

strategies before and during missions in order to enhance Soldier readiness and performance.

Support: Support for this study came from the Military Operational Medicine Research Program (MOMRP) of the United States Army Medical Research and Development Command (USAMRDC).

0190

IMPACT OF MENOPAUSE-RELATED SLEEP FRAGMENTATION ON DAYTIME SLEEPINESS AND NEUROBEHAVIORAL PERFORMANCE: RESULTS OF AN EXPERIMENTAL MODEL

Grant, L. K.^{1,2} Cohn, A.^{3,4} Abramson, M.⁴ Russell, J. A.⁴ Wiley, A.^{4,5} Coborn, J. E.^{4,5} Nathan, M. D.⁴ Scheer, F. A.^{1,2} Klerman, E. B.^{1,2,6} Kaiser, U. B.³ Rahman, S. A.^{1,2} Joffe, H.^{1,2,4,5}

¹Division of Sleep Medicine, Department of Medicine, Harvard Medical School, Boston, MA, ²Division of Sleep and Circadian Disorders, Departments of Medicine and Neurology, Brigham and Women's Hospital, Boston, MA, ³Division of Endocrinology, Diabetes and Hypertension, Department of Medicine, Brigham and Women's Hospital, Boston, MA, ⁴Women's Hormones and Aging Research Program, Department of Psychiatry, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, ⁵Mary Horrigan Connors Center for Women's Health and Gender Biology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, ⁶Department of Neurology, Massachusetts General Hospital, Boston, MA.

Introduction: Cognitive performance may be adversely affected during the menopause transition from hot flash-induced sleep fragmentation even without changes in sleep duration. We examined the effects of experimentally-induced sleep fragmentation without shortened sleep duration on daytime sleepiness and neurobehavioral performance in women in a high and low estradiol (E2) state.

Methods: Seven pre-menopausal women (29.4 ± 3.8 years) participated in two 6-day inpatient studies repeated in a high-E2 (mid-to-late follicular phase) then low-E2 state (gonadotropin-releasing hormone agonist-induced E2 suppression - similar to levels during menopause) ~6 weeks apart. Sleep was uninterrupted on nights 1–2 [8-h time-in-bed (TIB)] and fragmented on nights 3–5 (9-h TIB) using an auditory stimulus delivered every 15 min that sustained wake for 2 minutes, producing 1-h total wake after sleep onset. Wakefulness was confirmed by event-markers during polysomnographically-recorded sleep episodes. Daytime subjective sleepiness (Karolinska Sleepiness Scale; KSS) and neurobehavioral performance (Psychomotor Vigilance Task; PVT) were assessed every 2–3 hours on study days 2–5. The effects of study day and E2 state on KSS scores and PVT measured reaction time (RT) and attentional failures (RT>500ms) were examined using linear mixed models.

Results: Participants reported feeling sleepier (+10%), had longer RTs (+22ms), and more attentional failures (+53%) after sleep fragmentation than after uninterrupted sleep (all $p < 0.001$). While there was no main effect of E2 state, there was a differential effect of sleep fragmentation by E2 state on PVT, but not sleepiness, such that the increase in RT and attentional failures in response to sleep fragmentation was only observed in the high-E2 state ($p < 0.001$).

Conclusion: Eight hours of total sleep time may not be sufficient to maintain subjective sleepiness and PVT performance levels when sleep is not consolidated. These findings have important implications for understanding the role of sleep and E2-modulated cognitive impairment during the menopause transition.

Support: This work was supported by the NIH: 5R01 AG053838-02 (HJ) and K24-HL105664 (EBK).

0191

SOCIAL JETLAG AND SLEEP HABITS ON WEEKENDS MODERATE THE RELATIONSHIP BETWEEN PERSONAL STANDARDS PERFECTIONISM AND ACADEMIC PERFORMANCE IN YOUNG ATHLETES

Caron, J. Roy, J. Godin, R. Gaudreault, P. Forest, G.

Laboratoire du sommeil, Département de psychoéducation et de psychologie, Université du Québec en Outaouais, Gatineau, QC, CANADA.

Introduction: Research suggests that young athletes may present different levels of perfectionism, which affect sport and academic performances. Sleep is also a variable that can affect grades. The aim of the present study was to investigate the relationship between personal standards (PS) perfectionism, sleep and school performance in young athletes.

Methods: 27 young athletes (13–16y) wore an actigraph for a week and completed an adapted version of the Frost Multidimensional Perfectionism Scale at the beginning, middle and end of the school year. Sleep habits during weekdays (WD) and weekends (WE), and social jetlag (SJ) were extracted from the actigraphy. Mean performance of the two main school subjects were taken from the final report at the end of the school year (*M*grades). A linear regression was done between PS and *M*grades. Then, we used Hayes' PROCESS Macro V3.4 to examine the role of sleep as a moderator of the relation between PS and *M*grades.

Results: PS significantly predicts *M*grades ($\beta = .59$, $p = .001$; $R_a^2 = .34$, $p = .001$). The addition of the interactions terms, first between SJ and PS, then, between WE bedtimes and PS, and finally, between WE waketimes and PS, explained a significant increase in variance in *M*grades ($\Delta R^2 = .14$, $F(1,23) = 31.81$, $p < .001$; $\Delta R^2 = .17$, $F(1,23) = 25.99$, $p < .001$; $\Delta R^2 = .10$, $F(1,23) = 12.43$, $p = .002$, respectively). Therefore, when SJ is higher than 39min, WE bedtimes are after 10:21PM and WE waketimes are after 7:12AM, PS and *M*grades are significantly related.

Conclusion: These results show that when higher SJ and later WE bedtimes and waketimes are present, low PS are associated with low grades and high PS are associated with high grades. In contrast, when a small SJ, earlier WE bedtimes and waketimes are present, PS are not associated with grades. These results suggest that young athletes may be more vulnerable to the effect of sleep disturbances on grades depending on various factors such as perfectionism.

Support: N/A

0192

SLEEP CHARACTERISTICS AND MOOD OF PROFESSIONAL ESPORTS ATHLETES: A MULTI-NATIONAL STUDY

Lee, S.¹ Bonnar, D.² Roane, B.³ Gradisar, M.² Jang, E.¹ Suh, S.¹

¹Sungshin Women's University, SEOUL, KOREA, REPUBLIC OF, ²Flinders University, Adelaide, AUSTRALIA, ³University of North Texas, Fort Worth, TX.

Introduction: Esports is becoming increasingly professionalized, yet research on performance management is remarkably lacking. The present study aimed to investigate sleep and mood in professional esports athletes.

Methods: Participants were 17 professional esports athletes from South Korea (8), Australia (4) and the US (5) who played First

Person Shooter games (mean age 20 ± 3.5 years, 100% male). All participants wore a wrist-activity monitor for 7–14 days, and completed subjective sleep and mood questionnaires.

Results: Based on data from the wrist-activity monitor, participants averaged 409 ± 37 minutes of total sleep time, and $87 \pm 1\%$ of sleep efficiency per night. All participants had significantly delayed sleep patterns (Average bed Time 3:41 am and wake Time 11:11 am). Participants had an average SOL of 26.15 minutes and prolonged wake after sleep onset of 51.91 (± 31.84) minutes. Korean players had significantly higher depression scores compared to the other groups ($p = .006$) and trained longer than the Australian or US teams (13.38 vs. 4.75 vs. 6.10 hours, respectively). Depression scores were strongly correlated with number of awakenings, wake after sleep onset and training time per day ($ps < .05$).

Conclusion: As the first exploratory study in the esports field, the study indicates that esports athletes show delayed sleep patterns and have prolonged wake after sleep onset. These sleep patterns may be associated with mood (depression) and training time. There may also be cultural differences that contribute to sleep disturbance in this population.

Support: Korean Society of Sleep Medicine

0193

SLEEP HEALTH ACROSS RELIGIONS: A CONSIDERATION OF BIDIRECTIONAL PROCESSES

Ferguson, K. Rowatt, W. Scullin, M. K.
Baylor University, Waco, TX.

Introduction: The psychology of religion literature indicates that religious engagement is beneficial to physical and mental health. Such effects might be mediated by sleep health, which causally affects mood, cognitive, and immune functioning. However, few studies have investigated whether religiosity is associated with better sleep, and no studies have considered the reverse causal direction: better sleep may impact religious behaviors or perceptions. **Methods:** We conducted a secondary data analysis of 1,501 participants in Wave 5 of the Baylor Religion Survey (BRS-5). Completed in Spring 2017, the BRS-5 used Address Based Sample methodology to derive a population-based sample. The survey included questions on religious affiliation, behaviors, and perceptions (e.g., certainty of Heaven). Additionally, participants rated their difficulty falling asleep and their average total sleep time. We investigated whether participants were meeting AASM/SRS consensus guidelines of 7–9 hours/night.

Results: Religious affiliation was associated with sleep duration, but not in the predicted direction. Atheists/Agnostics (73%) were significantly more likely to report meeting consensus sleep duration guidelines than religiously-affiliated individuals (65%), $p < .05$. For example, Atheists/Agnostics reported better sleep duration than Catholics (63%, $p < .01$) and Baptists (55%, $p < .001$). Atheists/Agnostics also reported less difficulty falling asleep at night than Catholics ($p = .02$) and Baptists ($p < .001$). The effects persisted when controlling for age and were particularly evident in members of African American congregations. Perceptions of getting into Heaven were significantly higher in participants who obtained better sleep duration, $p < .05$, but interestingly, such beliefs/perceptions were unrelated to difficulty falling asleep at night, suggesting that better sleep may lead to these perceptions rather than vice versa.

Conclusion: In contrast to predictions, religious affiliation was associated with significantly poorer sleep health. Poor sleep health has implications for physical and mental health, and seemingly also religious perceptions/beliefs. Future experimental work is required to disentangle the causal direction of sleep-religiosity associations.

Support: The Baylor Religion Survey was supported by the John Templeton Foundation.

0194

BEDTIME TECHNOLOGY USE AND NEW QUESTIONS FOR THE SLEEP HYGIENE INDEX

*Mastin, D.¹ Abu-Halimeh, N.¹ Collins, B. T.¹ Critton, J.¹
Henderson, M.¹ Michelle, S.¹ Quattom, M.¹ Sanders, M.¹
Moore, B.¹ Peszka, J.²*

¹University of Arkansas Little Rock, Little Rock, AR, ²Hendrix College, Conway, AR.

Introduction: We examined the relationship between bedtime active and passive social technology use (self and bedpartner) and daytime sleepiness/sleep. We generated questions to differentiate participants with and without bedpartners and updated passive personal, active bedpartner, and passive bedpartner social technology questions of the Sleep Hygiene Index.

Methods: 327 students (age: $M = 19.7$ years, $SD = 3.78$) recruited through psychology courses and campus newsletters received extra credit or chances to win \$25 gift cards. Participants completed demographic information, the Epworth Sleepiness Scale (ESS), the Pittsburgh Sleep Quality Index, questions regarding associated features of inadequate sleep hygiene, and the Sleep Hygiene Index. Five questions assessed active and passive social technology use, presence of a bedpartner, and awareness of bedpartner active and passive social technology use during sleep time.

Results: 61.8% and 62.7% of students reported frequently or always using active and passive bedtime social technology, respectively; and 23.5% and 29.1% reported noticing a partner's active or passive use. More frequent active technology use was significantly related to greater daytime sleepiness (ESS) ($r(305) = .193$, $p < .05$), sleep disturbances (PSQI-global: $r(302) = .120$, $p < .05$), and associated features of inadequate sleep hygiene (daytime sleepiness, worry about sleep, mood disturbance, avolition, and reduced cognition ($r(306) = .212$, $p < .05$)). Neither passive use nor passive or active partner use was significantly related to any sleep/sleepiness variables.

Conclusion: We continue to find students are frequent users of bedtime social technology which is related to daytime sleepiness, disrupted sleep, and related complaints. Passive and partner active/passive bedtime technology use may not have a significant impact on daytime sleepiness. It is possible younger participants are not good judges of passive or partner technology use or this younger population is resilient to these disruptions.

Support: none

0195

SOCIAL DETERMINANTS OF SLEEP: INSIDE RELATIONSHIPS WITH SIGNIFICANT OTHERS

Mousavi, Z. Tran, M. Kuhlman, K. R.

University of California, Irvine, Irvine, CA.

Introduction: Social relationships impact health through different mechanisms. Sleep problems are prevalent among adults in the USA, negatively impacting all-cause mortality, and increasing the risk for chronic diseases such as depression, cardiovascular disease, and cancer. This study aimed to assess whether the quality of an individual's relationship with their significant other including support and strain, subjective relationship quality, joint decision making, marital risk, and conflict are associated with clinical, subjective, and objective measures of sleep.