

Research Assessment Exercise 2020
Impact Case Study

University: The Education University of Hong Kong

Unit of Assessment (UoA): 24 Psychology

Title of case study: The importance of sleep health in modern societies

(1) Summary of the impact

Poor sleep kills people through medical illnesses (e.g., heart diseases), traffic accidents (impaired concentration and decision making), and suicides (relating to mood disorders). Since joining EdUHK in 2015, Lau's long-term research has shed light on the underlying mechanisms of sleep deprivation and its negative effect on emotions, cognition and daily functioning. The findings have been disseminated via public media and workshops to education and government bodies and have led to changes in community attitudes and school policy. They have also resulted in the establishment and strengthening of clinical and consultation support for sleep health in universities and government departments.

(2) Underpinning research

Poor quality sleep affects almost half of the world's population and research shows this has a negative impact on attention, memory, decision making and physical and mental health. Yet there is limited knowledge of the impact of sleep loss on the higher cognitive-emotive functions and personality-character traits and their neuropsychological mechanisms. Building on her research and clinical experience, Lau has shown how an understanding of the cognitive and emotional consequences of sleep loss/gain not only informs clinical understanding of sleep disturbances and related psychopathologies, but also influences public health policies and organisational practices. Using multiple scientific methods, including online panel studies, laboratory-based experiments, physiological measures, clinical assessments and subjective reports, Lau's team has investigated the predictors, mediators, and consequences of poor sleep.

Supported by multiple GRF and HMRF grants (EdUHK #17612015, #18611717, #12132951), Lau's research demonstrates that the quantity and quality of sleep directly contributes to our outlook on life and the decisions we make. She has built a unique, eight-year longitudinal dataset of over 8,000 students and community adults with over 100 psychosocial-spiritual variables per person to generate the first empirical evidence in the world that sleep quality predicts optimistic/pessimistic attitudes to life, both directly and indirectly through its effects on mood [R1]. She has also identified an increase in risk taking over the longer term among young adults who habitually sleep less or irregularly [R2]. Her longitudinal research in a boarding-school has shown that a delayed school start-time helps student wellbeing by increasing the length and quality of their sleep which, in turn, improves life satisfaction and reduces insomnia and psychological distress [R3].

Collaborating with local and overseas institutions, Lau and her team have uncovered links between sleep, clinical depression and emotional processing biases. Rapid-Eye-Movement-Sleep (REM) had differential roles in emotional processing between individuals with and without clinical depression, underlining the significance of sleep processes for the onset and maintenance of depression [R4]. In Lau's GRF project on the sleep-associated behavioural and neural mechanisms of emotional functioning, EEG data showed that the brain is less able to apply effective emotional regulatory strategies in the face of negative emotional stimuli after sleep deprivation [R5].

Lau's team also collaborated with the University of Oxford to develop and validate the Chinese version of the Sleep Condition Indicator (SCI) for both clinical and research use [R6]. Backed by a solid empirical foundation showing the effects on sleep on cognitive-emotive functions and personality-character development, with a clinical and research sleep measure of demonstrated validity and reliability, Lau and her team transformed clinical and educational practices and organizational policies to promote good sleep as detailed below.

(3) References to the research

(* corresponding author, student's name in *italics*)

- [R1] Lau, E. Y. Y.*, Hui, C. H., Lam, J., & Cheung, S. F. (2017). Sleep and optimism: A longitudinal study of bidirectional causal relationship and its mediating and moderating variables in a Chinese student sample. *Chronobiology International*, 34(3), 360-372. (2018 JCR Impact Factor (IF): 2.562) (General Research Fund, GRF, HKU#745312, HK\$531,900)
- [R2] Lau, E. Y. Y.*, Wong, M. L., Rusak, B., Lam, Y. C., Wing, Y. K., Tseng, C. H., & Lee, T. M. C. (2019). The coupling of short sleep duration and high sleep need predicts riskier decision making. *Psychology & Health*. (2018 JCR IF: 2.401) (GRF EdUHK# 17612015, HK\$ 388,990)
- [R3] Chan, C. S.*, Poon, C. Y. S., Leung, J. C. Y., Lau, K. N. T., & Lau, E. Y. Y. (2018). Delayed school start time is associated with better sleep, daytime functioning, and life satisfaction in residential high-school students. *Journal of Adolescence*, 66, 49-54. (2018 JCR IF: 2.35)
- [R4] Lau, E. Y. Y.*, Lau, K. N. T., Chan, C. S., Tseng, C. H., Lam, Y. C., Tse, D. M. S., Cheng, W. Y., Chung, K. F. & Wing, Y. K. (2019). Effects of REM sleep during a daytime nap on emotional perception in individuals with and without depression. *Journal of Affective Disorders*. <https://doi.org/10.1016/j.jad.2019.09.058> (2018 JCR IF: 4.084) (Health and Medical Research Fund EdUHK#12132951, HK\$526,856)
- [R5] Zhang, J., Lau, E. Y. Y.*, Hsiao, J. H. (2018). Using emotion regulation strategies after sleep deprivation: ERP and behavioral findings. *Cognitive, Affective, & Behavioral Neuroscience*, 19(2), 283-295. (2018 SJR IF: 1.769) (GRF EdUHK#18611717, HK\$810,168)
- [R6] Wong, M. L., Lau, K. N. T., Espie, C. A., Luik, A. I., Kyle, S. D., & Lau, E. Y. Y.* (2017). Psychometric properties of the Sleep Condition Indicator and Insomnia Severity Index in the evaluation of insomnia disorder. *Sleep Medicine*, 33, 76-81. (2018 JCR IF: 3.36)

(4) Details of the impact

Through extensive media coverage, sleep education, community engagements and professional training, Lau's research-based advocacy for healthy sleep practices for well-being has resulted in: (I) shifts in attitudes and knowledge among the general public and professionals; (II) a new policy in school for a later start time; (III) the creation of a new sleep health initiative in Hong Kong Police; and (IV) early identification of mental health issues by screening college students for sleep-related problems.

(I) Sleep education via broadcast media, in the community and in education institutions.

Lau provided both *local* and *global* community sleep education through seventeen interviews on popular public television (i.e. TVB Pearl [S1], TVB Jade, RTHK TV 31), radio (German Radio ARD, RTHK [S2]), and newspapers (*SCMP*, *Ming Pao Weekly* [S3], CNN [S4], *The Mag*) [R1-6]. Her interview with *Ming Pao Weekly* on napping was reprinted by a university student forum and received over 140 shares, 230 comments, 700 likes and 20,000 visits [R2-3, 5-6]. The appearance of her interviews on other online sites also serves as pathways to extend the impact of her work.

Lau's advocacy led to invitations to speak at schools on students' sleep health, reaching over 400 students, parents and teachers. Questionnaires completed by 40 parents at one talk showed that they learned to dispel the myth of sleep compensation during the weekends and became more motivated to make changes to improve their own sleep and their children's; strong intentions doubling from 26% (pre-talk) to 52% (post-talk) [S5]. In a one-month follow-up survey after another talk, parents stated "the whole family's sleep has shifted one hour earlier", and "my daughter is now more serious about getting to bed early" [S6; R1-3, R4, R6].

(II) Changes in school policy. Lau's advocacy for a more flexible approach to starting times at schools resulted in a successful policy change at the International Li Po Chun United World College, impacting 250 students so far. The principal reflected that "Lau's...research demonstrating the benefits to students from a later school start time compelled us to change our existing practice" [S7; R4].

(I, III) Lau's training sessions and new sleep initiatives for professionals. They include equipping 26 officers and psychologists of the Correctional Services Department (CSD) with the knowledge and tools to better assess and treat inmates' sleep problems. [REDACTED], CSD senior clinical psychologist, said that "by changing staff's attitudes towards sleep, they developed more empathy towards inmates experiencing sleep problems.....my colleagues are now more skilful in helping persons in custody", whose sleep problems may further complicate their behavioural and mental health issues with suicide and violence as possible consequences [S8; R1-3].

In collaboration with police psychologists, Lau enhanced the sleep health of police officers through a strategic and multifaceted programme, including seminars for 300 police officers and family plus training on sleep assessment and interventions for all police clinical psychologists. Both print- and online-based materials were circulated.

In one seminar, 156 police indicated statistically significant improvements in their knowledge of sleep health, with respondents strongly agreeing that the seminar was personally (91%) and professionally (88%) helpful. [REDACTED], senior police clinical psychologist, saw how "Lau's evidence-based suggestions helped [officers] both to overcome their sleep barriers and to serve as a credible source of information to share with their friends and family. Apart from experiencing better moods, officers have also shown more engagement in their professional duties with improved physical and psychological well-being." Motivated by Lau's research, the police would not hesitate to provide the resources to create a sleep centre, named Sleep Centre for Operations and Personal Enhancement (SCOPE). SCOPE, where Lau serves as the honorary consultant [S9; R1-3, 5-6], is the first-of-its-kind to provide in-house professional sleep services, including sleep health education, clinical assessment and treatment, and research to support and enhance operational and personal effectiveness for over 30,000 personnel.

(IV) Novel approaches to screen sleep-related problems. To detect and alleviate academic and mental health issues rooted in sleep problems in college students [R2, R3], Lau trained counsellors representing 14 local tertiary institutions to carry out sleep assessments and interventions. Not only did 90% of the counsellors indicate a sharp improvement in their understanding of sleep, 100% of them found her talk beneficial for their practice, evidenced by requests to incorporate the SCI into their practice [S10; R1-3, R4, R6]. Similar positive feedback was received from staff trained at the HKUST Counseling and Wellness Center [S10; R1-3, 5-6]. Three institutions have adopted the SCI in their counselling service for the early detection of sleep problems, a measure of mental health.

(5) Sources to corroborate the impact

- [S1] Sleep and Bus Driving. News Magazine, TVB Jade. March 2018. *In the programme, Lau clarified the neglected impact of short sleep time among bus drivers and suggested some useful tips for drivers to remain vigilant.*
- [S2] Sleep Deprivation among Hong Kong People. Backchat: RTHK Radio 3. 8 May 2018. *Together with other health professionals, Lau discussed the wide spectrum of adverse effects of short sleep duration and poor sleep quality. She pointed out that poor sleep was correlated with risk-taking behaviors. She also educated the audience about the potential benefits of designated naps to physical and mental health.*
- [S3] The Benefits of Napping. *Ming Pao Weekly*. December 2018. (in Chinese). *In the magazine, Lau introduced how short sleep duration had an impact on physical and psychological health. She also proposed the beneficial effects of napping and advocated for developing comfortable napping environment in offices and schools so as to promote healthier attitude and practices about resting in Hong Kong.*
- [S4] In super-dense Hong Kong, capsule hotel offers rest. CNN. May 2018. *In the article, Lau pointed out that sleep problems in Hong Kong are contributed by factors like long work hours, stressful lifestyles, bad habits and nighttime use of digital devices. She also introduced how napping can be part of the solution to the common problem of sleep deprivation among Hong Kong adults.*
- [S5] Pre- and Post-test Survey. “Is your child indebted.....of sleep?”, Independent Schools Foundation. May 2019. *Compared to the survey conducted before the talk, the number of parents intending to improve sleep of their children and their own was doubled after the talk.*
- [S6] E-mail from Chinese International School Parents & Teachers Association. Sept & Nov 2018. *The qualitative feedback from parents indicated that the talk successfully educated students, parents and teacher about adapting healthier sleep practices. Parents and students also became more motivated to increase their sleep quantity and improve their sleep quality.*
- [S7] E-mail from Principal [REDACTED], Li Po Chun United World College. July 2018. *Lau’s research directly motivated the change in school start-time and the ongoing systematic efforts to understand the effects of the change on students’ sleep, physical and mental health, and academic performance.*
- [S8] E-mail from [REDACTED], Senior Clinical Psychologist at CSD. Nov 2018. *Lau’s work brings observable changes in professionals’ competence and their practices in assessing and treating inmates’ sleep problems.*
- [S9] Letter from [REDACTED], Senior Police Clinical Psychologist with findings of pre- and post-seminar comparisons of sleep health knowledge and feedback. March 2019. *The pre vs. post comparisons demonstrate the effectiveness of Lau’s educational efforts in improving police officers (both senior and frontline)’s knowledge and motivation in enhancing their sleep health.*
- [S10] Feedback Survey. Sleep Health for College Students: Science and Practice. The Hong Kong Tertiary Institution Psychological Counselling Working Group of Hong Kong Student Services Association. Oct 2018, and Counseling and Wellness Center of The Hong Kong University of Science and Technology. Jan 2019. *Representatives of counselling units of the 14 tertiary institutions provided overwhelmingly positive feedback to Lau’s training on student sleep health. All of them requested the Chinese SCI that Lau’s team developed and validated, and 3 Hong Kong tertiary institutions are currently applying the instrument to detect sleep problems in college students.*