Publication

Morning bright light exposure has no influence on self-chosen exercise intensity and mood in overweight individuals - A randomized controlled trial

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Overweight is a worldwide increasing public health issue. Physical exercise is a useful countermeasure. Overweight individuals choose rather low exercise intensities, but especially high exercise intensities lead to higher energy expenditure and show beneficial health effects compared to lower exercise intensities. However, especially in the morning higher exercise intensities are likely to be avoided due to higher subjective effort. Bright light exposure has shown to increase maximum performance. The aim of this study was to investigate if bright light exposure can also increase self-chosen exercise intensity. We hypothesized that morning bright light exposure increases self-chosen exercise intensity of subsequent exercise through increased mood and reduced sleepiness in overweight individuals. In this randomized controlled single-blind parallel group design, 26 overweight individuals (11 males, 15 females; age 25ăśă5.7ăyears; body mass index 28.9ăśă2.1ăkg/m; 2;) underwent three measurement appointments. On the first appointment, subjects performed a cardiopulmonary exercise test to measure maximum oxygen uptake (VO2max). Two days later a 30-min exercise session with self-chosen exercise intensity was performed for familiarization. Then subjects were randomly allocated to bright light (4400ălx) or a control light (230ălx) condition. Three to seven days later, subjects were exposed to light for 30ămin starting at 8:00 am, immediately followed by a 30-min exercise session with persisting light exposure. Multidimensional mood questionnaires were filled out before and after the light exposure and after the exercise session. The primary outcome was the mean power output during the exercise session and the secondary outcome the rating on the three domains (i.e. good-bad; awake-tired; calm-nervous) of the multidimensional mood questionnaire. Mean power output during the exercise session was 92ăśă19 W in bright light and 80ăśă37 W in control light, respectively. In the multivariate analysis adjusted for VO2max, the mean power output during the exercise session was 8.5ăW higher (95% confidence interval -12.7, 29.7; pă=ă0.416) for participants in bright light compared to control light. There were no significant differences between the groups for any of the three domains of the questionnaire at any time point. This is in contrast to longer lasting intervention studies that show positive influences on mood and suggests that bright light therapy requires repetitive sessions to improve mood in overweight individuals.

In conclusion bright light exposure does not acutely increase self-chosen exercise intensity or improve mood in a 30-min exercise session starting at 08:30. However, regarding the fact that overweight is a worldwide and rapidly increasing public health issue even small increases in exercise intensity may be relevant. The trend toward superiority of bright light over control light implicates that further studies may be conducted in a larger scale.; VO2max: maximum oxygen uptake; 95% CI: 95% confidence interval; SD: standard deviation.

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