

# Indoor Light and Health Study at U.S. Embassies in the Far North

Office workers in the far north, near the Arctic, experience a dramatic reduction in daylight during winter months, which can lead to decrements in alertness, energy levels, and general health and wellbeing. The goal of the present study was to test whether supplemental electric lighting that provides a circadian stimulus (CS) of 0.3 or greater would increase alertness, energy, and vitality during working hours in locations where daylight availability is reduced during winter months.

LRC researchers conducted a field study at U.S. embassies in Riga, Latvia, and Reykjavik, Iceland. Thirteen participants from Riga and nineteen from Reykjavik volunteered for the study.

Site	Mean Age (yr)	Gender		Total
		Male (n)	Female (n)	
U.S. Embassy, Riga, Latvia	41.8	8	5	13
U.S. Embassy, Reykjavik, Iceland	43.2	12	7	19
Both sites	42.6	20	12	32

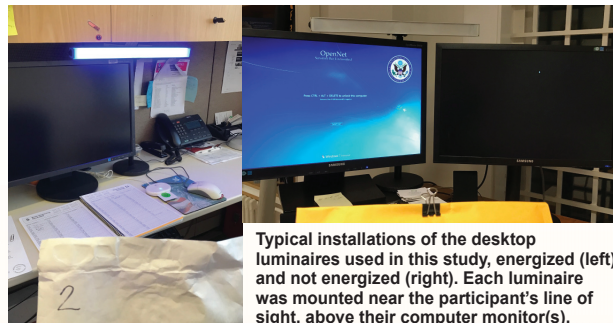
Summary of demographic data for participants in this study, by site.

The LRC built 40 luminaires for the study: 20 were designed to emit white light (440 nanometers [nm] peak wavelength) and the other 20 were designed to emit blue light (460 nm peak wavelength). Both types of luminaires were designed to provide a CS  $\geq 0.3$  when mounted at typical viewing distances.

Baseline data were collected prior to turning on the lights on Day 1 and intervention data were

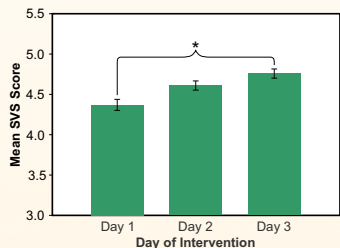
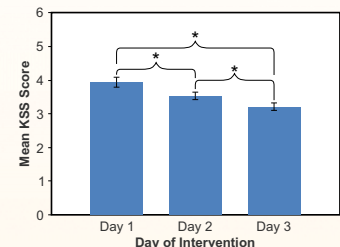


Example of the desktop luminaires used in this study. The luminaires were designed to emit either white or blue light (shown here).



Typical installations of the desktop luminaires used in this study, energized (left) and not energized (right). Each luminaire was mounted near the participant's line of sight, above their computer monitor(s).

collected on Days 2 and 3. On all three days, participants were provided with Daysimeters, calibrated personal light meters, to wear as pendants, and asked to complete several questionnaires about sleep habits (Pittsburgh Sleep Quality Index [PSQI] and Karolinska Sleepiness Scale [KSS]), stress (Perceived Stress Scale [PSS-10]), and subjective feelings of vitality and alertness (Subjective Vitality Scale [SVS]).



Mean KSS and SVS scores by day of intervention for both sites. \* - statistically significant.

Participants reported feeling significantly less sleepy during the days of the intervention with the supplemental lighting turned on, compared to baseline, prior to utilizing the supplemental lighting. Participants also reported feeling significantly more alive and having more energy during the intervention than during baseline.

## Sponsors

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