







lack of sleep can have a profound negative effect on productivity. When present, these factors may offset the beneficial effects due to lighting improvements.

Another reason that productivity improvements associated with lighting changes may be underestimated may be attributable to the way some researchers measure productivity. By focusing on performance over relatively short periods of time, longer term effects may not be noticed. Consider a recent study conducted by researchers from the Lighting Research Center at Rensselaer Polytechnic Institute. In this study workers performed data entry tasks while sitting at a computer. Some monitors had reflections (a form of reflected glare) while others did not. The reflections were annoying but did not mask critical information needed to complete the tasks. Work time (how long it took a worker to complete a single data entry task) was about the same regardless of the lighting conditions. However, workers at monitors with reflections took longer rest periods between tasks. The researchers estimated that the loss in productivity due to the longer breaks was about 80 minutes per week. At \$10/hr this adds up to a loss in productivity of about \$650 per year per employee that could be recovered by making lighting improvements.

### Improvement in employee well-being

A third benefit frequently associated with lighting upgrades is an improvement in employee well-being, which often leads to a reduction in absenteeism and employee turnover. “Employee well-being” in this context refers to the overall quality of working life in general but more specifically to job satisfaction.

Lighting affects our subjective impressions of our working environment, which ultimately affect our behavior and job satisfaction. Relationships between lighting and subjective impressions were clearly established in a well-known series of studies by John Flynn at Pennsylvania State University during the 1970s. Flynn varied the type, amount, and distribution of light in conference rooms and measured subjective impressions of visual clarity, spaciousness, relaxation, privacy, and overall pleasantness. Flynn found that rooms with a combination of lighting on the table and walls were perceived as being pleasant, relaxed, interesting, and likeable. Rooms that provided illumination only on the table were perceived as being small and cramped, whereas those with both wall and table lighting or wall lighting alone were perceived as being larger and more spacious. Later studies showed that certain types of lighting contributed to anxiety, stress, and depression.



