task with a Left-Right-Left-Right eye movement and reported their dreams after being awakened. The same procedure was used for the second experiment with seven lucid dreamers except that they had to walk 10, 20 or 30 steps. In the third experiment nine participants performed an exercise involving gymnastics elements such as various jumps and a roll. To control for length of the task the gymnastic exercise in the waking state lasted about the same time as walking 10 steps.

#### Results:

As a general result we found – as in the study before – that performing a task in the lucid dream requires more time than in wakefulness. This tendency was found for all three tasks. However, there was no difference for the task modality (counting vs. motor task). Also the relative time for the different lengths of the tasks showed no difference. And finally, the more complex motor task (gymnastic routine) did not require more time in lucid dreams than the simple motor task.

#### Discussion/Conclusion:

The results showed that there is a robust effect of time in lucid dreams compared to wakefulness. The three experiments could not explain that those differences are caused by task modality, task length or task complexity. Therefore further possible candidates needs to be investigated e.g. experience in lucid dreaming or psychological variables.

#### References:

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