

Gender effect found in the association between overnight breathing rate variation and reported sleep quality scores

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GENDER EFFECT FOUND IN THE ASSOCIATION BETWEEN OVERNIGHT BREATHING RATE VARIATION AND REPORTED SLEEP QUALITY SCORES

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Introduction: The relationship between objective sleep parameters, derived from polysomnography (PSG), and subjective sleep quality has been researched thoroughly in the past. Yet, correlations between other objective measures, such as respiratory parameters, and subjective sleep quality have not been analyzed. We expect that a stable sleep, seen in, for example, a low breathing rate variation overnight, is indicative for a good sleep quality rating.

Methods: Data from the SIESTA project was used, consisting of 165 healthy participants (age 51.8 ± 19.4 years; 88 females). Participants spent two consecutive nights in a sleep laboratory, where a complete PSG was assessed. From the PSG two parameters were derived: mean breathing rate (BR) and mean standard deviation of breathing rates (SDBR). In addition, participants filled out every morning the self-rating questionnaire for sleep and awakening quality (SSA). Spearman's rho correlation analyses were conducted to analyze the association between the SSA score and the two respiratory parameters.

Results: Positive correlations were found between SDBR and the total SSA score (night 1: $r = 0.179$, $p = 0.024$; night 2: $r = 0.213$, $p = 0.007$). However, the correlation coefficient was not high, implicating that the association is weak. A gender effect was observed in both nights, as significant correlations were found between SDBR and total score on SSA for females (night 1: $r = 0.263$, $p = 0.014$; night 2: $r = 0.300$, $p = 0.005$), but this was not the case for males.

Conclusion: The association between breathing rate variation and the SSA score was more profound for females. However, these correlations were not as high as we expected. If future research can find a strong relationship between other objective sleep parameters and subjective sleep quality ratings, this would mean that predictions can be made about how someone has slept.

0163

CALCULATING UPPER AIRWAY NEURAL RESPONSE FROM AIRFLOW MEASUREMENTS AT ATMOSPHERIC PRESSURE

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Introduction: We hypothesized that spontaneous variability of $V_{I,max}$ at atmospheric pressure would reflect a spectrum of passive and active states, which can be probed to estimate passive and active P_{CRIT} and the upper airway neuromuscular response (ΔP_{CRIT}).

Methods: In 7 subjects, active and passive standard P_{CRIT} were measured and compared to calculated P_{CRIT} . The latter was derived from breath-by-breath $V_{I,max}$ measurements at atmospheric pressure in ~70 flow limited breaths during a 5–10 min period of sleep. The mean P_{CRIT} ($-R_{US} \times V_{I,max}$) was calculated from breaths in the 5th and 95th percentiles of $V_{I,max}$ to define the calculated passive and active P_{CRIT} , respectively. R_{US} from previously established population mean (22.9 cm H₂O/L/s) was used for both the passive and active condition. The ΔP_{CRIT} was computed to determine the upper airway neural response.

Results: For the group, no differences between standard and calculated passive, active and ΔP_{CRIT} were observed.

Conclusion: Capitalizing on spontaneous variability of $V_{I,max}$ at atmospheric pressure, we demonstrated that active P_{CRIT} and ΔP_{CRIT}

neural responses can be characterized from flow measurements at atmospheric pressure during baseline sleep studies.

0164

SLOW WAVE SLEEP IN A DAYTIME NAP DIFFERED IN INDIVIDUALS WITH/WITHOUT EXERCISE BEHAVIOURS AND SHORT SLEEP DURATION

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Introduction: Previous research showed that exercise and sleep restriction could lead to an increase in slow wave sleep (SWS) in nocturnal sleep. SWS has been found to relate to enhanced cognitive abilities, e.g. memory, as well as restoration of bodily functions after exercise. While we recently found that exercise habits interacted with short sleep duration (SSD) in predicting cognitive functions, we here investigated whether exercise experience interacted with habitual sleep duration in affecting individuals' sleep physiology during a daytime nap.

Methods: Participants included 48 university students (aged 17–25, 39.6% male). Participants reported exercise experience and sleep-wake behaviours throughout the 7-day experimental protocol and came to a laboratory to have 90-minute polysomnography-monitored nap at about 2:30–4 pm on the 6th day. Based on their self-report measure, 47.9% of participants were classified as Exerciser (> 150 minutes of moderate-intensity or > 75 minutes of vigorous-intensity exercise per week) and less than an average of 6.5 hours of sleep throughout the protocol was classified as SSD (52.2% exercisers, 32% sedentary adults).

Results: No significant group differences for gender, age, body mass index was found ($ps > 0.05$). A 2x2 factorial design, with two between subject factors (exercise and sleep duration), revealed a significant interaction effect between exercise and sleep duration on SWS, $F(1,47) = 7.21$, $p = 0.010$. Exercisers without SSD were found to have significantly fewer SWS than exercisers with SSD (mean difference = -11.045 , $p = 0.018$) and sedentary adults without SSD (mean difference = -12.487 , $p = 0.004$).

Conclusion: This was the first study reporting the sleep physiology during a daytime nap among exercisers with/without habitual SSD. Exercisers' SWS during daytime napping was found to depend on habitual sleep duration. It might be possible that exercisers without SSD had sufficient SWS at night, and therefore had fewer SWS during the daytime nap, than both exercisers with SSD and sedentary adults without SSD. The lack of significant results in the comparison between sedentary adults with SSD with the other three groups may be due to small sample size.

0165

STATES OF REDUCED BRAIN AROUSAL AGGRAVATE OPIOID-INDUCED RESPIRATORY DEPRESSION IN RATS

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Introduction: Drugs acting on μ -opioid receptors (MOR) are widely used in pain management or as drugs of abuse, but present unwanted side-effects, such as sedation and life-threatening cardio-respiratory depression. Although mortality and morbidity related to MOR drugs are major health issues, our understanding of opioid-induced respiratory depression is limited because their mechanisms of action on physiological and brain functions are unclear. For instance, major breathing disorders can occur during sleep, but it is unknown whether respiratory depression by MOR drugs is more severe in states of reduced arousal such as sleep, especially considering that these drugs also have potent sedative properties. We aim to determine whether respiratory depression by MOR drugs is aggravated in states of reduced arousal, such