

Sleep Perception – The Dependence of Subjective Judgements on the Sleep State

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INTRODUCTION When subjects are deliberately awakened from physiological sleep, they frequently judge themselves to be awake. The extent of the false perception and the kind of evaluation are stage-dependent, with a higher rate of misperceptions in sleep stage 2 (S2) than in REM sleep (REMS) [1, 2]. However, in a more recent study with only one deliberate awakening per night, we found no significant difference in the subjective judgements of wakefulness between S2 and REMS [3]. The objective of the present study was to determine whether the number of awakenings per night might be an intervening factor. Therefore, a new sample of subjects was examined with two awakenings per night, one in S2 and one in REMS.

METHODS Five male and nine female student subjects (mean age: 25.8 years), who had no sleep complaints, were deliberately awakened after 15 minutes of S2 and after 7.5 minutes of REMS. The sequence of these conditions was randomized. Subjects were woken up by a buzzer and interviewed with a standardized set of questions [1]. The questions referred to subjective sleep perception, mental activity and aspects of the perception. The first awakening in each night was scheduled for the second sleep cycle, with a minimal difference of 75 minutes between the two awakenings.

RESULTS In eight cases (28,6%) subjects assumed that they were awake before the sounding of the buzzer. This was the case for 50% (7 of 14) of the awakenings in S2, but only for 7,1% (1 of 14) of the awakenings in REMS. This difference was significant ($\chi^2 = 4,5$; $p < .05$). The degree of certainty in judgement differed also between the sleep stages, with 35.7% of "completely reliable" judgements in S2, in contrast to 64,3% after awakenings in REMS. In S2 64.3% of the subjects were oriented in regard to the present situation, while this was the case in only 28,6% in REMS. Finally, ongoing mental activity was prevalent in both states, with 78.6% for awakenings from S2 and 85,7% for awakenings from REMS. However, the mental content was less imager-like in S2 than in REMS, 35.7% vs. 85,7%, respectively. Additionally, the mental content was more uncontrollable in REMS (71.4%) than in S2 (42,9%).

DISCUSSION In agreement with earlier investigations [1, 2], about one-third of the subjects assumed themselves to be awake, while according to electrophysiological criteria they were actually asleep. In contrast to an earlier investigation with only a single deliberate awakening per night [3], the present study reveals a substantially higher percentage of wake judgements after awakenings in S2 compared to awakenings in REMS. This result suggests that the number of awakenings per night may have an influence on the perception of the actual sleep state, and may strengthen differences in the perception of S2 and REMS.

LITERATURE

- [1] Amrhein C, Schulz H: Selbstberichte nach dem Wecken aus dem Schlaf – ein Beitrag zur Wahrnehmung des Schlafes. *Somnologie* 4: 61-67, 2000.
- [2] Mendelson WB: Pharmacological alterations of the perception of being awake or asleep. *Sleep* 16: 641-646, 1993.
- [3] Michael L, Weigand D, Schulz H: Subjektive Wahrnehmung des Schlafes – Schlaferleben und Fehlwahrnehmung. *Somnologie* 5 (Suppl.2): 38, 2001.