

COURSE INSTRUCTIONS - PSMT64-HT23

Stress and sleep: from bench to bedside

Course content

An established theme in the contemporary society regards how stressors and sleep problems should be handled. Over longer time, such exposures can affect wellbeing and risk for ill health. The present course aims to give in-depth knowledge about how stress and sleep are related to mental and somatic health and how stress and sleep are interconnected, and the underlying mechanisms. The course will also provide an opportunity to develop a critical perspective on relevant research, and to apply interdisciplinary perspectives on pathological states as well as on behavioral and biological processes related to stress and sleep.

The course reviews central concepts and topical research in stress, sleep and health. In particular, it is focused on how acute stress, chronic stress, diurnal rhythm and sleep problems affect and interact physiological systems such as the immune system, the endocrine system, cognitive processes and possible consequences for health. The course encompasses neuroscientific and other biological perspectives, and describes interventions to improve stress- and sleep related symptoms. Theoretical models and methods to understand and study stress- and sleep related processes will be applied.

Expected learning outcomes

Upon completion of the course, students are expected to be able to:

- 1) understand, describe and critically discuss central theoretical and empirical issues regarding how stress and sleep are related to health, as well as the fundamental mechanisms for associations between stress, sleep and health;
- 2) critically reflect on research reports in the field of interest;
- 3) design an adequate research plan for a study of the effects of stress and sleep on health outcomes, and to critically discuss the chosen design in relation to pertinent literature;
- 4) orally and in letter present a research plan, and to critically reflect on other students' research plans.

Educational activities and attendance

The course is running as a distance course through the Stockholm University e-learning platform, Zoom and Gather Town. All teaching is given in English, and consists of lectures, seminars (including a journal club), as well as preparatory activities and reflective learning activities.

The participation in the seminars (in Zoom and in Gather Town) are mandatory. **During the seminars, it is a requirement to have the camera on as well as have the possibility to use the microphone.** Technical problems e.g. related to equipment need to be taken up with the course leader at the beginning of the course or well before each seminar. Absence can be compensated by written assignments in accordance with the course leader's instructions.

Journal Clubs are literature seminars where the student analyze strengths and limitations of research articles about the effect of stress and/or sleep alterations on health, and then discusses these articles in small groups. Details about the choice of articles and the discussion

will be given during the course. The purpose of the Journal Clubs is to give the student the opportunity to critically reflect on research that is conducted in the field and to consolidate knowledge obtained from lectures and own studies.

Non-mandatory educational activities include lectures in Zoom, as well as preparatory activities and reflective learning activities (e.g. quiz, write 2-3 sentences reflection on the knowledge learned) online. **The participation in the non-mandatory educational activities is highly recommended as it facilitates the reading of literature and provides an opportunity for in-depth learning and discussion.** Having the camera on during non-mandatory educational activities is not a formal requirement, but encouraged as it provides more interactivity, both for the teacher and for the students.

Course literature and educational activities form the basis for the assignments. To make the best use of the educational activities and to save precious time for the course organizers, please follow the reading instructions in Athena closely.

Assignments and course requirement

The course is examined on the basis of a written assignment, consisting of a research plan of a mock project for a study of the effects of stress and sleep on health outcomes. Additional assignments are provided to verify that the student has fulfilled the expected learning outcomes (ELOs, see above).

Assignments are as follows:

- 1) present a research plan for a mock project in writing (ELOs #1, #2, #3, #4);
- 2) provide feedback on the research plan of another student (ELOS #1, #3, #4);
- 3) present your project orally in a video-recorded “elevator pitch” (ELO #4);
- 4) provide a summary of the discussion in the journal club (ELO #2).

Course requirements are:

- 1) attendance and active participation in seminars;
- 2) a passing grade on the assignments #1-4 above.

Assessment and grading criteria

Grades will be set according to a seven-point scale related to the learning objectives of the course. In order to pass the course, students must receive a grade of E or higher on the written examination, as well as a passing grade (G or VG) on all mandatory components of the course. The overall course grade is the grade of the written assignment weighted with the grades of the additional assignments.

Overall course grade:

A = Excellent.

The expected learning outcomes have been reached to an exceptionally high degree. The student is able to independently connect key concepts, theories, and models to explain actual examples, and is also able to critically reflect on the strengths and limitations of the concepts/theories/models. The student engages in argumentation and discussion independent of the

literature and course material, and integrates relevant principles on a general theoretical level in a meritorious way.

B = Very good.

The expected learning outcomes have been reached to a very high degree. The student can in own words account for differences and similarities between central concepts, theories and models, and reason about the relevance, shortcomings and validity of key concepts. The student engages in argumentation and discussion independent of the literature and course material.

C = Good.

The expected learning outcomes have been reached to a high degree. The student can in own words explain differences between key concepts, theories, and models, and can apply key concepts to own examples. The student is able, to some degree, to draw independent connections between the various theories and lines of reasoning presented in the literature.

D = Satisfactory.

The expected learning outcomes have been satisfactorily reached. The student can reasonably explain key concepts, theories and models in their own words. The student is able to refer to the concepts, theories, and models when discussing actual examples.

E = Adequate.

The expected learning outcomes have been reached despite some shortcomings. The student is able to define the concepts and describe what the theories and models are meant to explain. The student is able to utilize such lines of reasoning to some extent to describe the processes occurring in actual examples.

Fx = Insufficient, some additional work required.

The expected learning outcomes have not been reached, compensatory work is required.

F = Fail, much additional work required.

Completely insufficient. The learning outcomes have not been reached and reaching them is not judged to be possible.

Plagiarism, cheating and unallowed cooperation

It is included in your responsibility as a student to be aware of the examination rules at Stockholm University. Detailed information is available both at the web pages of the Department of Psychology and Stockholm University (www.su.se/regelboken). Teachers are obliged to report suspicion about cheating and plagiarism to the principal and the disciplinary board. Plagiarism and cheating are always disciplinary matters and can lead to shutting off from studies. One example of plagiarism is to verbatim (word-by-word), or almost verbatim, copy a text (this also concerns occasional sentences) without quoting the source of the text. This also concerns texts that you have yourself authored previously (self-plagiarism). To be involved in study groups (i.e., the smaller units within seminar groups) is developing and time efficient, but when it comes to examination tasks you will need to make sure that you are working on your own (if nothing else is instructed) in order not to risk that any collaboration will be considered unauthorized.

Although AI chatbot (e.g. ChatGPT) can be useful during education in certain cases, the following is not permitted:

- It is not permitted to let an AI chatbot write the text for the assignments and to submit it as one's own. This can be equated with ghostwriting or plagiarism and is considered cheating. It is also not permitted to use AI chatbot to improve the text of the assignments.
- It is not permitted to use AI chatbots for peer review of the other students' text during the course. The student must make their own assessment.

The student can use AI chatbots to find errors in texts, but if so, must clearly explain how the AI chatbot has been used in the production of the text. The student must indicate if AI chatbots have been used in any has been involved in any ways to reach the learning outcomes related to the written assignment.

Schedule and teachers

See Athena for the complete schedule and teachers. The schedule might change over time until the course starts. Any changes during the course will be communicated directly to you.

Course leader:

Julie Lasselin, PhD (julie.lasselin@su.se, 073 707 8921)

Co-organizer:

Mats Lekander, Professor (mats.lekander@su.se, 08-553 789 33)

Course examiner:

Mats Lekander, Professor

Course literature:

Stress:

Book (available in e-book via Stockholm University's library):

The Handbook of Stress Science: Biology, Psychology, and Health. R Contrada and A Baum.

Springer Publishing Company.

Chapter 2, MF Dallman and D Hellhammer, Regulation of the Hypothalamo-Pituitary-Adrenal Axis, chronic stress, and energy: the role of brain networks

p14-16 **Characteristics of the HPA axis**

p16-17 **Feedback regulation of the HPA axis from the periphery**

p17-18 **Characteristics of the ANS**

Chapter 5, JM Hash-Converse and AW Kusnecov, Behavioral, Emotional, and Cognitive Sequelae of Immune System Activation

p65 **Introduction**

p65-69 **Immune system-CNS interaction**

Chapter 16, PH Finan, AJ Zautra, and R Wershba, The Dynamic of Emotion in Adaptation to Stress

p213-214 **Negative emotions, stress, and health**

p214-216 **Positive emotions, stress, and health**

Chapter 17, CS Carver, Coping

p221-222 **Psychological stress**
p222-224 **Coping**
Chapter 23, TM Edenfield and JA Blumenthal, *Exercises and Stress Reduction*
p304-306 **Exercise-related stress reduction**
Chapter 35, DA Gutman and CB Nemeroff, *Stress and Depression*
p347 **The HPA axis and depression**
p347-349 **Functional tests of HPA axis activity**
p350-351 **Early life stress and depression**
p351 **Current life stressors and depression**

Articles:

McEwen BS. **The neurobiology of stress: from serendipity to clinical relevance.** *Brain Res.* 2000 Dec 15;886(1-2):172-189. doi: 10.1016/s0006-8993(00)02950-4. PMID: 11119695.

Allen AP, Kennedy PJ, Dockray S, Cryan JF, Dinan TG, Clarke G. **The Trier Social Stress Test: Principles and practice.** *Neurobiol Stress.* 2016 Nov 12;6:113-126. doi: 10.1016/j.ynstr.2016.11.001. PMID: 28229114; PMCID: PMC5314443.

Eriksen HR, Murison R, Pensgaard AM, Ursin H. **Cognitive activation theory of stress (CATS): from fish brains to the Olympics.** *Psychoneuroendocrinology.* 2005 Nov;30(10):933-8. doi: 10.1016/j.psyneuen.2005.04.013. PMID: 15964143.

Yang L, Zhao Y, Wang Y, Liu L, Zhang X, Li B, Cui R. **The Effects of Psychological Stress on Depression.** *Curr Neuropharmacol.* 2015;13(4):494-504. doi: 10.2174/1570159x1304150831150507. PMID: 26412069; PMCID: PMC4790405.

Dhabhar FS. **Effects of stress on immune function: the good, the bad, and the beautiful.** *Immunol Res.* 2014 May;58(2-3):193-210. doi: 10.1007/s12026-014-8517-0. PMID: 24798553.

Eriksen HR, Hellesnes B, Staff P, Ursin H. **Are subjective health complaints a result of modern civilization?** *Int J Behav Med.* 2004;11(2):122-5. doi: 10.1207/s15327558ijbm1102_9. PMID: 15456682.

Cohen S. **Psychosocial Vulnerabilities to Upper Respiratory Infectious Illness: Implications for Susceptibility to Coronavirus Disease 2019 (COVID-19).** *Perspect Psychol Sci.* 2021 Jan;16(1):161-174. doi: 10.1177/1745691620942516. Epub 2020 Jul 8. PMID: 32640177; PMCID: PMC7345443.

Shields GS, Slavich GM. **Lifetime Stress Exposure and Health: A Review of Contemporary Assessment Methods and Biological Mechanisms.** *Soc Personal Psychol Compass.* 2017 Aug;11(8):e12335. doi: 10.1111/spc3.12335. Epub 2017 Aug 3. PMID: 28804509; PMCID: PMC5552071.

Elin Lindsäter, **Background in "Cognitive behavioral therapy for stress-related disorders"**, pages 26-36. Thesis. 2020.
https://openarchive.ki.se/xmlui/bitstream/handle/10616/46983/Thesis_Elin_Linds%C3%A4ter.pdf?sequence=2&isAllowed=y

Lindsäter E, Axelsson E, Salomonsson S, Santoft F, Ejeby K, Ljótsson B, Åkerstedt T, Lekander M, Hedman-Lagerlöf E. **Internet-Based Cognitive Behavioral Therapy for Chronic Stress: A Randomized Controlled Trial.** *Psychother Psychosom.* 2018;87(5):296-305. doi: 10.1159/000490742. Epub 2018 Jul 24. PMID: 30041167.

Sleep:

Book (available in e-book via Stockholm University's library):

Sleep and Health. MA Grandner. Academic Press

Chapter 1 (p3-10), **The basics of sleep physiology and behavior.** AS Tubbs, HK Dollish, F Fernandez, MA Grandner.

Chapter 10 (p117-131), **Screening for sleep disorders.** CA McCall, NF Watson.

Chapter 12 (p147-157), **Actigraphic sleep tracking and wearables.** MA Grandner, ME Rosenberger.

Chapter 16 (p203-210), **Insufficient sleep and cardiovascular disease risk.** S Javaheri, O Omobomi, S Redline.

Chapter 26 (p339-358), **Sleep loss, executive function, and decision-making.** BC Satterfield, WDS Killgore.

Chapter 28 (p373-389), **Insomnia and psychiatric disorders.** I Vargas, SN Garland, JD Kloss, ML Perlis.

Articles:

Institute of Medicine (US) Committee on Sleep Medicine and Research; Colten HR, Altevogt BM, editors. **2, Sleep Physiology**, in *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem*. Washington (DC): National Academies Press (US); 2006. Available from:

<https://www.ncbi.nlm.nih.gov/books/NBK19956/>

Laposky AD, Van Cauter E, Diez-Roux AV. **Reducing health disparities: the role of sleep deficiency and sleep disorders.** *Sleep Med.* 2016 Feb;18:3-6. doi: 10.1016/j.sleep.2015.01.007. Epub 2015 Feb 27. PMID: 26431756; PMCID: PMC4603998.

Irwin MR. **Why sleep is important for health: a psychoneuroimmunology perspective.** *Annu Rev Psychol.* 2015 Jan 3;66:143-72. doi: 10.1146/annurev-psych-010213-115205. Epub 2014 Jul 21. PMID: 25061767; PMCID: PMC4961463.

Geiger SS, Fagundes CT, Siegel RM. **Chrono-immunology: progress and challenges in understanding links between the circadian and immune systems.** *Immunology.* 2015 Nov;146(3):349-58. doi: 10.1111/imm.12525. Epub 2015 Sep 28. PMID: 26301993; PMCID: PMC4610624.

Yoo SS, Gujar N, Hu P, Jolesz FA, Walker MP. **The human emotional brain without sleep--a prefrontal amygdala disconnect.** *Curr Biol.* 2007 Oct 23;17(20):R877-8. doi: 10.1016/j.cub.2007.08.007. PMID: 17956744.

Kecklund G, Axelsson J. **Health consequences of shift work and insufficient sleep.** *BMJ.* 2016 Nov 1;355:i5210. doi: 10.1136/bmj.i5210. PMID: 27803010.

Schripf M, Liegl G, Boeckle M, Leitner A, Geisler P, Pieh C. **The effect of sleep deprivation on pain perception in healthy subjects: a meta-analysis.** *Sleep Med.* 2015 Nov;16(11):1313-1320. doi: 10.1016/j.sleep.2015.07.022. Epub 2015 Aug 20. PMID: 26498229.

Choy EH. **The role of sleep in pain and fibromyalgia.** *Nat Rev Rheumatol.* 2015 Sep;11(9):513-20. doi: 10.1038/nrrheum.2015.56. Epub 2015 Apr 28. PMID: 25907704.

Ye YY, Zhang YF, Chen J, Liu J, Li XJ, Liu YZ, Lang Y, Lin L, Yang XJ, Jiang XJ. **Internet-Based Cognitive Behavioral Therapy for Insomnia (ICBT-i) Improves Comorbid Anxiety and Depression-A Meta-Analysis of Randomized Controlled Trials.** *PLoS One.* 2015 Nov 18;10(11):e0142258. doi: 10.1371/journal.pone.0142258. PMID: 26581107; PMCID: PMC4651423.