The effect of partial sleep deprivation on food craving and energy intake differs depending on habitual sleep quality

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Background: Poor sleep and obesity

Cross-sectional studies and reviews

Is sleep deprivation a contributor to obesity in children?
Jean-Philippe Chaput

Longitudinal studies

Experimental studies

A single night of sleep deprivation increases ghrelin levels and feelings of hunger in normal-weight healthy men
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Brief Communication: Sleep Curtailment in Healthy Young Men Is Associated with Decreased Leptin Levels, Elevated Ghrelin Levels, and Increased Hunger and Appetite
Karlene Spiegel, PhD; Eric Tosi, MD; Purnima Panesar, MD, PhD; and Dwe Van Caer, PhD

Sleep loss

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Short sleep duration and weight gain: a systematic review
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2 Channing Laboratory, Brigham and Women's Hospital and Departments of Nutrition and Epidemiology, Harvard School of Public Health, Boston, MA

Is sleep duration related to obesity? A critical review of the epidemiological evidence
Nathaniel S. Marshall5, 6, Nick Glozier8, Ronald R. Grunstein5, 6
Aim of the study

- The study aims to compare the effects of partial sleep deprivation (5 hours of sleep allowed) on food craving and energy intake in two groups differing for sleep quality.

Method

The sample
- 20 participants (5 males; Mean age=23.85 ± 2.35): 10 good sleepers (GI) and 10 individuals with symptoms of chronic insomnia (CI).

Tasks in the laboratory:
- Food craving induction task - sweet and salty high palatable food images.
- Energy & nutrient intake at breakfast in the lab.
Procedure

Consent form, self-report questionnaire, delivery of ZEO and sleep and food diaries

Deprivation night+ tasks in the laboratory during the subsequent morning (without having breakfast)

Recovery night

Habitual night+ tasks in the laboratory during the subsequent morning (without having breakfast)

Restitution of ZEO and diaries

Habitual night+ tasks in the laboratory during the subsequent morning (without having breakfast)

Deprivation night+ tasks in the laboratory during the subsequent morning (without having breakfast)
Results

• **MANIPULATION CHECK:**
The total sleep time differed significantly between nights in both groups $F_{(1,18)}=48.6 \ p<.001$.

• **CRAVING TASK:**
-A mixed design factorial Anova group (GS vs CI) x night (NN vs DN) x Moment (baseline vs post exposure) evidenced that both groups rated as more positive sweet stimuli than salty stimuli ($F_{(2,17)}=9.936; \ p<.001$) and observed sweet stimuli for longer time than salty stimuli ($F_{(1,18)}=4.516 \ p<.05$).

-There was a significant interaction nights*groups ($F_{(1,18)}=4.83 \ p<.05$): after the deprivation night GS reported higher sense of craving for sweet stimuli as compared to CI.

• **TEST MEAL:**
The ANOVA group x night conducted on the amount of total energy consumed during the test meal, controlled for BMI, revealed a significant effect of the night $F_{(1,17)}=8.36 \ p=.01$ and a significant interaction night*group ($F_{(1,17)}=6.13 \ p=.024$).
Discussion and conclusion

Sleep deprivation:
- increases craving for sweet foods
- energy intake in normal sleepers
- reduces energy intake in people reporting symptoms of chronic insomnia.

On the basis of these results it is possible to speculate that inconsistencies evidenced by previous research on adults may be reduced taking into account insomnia symptoms.
Thank you for the attention