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# THE EFFECTS OF LAYOUT ATTRIBUTES AND BEHAVIORS ON INDIVIDUALS' PERCEPTION OF PSYCHOSOCIAL CONSTRUCTS IN OFFICES

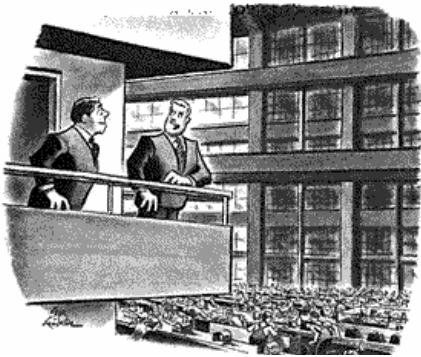
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## Importance of Space



***“Productivity is up nine percent since I made everyone a vice-president.”***

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***“And the dim fluorescent lighting is meant to emphasize the general absence of hope.”***

- **21% - Physical workspace impacts decisions to accept or leave a job**
- **41% - Physical workspace influences taking a new job**
- **51% - Physical workspace influences staying in a job**
- **68% - Office design needs to be reviewed at least once a year to help companies remain competitive**
- **36% - Office design should be reviewed at least once a year**

Source: ASID (2001). “Workplace Values: How Employees Want to Work”



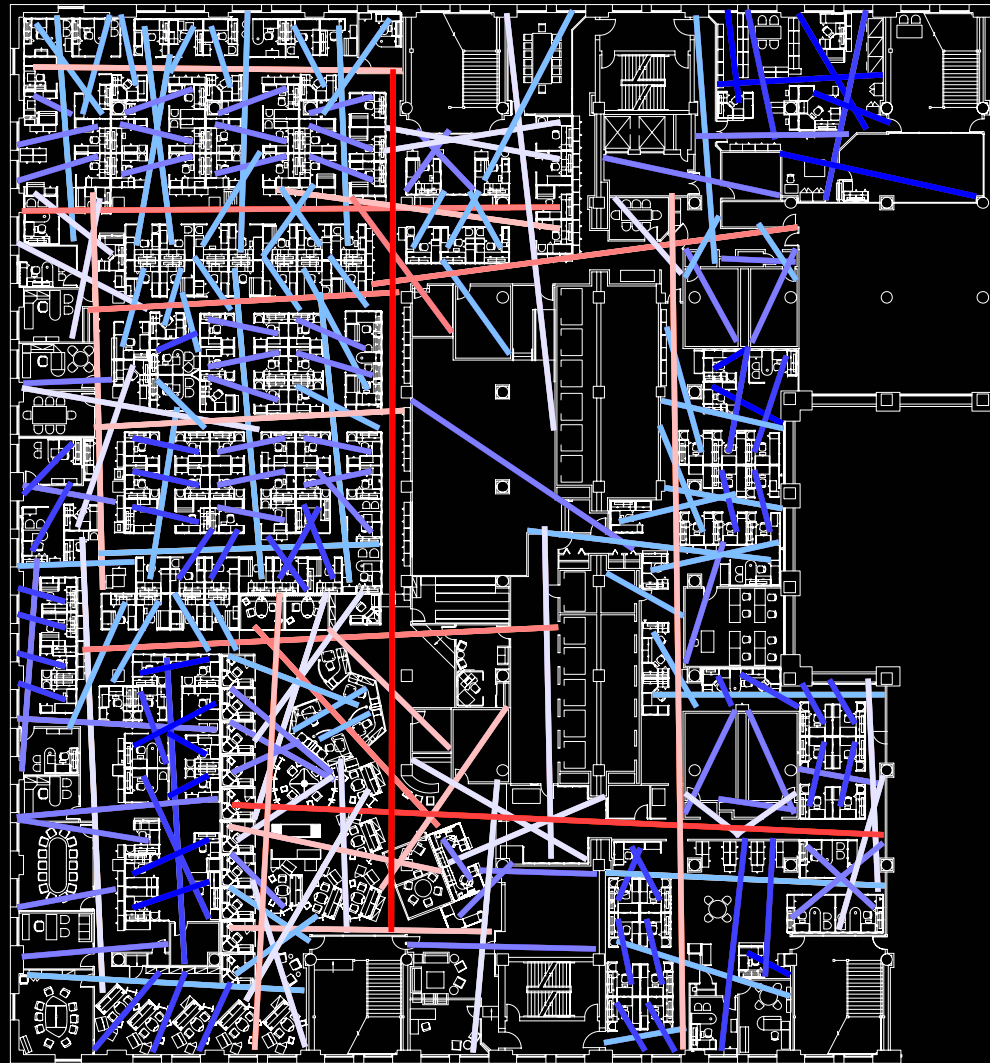
## Important Factors

- **Access (i.e., proximity to resources)**
- **Communication**
- **Comfort**
- **Privacy**
- **Flexibility**
- **Functional Efficiency**

Source: ASID (1998). "Productive Workplaces: How Design Increases Productivity"



## Space Syntax: Axial Map Analysis



### Layout Attributes:

- Integration
- Connectivity
- Length of Axial Line



## Methodology: Behavior Mapping



### Observed Behaviors:

- Movement
- Face-to-face Interaction
- Visible Co-presence



# Model Linking Layout Attributes and Behaviors

## Spatial Variables

- Visual Fields
- Relational pattern of space
- Sightlines, etc.

## Spatial Behavior

- Visible Co-presence
- Movement

Encounter

Face-to-face Interaction



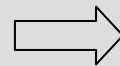
# Relationships of Layout Attributes and Observed Behaviors

Correlations between observed behaviors in the office settings

	Wanamaker 6	MLK 4	MLK 5	Eagleton 3
Movement & Interaction	0.132	0.144	0.839	0.501
Co-presence & Interaction	0.904	0.861	0.889	0.741
Co-presence & Movement	0.174	0.174	0.785	0.369

## Spatial Variables

- INTEGRATION
- CONNECTIVITY
- LENGTH OF LINES



## Spatial Behaviors

- VISIBLE COPRESENCE
- MOVEMENT



FACE-TO-FACE INTERACTION

Organizational and/or social Program

Correlations: spatial variables and observed behaviors

	Wanamaker 6	MLK 4	MLK 5	Eagleton 3
Integration & Movement	0.325	0.769	0.393	0.412
Connectivity & Movement	0.222	0.643	0.125	0.618
Length & Movement	0.235	0.531	0.226	0.663
Integration & Interaction	-0.252	-0.131	0.188	-0.273
Connectivity & Interaction	-0.221	-0.078	-0.053	-0.058
Length & Interaction	-0.130	-0.289	0.051	0.025
Integration & Co-presence	-0.182	-0.112	0.186	-0.554
Connectivity & Co-presence	-0.163	0.041	0.146	-0.395
Length & Co-presence	-0.132	-0.313	0.248	-0.240



## Interactions in office settings

Office Settings	Interactions at different locations				All Locations along the route
	Individual workspaces	Designated areas and/or meeting rooms	Corridors	Common and/or service areas	
Wanamaker 6	109 (80.74%)	15 (11.11%)	7 (5.18%)	4 (2.96%)	135 (100%)
MLK 4	60 (75%)	0 (0%)	17 (21.25%)	3 (3.75%)	80 (100%)
MLK 5	77 (55%)	13 (9.28%)	31 (22.14%)	19 (13.58%)	140 (100%)
Eagleton 3	99 (66.44%)	5 (3.35%)	12 (8.05%)	33 (22.15%)	149 (100%)





## Summary Findings: How Layout Attributes and Behaviors Interact

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- People interact more in individual workspaces than in semi-public and public territories.
- The spatial cultures of interaction are different in offices.
- Co-presence is a strong predictor of face-to-face interactions.
- Movement may not consistently predict face-to-face interaction in offices.
- Organizational programs may influence the relationships between spatial variables and behaviors in offices.



## Effects of Layout Attributes and Behaviors on Individual's Perception of Privacy

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- **Hypothesis 1:**
  - Individuals' sense of privacy will be negatively affected by an increase in observed behaviors and layout attributes (direct effects)
  - Any negative effect of an increase in observed behavior on privacy will be amplified in workspaces with a higher value of a layout attribute (moderator effect)



## Effects of Layout Attributes and Behaviors on Individual's Perception of Communality

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- **Hypothesis 2:**
  - **Individuals' sense of communality will be positively affected by an increase in observed behaviors and layout attributes (direct effects)**
  - **Any positive effect of an increase in observed behavior on individuals' sense of communality will be amplified in spaces with a higher value of a layout attribute (moderator effect)**



## Variables Used in Regression Models

<b>Dependent Variables: Individuals' Perception of Psychosocial Constructs</b>	<b>Predictor Variables: Observed Behaviors</b>	<b>Predictor Variables: Layout Attributes</b>
<p>(1) Privacy: "Do not have enough privacy from others"</p> <p>(2) Communalities: "A sense of community exists"</p> <p>(3) Control/Territoriality/Privacy: "Co-workers interrupt work"</p> <p>(4) Communication: "Communications seem good at work"</p> <p>(5) Independence/Autonomy: "Can determine how to do work"</p> <p>(6) Safety: "Generally feel safe at work"</p>	<p>(1) Movement</p> <p>(2) Interaction</p> <p>(3) Copresence</p> <p>(4) Interaction rate</p>	<p>(1) Integration</p> <p>(2) Connectivity</p> <p>(3) Length of Axial Line</p>



- **Four federal office settings were included in the study.**
- **Numbers of workstations in these settings varied between 57 and 163.**
- **131 workers responded to the survey, which was about 37 % of 350 workstations in the four settings.**
- **Of the respondents, 61% were females and 39% males.**
- **Of the respondents, 47.3% professionals, 32.8% staff, 9.2% mid-level managers, and the remainder included senior and low level managers and trainees.**



## Pearson Correlation Matrix for the Study Variables

	Individual's Perception of Psychosocial Constructs						Observed Spatial Behaviors				Attributes of Spatial Layouts		
	Don't Have Enough Privacy From Others	A Sense of Community Exists	Co-Workers Interrupt Work	Communications Seem Good at Work	Can Determine How to do Work	Generally Feel Safe at Work	Movement	Interaction	Copresence	Interaction Rate	Integration	Connectivity	Length
Don't Have Enough Privacy From Others	1												
A Sense of Community Exists	-.195(**)	1											
Co-Workers Interrupt Work	.257(**)	-.139(*)	1										
Communications Seem Good at Work	-.325(**)	.597(**)	-.289(**)	1									
Can Determine How to do Work	-.109	.175(*)	-.081	.170(*)	1								
Generally Feel Safe at Work	-.234(**)	.206(**)	-.166(*)	.334(**)	.120	1							
Movement	.255(**)	-.175	.035	-.247(**)	-.195(*)	-.193(*)	1						
Interaction	.158	.043	.150	.032	-.146	.105	.262(**)	1					
Copresence	.295(**)	-.102	.164	-.113	-.243(**)	.040	.479(**)	.759(**)	1				
Interaction Rate	.116	-.166	.293(**)	-.200(*)	-.198(*)	-.130	.178(*)	.479(**)	.426(**)	1			
Integration	-.091	.225(*)	.040	.177	.074	.166	-.330(**)	-.002	-.236(**)	-.040	1		
Connectivity	.190(*)	.081	.023	-.119	-.184(*)	-.073	.342(**)	.081	.115	.197(*)	.323(**)	1	
Length	.209(*)	.028	.153	-.110	-.203(*)	-.019	.133	.052	.037	.180(*)	.439(**)	.807(**)	1

\*\* Correlation is significant at the 0.01 level (2-tailed).  
 \* Correlation is significant at the 0.05 level (2-tailed).

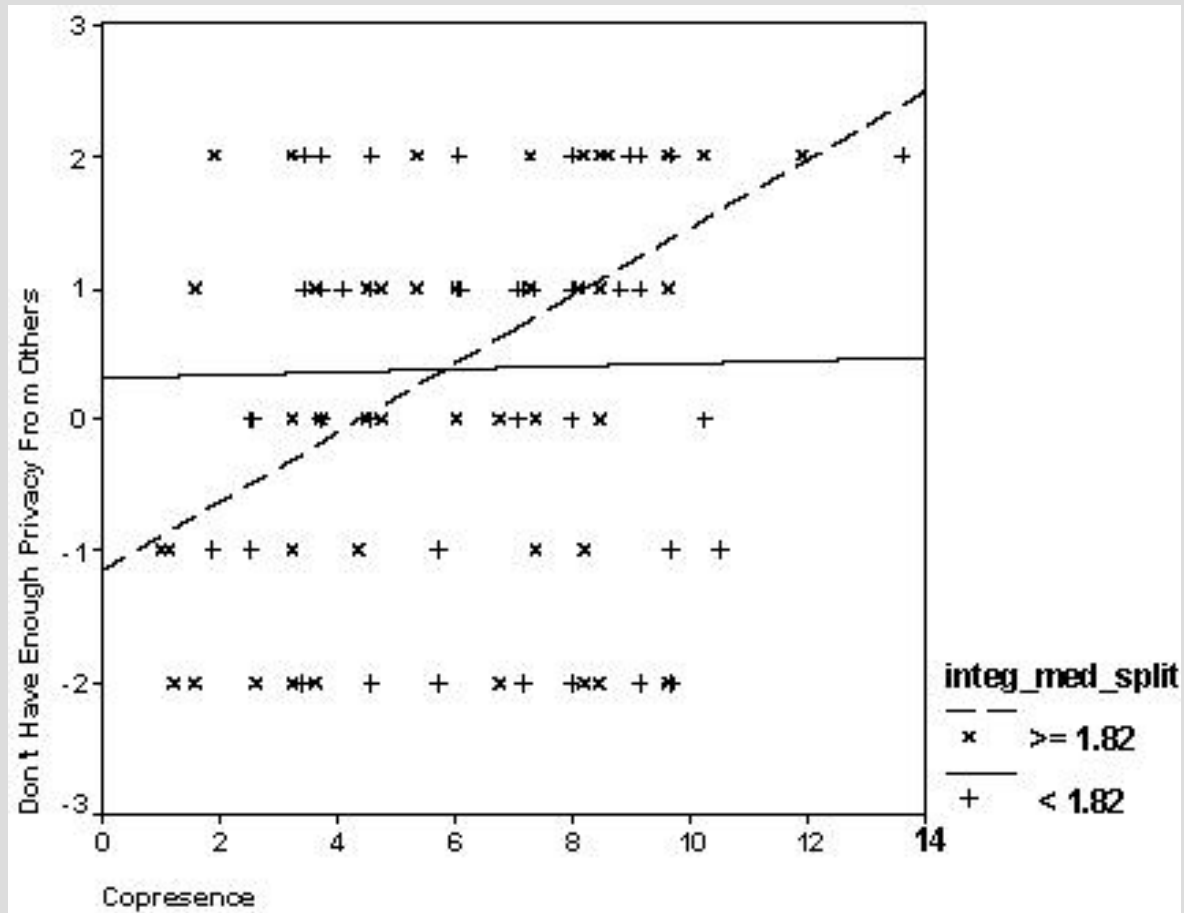


## Multiple Regression Analysis: "Do Not Have Enough Privacy From Others"

	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F (Sig.)	Beta	t	Sig.
<b>Step 1</b>	<b>.331</b>	<b>.109</b>	<b>.078</b>	<b>3.529 (.009)</b>			
Movement (M)					.129	1.253	.213
Interaction (I)					-.133	-.933	.353
Copresence (C)					.323	2.134	<b>.035</b>
Interaction Rate (IR)					.018	.182	.856
<b>Step 2</b>	<b>.391</b>	<b>.153</b>	<b>.100</b>	<b>2.884 (.008)</b>			
Integration (I)					-.098	-.856	.394
Connectivity (C)					-.068	-.415	.679
Length (L)					.296	1.872	.064
<b>Step 3</b>	<b>.486</b>	<b>.236</b>	<b>.091</b>	<b>1.627 (.064)</b>			
M X I					.081	.147	.884
M X C					-.124	-.144	.886
M X L					-.097	-.088	.930
I X I					-1.230	-1.345	.182
I X C					-.749	-.804	.423
I X L					1.440	1.154	.251
C X I					2.019	2.076	<b>.040</b>
C X C					.682	.463	.644
C X L					-1.796	-.992	.324
IR X I					-.365	-.576	.566
IR X C					.426	.719	.474
IR X L					.151	.224	.823



# The effects of Copresence and Integration on "Don't Have Enough Privacy From Others"





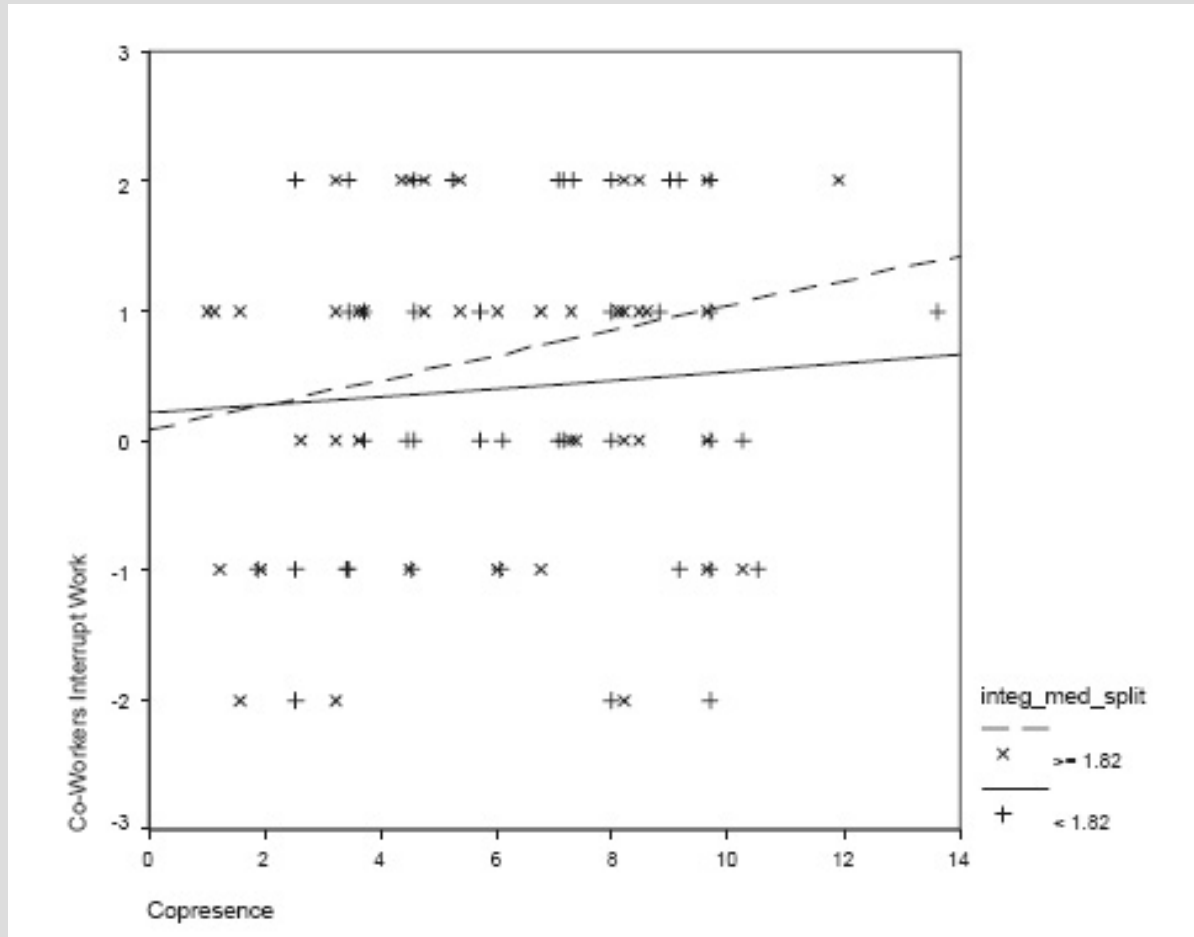


## Multiple Regression Analysis: "Co-workers Interrupt Work"

	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F (Sig.)	Beta	t	Sig.
<b>Step 1</b>	<b>.302</b>	<b>.091</b>	<b>.059</b>	<b>2.844(.027)</b>			
Movement (M)					-.057	-.551	.583
Interaction (I)					-.061	-.421	.674
Copresence (C)					.122	.796	.428
Interaction Rate (IR)					.282	2.754	<b>.007</b>
<b>Step 2</b>	<b>.381</b>	<b>.145</b>	<b>.091</b>	<b>2.669(.014)</b>			
Integration (I)					.050	.436	.664
Connectivity (C)					-.365	-2.224	<b>.028</b>
Length (L)					.380	2.416	<b>.017</b>
<b>Step 3</b>	<b>.477</b>	<b>.227</b>	<b>.077</b>	<b>1.516(.096)</b>			
M X I					-.797	-1.415	.160
M X C					.139	.158	.875
M X L					-.040	-.037	.971
I X I					-2.215	-2.371	<b>.020</b>
I X C					-.036	-.039	.969
I X L					.849	.682	.497
C X I					2.490	2.572	<b>.012</b>
C X C					.293	.203	.840
C X L					-.995	-.569	.571
IR X I					.696	1.103	.273
IR X C					.111	.191	.849
IR X L					-.940	-1.434	.155



# The effects of Copresence and Integration on "Co-workers Interrupt Work"





## Summary Findings

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- **Spatial behaviors and layout attributes *collectively* have significant effects on individuals' perception of privacy, communality, communication, control, autonomy, and safety .**
- **The effects of any individual behavior or layout attribute on individuals' perception of privacy, communality, communication, control, autonomy, and safety are inconsistent.**
- **Integration amplifies the negative effects of copresence on individuals' perception of privacy.**
- **Privacy may affect one's perception of other psychosocial constructs such as security and communality.**



## Future Directions

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- **Working with DEGW to integrate their observational techniques with our techniques. This will produce a rich dataset for**
  - further testing space syntax hypotheses and
  - further validation of space syntax tools and methods
- **Working with GSA to apply some of our findings in Workplace 20.20 projects**

