

OCCUPANT EXPERIENCE IN BUILDINGS

Judith Heerwagen, PhD US General Services Administration Office of High Performance Green Buildings Let's open the door and see all those people. Many people, Doing different Things in Different places.



What are we learning about people in buildings?

KEY FINDING #1.

Buildings can have medicinal effects.



NIH Stress Study

- Workers in "old" vs "new" workspace in the Denver Federal Center
- Hourly survey of perceived stress levels
- Continuous cardiac activity
- Salivary cortisol 4 times/day
- 60 Ss, studied for 5 days







New space





Key Results

- Lower cortisol and healthier heart rate pattern in the new space
- No differences in perceived stress no conscious awareness of stress effects?
- Causal links between environment and stress outcomes were uncertain

DAYLIGHT AT WORK AND CIRCADIAN HEALTH

Light is the primary synchronizer of circadian rhythms; and daylight is an ideal source.

Light needed for circadian Functioning is much brighter than light needed for office work.

Output Rhythms: Physiology Behavior

Suprachiasmatic Nucleus (SCN)

Wayne G. Aspinall Federal Building Grand Junction CO







Edith Green-Wendell Wyatt Federal building Portland, OR







Federal Center South Seattle WA







GSA Headquarters, Washington DC







Photometric Analysis

Study team: RPI Lighting Research Center Winter and summer measurements Daysimeter on a stick.





Light Exposure and Sleep Quality Daysimeter worn for 7 days at work and elsewhere

Daysimeter captures light exposure during waking hours.



Wristband measures sleep quality.



WHAT ARE WE LEARNING?

LOCATION MATTERS. People nearest windows and on high floors get the most circadian stimulus.



BUT, Many are in biological darkness for much of the day.



Computers are a key driver of shade use and other daylight reducing behaviors.



Behavior and interior design have a big impact on circadian stimulation.





Light is an ecosystem, not a technology

Daylight Design – windows, controls, integration with electric light

Interior Design – furniture, layout, colors, finishings, computer ergonomics

Organizational System –

culture, occupant behavior, nature of work, reward structure, work technologies



KEY FINDING #2.

Workplace redesign can enhance occupant experience: findings from GSA's workplace research



Chicago Federal Building Old space







New space







Denver Federal Building Old space







New space









US Coast Guard Old space







US Coast Guard New space







Veterans Affairs Old Space







New space







Consistent areas of design improvement

Access to daylight and views

Better balance between interaction and focus

- Attractive break areas
- Improved overall aesthetics
- Environmentally friendly materials and furnishings Spatial equity

Overall findings: comfort & satisfaction



Percent Satisfied

Percent Citing Problems with Acoustic-related Behaviors



Yet the research also shows:

- 59% of survey respondents say they stop and talk to others in corridors and workspaces
- 56% say they learn a lot from overhearing others talk
- 53% say they often have meetings in their personal workstations

Do we need a "cognitive cocoon" for privacy and focus?

CLOSE TO HOME BY JOHN MCPHERSON



Although the new office cubicles were a refreshing change, they did make it difficult to have a private conversation.

Psycho-social and organizational well being



KEY FINDING #3. People are not passive recipients of design. People actively modify environments to increase comfort, functionality and pleasure

In a study of 7 office buildings in the Pacific Northwest:

64% added personal artifacts or posters
48% added plants
21% added desk lamps
16% added heaters

Only 13% made no changes

Heerwagen, Diamond and Loveland, 1992. Post occupancy evaluation of seven Energy Edge Buildings. US Department of Energy.

plants

People in windowless offices decorate their spaces with more nature artifacts than those in offices with windows.

Are they selfmedicating?



J.Heeerwagen, 1986. Adaptations to Windowlessness. *Environment and Behavior* 18(5): 623-629



Others cope creatively with thermal discomfort.

KEY FINDING #4.

Individual differences may play a large role in environmental experience.

People are not clones.



Some like it bright. Some like it dim. And the causes may be biological.



PEOPLE ALSO VARY ON:

Noise sensitivity, personality, preference patterns, age, work needs, and health factors. How do we intentionally integrate individual differences into design thinking and solutions in place of the "one size fits all" approaches we currently use

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