

# Stress vulnerability and the effects of moderate daily stress on sleep polysomnography and subjective ratings

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## Conclusion

Moderate daily stress is associated with moderately impaired sleep physiology and subjectively impaired cognitive functions. A slightly stronger effect was seen in a sensitive group.

## Introduction

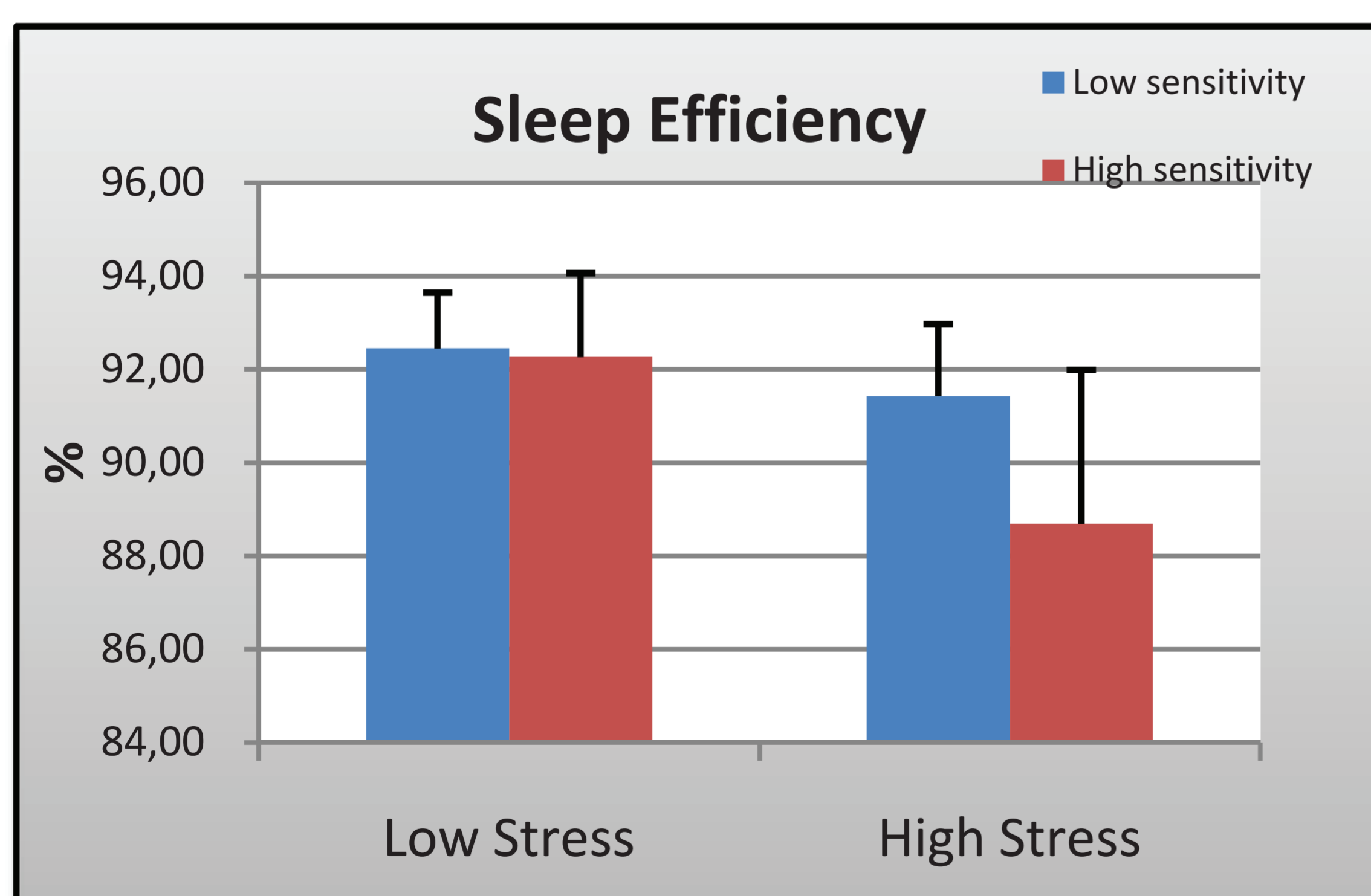
Stress is assumed to impair sleep but very few studies of naturally occurring variation in stress and polysomnography (PSG) have been carried out. There is also a possibility that some individuals are more vulnerable to stress-disturbed sleep than others (Drake et al 2004). The purpose of the present study was to investigate if and how sleep physiology is affected by naturally occurring everyday work stress. Another objective was to identify individual differences in the response of sleep to stress.

## Methods

Sleep was recorded at home in 28 teachers during one high stress and one low stress condition (and a habituation night). Probable upcoming stress levels were estimated through weekly ratings on a web questionnaire. Participants also kept sleep diaries and wore actigraphs. Saliva samples were obtained for analysis of cortisol. Participants were grouped into high (N= 9) or low (N= 19) habitual vulnerability to stress related sleep disturbances based on the FIRST-scale (Ford insomnia response to stress) (Drake et al 2004).

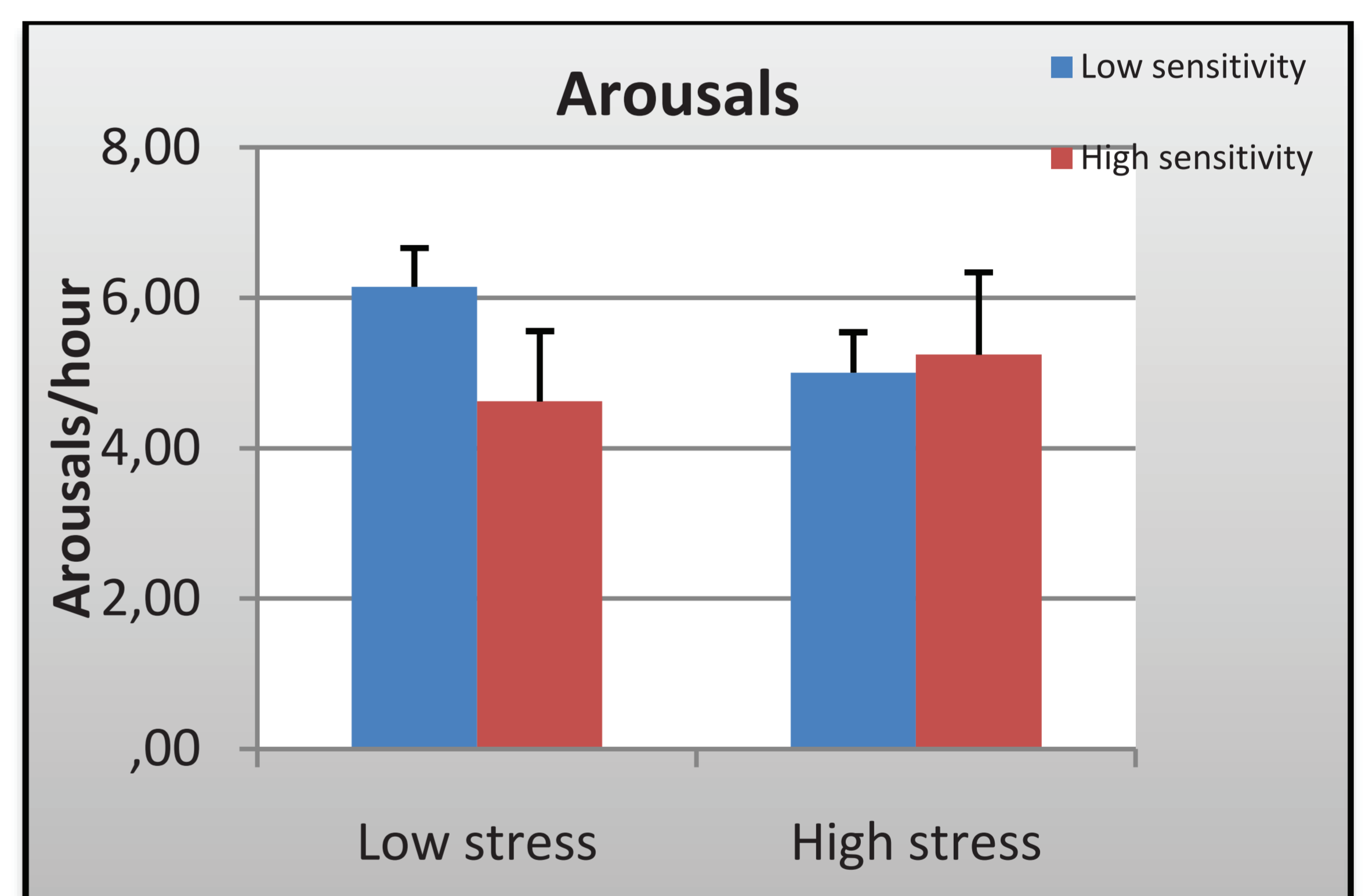
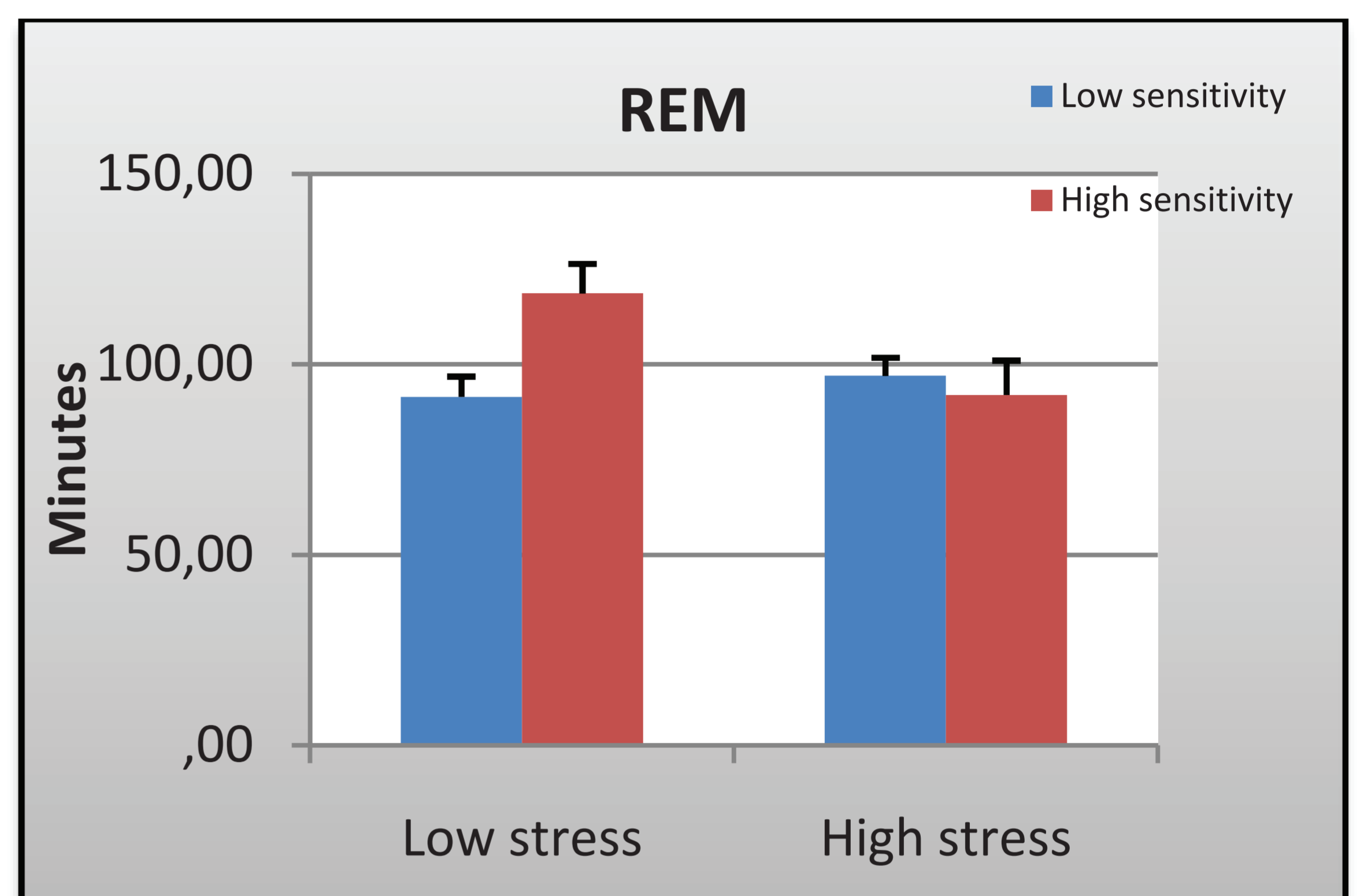
## Results

Sleep efficiency was lower during the high stress condition ( $p=0.030$ ) but the interaction with group was not significant. None of the other sleep variables were affected.



However, there was also a trend ( $p=.07$ ) towards increased Wake after sleep onset during the night with stress.

Significant interactions were seen for REM sleep ( $p=0.018$ ) and arousals ( $p=0.045$ ) across conditions. The sensitive group had less REM while the group with lower sensitivity had more during high stress. Arousals/h was higher for the group with high sensitivity and lower for the less sensitive group during high stress than during low stress.



Diary ratings during the high stress condition showed lower subjective sleep quality, more difficult awakening and feeling less rested in the morning. Concentration and memory were lower as well as the ability to stop thinking about work in the evening and levels of arousal and stress were higher throughout the day. KSS ratings of sleepiness were higher only in the early day during stress.

	Low Stress	High Stress	
	mean±se	mean±se	p
Stress at bedtime (1-5 no stress)	4.61±0.11	3.61±0.15	.000
Sleep quality (1-5 good)	3.5±0.15	3.11±0.20	.039
Stop thinking of work (1-4 easy)	3.33±0.17	2.50±0.18	.000
Memory/concentration index (1-9=good)	8.14±0.26	6.86±0.36	.000
Awakening index (1-15=good)	10.36±0.33	8.86±0.48	.004
Arousal level (1-9 high)	4.19±.20	5.09±0.19	0.001

## References

Drake, C., Richardson, G., Roehrs, T., Scofield, H. and Roth, T. Vulnerability to stress-related sleep disturbance and hyperarousal. *Sleep*, 2004a, 27: 285

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