

## Conclusion

Positive effects of artificial full spectrum lights could be observed on sleep efficiency, alertness levels and melatonin levels suggesting that a change of "classroom lighting" should be considered especially during the dark season.

## Introduction

Sleep problems has been four-fold in Sweden since the middle of the 90-ties and today about 40% report bad sleep at least once a week (Statistics Sweden). This is problematic since it is connected to a number of problems at school, including learning. One outcome of such influences may be a delay of circadian rhythms that will negatively affect sleep and alertness levels.

## Aim

The aim of the present study was to improve the possibility to adapt persons having difficulty to adapt to early morning work and daytime-oriented activity.

## Methods

Intervention: The old classroom ceiling lights (32 lights, 2900K, Ra 56) were replaced with white light, full spectrum lights (41 lights, 5500K, Ra 91-96, TrueLite®).

## Design:

- Baseline week
- 3 bright light weeks
- Return to baseline (dark light week)
- 53 adolescents
- Aged 14-15
- Wintertime

Measures: Light sensors, motion loggers, sleep-wake diary, saliva melatonin

Statistics: repeated ANOVA

## Discussion

The importance of artificial light systems to compensate from lack of natural daylight in Scandinavia seems to be significant during the dark season. Future work in the study of adolescents is geared towards the study of light exposure earlier in the day (during breakfast), and evaluation of changed starting times in schools and the effect on daytime functioning.

## Results

The result showed that sleep efficiency measured with actigraphs increased during the week with changed lights (interaction condition/weekday,  $F=3.41$ ,  $p=0.0262$ ).

Sleepiness decreased during school days in the mornings and increased before bedtime in the evening (interaction condition/time,  $F=8.90$ ,  $p=0.0030$ , figure 1).

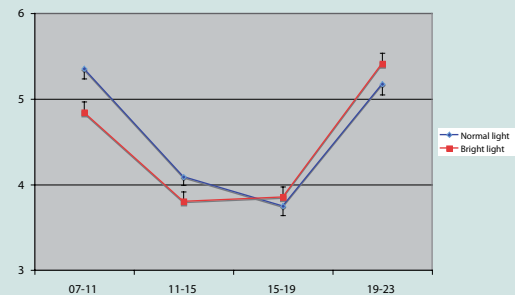


Figure 1. Mean sleepiness, Mon-Fri

Morning melatonin at 07.00 decreased during bright light treatment and continued to drop the week after exposure (interaction condition/day,  $F=3.90$ ,  $p=0.0049$ , figure 2).

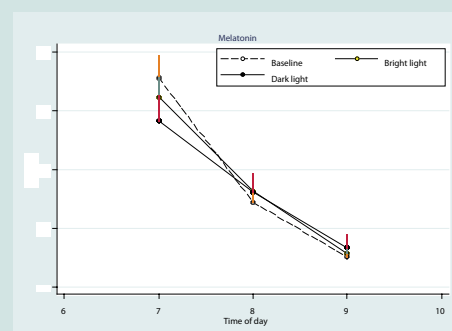


Figure 2. Saliva melatonin

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