

Optimizing the Daylighting Ecosystem in Buildings













Later that morning....



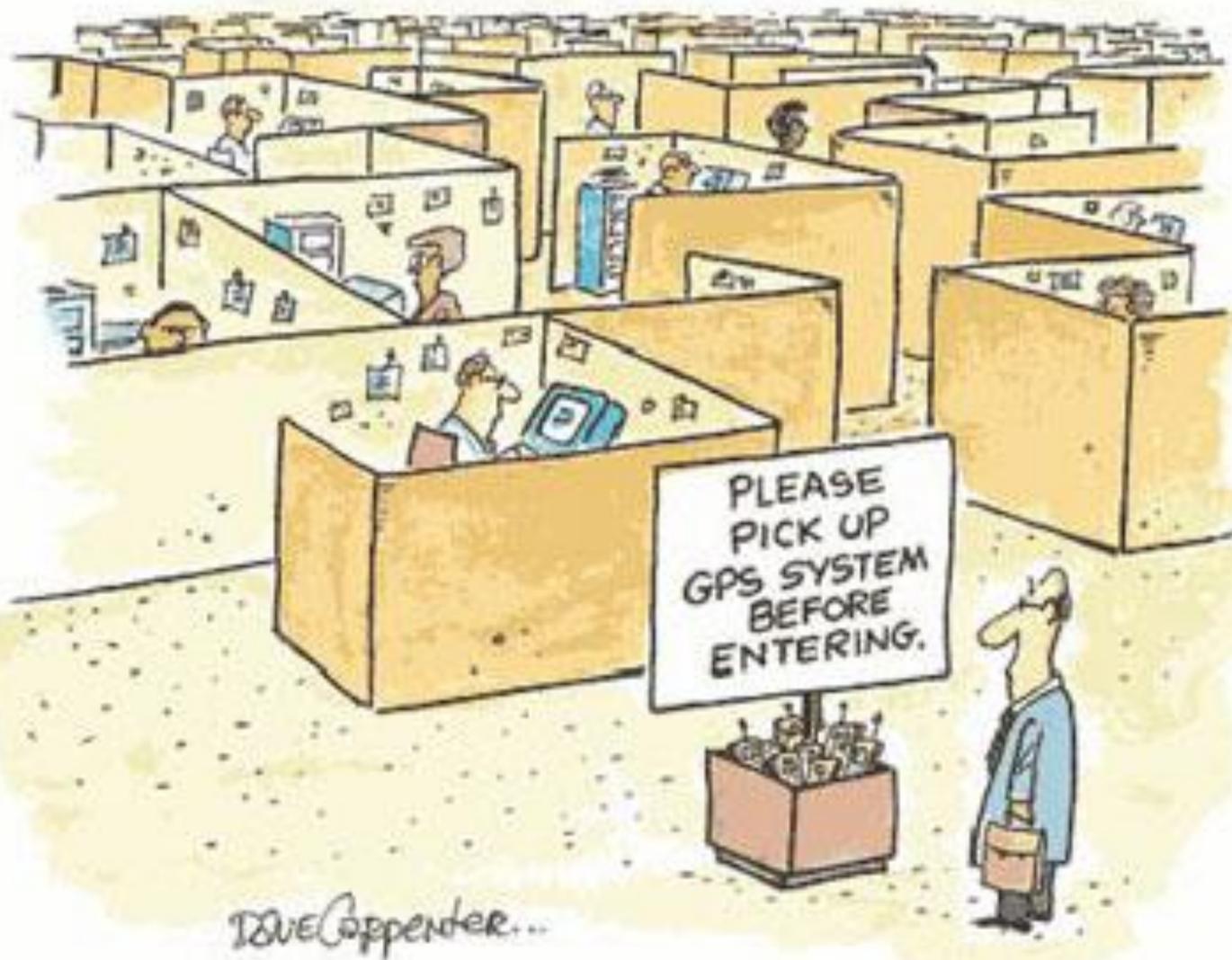
For most of human history, we lived outdoors in a daylight rich world as hunter-gatherers...



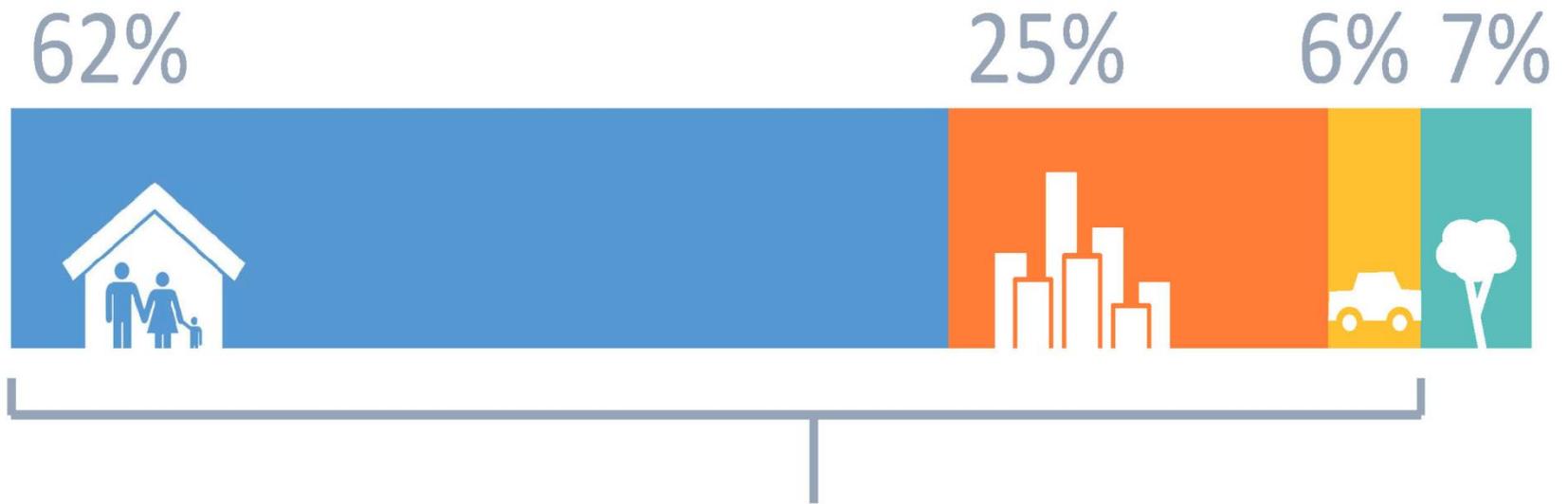
“Someday this will all be done by consultants.”

Tim Birkan

We now live and work indoors most of the day under evolutionarily novel conditions.



(So how much time DO we spend indoors?)



We spend about **93%** of our time indoors

What are the consequences?

NOTE: 93% figure is based on Americans

SOURCE: EPA: J. Spangler, **Indoor Air Pollution, A Public Health Perspective**

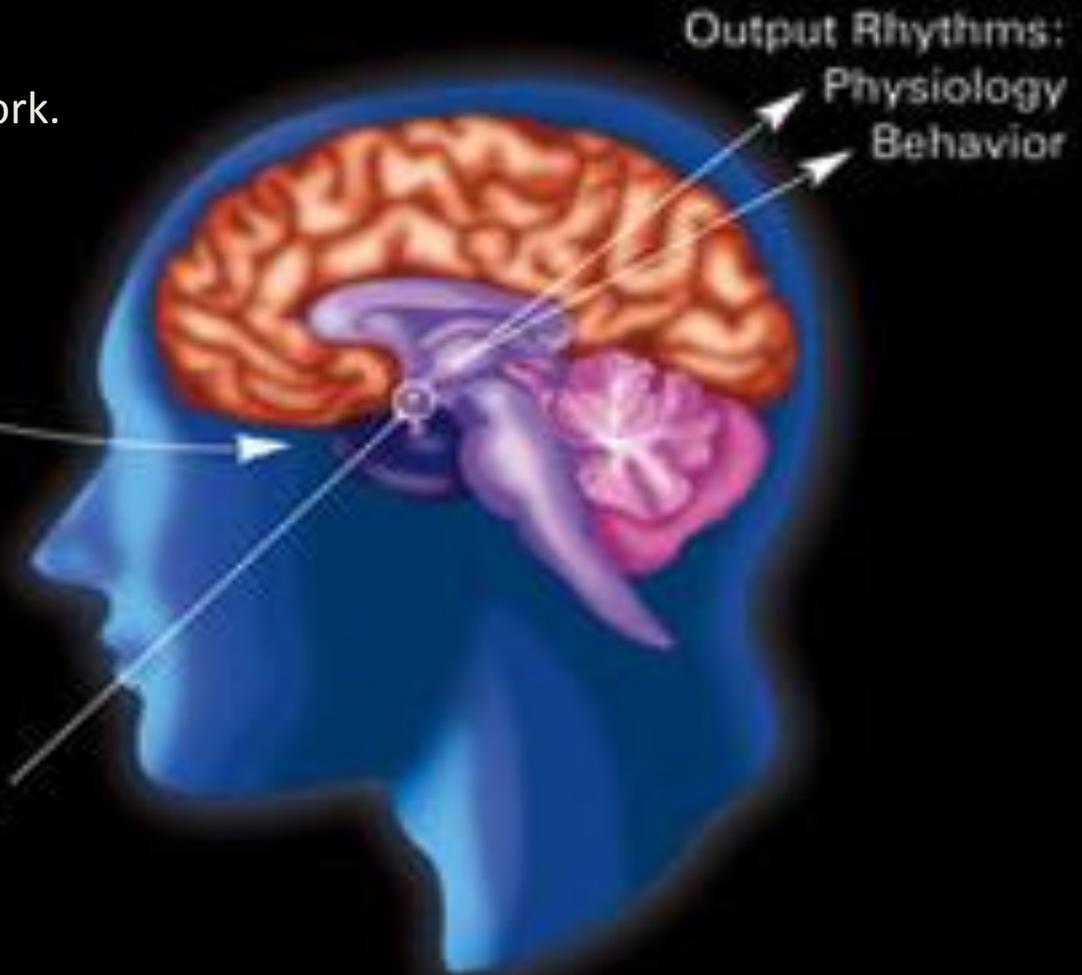
sensory science by **aclima**

Light is the primary synchronizer of circadian rhythms; insufficient light can create circadian disruption

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



Suprachiasmatic
Nucleus (SCN)



WHY FOCUS ON DAYLIGHT AT WORK?

Circadian Lighting Research

- Indoor Lighting Focus for work purposes
 - Daylight used as aesthetic enhancement and means of reducing electric energy
- Little attention paid to understand light impact on psychological and physiological systems

Purpose of GSA Research: Can daylight be a health benefit related to its importance in stimulating circadian processes

Why Is This Research Important?

- Building research concentrated on eliminating risks—not enhancing health
- Science of energy well explored; the science of buildings' ability to improve health is not
- Need to know how to **intentionally** enhance health and well being through building design choices and **get that knowledge into professional practice**



Wayne G. Aspinall Federal Building Grand Junction CO



Wayne N. Aspinall Federal Building and U.S. Courthouse



Historic Lobby | GSA Westlake Road Lockwood BICC

Common Areas



Historic Tenant Space | GSA Westlake Road Lockwood BICC

Wayne N. Aspinall Federal Building and U.S. Courthouse

Common Areas



Edith Green-Wendell Wyatt

Portland, OR





Before



After



Photo: Nic Lehoux

Common Areas



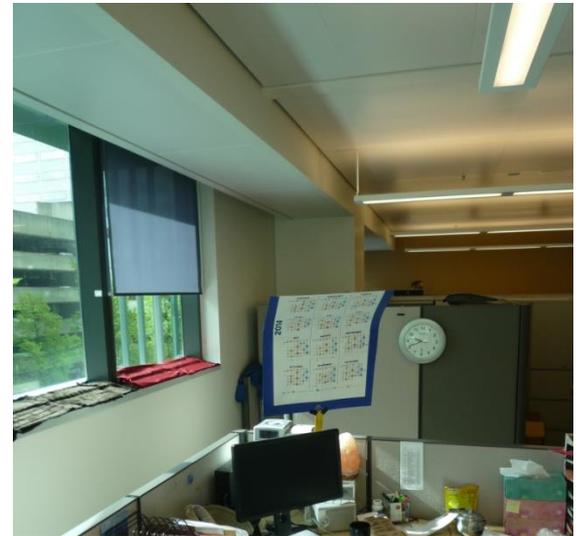
Edith Green Wendell Wyatt Federal Building

Shading Devices

Designed



Improvised



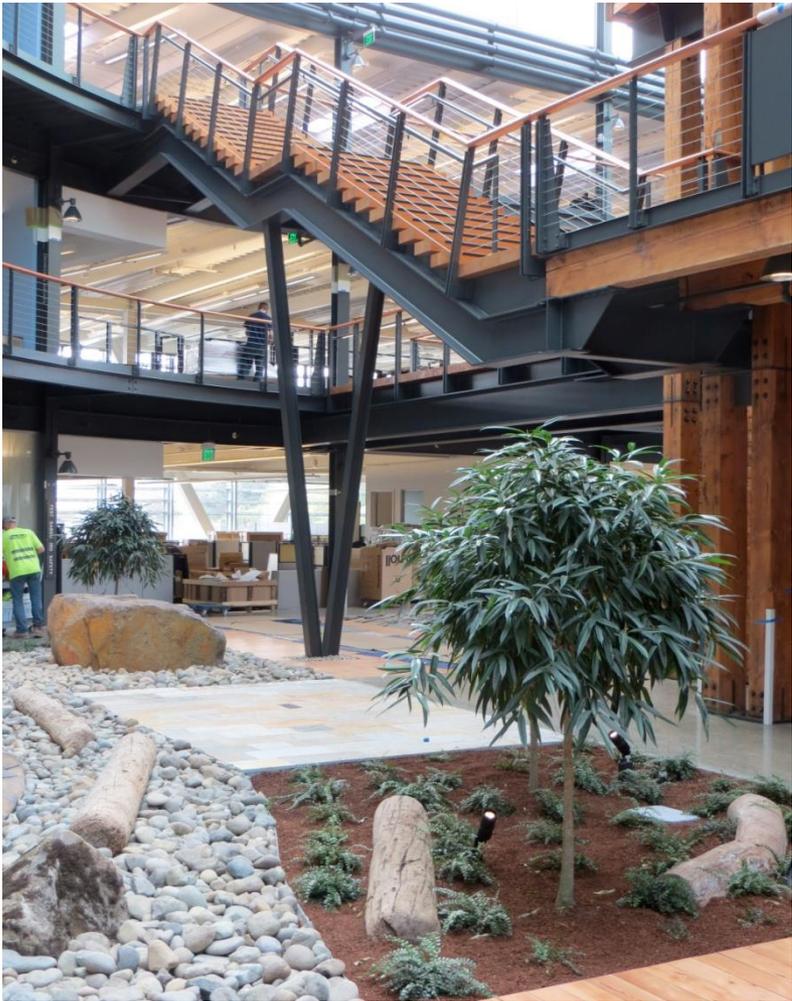
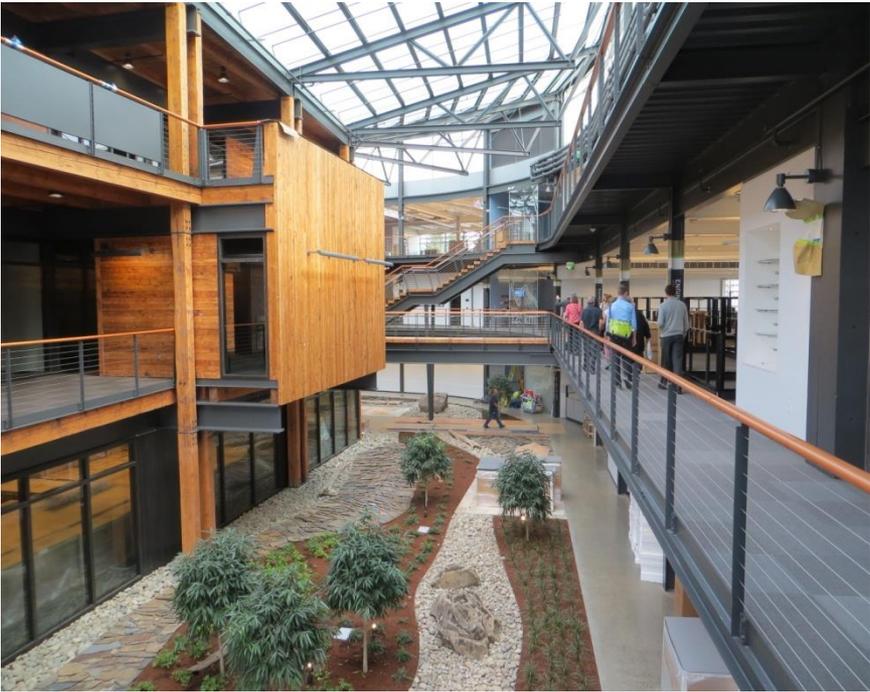
Federal Center South

Seattle WA



Federal Center South Building 1202

Common Area



Federal Center South Building 1202

Redesigned Shading + Improvised Shading



Figure . Examples of rectangular and atrium skylights at FCS.

GSA Headquarters, Washington DC



GSA Regional Office Building Washington, DC



GSA Regional Office Building



Circadian Lighting Workshop: Optimizing the Daylighting Ecosystem in Buildings

Office of Federal High-Performance Green Buildings

April 21-22, 2015
GSA Central Office
Washington, DC



GOOGLE SEARCH RESULTS

2.5 Billion for “Light and Health”

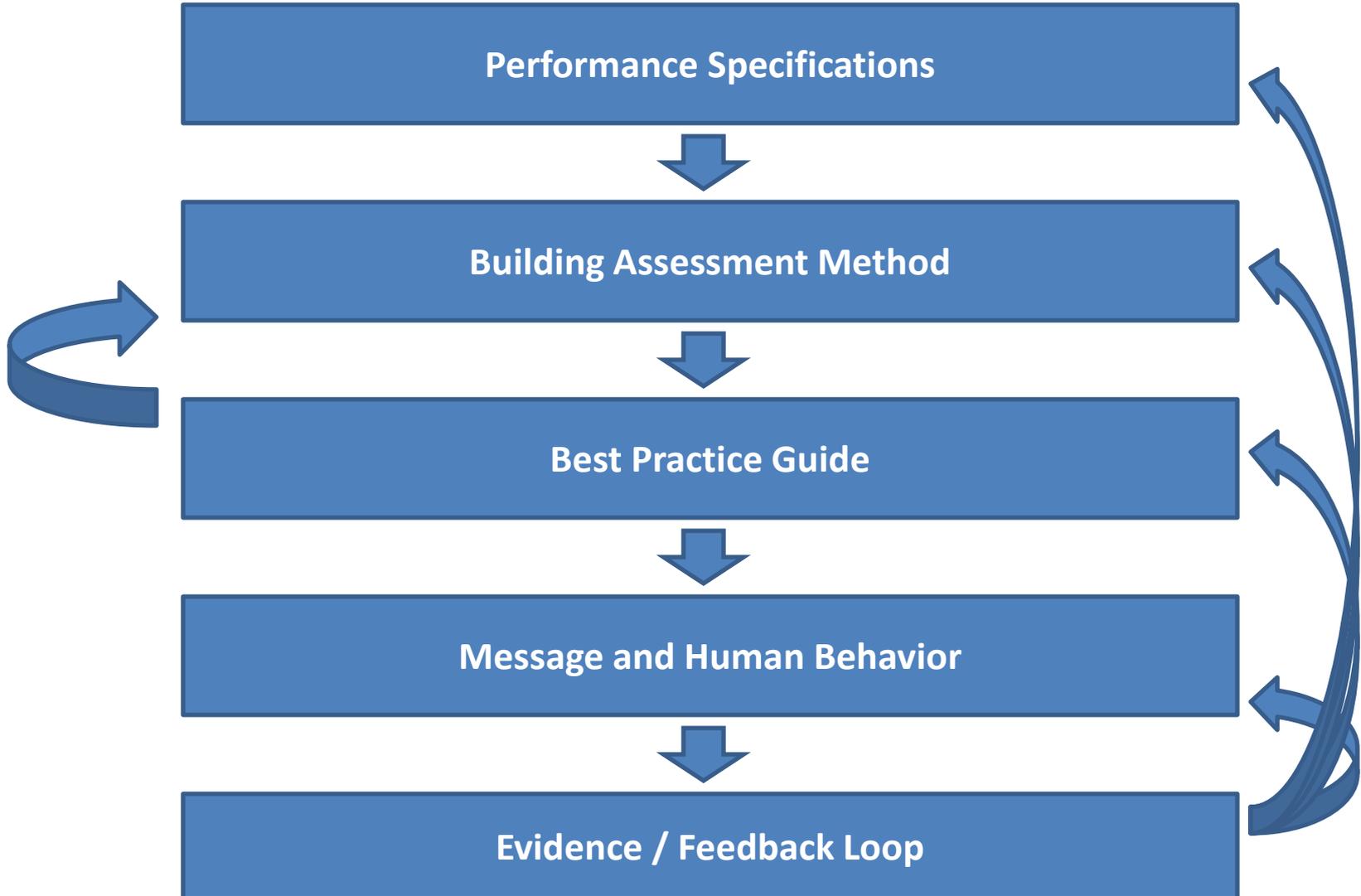
92 Million for “Daylight and Health”

Workshop Purpose

- How can we optimize the daylighting ecosystem in buildings?
- What are some solutions we can test
- What are the pathways for implementing new practices
- Who are the target audiences?



Workshop Outcomes



Discussion

- Based on this research, what data points are the most interesting?
- From workshop outcomes, what did we miss that we should also consider as an action?
- What should our key messages be for getting this research into practice?
- Who should be our main audiences and what is the best avenue to them?
- Where do you get your lighting information from for projects?