



Missouri  
Department of  
Natural Resources

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Missouri Department of Natural Resources

# Environmental Factors & Business Outcomes: An Evaluation for the Lewis & Clark Workplace

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# Summary of Process & Major Findings

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# THE SURVEY PROCESS:



## PROCESS OVERVIEW.....

- Survey draft developed & modified after feedback from client groups
- Survey administered
- Data entry & analysis
- And today.... Results
  
- But first, a quick reminder of the survey issues

# Issues Included: Building Environment, Employee Experiences & Outcomes



- **“You and Your Job”**
  - Job type, level, & function
  - Organization
  - Work background (e.g. prior office location, time on job)
- **“Activities in the Workplace”**
  - Work activities & locations (Percent of time, importance, & environmental support for doing them)
  - Work experiences (e.g., importance & support of various spaces/interactions)
  - Concentration, Disruptions, & Time to recover
- **“Meetings & Interactions”**
  - Importance & Support for activities

# Issues Included: Building Environment, Employee Experiences & Outcomes



- **“Describing your workspace, storage & equipment”**
- **“Evaluating Your Workspace”**
  - Workspace type & adequacy
  - Ambient conditions & other LEED issues
  - Privacy, distraction issues
  - rooms, etc.
- **“Evaluating Specific Building Features”**
  - Lighting, water, and other LEED features
  - Specific room types & features
  - Exterior aspects (shuttle service, landscaping)

# Issues Included: Building Environment, Employee Experiences & Outcomes



- **“Evaluating the Work Environment, In General”**
  - Windows, day-lighting
  - Work specific locations
  - Water-saving features
  - HVAC issues
  - Colors & material finishes
  - Break areas
  - General building evaluations (maintenance, safety, energy efficiency)
- **“Lewis & Clark Building & Site, In General”**
  - Shuttle service, parking lot & and access
  - Natural vegetation
  - Values (Sustainability, environmental awareness, representation of the organization and its accomplishments)

# Issues Included: Building Environment, Employee Experiences & Outcomes



- **“Work Experiences: Prior & Current Bldgs”**
  - Degree & nature of muscle aches or pain
  - Respiratory issues
  - Eye strain
  - Nausea, headache
- **“Understanding How You Work” (Performance, an outcome)**
  - Amount, quality, communication
  - Overall performance
- **“General Satisfaction” (Outcomes)**
  - Ability to concentrate
  - Workspace satisfaction
  - Building satisfaction
  - Job satisfaction

# Issues Included: Building Environment, Employee Experiences & Outcomes



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- **“Other Work Environment Comments”** (Opportunities to provide additional information about the work environment)
  - **Workspace:** What works well? What needs improvement?
  - **In the Building:** What works well? What needs improvement?
  - **Outside the Building:** What works well? What needs improvement?
  - **Additional comments about your work environment**

# RESULTS



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- 1. Who responded to the survey?**
- 2. What were their primary work activities?**
- 3. What effect does the workplace environment have on major business outcomes?**

# 1. Respondents (65% Return Rate)

<b>JOB TYPE (Q2)</b>	<b>Number</b>	<b>Percent</b>
<b>Acct/Audit/Budget</b>	<b>20</b>	<b>9.6%</b>
<b>Admin/Support</b>	<b>36</b>	<b>17.3%</b>
<b>Clerical</b>	<b>21</b>	<b>10.1%</b>
<b>Engineers</b>	<b>10</b>	<b>4.8%</b>
<b>Manager/Supervisor</b>	<b>48</b>	<b>23.1%</b>
<b>Specialists/Scientists</b>	<b>67</b>	<b>32.2%</b>
<b>Technical Support</b>	<b>5</b>	<b>2.4%</b>
<b>Other</b>	<b>1</b>	<b>0.5%</b>
<b>Total for Q2</b>	<b>208</b>	<b>100.0%</b>
<b>Did not answer</b>	<b>8 (3.7%)</b>	
<b>Total</b>	<b>216</b>	

# Generic Job Types (Used in report)

<b>General Job Types</b>	<b>Number</b>	<b>Lewis &amp; Clark Categories</b>
<b>Managers</b>	<b>48</b>	<b>Manager/ Supervisor</b>
<b>Technical</b>	<b>82</b>	<b>Engineers/Specialists/Scientists/ Technical Support</b>
<b>Professionals</b>	<b>20</b>	<b>Accounting/Audit/Budget</b>
<b>Administrative</b>	<b>57</b>	<b>Admin/Support/Clerical</b>

All Lewis & Clark job types combined into these typical groups, to:

- Compare to types typically used in analyses elsewhere
- Allow large enough groups for statistical comparison

# Results

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## 1. Respondents

## 2. Work activities:

- Frequency, Importance & Support for them

## 3. What workplace features have the strongest impacts on outcomes?

- Performance
- Satisfaction

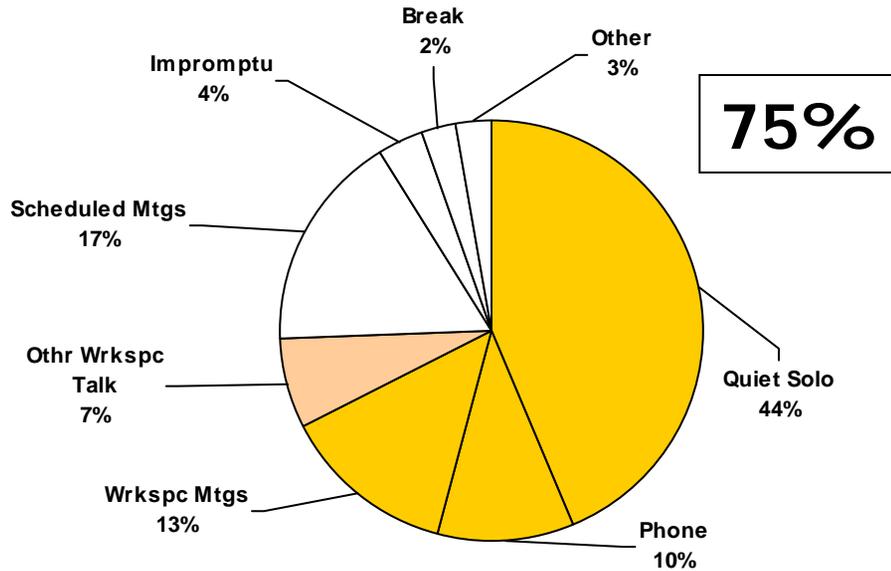
## **2. Work Activities**

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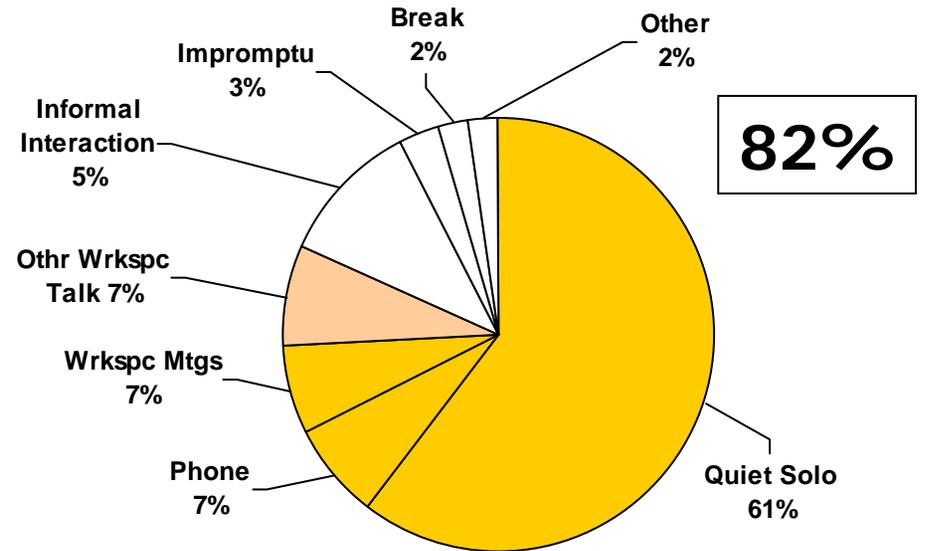
- **Where do people spend most of their time?**
- **What types of work are they doing there?**
- **Which are 'most important' activities?**
- **How well are those important activities supported by the office environment?**

# Time Spent In WORKSPACES: By Job Type

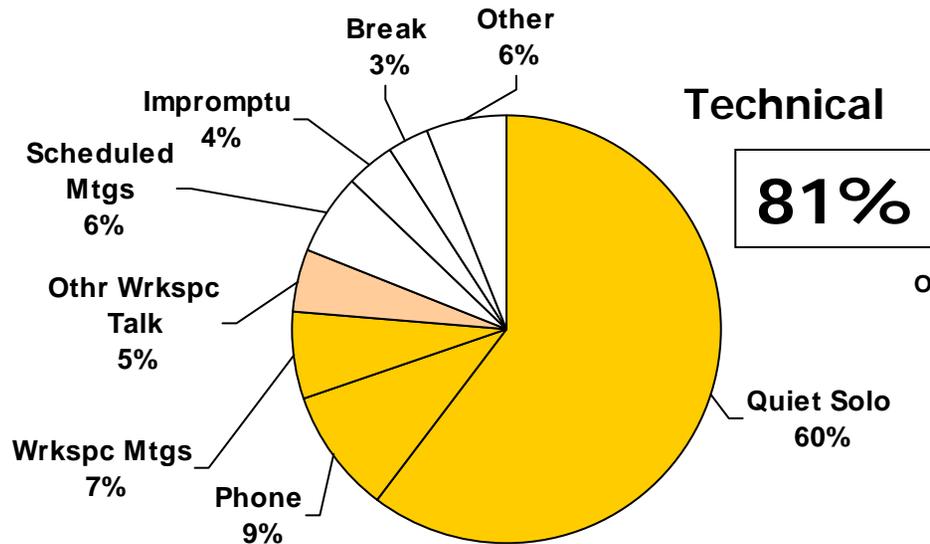
## Managers



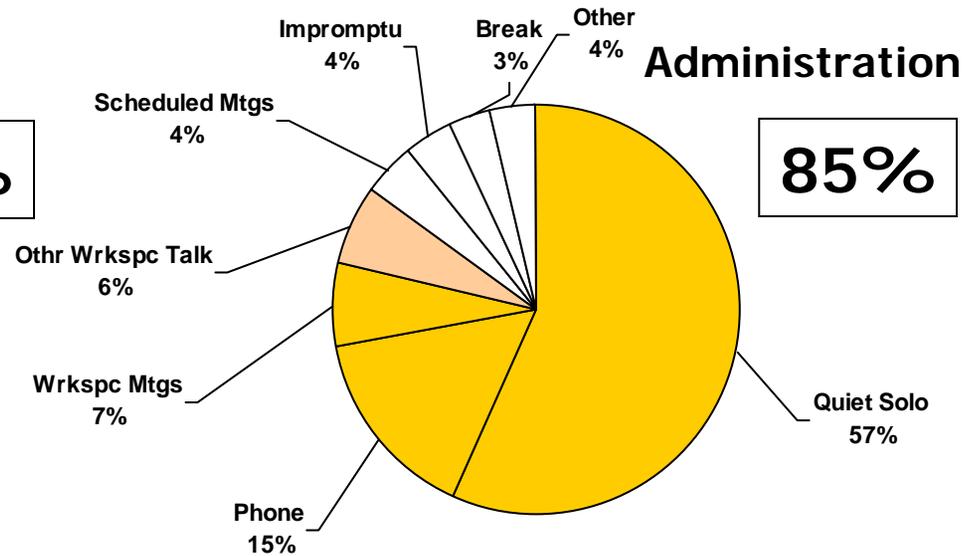
## Professionals



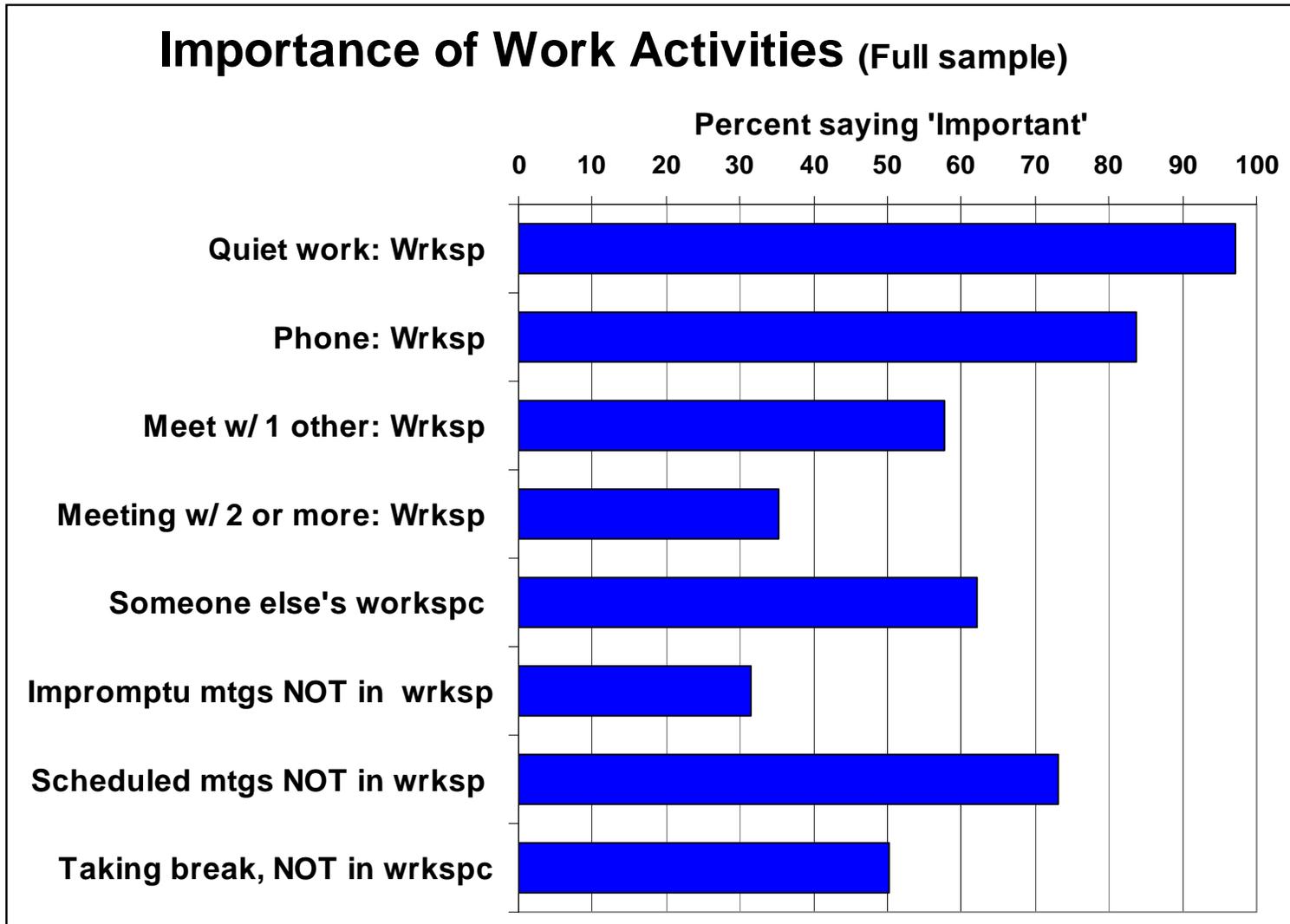
## Technical



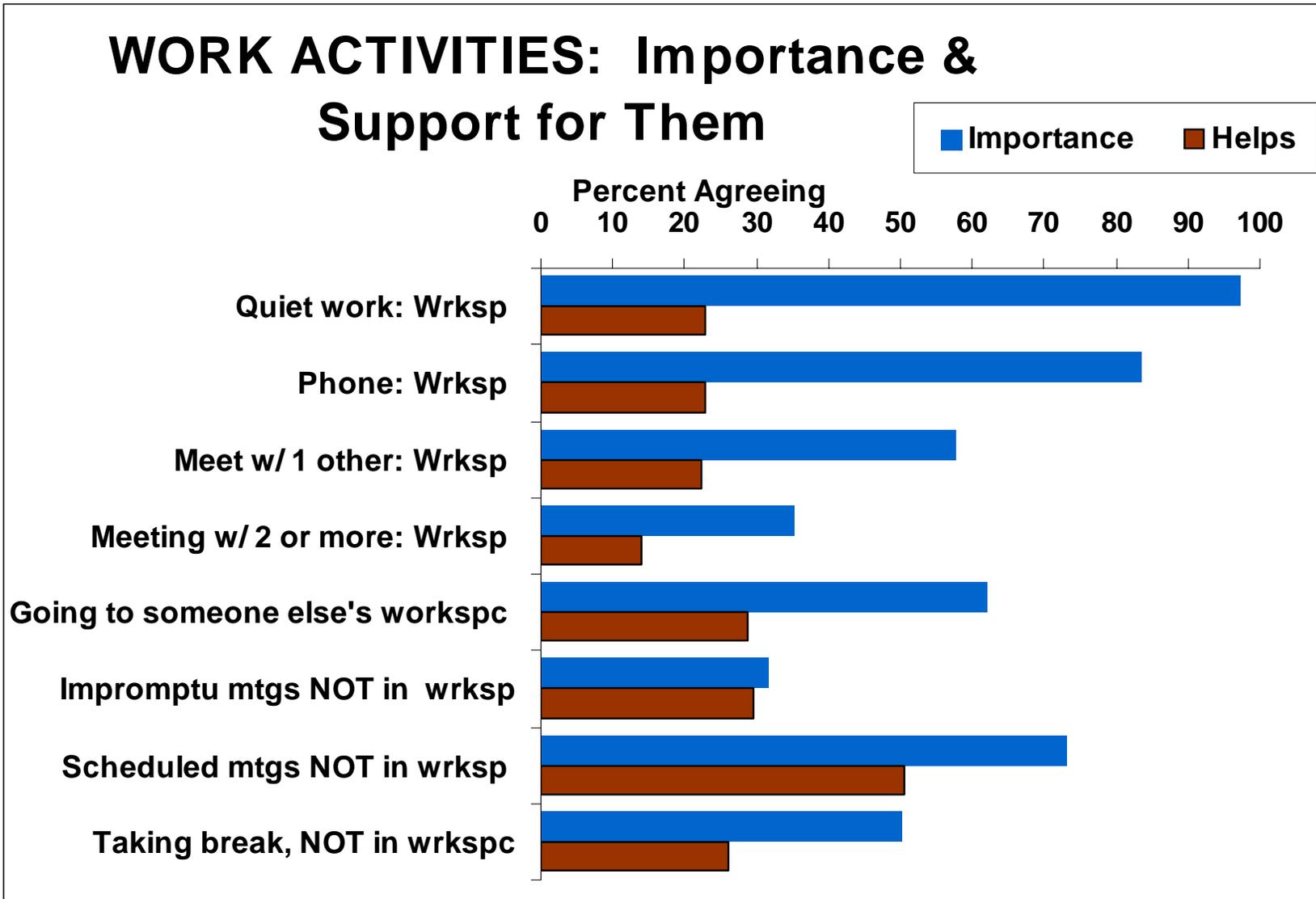
## Administration



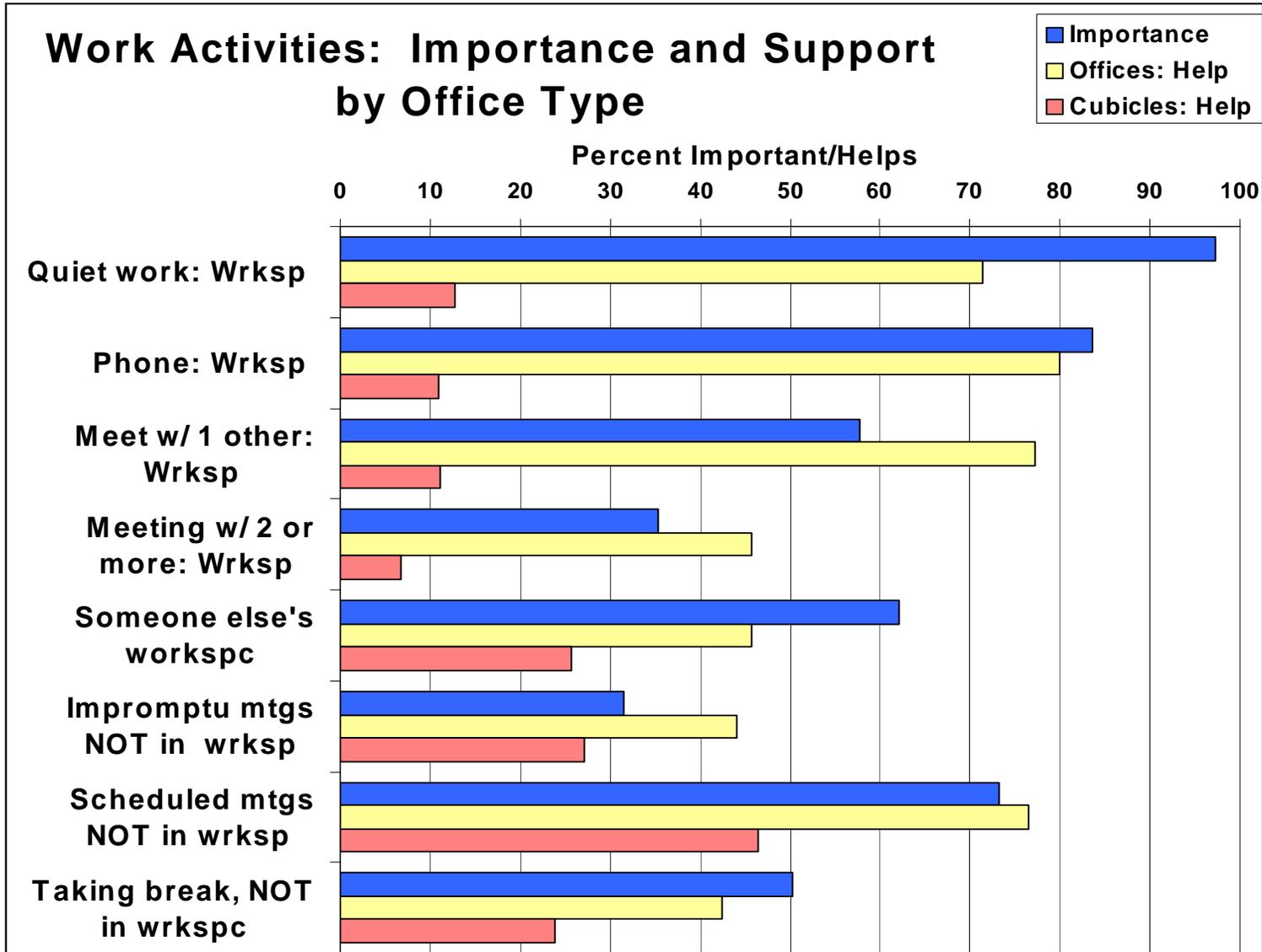
# Importance of Work Activities



# Importance & Support for Activities



# Work Activities: Importance & Support, by Workspace Type



# Implications

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- A reasonable objective: Design & manage work environments that best support the most frequent, and most important, work that people have to do
- Findings:
  - **The workspace is the most used work area for L&C employees**
  - **Most of the work that all need to do is quiet, solo work**
  - **Open workspaces provide the least support for this activity.**

# Results



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## 1. Respondents

## 2. Work activities:

- Frequency, Importance & Support for them

## 3. **What workplace features have the strongest impacts on outcomes?**

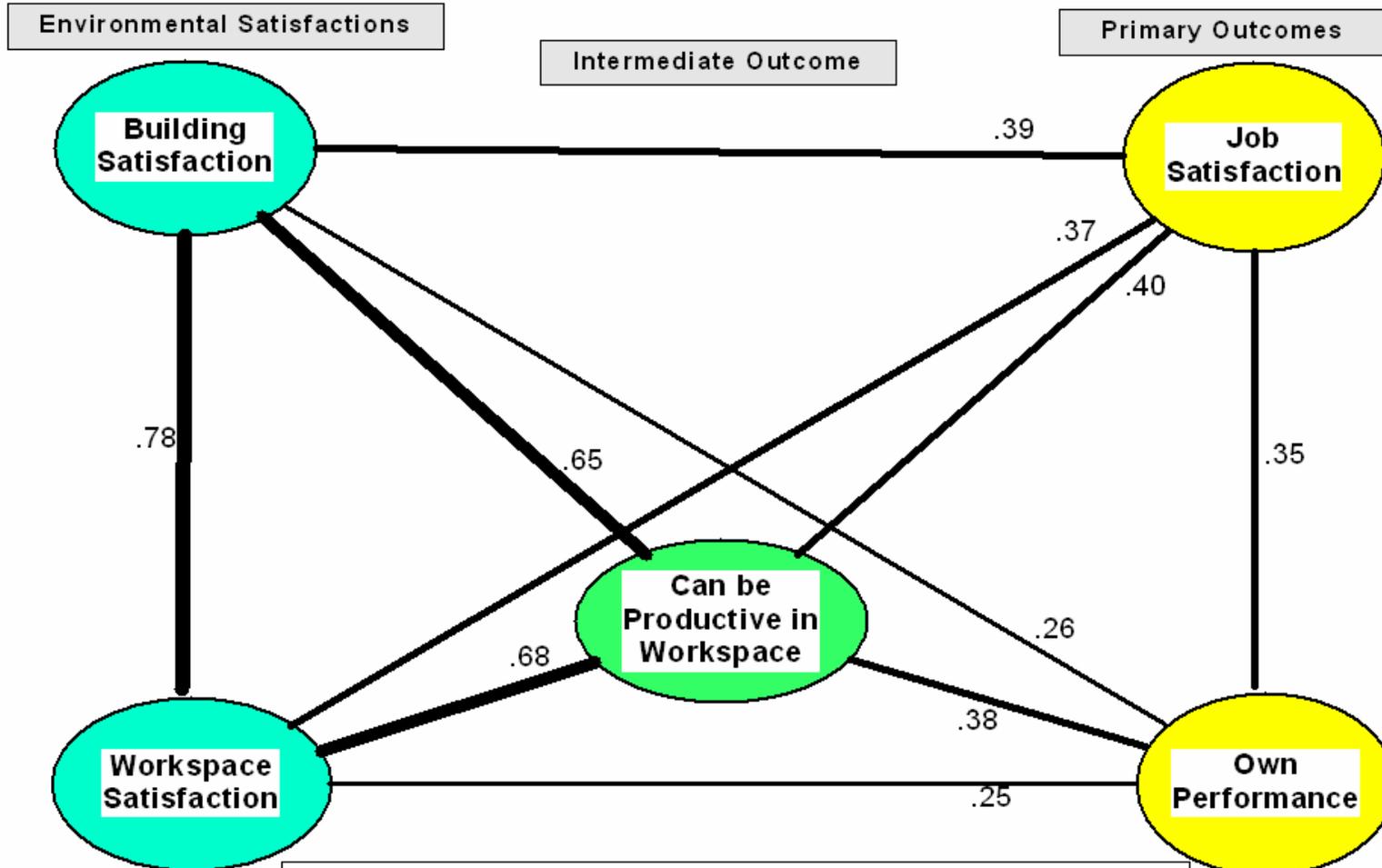
- **Performance**
- **Satisfaction**

# 3. Impact of the Work Environment on Outcomes

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- What are the **major outcomes** in this research?
  - **Performance:**
    - Can be productive in my workspace
    - Overall performance (Amount, quality, communication, & my overall performance)
  - **Satisfaction**
    - With my workspace
    - With my job, overall
- They are related to each other
- What affects one will also affect the others

# Outcomes: Interrelationships



**Lewis & Clark Workplace Evaluation:  
Outcome Relationships**

Line width indicates correlation (also seen in numbers)

# Workplace Features: Strength of Effect & Evaluations

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- Relationships between workplace aspects and outcomes
- How employees evaluated the workplace aspects
- Information can:
  - Inform future design & planning
  - Prioritize decisions about possible modifications to existing work environments
  - Provide a baseline for future evaluations

# Size of the impacts

- The following results show the top workplace features having the largest impacts on each outcome

Correlations	Circles
r= Mid-teens to .29	#
r= .30 to .44	#
r= .45 to .54	#
r= .55 and higher	#

- Also shown is the percentage of people who responded with positive evaluations of the feature; if less than 50%, they are shown in red

# Order of Information



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- **First....what affects employee performance?**
- **Second...what effects employee satisfaction?**
- **For each outcome, findings for:**
  - **Workspace features**
  - **Interactions**
  - **Building features**
  - **Exterior features**
- **Written comments provide additional info**

# Workspace Features: Impacts on Performance

	Outcomes		% Agree
	Productive in Wrkspc	Overall Performance	
Able to do focused work in workspace	#	#	26%
Time needed to regain focus, after distraction	#	#	3.9 minutes
Workspace well designed (storage, furniture, space, comfort)	#	#	51%
Workspace colors & materials	#	#	41%
Workspace lighting (electric & natural, and control of it)	#	#	69%
Workspace temp, air control, few drafts	#	---	52%

- Most important: Doing focused work, but it's not well supported

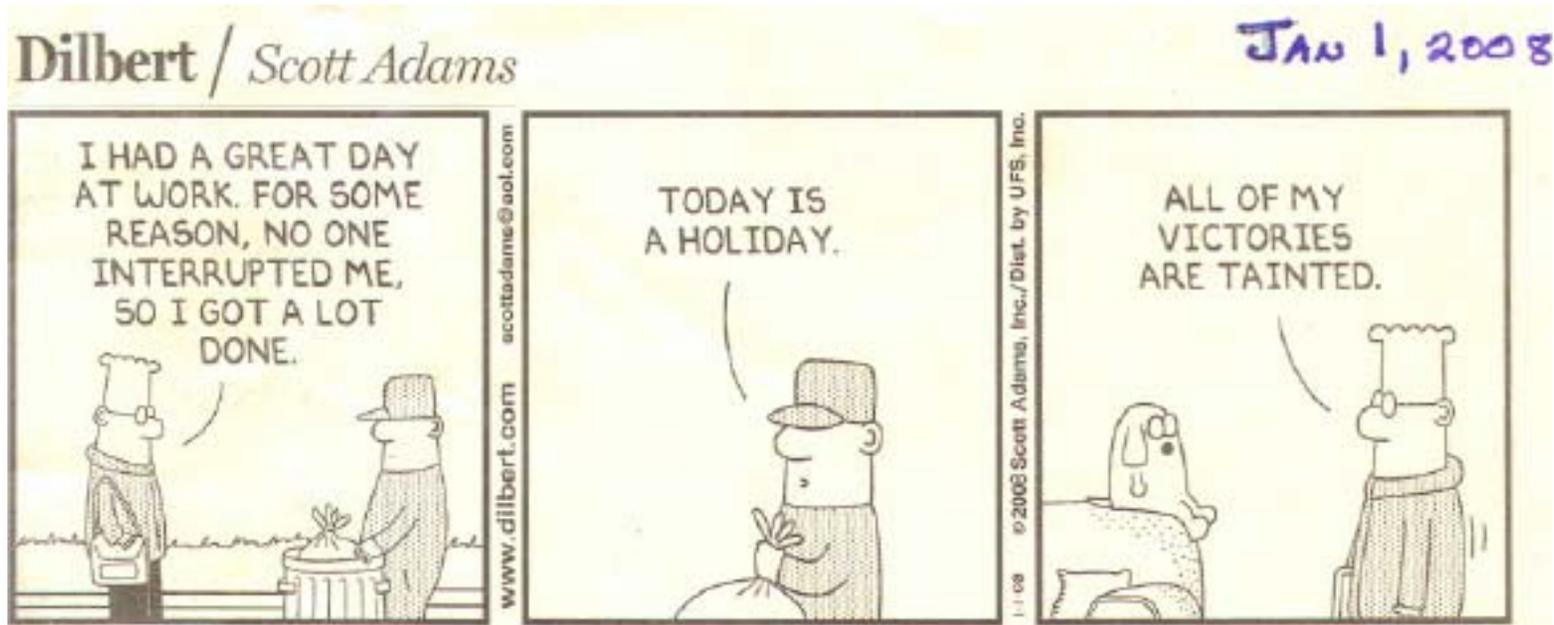
# A Note about Distractions & Return to Concentration....Employee Reports

Counts	Workspace	Managers only		Full Sample	
		N	Average	N	Average
<b>a. Times/Day: Noise disruptions</b>	Private Office	28	<b>5.6</b>	34	<b>4.9</b>
	Cubicle	17	<b>13.2</b>	169	<b>11.5</b>
<b>b. Times/Day: People drop in my workspace (no sig. diff)</b>	Private Office	29	3.3	35	3.4
	Cubicle	16	4.8	167	3.9
<b>c. Times/Day: People drop in, talk to OTHERS</b>	Private Office	27	<b>2.4</b>	33	<b>2.5</b>
	Cubicle	16	<b>4.8</b>	167	<b>5.1</b>
<b>Total # of Reported Interruptions</b>	Private Office	29	<b>11</b>	35	<b>10.6</b>
	Cubicle	17	<b>22.3</b>	171	<b>20.2</b>
<b>Ave. Mins: Return to concentration</b>	Private Office	29	<b>2.6</b>	35	<b>2.5</b>
	Cubicle	17	<b>5.3</b>	165	<b>4.3</b>
<b>Minutes/Day Lost to Interruptions</b>	Private Office	29	<b>27.7</b>	35	<b>25.4</b>
	Cubicle	16	<b>69.3</b>	163	<b>59.6</b>

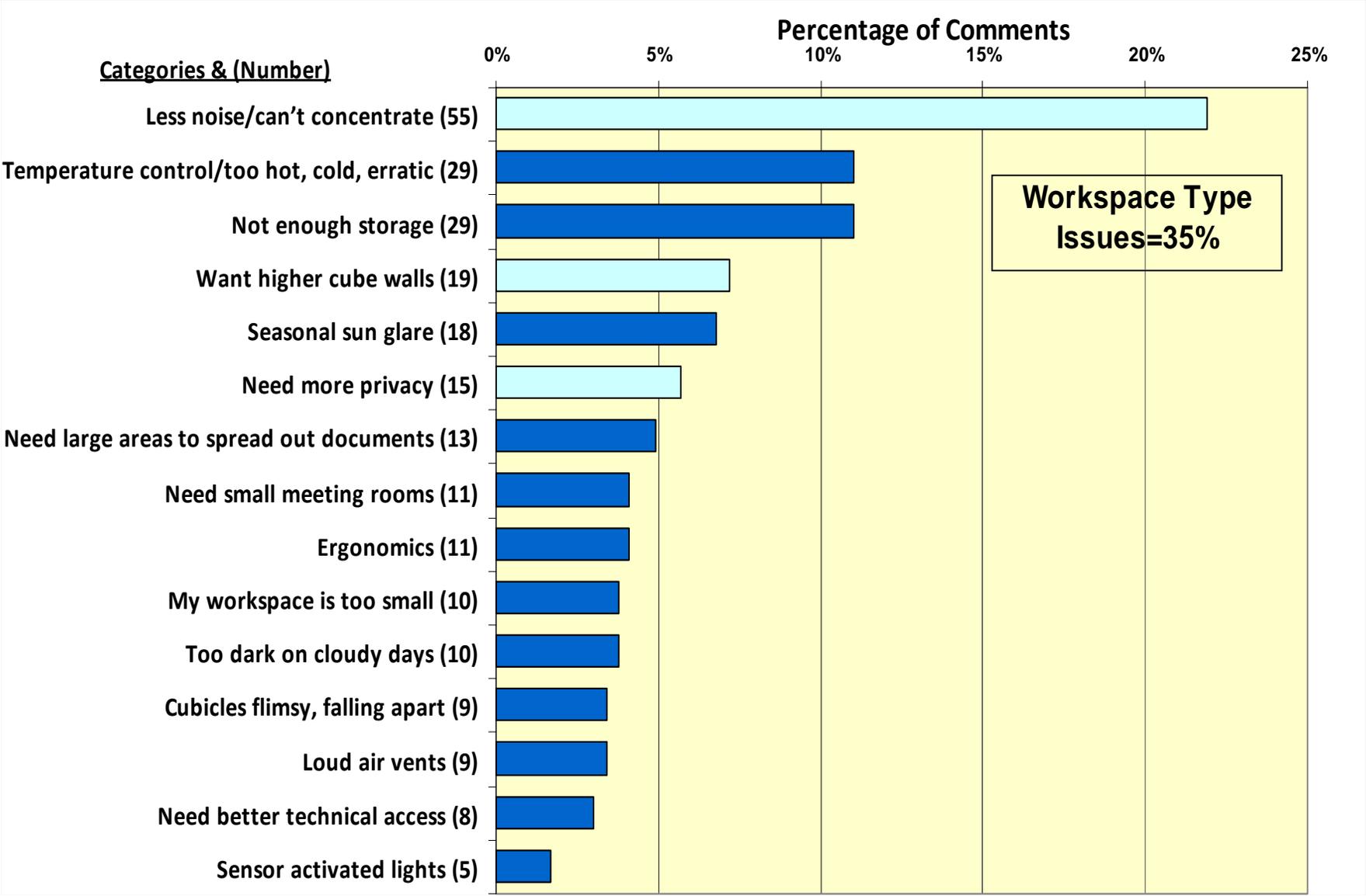
# Thank you, again, Scott Adams....

## INTERRUPTIONS, re-visited

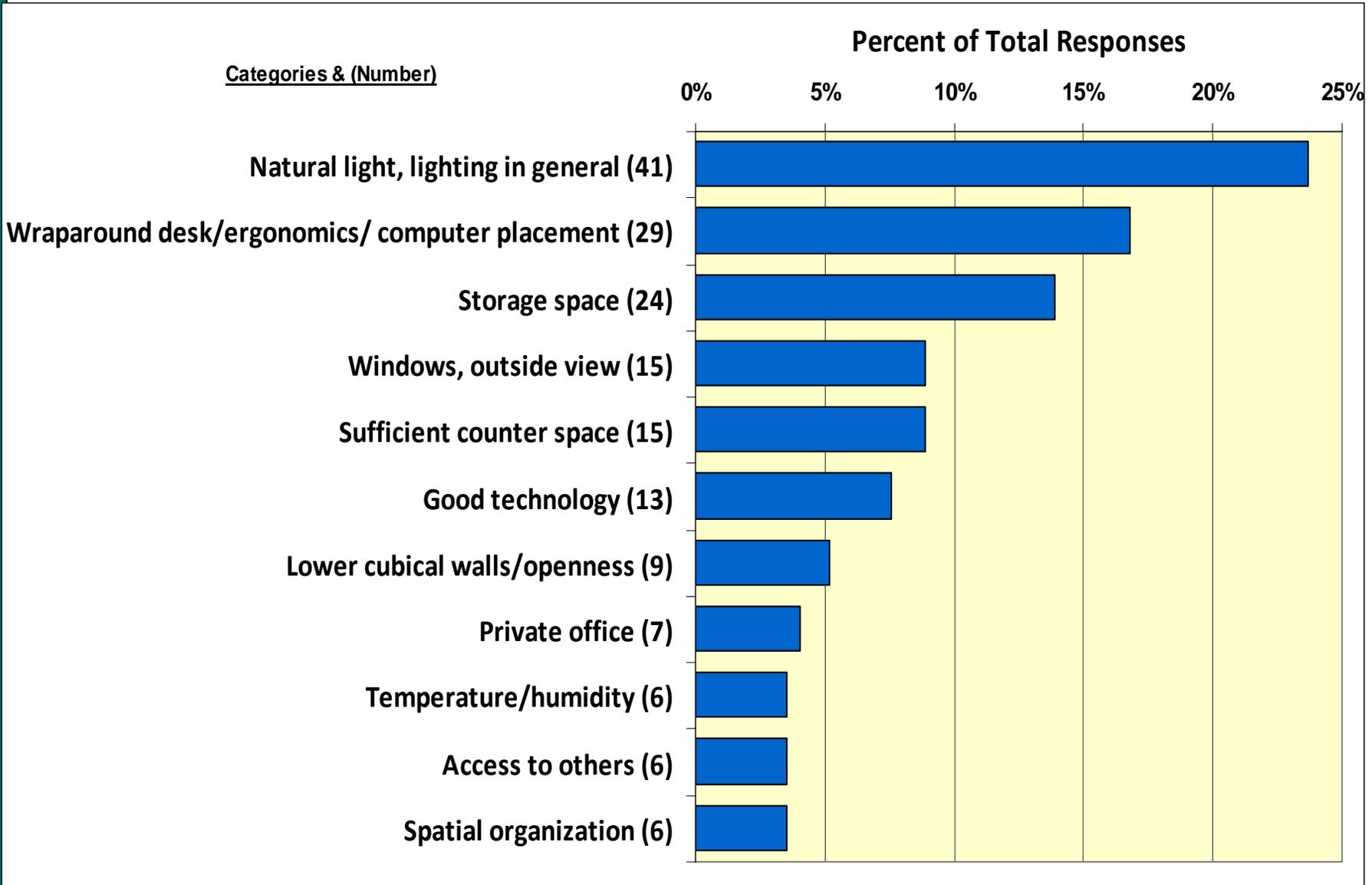
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# Needs Improvement: Workspace Comments



# What Works Well in the Workspace?



# Interactions:

## Impacts on Performance

	Outcomes		% Agree
	Productive in Wrkspc	Overall Performance	
Building interactions & informal learning	#	#	72%
Shared spaces (atrium, meeting rooms, food court, break areas)	#	#	61%
Workspace interactions	#	#	26%
Good places for group meetings (not in workspaces)	#	#	57%

- Support for interactions & informal learning is most important, and is well supported
- Workspace interactions not well supported

# Building Features: Impacts on Performance

BUILDING FEATURES	Outcomes		% Agree
	Productive in Wrkspc	Overall Performance	
Building light features (lighting controls, interior & exterior shading, indirect lighting)	#	#	65%
Furniture, colors, material finishes	#	#	53%
Support for water-saving features	#	#	72%
Evaluation of low-flow faucets & toilets	#	#	65%
No problems w/ raised flooring (*most were neutral)	#	#	44%*

# Employee Beliefs & General Building Aspects: Performance

Employee Beliefs & General Building Aspects	Outcomes		% Agree
	Productive in Wrkspc	Overall Performance	
Employee environmental awareness & support for sustainability	#	#	60%
Interpretation of building & site to public well done	#	#	44%
Perceived safety (accidents & others)	#	#	56%
Building is energy efficient	#	#	42%
Building is well maintained	#	#	61%

- Employee beliefs about sustainability are important and positive
- Adequacy of interpretation is important, but employees feel improvements are needed
- Safety is important, and generally positive

# Exterior Aspects: Performance

Exterior Aspects	Outcomes		% Agree
We have good places OUTSIDE the building to take a break, relax	#	#	41%
Shuttle Services	#	---	29%
Natural Vegetation & Landscaping Around Building	#	#	26%

- No big impacts, in terms of correlations, but few people evaluate them positively
- Written comments offer reasons, will discuss with Satisfaction outcomes

# Workplace Features: **Impacts on Satisfaction**

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- **Similar findings, as for Performance**
- **Stronger for more specific measures than for more general measures**
  - **Effects on workspace satisfaction are stronger than for Job Satisfaction**
- **But both tend to be a bit stronger than the effects on Performance**
- **And, remember, satisfaction has been linked to retention (although retention not measured here)**

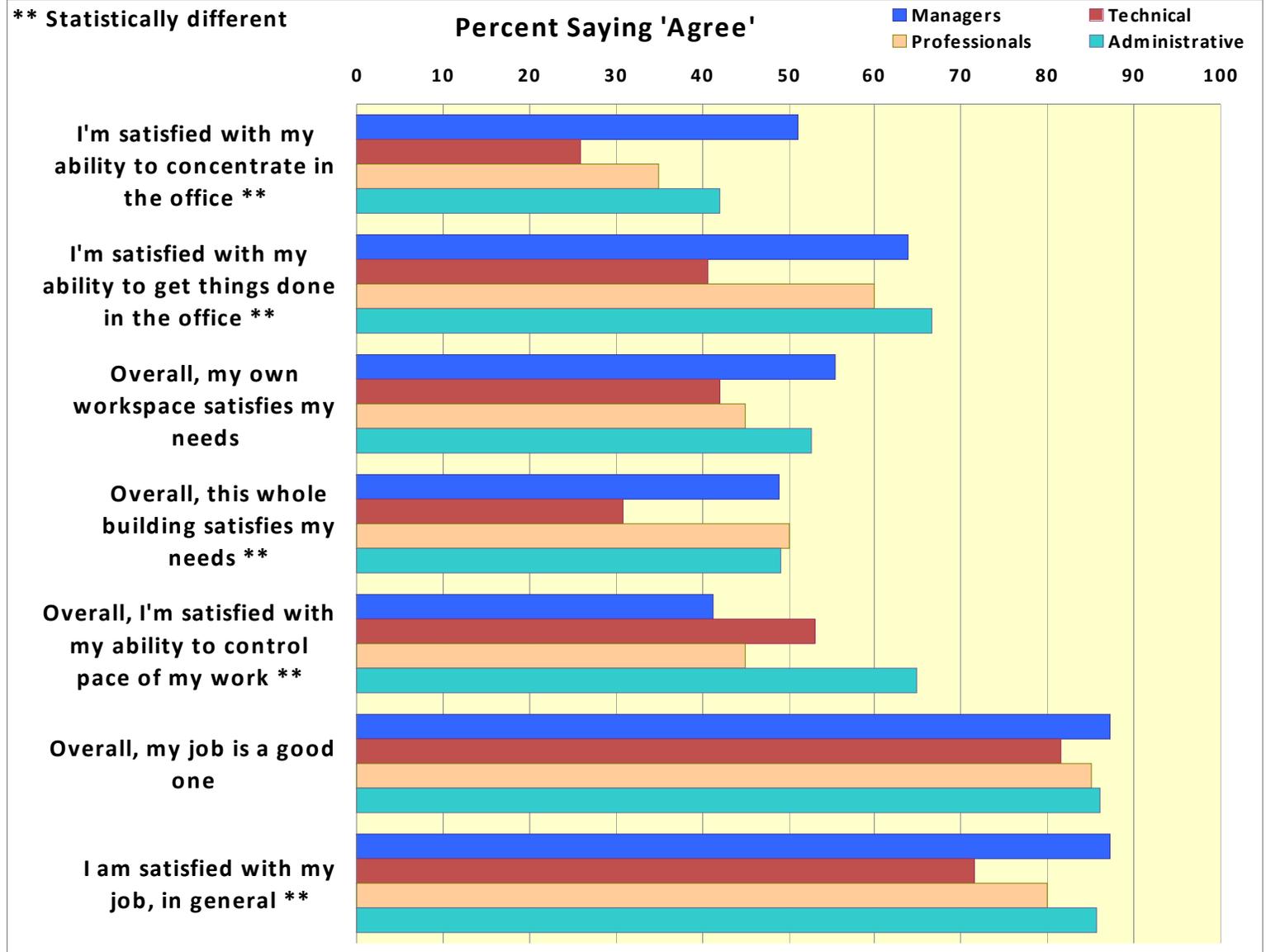


# First, Satisfaction Levels....

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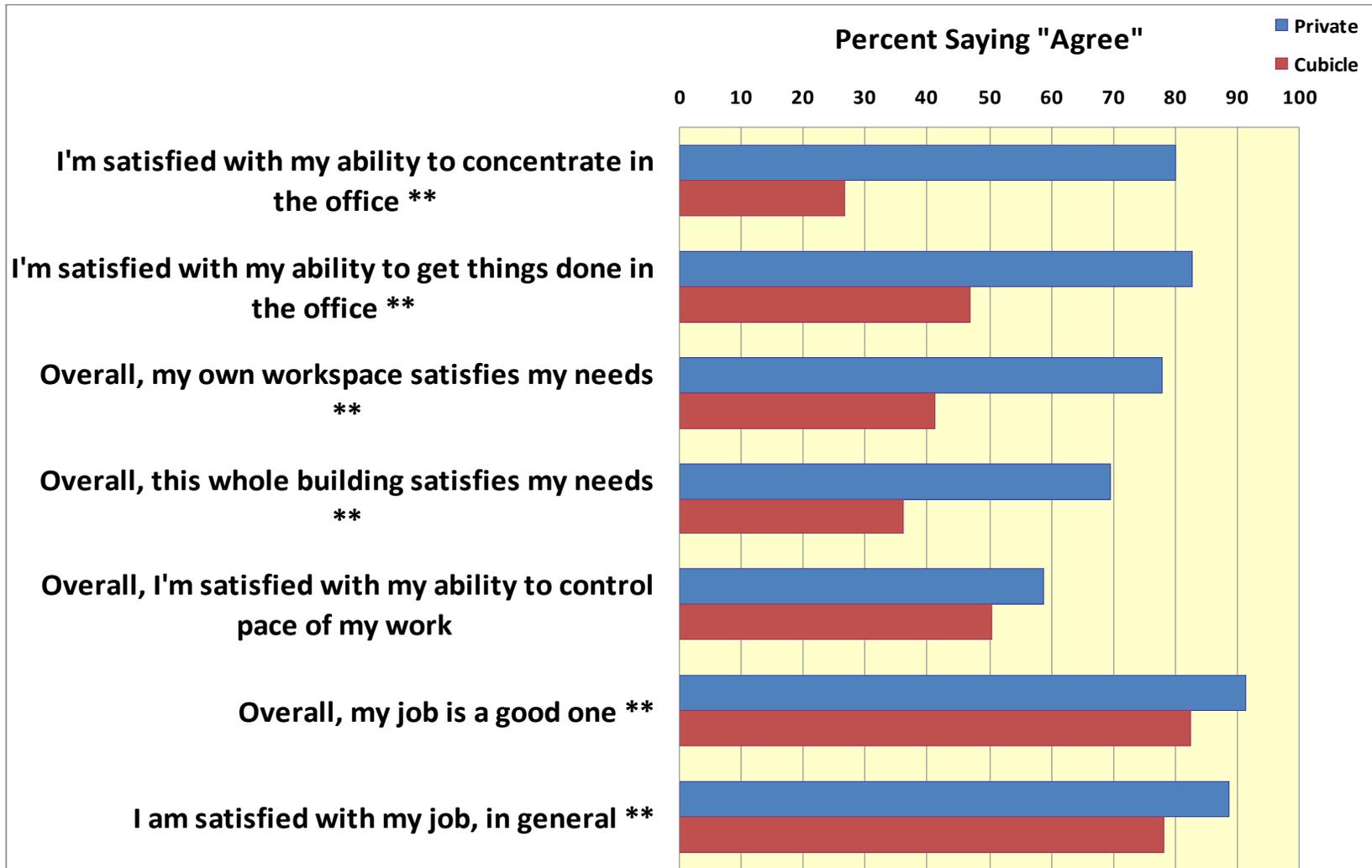
- **By Job Type**
- **By Workspace Type**

# Satisfaction: Job Type Comparisons



# Satisfaction: Workspace Comparison

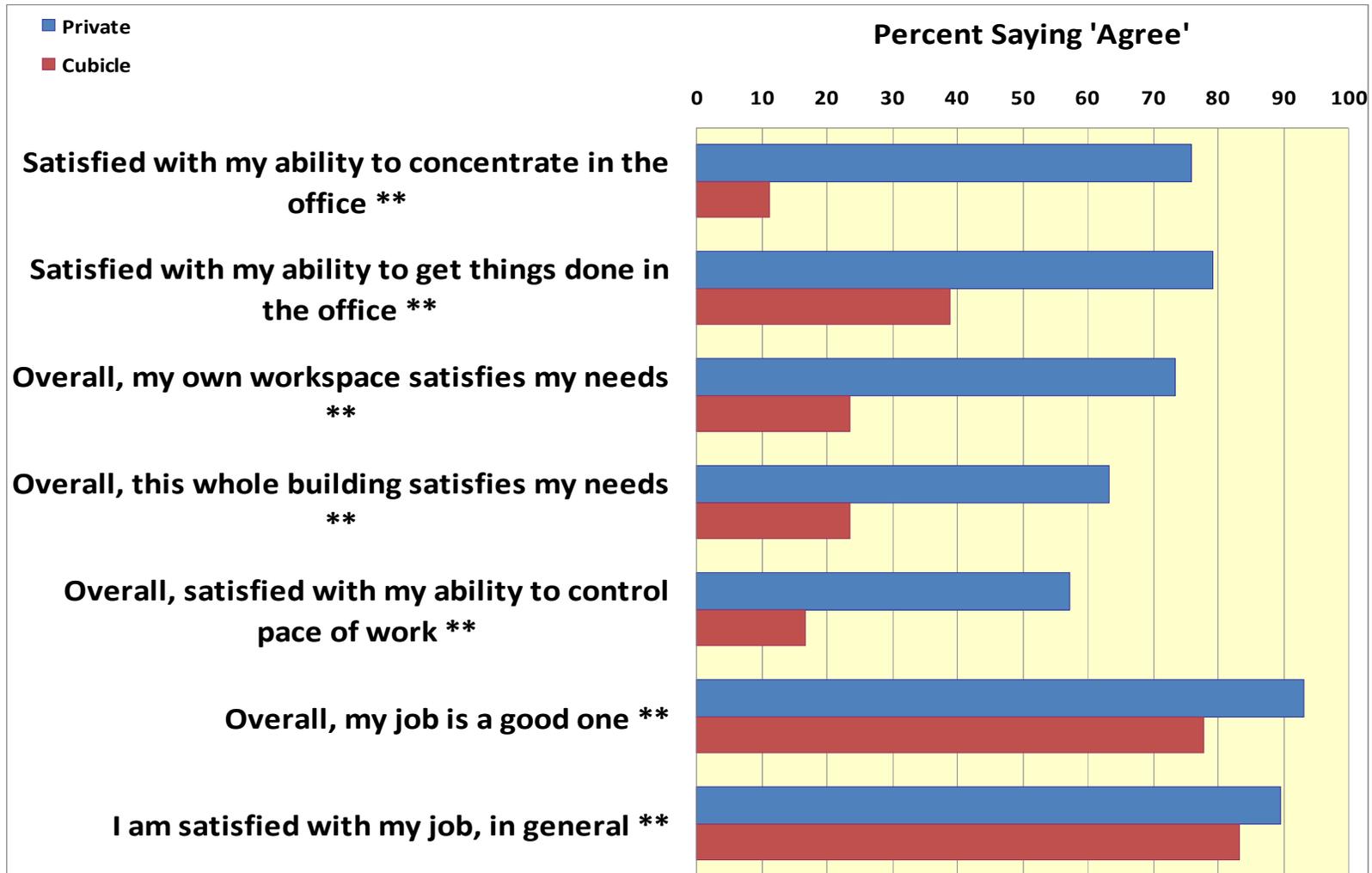
(Full sample)



- Those in offices more satisfied for all but 1 item (no difference for that one)

# Satisfaction: Workspace Comparison

(Managers Only)



- Difference is even more extreme....when Job Type is controlled for

# Workspace Features: Impacts on Satisfaction

	Outcomes		% Agree
	Workspace Satisfaction	Job Satisfaction	
Able to do focused work in workspace	#	#	26%
Time needed to regain focus, after distraction	#	--	3.9 minutes
Workspace well designed (storage, furniture, space, comfort)	#	#	51%
Workspace colors & materials	#	--	41%
Workspace lighting (electric & natural, and control of it)	#	#	69%
Workspace temp, air control, few drafts	#	#	52%

Being able to focus on work, and having a well-designed workspace (to support work), are most important in affecting satisfaction

# Interactions:

## Impacts on Satisfaction

	Outcomes		% Agree
	Workspace Satisfaction	Job Satisfaction	
Building interactions & informal learning	#	#	72%
Shared spaces (atrium, meeting rooms, food court, break areas)	#	#	61%
Workspace interactions	#	#	26%
Good places for group meetings (not in workspaces)	#	#	57%

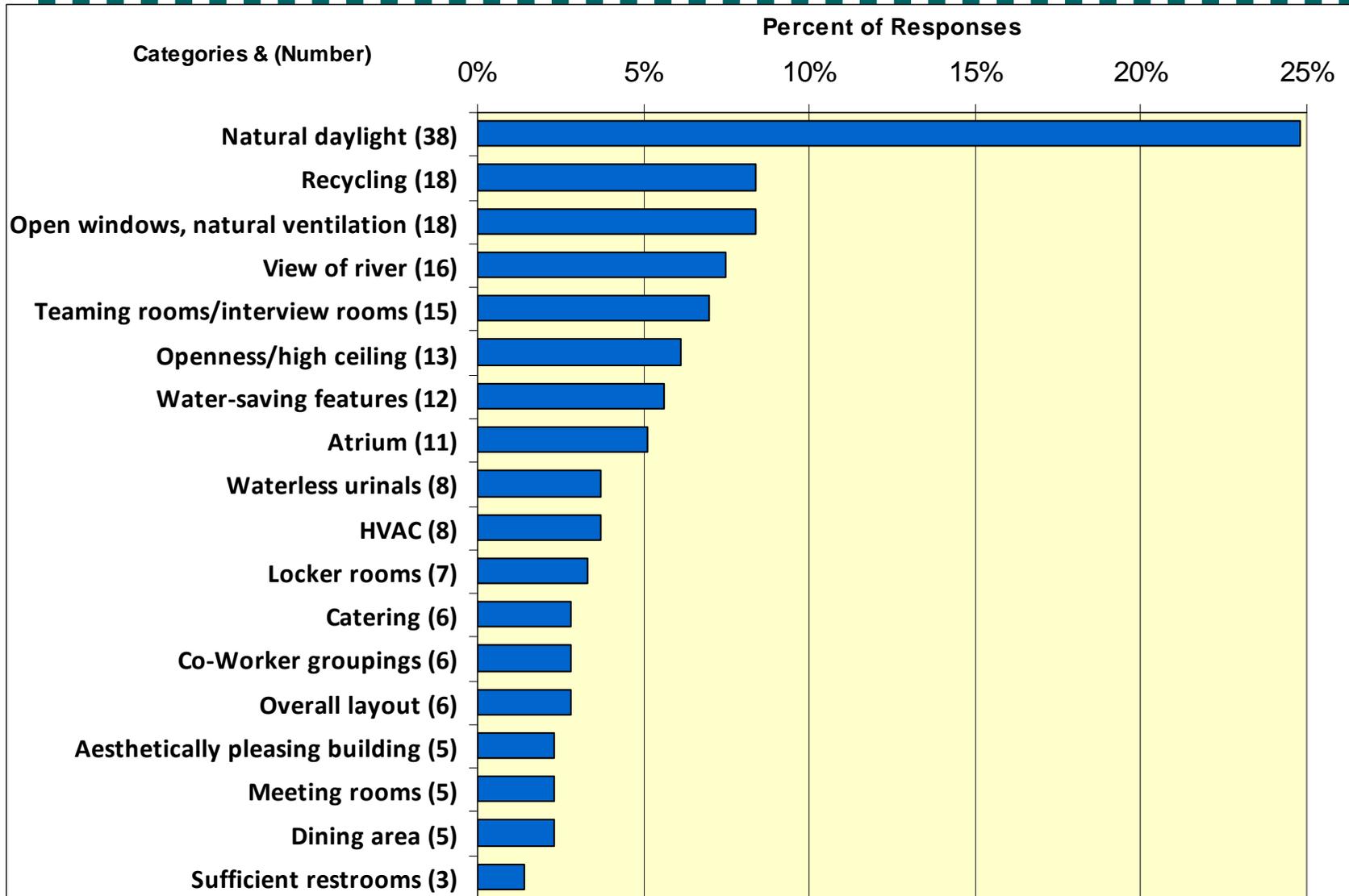
- Having opportunities for interactions & informal learning in the building areas have strong positive impacts on workspace satisfaction (can't easily interact in cubicles)
- Workspace interactions not positively perceived; comments from cubes indicate noise problems

# Building Features: Impacts on Satisfaction

	Outcomes		% Agree
	Productive in Wrkspc	Overall Performance	
Building light features (lighting controls, interior & exterior shading, indirect lighting)	#	#	65%
Furniture, colors, material finishes	#	#	53%
Support for water-saving features	#	#	72%
Evaluation of low-flow faucets & toilets	#	#	65%
No problems w/ raised flooring (*most were neutral)	#	#	44%*

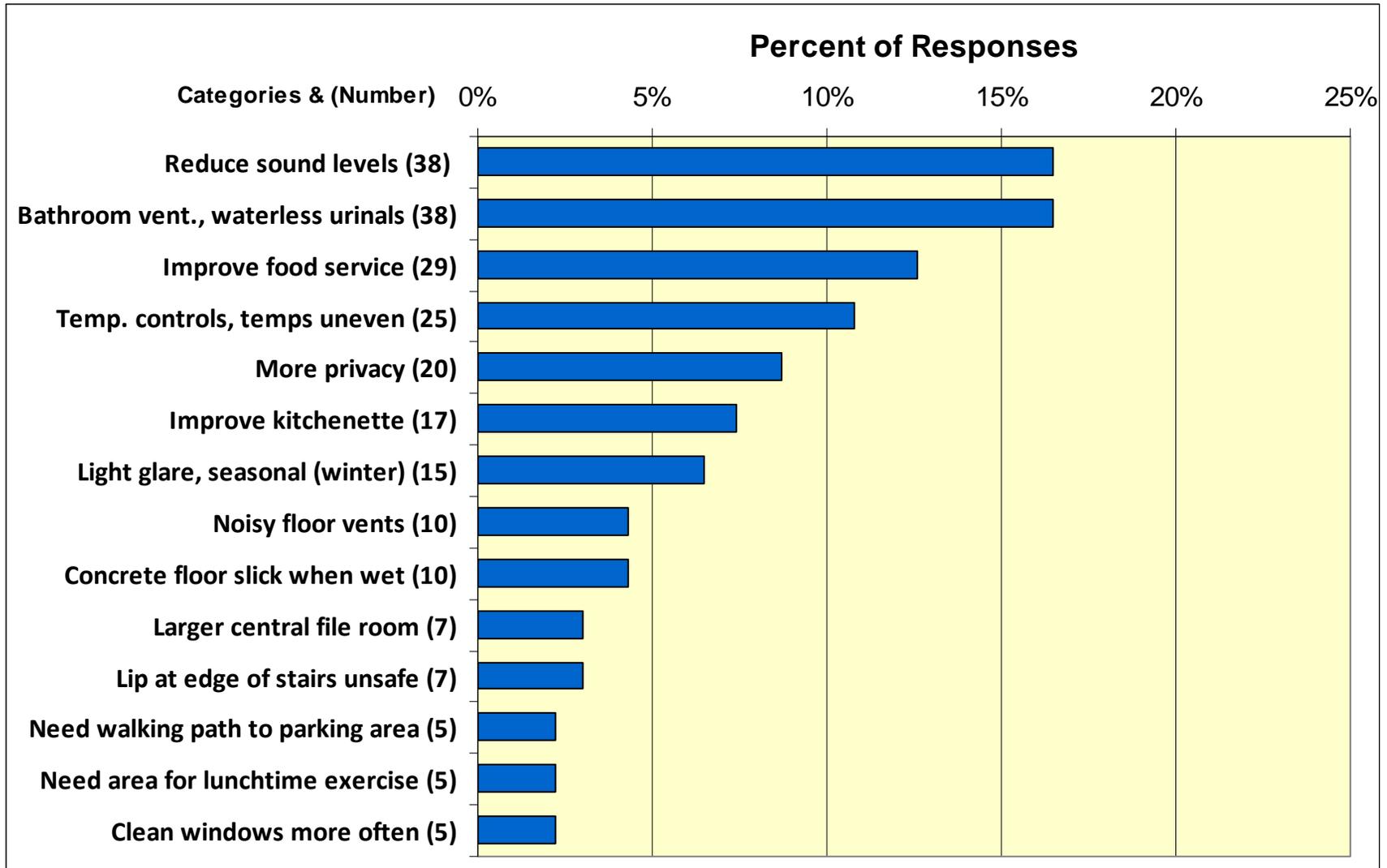
- Big impacts of building light features on workspace productivity
- Great appreciation of light and other sustainable features

# What Works Well in the Building?



- Natural daylight is a big hit

# Needs Improvement: Building



- Sound levels and odors from bathroom features a problem

# Employee Beliefs & General Building Aspects: Satisfaction

Employee Beliefs & General Building Aspects	Outcomes		% Agree
	Workspace Satisfaction	Job Satisfaction	
Employee support for sustainability	#	#	60%
Interpretation of building to public	#	#	44%
Perceived safety (accidents & others)	#	#	56%
Building is energy efficient	#	#	42%
Building is well maintained	#	#	61%

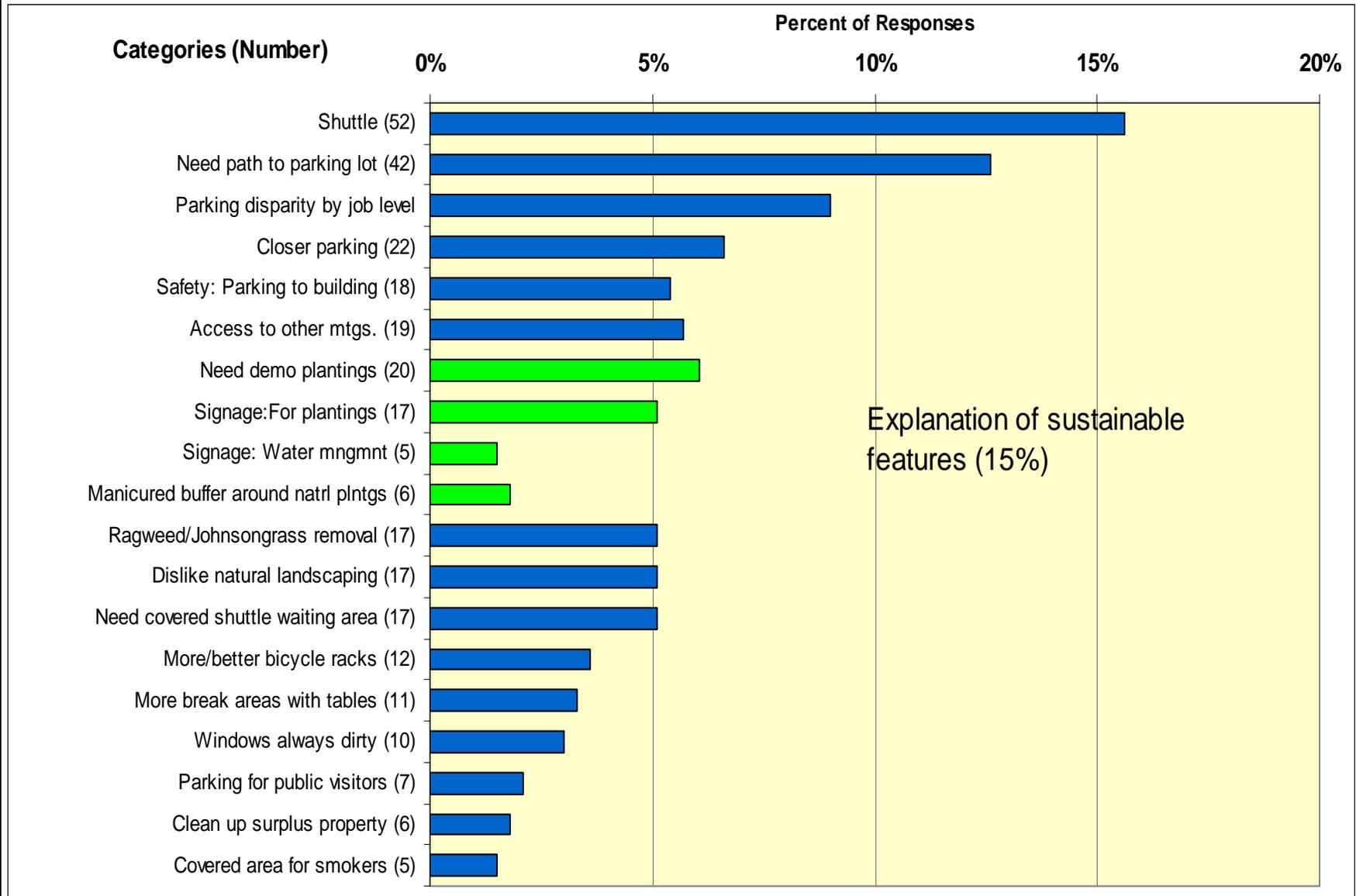
- Employee support for sustainability generally high, and strongly related to workspace satisfaction

# Exterior Aspects: Satisfaction

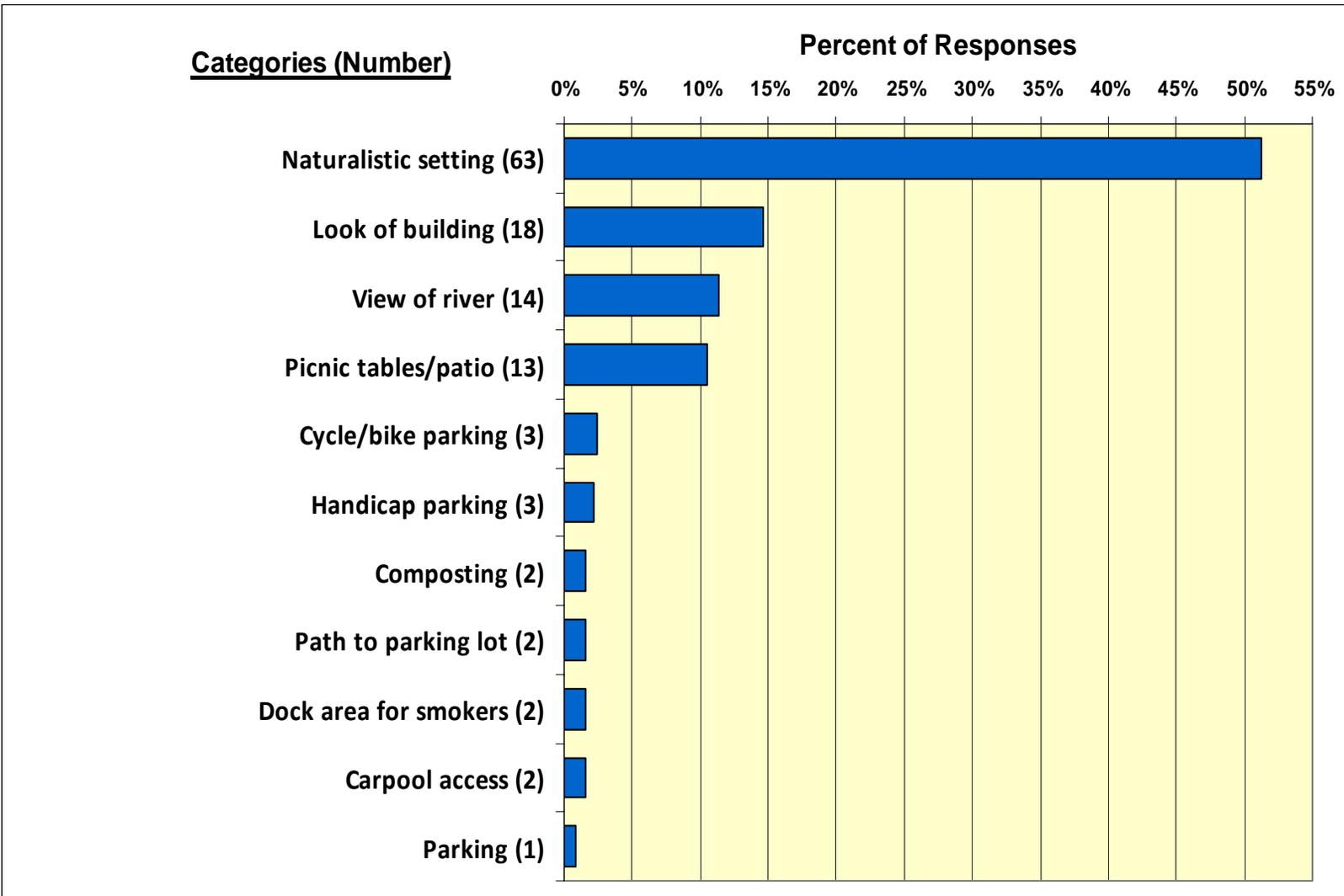
Exterior Aspects	Outcomes		% Agree
	Workspace Satisfaction	Job Satisfaction	
Natural Vegetation & Landscaping Around Building	#	#	25.6%
We have good places OUTSIDE the building to take a break, relax	#	#	40.6%
Shuttle Services	#	#	29.3%

- No large impacts on major satisfaction outcomes
- But negative evaluations a problem
- Written comments provide further information

# Improvements Needed: Exterior



# What Works Well Outside?



# Summary of Major Impacts



- **Combining results.... from Performance & Satisfaction outcomes**

# Top 10 Factors Affecting Outcomes

Workplace Characteristics	SATISFACTION	PERFORMANCE	% Agreement
Able to do focused work in workspace	#	#	26%
Workspace well designed (storage, furniture, space, comfort)	#	#	51%
Shared spaces (atrium, meeting rooms, food court, break areas)	#	#	61%
Employee support for sustainability	#	#	60%
Building furniture, colors, material finishes	#	#	53%
Building light features (lighting controls, interior & exterior shading, indirect lighting)	#	#	65%
Perceived safety (accidents & others)	#	#	56%
Interpretation of building to public	#	#	44%
Building is energy efficient	#	#	42%
Building interactions & informal learning	#	#	72%

# Most Important Impacts on Outcomes?

- The place where people spend most of their time, and most of that time is doing work that requires focus & concentration....the workspace
- Shared spaces in the building....important for specific activities, but also provide support for *interaction & informal learning*, another important factor in satisfaction and performance
- Employee support for sustainability
- Building furniture, colors & material finishes
- **All positively evaluated, except being able to do focused work in the workspace (affected by workspace type)**

# Workspace Type & Natural Light....

## A Conflict for Building Design?

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- Enclosed offices typically not used because of their initial cost (higher than cubes)
- In green buildings, use is even more rare because 'they would block the natural light'
- **DILEMMA: Considerations for resolution**
  - While natural lighting is highly valued, it is not as important as being able to concentrate, in terms of its **effect on outcomes**
  - Are there other design solutions to allow natural light into enclosed offices
    - Clear panels?
    - What else?
  - And....what about other types of **sound control**?
  - **Priority...to address most important factors**

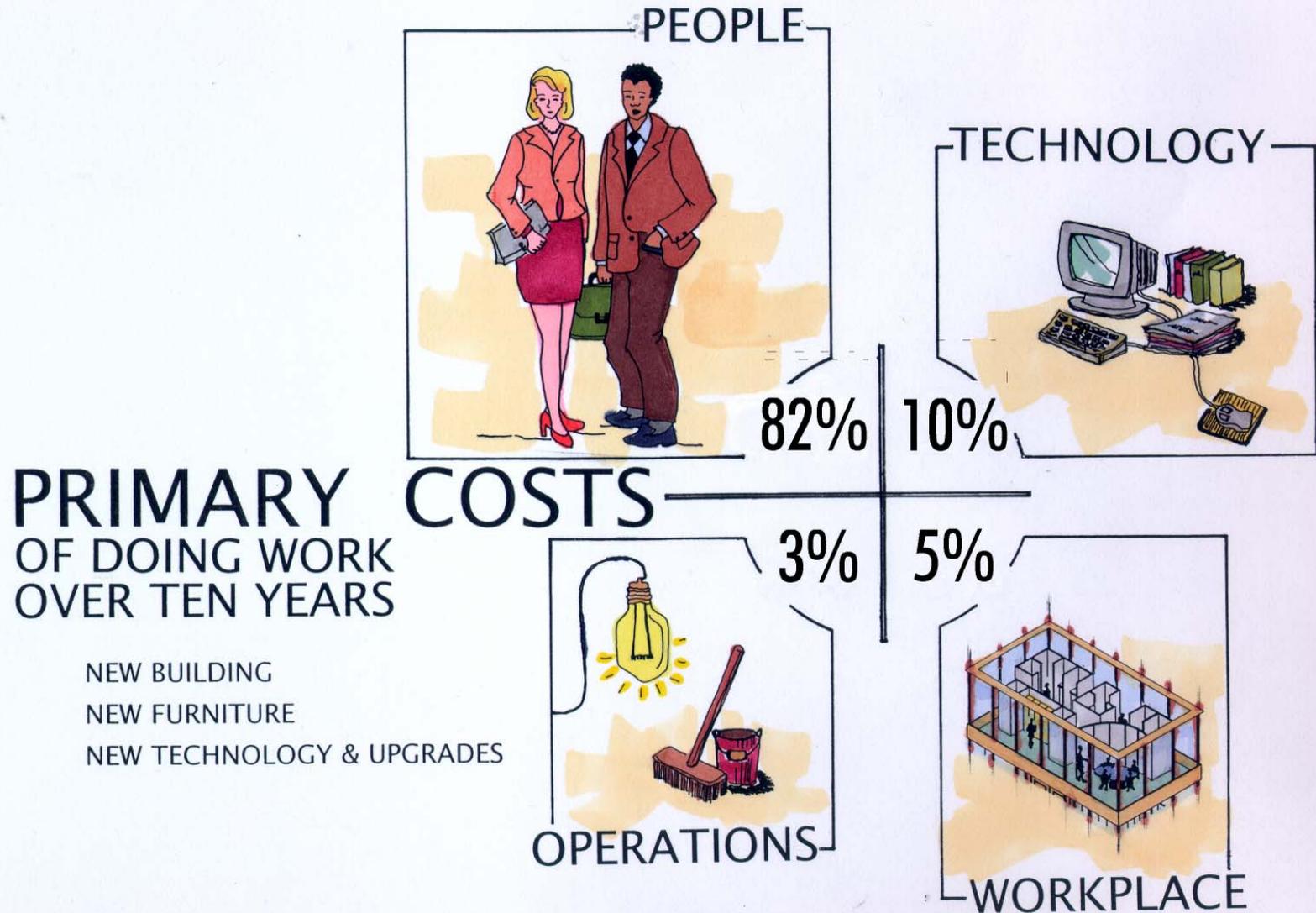
# Don't forget....



- The workplace is a tool
- **People** are the long term primary resources for the organization
- Their work needs to be well supported by the workplace
- Make the tool fit the job...employees and the organization will benefit



# The entire workplace is a very small portion of total costs of doing work



# Questions?



**Thanks! Contact me later if you have  
other questions**

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# Additional info, if of interest



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- Not intended as part of the presentation, but a couple of examples and some cost info

# Small, private offices....

## One example

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•Transwall design, based on BOSTI recommendations

# Cost Comparisons (an example)

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<b>SIZE</b>	<b>“Cockpit” Office*</b>	<b>Cubicle</b> (Ave. price)
<b>8 X 8</b>	<b>\$5,800</b>	<b>\$2,300</b>
<b>8 X 6.5</b>	<b>\$5,400</b>	<b>\$2,200</b>

\*Transwall cost per ln/ft is \$225

**But....it isn't an 'apples to apples' comparison**

# Productivity increase... 'pays it back' in time

Productivity Increase w/ 'Cockpit' Office							
Salary & Benefits Package	% Increase	Savings/Year	Year				
			one	two	three	four	five
30,000	0.03	900	900	945	992	1042	1094
40,000	0.03	1200	1200	1260	1323	1389	1459
50,000	0.03	1500	1500	1575	1654	1736	1823
60,000	0.03	1800	1800	1890	1985	2084	2188
70,000	0.03	2100	2100	2205	2315	2431	2553

**The return on the additional investment is about 2.5 years, depending on job level** (based on BOSTI Associates analyses).

(From Transwall, 2008)

# Another example, a shared cubicle, but showing clear panels, to allow light



- Clear panels would allow natural light
- Help cut down on noise distractions

- Pathways® Technology  
Wall and Ports  
by Steelcase