power normalization to derive the relative oscillatory-theta activity (OTA). The average OTA was then used to predict next-day performance on the PVT. Traditional sleep parameters (sleep efficiency, total sleep time, %NREM, %N3, and delta-band power) were also examined. We combined data from two previously reported in-laboratory studies resulting in a sample size of 42 healthy young adult subjects. Analyses used non-sleep restricted overnight EEG recordings from a frontal channel.

Results: There was a substantial PVT-OTA association (OTA positively correlated with response-time and thus with reduced vigilance) during scored-REM epochs (r=0.44, p=0.003). This was stable irrespective of conventional sleep staging when using all sleep epochs (r=0.48, p=0.001), and OTA during scored-NREM (r=0.35, p=0.02). The effect was also stable after controlling for total sleep time, %NREM, and N3 delta-band power in a multivariate model (all-sleep PVT-OTA: r=0.5, p=0.004). Traditional sleep parameters were not significantly correlated with PVT performance.

Conclusion: OTA was a superior quantitative predictor of reduced next-day vigilance than traditional sleep parameters, and this persisted after controlling for NREM parameters. These findings are consistent with the hypothesis that periods of high REM-like activity are less restorative than other periods and may actually increase homeostatic sleep pressure.

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0098

A MODEL FOR A CHRONIC NAPPING IN OLDER ADULTS AT RISK FOR ALZHEIMER'S DISEASE

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Introduction: Theoretically, napping could have positive effects on health (e.g., by reducing stress and compensating for short night time sleep) or negative effects (e.g., by disrupting nighttime sleep or impairing circadian synchronization). Epidemiologic studies have produced mixed results regarding associations of napping with health. Causality can be better addressed with a randomized controlled trial of daily napping, as described herein.

Methods: Participants were 12 older adults (70.8±4.4 years) with a first degree relative with Alzheimer's Disease. Inclusion criteria included normal cognitive function; stable sleep schedule; stable medication use; and self-reported ease of taking naps, but with napping frequency of ≤2 days per week. Exclusion criteria included having a sleep disorder or high risk of obstructive sleep apnea; hypertension; sleeping pill use > once per week; MI or stroke within the past 3 years. Following a one week baseline involving a stable sleep/nap schedule consistent with usual habits, participants were randomized to one of two 21-day treatments: (1) daily napping (1 h/day begun at 5-7 h after arising) while keeping a stable night sleep schedule consistent with baseline (n=6); (2) a no-napping control treatment in which participants read quietly for 1 h/day at the same time (n=6). Sleep for night sleep and napping (or non-napping) was assessed via self-report, actigraphy, and the Z-machine.

Results: ANOVA revealed a significant increase in napping minutes/day (p=0.01) in the napping treatment (baseline: 14.5±21.1; 21-day average: 42.1±19.1) compared with the control treatment (baseline: 2.2±5.5; treatment: 1.4±3.5). However, reported nighttime sleep duration did not change significantly between the napping (from 7.1±1.2 to 7.4±1.0 h) and the control treatment (7.8±0.7 to 7.8±0.6 h). Actigraphic night sleep changed from 7.3±0.8 to 7.1±0.9 and 7.8±5 to 7.6±0.7 after napping and control, respectively. There were not significant treatment differences (nor notable effect size differences) for depressed mood, sleepiness, PSQI, amyloid beta, nor cardiovascular measures (e.g., blood pressure, flow mediated dilation, pulse wave velocity).

Conclusion: The data indicate that older adults can undergo daily napping without significant impairment in nighttime sleep. Neither benefits nor detrimental effects on health-related variables were shown in this small sample. A more prolonged intervention is needed.

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0099

COMPARISON OF TWO ACTIGRAPHY-BASED ALGORITHMS FOR DETECTING DAYTIME AND NIGHTTIME SLEEP

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Introduction: The Actiware software that comes with Philips Respironics' actiwatches tends to overestimate sleep, due to its poor accuracy in distinguishing immobility from sleep. Re-scoring rules were introduced in the Cole-Webster algorithm to overcome this issue. Previous validation of the two algorithms was based on nighttime sleep, and their performance in daytime sleep detection is unknown. This study aims to test/compare the performance of the two algorithms in detecting daytime sleep and nighttime sleep.

Methods: We analyzed actigraphy and polysomnography data that were simultaneously collected from 25 participants (14 non-shift-workers and 11 shift-workers; age: 30.93±8.96 [mean±SD]; female: 14 [56%]) each in two in-lab visits with scheduled nighttime or daytime sleep. The sleep/wake epochs scored by the Cole-Webster algorithm and Actiware (using medium wake threshold) were compared to those obtained from polysomnography. We conducted linear mixed-effects regression models to compare the sensitivity, specificity, and F1-score (a measure of performance less affected by imbalanced datasets) in detecting daytime and nighttime sleep and between the two algorithms.

Results: The Cole-Webster algorithm (mean±SE: daytime=0.66±0.02, nighttime=0.60±0.02) yielded lower sensitivity than Actiware (daytime=0.96±0.02, nighttime=0.96±0.02; p<0.0001), which was consistent for both daytime and nighttime sleep (daytime/nighttime×algorithm interaction: p=0.2). The Cole-Webster algorithm (daytime=0.91±0.04, nighttime=0.94±0.05) yielded higher specificity than Actiware (daytime=0.45±0.04, nighttime=0.56±0.05; p<0.0001), which was consistent for both daytime and nighttime sleep (daytime/nighttime×algorithm interaction: p=0.2). Both sensitivity and specificity did not differ between daytime and nighttime sleep (p>0.05). F1 scores of the Cole-Webster algorithm were lower (daytime=0.77±0.02, nighttime=0.74±0.02) than those of Actiware (daytime=0.92±0.02, nighttime=0.97±0.02; p<0.0001) for both daytime and nighttime sleep. There was a significant daytime/nighttime×algorithm interaction on F1 score (p=0.02). Specifically, the Cole-Webster algorithm performed better in scoring daytime than nighttime sleep,

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