

Key Research: Czeisler et al. (1982) Rotating shift work schedules that disrupt sleep are improved by applying circadian principles

Method / Design

Field Experiment using a matched groups design with comparable jobs.

Procedure

33 Rotating shift workers by phase advance – rotated 8 hour shifts every 7 days – thus continuing on their normal work shifts:

Shift 1: 12am – 8am

Shift 2: 4pm – 12am

Shift 3: 8am – 4pm

52 rotating shift workers by phase delay – rotated shifts above but changing once every 21 days.

Each worker was given self-reports on health measures, sleepiness and schedule preference.

Nine months after implementing new schedules, staff turnover and plant productivity (potash production) were analysed.

Participants

85 male rotating shift workers, age 19-68 (mean 31.4).

Control group of 68 male non-rotating day and swing shift workers with comparable jobs Aged 19-56 (mean 27.3).

All participants selected from the Great Salt Lake Minerals and Chemicals corporation in Utah.

Results

Response rate was 84%

Pre-change shift: Rotating shift workers reported significantly more problems with insomnia than the non-rotators. 29% rotators reported falling asleep at work at least once in past three months.

Workers clearly preferred phase delay shift, with complaints of schedule dropping from 90 to 20% among those on the phase delay shift. This was associated with a reduction of staff turnover and increase in the production of work. This increase in productivity was maintained into the harvest season.

Conclusions

Work schedules that rotate by phase delay with an extended interval between each rotation are most compatible with the properties of the human circadian timing system. However any new schedule must take into consideration the nature of work and the needs of workers.

Key Issues relevant to study

Individual Differences

Ethics

Methodological issues with self-reports on the job

Individual vs Situational factors in effects of shift work

