0001

ASSOCIATIONS BETWEEN CIRCADIAN FACTORS AND TRAVEL DISTANCE WITH PERFORMANCE: A RETROSPECTIVE ANALYSIS OF 2014-2018 NATIONAL BASKETBALL ASSOCIATION DATA

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Introduction: Frequent travel across time zones and travelling long distances interferes with healthy sleep and disrupts the circadian system, often degrading athletic performance. National Basketball Association (NBA) players face a demanding travel schedule often requiring multiple games per week, with games spanning the continental United States. This investigation aimed to clarify the influence of circadian factors and travel distance on NBA performance using a dataset from the 2014-2018 seasons.
Methods: NBA (2014-2018) game data were acquired from an open-access source: (https://www.kaggle.com/ionaskel/nba-games-stats-from-2014-to-2018). Circadian variables of time zone change (TZΔ) and adjusted jet lag (AJL) were formulated, with quadratic versions utilized across analyses. TZΔ captured circadian delay/advance based on travel for a game, with each TZ going eastward and westward reflected by -1 and +1, respectively. AJL advances TZΔ by allowing acclimation to a novel TZ, with each day resulting in a 1-unit change towards circadian neutral. AJL is a season-long rolling summation, which was computed using two different travel approaches: Approach1 (AJL1) assumes travel the day before each game, whereas Approach2 (AJL2) was designed to prioritize being home. A standardized flight tracker determined travel distance for each game (GameDistance). Team ability differences, characterized as difference in season win percentages (SeasonWinPerDiff), served as an analytic covariate. Game point differential (PointDiff), defined as a team's score minus their opponent's score, and a team's free throw percentage (FreeThrowPer) served as outcome variables. Linear mixed-effects modeling assessed univariate and multivariate associations, with games nested within both team and year.
Results: AJL2 (β = -0.63; p = .01) and GameDistance (β = -0.73; p<0.0001) significantly associated with PointDiff. TZΔ (β = -0.002; p = .03), AJL1 (β = -0.002; p =.04) and GameDistance (β = -0.003; p = 0.007) significantly associated with FreeThrowPer. AJL2 and GameDistance maintained significant relationship with PointDiff in fully adjusted model that included AJL2, GameDistance, and SeasonWinPerDiff.
Conclusion: Results suggest that both circadian delay/advance and greater distance traveled for games negatively influence NBA performance, even when controlling for differences in team ability. Season travel and flight plans could be constructed to reduce the effects of circadian misalignment and travel distance.
Support (If Any): None

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GO TO BED! A SYSTEMATIC REVIEW AND META-ANALYSIS OF BEDTIME PROCRASTINATION DETERMINANTS AND SLEEP OUTCOMES.

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Introduction: Bedtime procrastination, the volitional delay of going to bed without any external circumstances causing the delay, is associated with poor sleep outcomes. Alleviating bedtime procrastination is an important target for interventions to promote adequate sleep, yet the social cognitive, biological, and behavioural determinants of bedtime procrastination are poorly understood. The present study aimed to conduct a systematic review, narrative synthesis, and meta-analysis of (1) the underlying determinants of bedtime procrastination, and (2) the strength and direction of the relationship between bedtime procrastination and sleep outcomes.
Methods: A database search was conducted through CINAHL, EMBASE, PsychINFO, PubMed, Scopus and Web of Science, using keywords related to procrastination, delay, bedtime and sleep.
Results: A total of 2087 records were identified, and 38 publications met the inclusion criteria. Random-effects meta-analysis for bedtime procrastination and sleep outcomes is ongoing. Preliminary findings suggest self-regulation, self-control and chronotype are the most prominent determinants.
Conclusion: Future research should expand focus to identify a broader range of determinants. Given that there are multiple benefits to a theory-based approach to behaviour change interventions, further research exploring determinants will be able to guide the development of interventions targeting bedtime procrastination.
Support (If Any):

0003

ON THE SAME WAVELENGTH? QUANTIFYING THE ASSOCIATIONS BETWEEN EATING TIMING AND REST-ACTIVITY RHYTHMS IN FREE-LIVING ADULTS

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Introduction: Misalignment between the central circadian clock and daily behaviors increases cardiometabolic morbidity and mortality risk, likely due to internal misalignment between central and peripheral circadian rhythms. Experimental studies suggest food intake may act as a time cue ('zeitgeber') for resetting circadian rhythms, representing a potential behavioral target to ameliorate circadian misalignment and associated health consequences. However, the extent to which eating timing relates to circadian rhythms in free-living adults is unclear. Therefore, we tested the associations between eating timing with 24-h rest-activity-rhythms (RAR), a free-living proxy for endogenous circadian rhythms, in non-shift-working adults.
Methods: Adults without chronic health conditions or sleep disorders completed 14 days of 24/7 wrist accelerometry to evaluate RAR variables of interdaily stability (IS; day-to-day stability in RAR), intradaily variability (IV; within-day fragmentation of RAR), relative amplitude (RA; difference between peak vs. trough activity), L5 onset time (5-h period with lowest activity), and M10 onset time (10-h period with highest activity). Concurrently, time-stamped image-assisted diet records were obtained to generate average eating timing variables, including daily eating onset (time of first caloric intake after awakening), offset (last caloric intake time), duration (time elapsed between eating onset and offset), and caloric midpoint (time at which 50% of daily kcals were consumed), and variables illustrating irregularity in eating timing (standard deviation of eating timing variables). Pearson's correlations quantified the associations between RAR and eating timing variables.
Results: Participants (N=30) were 28.0±6.6 years, 57% female, with a BMI of 23.8±2.5 kg/m2. Higher IS was correlated with lower irregularity in both eating onset (r=-0.55, p<0.01) and duration (r=-0.51, p<0.01). Higher RA correlated with earlier eating onset (r=-0.47, p<0.01), longer eating duration (r=0.53, p<0.01), and lower eating onset irregularity (r=-0.37, p<0.05). Later L5

correlated with later eating onset (r=0.67, p<0.001), offset (r=0.58, p<0.001), caloric midpoint (r=0.56, p<0.01), and greater eating offset irregularity (r=0.53, p<0.01). Later M10 correlated with later eating offset (r=0.40, p<0.05).
Conclusion: Preliminary findings indicate that eating timing and RAR are moderately correlated in free-living adults. Earlier eating timing, increased eating regularity, and longer daily eating duration may represent behavioral targets for improving circadian rhythms and subsequent cardiometabolic outcomes.
Support (If Any): Support provided by the American Heart Association (#831488) and a University of Delaware Research Fund-Strategic Initiative Award.

0004

SLEEP, TEAM AND SOCIAL PROCESSES, AND HEALTH, PERFORMANCE, AND SAFETY IN NAVAL OPERATIONAL ENVIRONMENTS

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Introduction: Sleep disruption and teamwork are inherent features of 24/7 operational environments, yet little is known about how sleep and team/social processes interact to affect crew readiness and endurance.
Methods: We analyzed data of 3,434 active duty US sailors (80% male) from the Afloat Safety Climate Assessment Survey. Using structural equation modeling, we specified latent factors of Sleep Health (typical hours of sleep per day and sleep disturbances in shipboard environment); crew team and social factors of Team Transition Processes, Team Action Processes, Team Interpersonal Processes, Unit Cohesion, Psychological Safety, and Social Support; and operational outcome risks of Physical Health (no. days in previous 30 with physical illness or injury), Mental Health (no. days with stress, depression, or emotional problems), Performance (frequency of fatigue-induced functional impairments on duty), and Safety (individual and crew noncompliance, and rate of observed near misses).
Results: Higher Sleep Health reduced impairments in Physical Health, Mental Health, Performance, and Safety (standardized βs = −0.096 to −0.542, ps < 0.0001, CFI/TLI > 0.980, RMSEA = 0.033). Higher Sleep Health improved Team Transition, Action, and Interpersonal Processes, Unit Cohesion, Psychological Safety, and Social Support (βs = 0.178 to 0.380, ps < 0.0001, CFI/TLI > 0.982, RMSEA = 0.029). Social Support reduced risks to Physical Health, Mental Health, and Performance; Team Interpersonal Processes reduced Metal Health risk; Psychological Safety reduced Performance and Safety risks; Unit Cohesion reduced Safety risk (βs = −0.053 to −0.709, ps < 0.05, CFI/TLI > 0.979, RMSEA = 0.027). Mediation models indicated good Sleep Health enhances Social Support's beneficial impact on Physical Health, Mental Health, and Performance; Psychological Safety's impact on Performance and Safety; Team Interpersonal Processes' impact on Physical Health; and Unit Cohesion's impact on Safety (indirect effect βs = −0.032 to −0.127, ps < 0.0001, CFI/TLI > 0.967, RMSEAs < 0.051).
Conclusion: Sleep health improves team/social functioning, which serves an additive protective function and enhancement to crew operational health, performance, and safety. Future work should closely examine these interrelationships to identify mechanisms as targets for policy and procedures to help optimize crew readiness and endurance.
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BIDIRECTIONAL ASSOCIATIONS OF SLEEP AND ALCOHOL USE WITHIN AND BETWEEN REGULARLY DRINKING YOUNG ADULTS

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Introduction: Young adults can be resistant to drinking interventions, but improving other health behaviors, such as sleep, may indirectly reduce hazardous drinking. Evidence linking sleep to next-day drinking among regular drinkers could support sleep interventions as an indirect pathway to alcohol misuse reduction. We investigate this connection in the natural environments of 222 regularly drinking young adults.
Methods: Regularly drinking young adults (21-29 years; 63% women) wore an alcohol monitor across six days that continuously measured transdermal alcohol concentration (TAC). Participants completed daily smartphone-based surveys reporting the previous night number of drinks and sleep. Predictors were disaggregated into within- and between-person variables. Sleep variables were used to predict next-day alcohol use, and alcohol use variables were used to predict subsequent sleep. Multilevel Poisson and linear models with random intercepts for each outcome were adjusted for weekends, sex, weight, and prior night sleep/drinking.
Results: Between-person results showed that participants who tended to go to bed later had on average 24% more drinks (p<0.01) and achieved 26% higher peak TAC (p<0.02) the next day. Every hour of sleep duration the prior night was associated with a 14% decrease in the number of next-day drinks (p<0.03). Conversely, participants who drank more went to bed on average 12-19 minutes later (p<0.01) and slept 5 fewer minutes (p<0.01). Within-person results showed that on nights when participants drank more than usual they went to bed 8-13 minutes later (p<0.01), slept 2-4 fewer minutes (p<0.03), and had worse sleep quality (p<0.01).
Conclusion: Young adults who went to bed earlier and slept longer on average tended to use alcohol less the next day, and using less alcohol tended to improve subsequent sleep within young adults. Taken together, these results suggest that better sleep health may improve drinking behaviors and intoxication dynamics, which may have implications for interventions targeting sleep as a mechanism to reduce heavy drinking.
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0006

AN AT-HOME EVALUATION OF A LIGHT INTERVENTION TO MITIGATE SLEEP INERTIA SYMPTOMS

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Introduction: Sleep inertia symptoms typically occur after waking from nocturnal sleep. Under laboratory settings, light exposure upon waking has been shown to improve alertness, mood, and