

Office Lighting for Circadian Health and Wellbeing

Humans in modern society spend more than 90% of their time indoors, yet little attention has been given to understanding light's effects on health in the built environment. The LRC recently investigated how circadian stimulus (CS), a measure of light's impact on the circadian system, is related to sleep and mood in this population.

The study included 109 participants from five different buildings managed by the U.S. General Services Administration (GSA) in Washington, D.C. (two buildings); Portland, OR; Seattle, WA; and Grand Junction, CO.

Personal circadian-effective light exposure (CS over time) and activity patterns were collected for seven consecutive days using the Daysimeter. Participants also responded to questionnaires relating to:

- Mood (Center for Epidemiologic Studies Depression Scale [CES-D], Perceived Stress Scale, Positive and Negative Affect Schedule [PANAS]) and
- Sleep quality (Pittsburgh Sleep Quality Index [PSQI], Patient-Reported Outcomes Measurement Information System [PROMIS]).



Study participants were asked to wear the Daysimeter (a calibrated light and activity meter) as a pendant for seven consecutive days, at least three of which were spent in the building during that time.

Publication

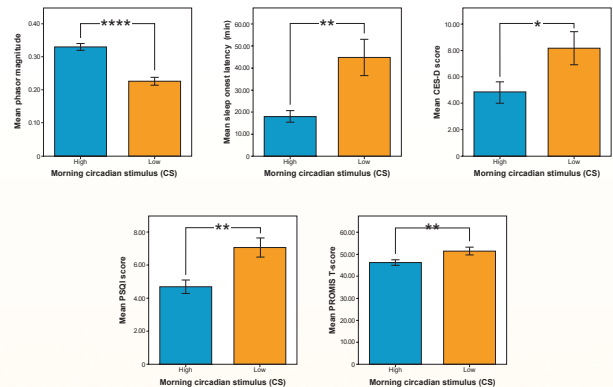
Figueiro MG, Stevension B., Heerwagen J, Kampschroer K, Hunter CM, Gonzales K, Plitnick B, Rea MS. The Impact of Daytime Light Exposures on Sleep and Mood in Office Workers. *Sleep Health*. 2017;Submitted.

Sponsor

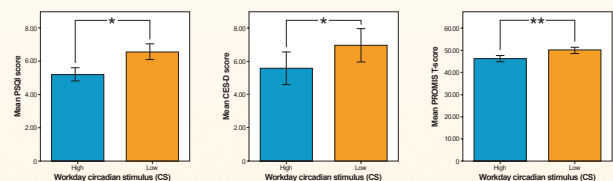
U.S. General Services Administration



Results



Participants receiving high CS (≥ 0.30) in the morning exhibited greater circadian entrainment (greater phasor magnitudes), fell asleep more quickly at bedtime (lower sleep onset latency), experienced less depression (lower CES-D scores), and had better quality sleep (lower PSQI and PROMIS T-scores) compared to those receiving low CS (≤ 0.15) in the morning.



While receiving high CS (≥ 0.30) in the morning is hypothetically the most beneficial for entrainment, participants receiving high CS during the entire workday also showed reduced depression (lower CES-D scores) and better sleep quality (lower PSQI and PROMIS T-scores) compared to those receiving low CS (≤ 0.15) during the entire workday.

Implications for Practice

Exposure to circadian effective light during the day has implications for sleep health. Lighting designers, architects, and facilities managers should consider how to effectively use electric lighting to supplement daylight and thereby ensure that every office worker receives sufficient daytime circadian-effective light to support circadian health and wellbeing.

