

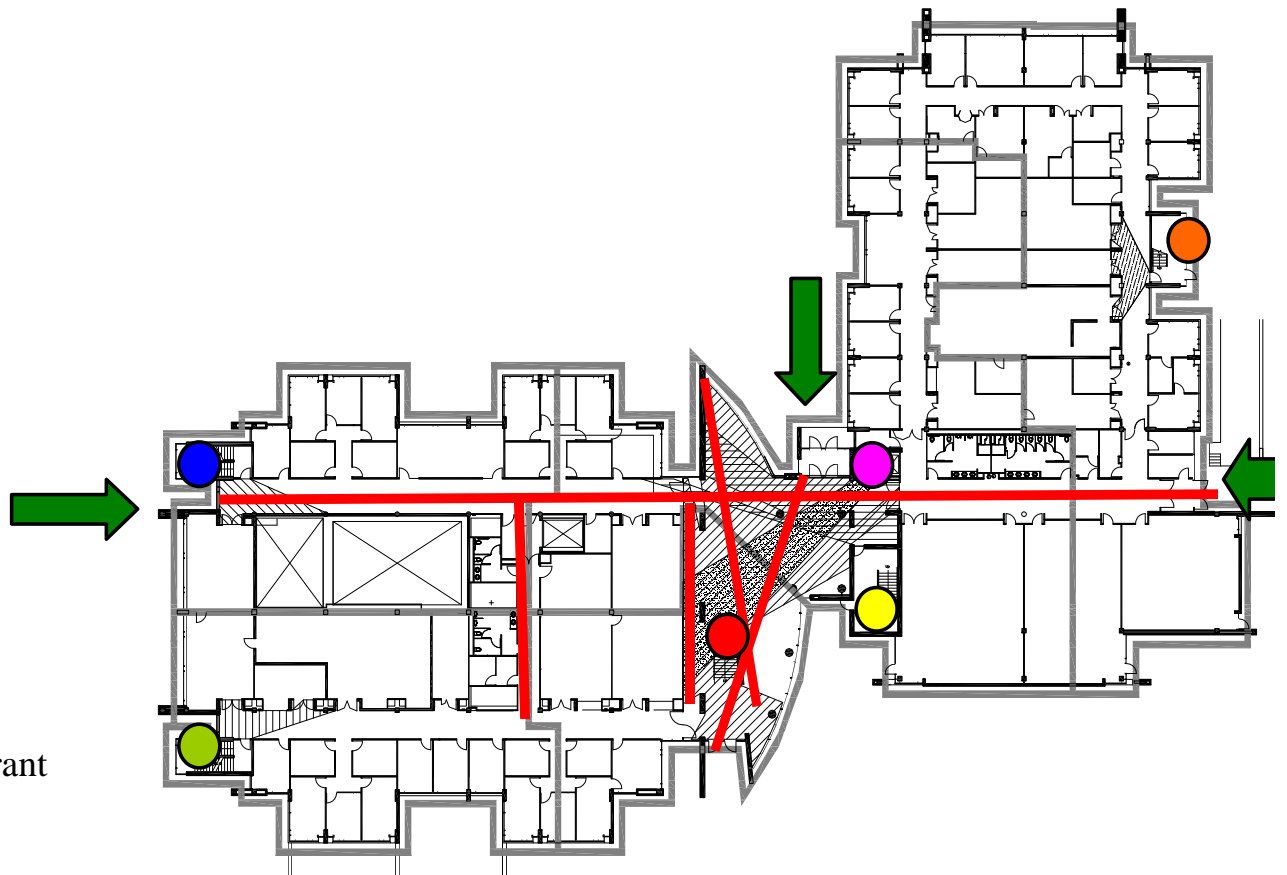
# Taking the Stairs

## Spatial Measures that Influence Stair Use

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Robert Wood Johnson Foundation grant



# Research Design

Create a theoretical & methodological framework for exploring the physical environmental influences of stair use

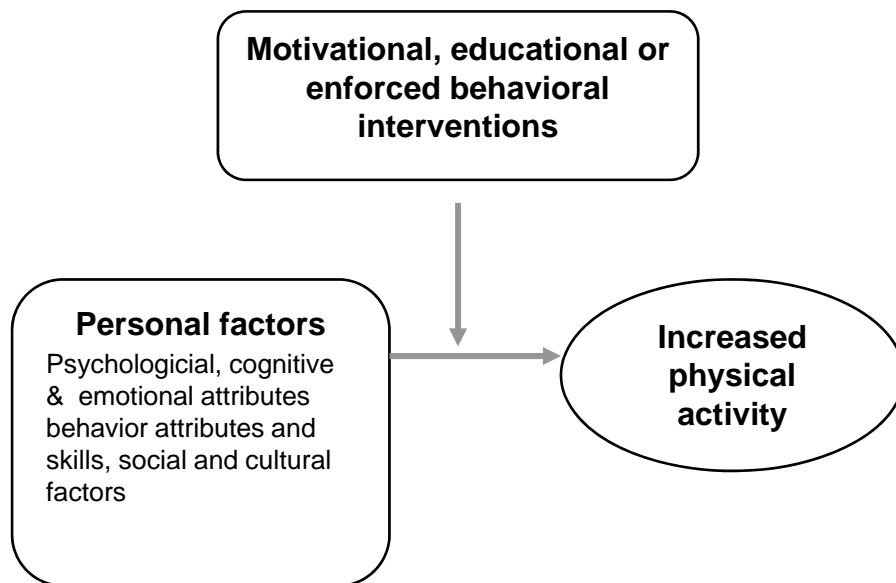
Develop tools and measures for stair use in the physical environment

Examine the influence of identified variables on natural patterns of stair use in buildings-in-use

Identify strategies for stair use in the design of buildings

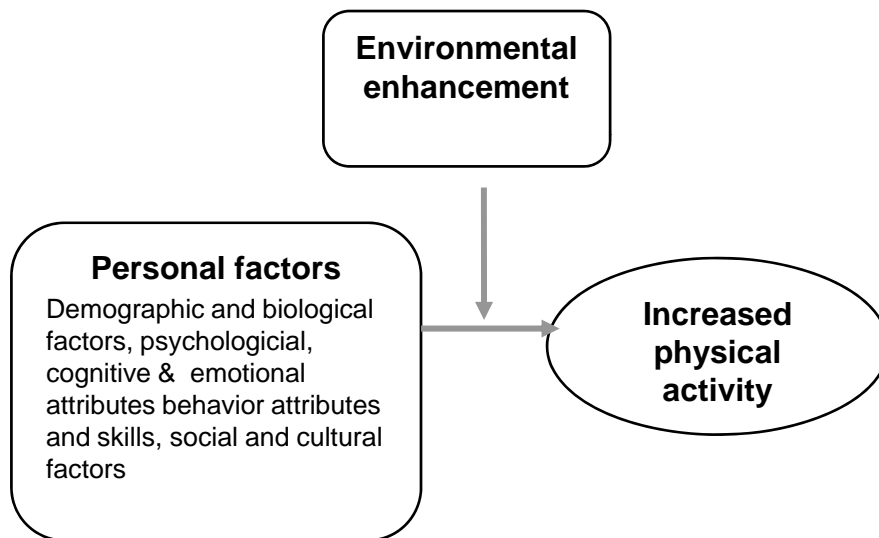
# Previous Stair Use Research

## Behavioral Change or Lifestyle Modification



# Previous Stair Use Research

## Environmental Enhancement and Restructuring



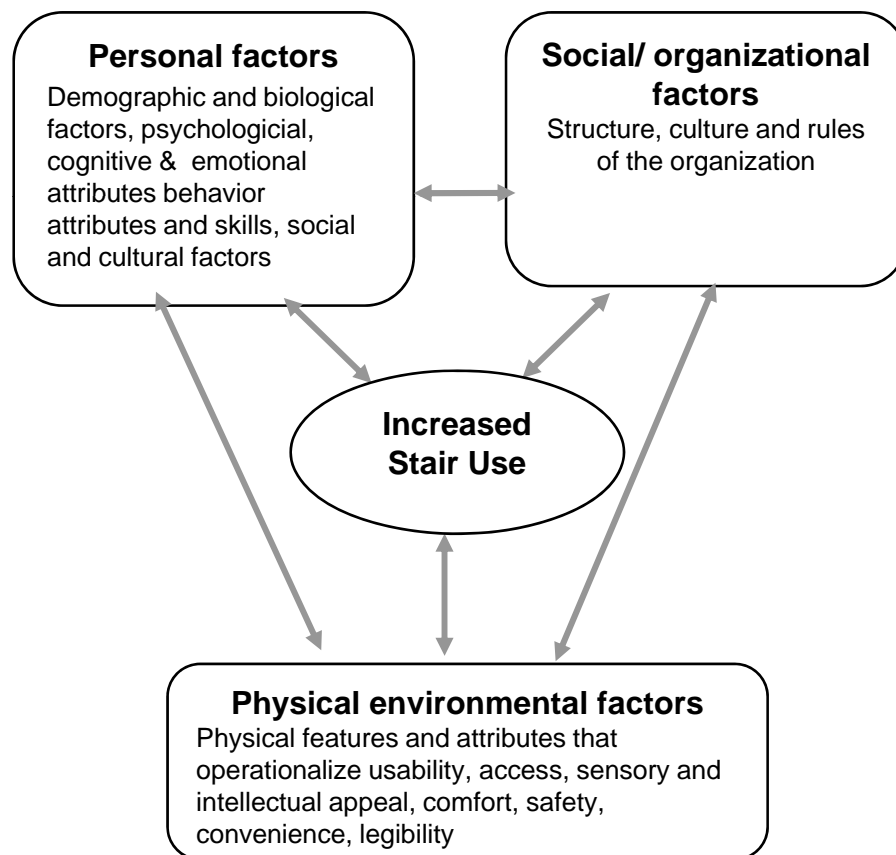
BEFORE



AFTER



## Social Ecological Approach



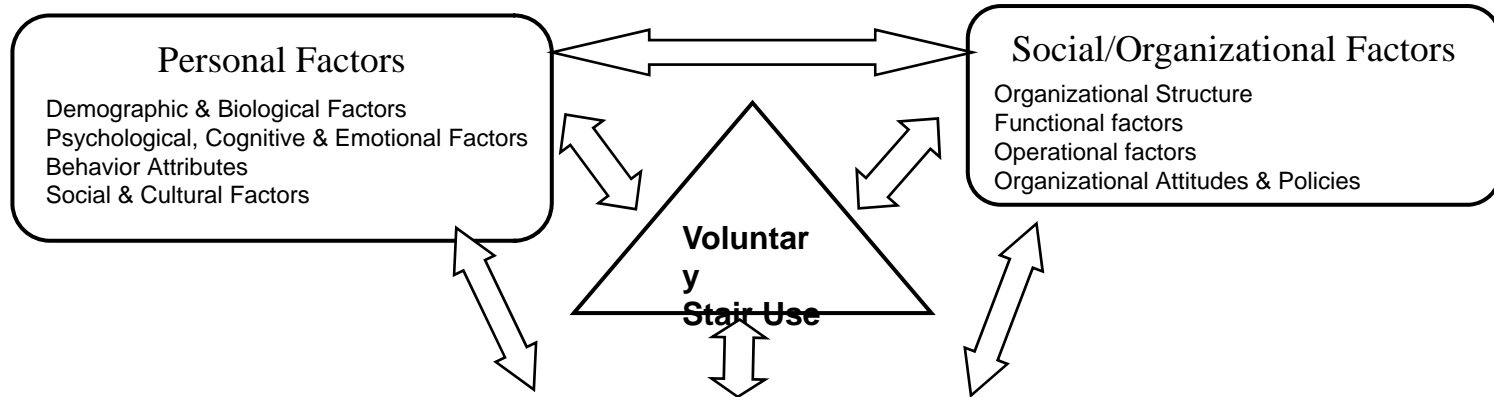
Examine the relationship between stair use and building design

10 Academic Program Buildings

38 stairs

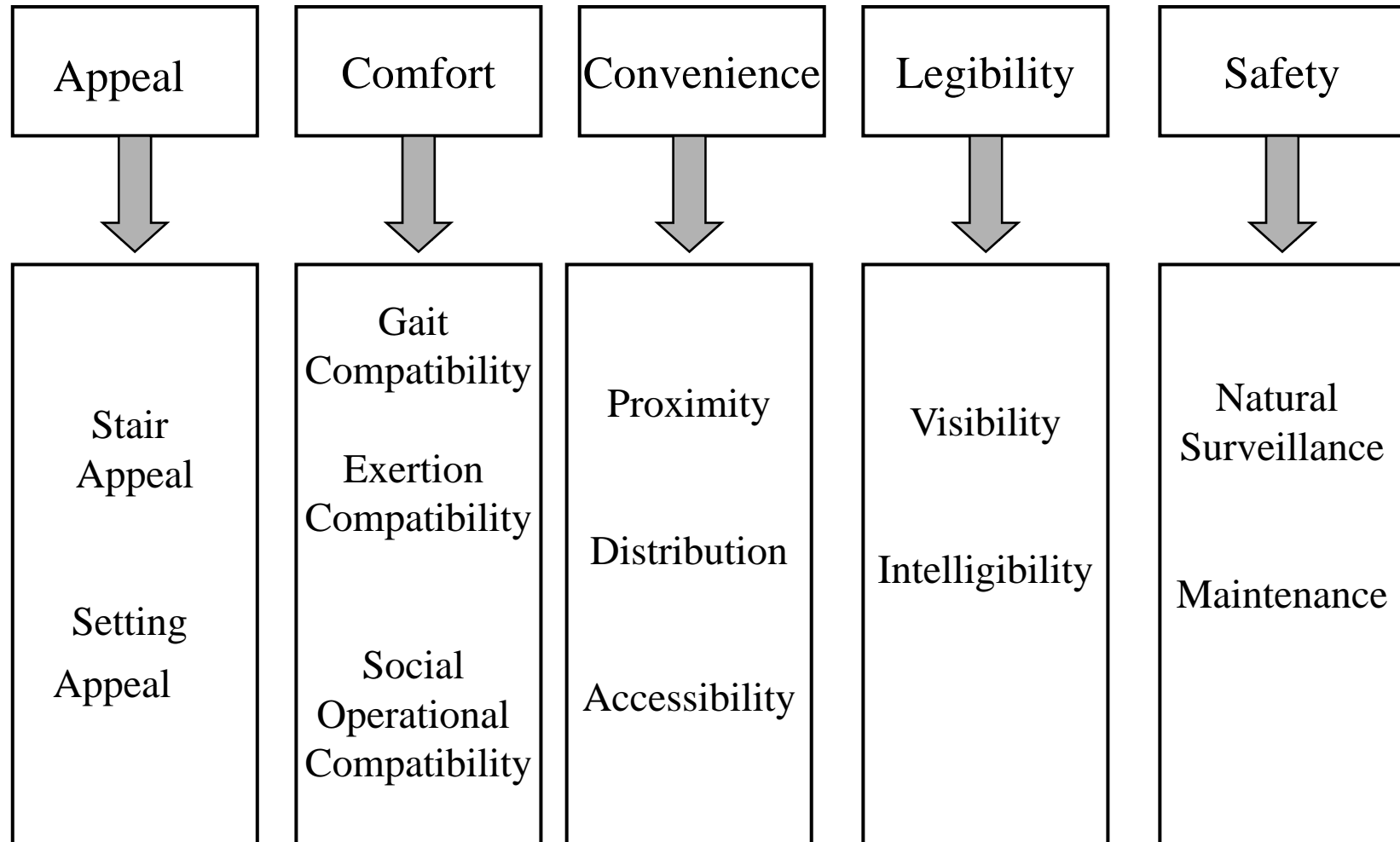
Optimize variance in building design and layout

# Theoretic Framework

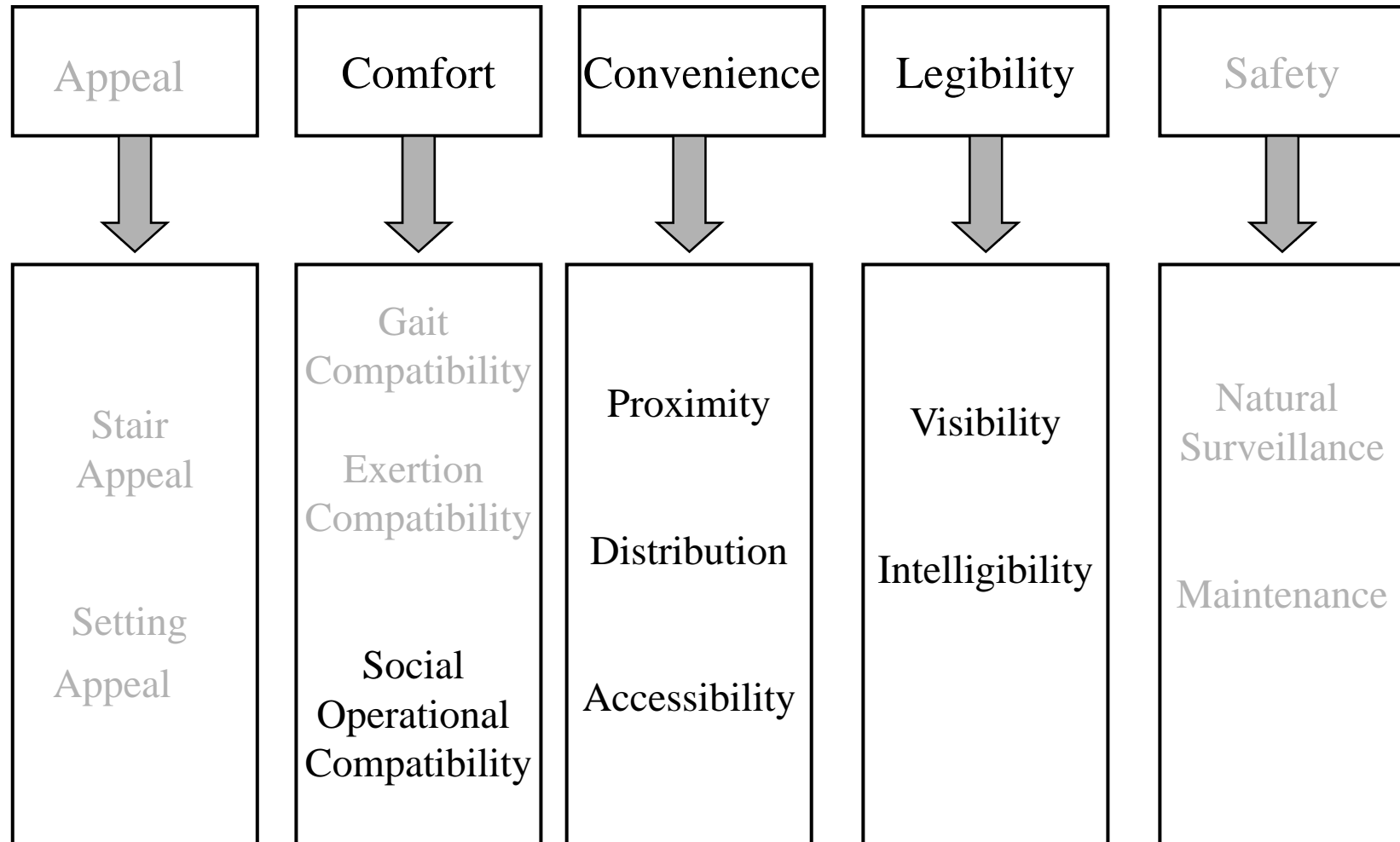


		<b>Physical Environmental factors</b>				
<b>Spatial Levels of Decision-making</b>		<b>Aesthetics</b>	<b>Comfort</b>	<b>Convenience</b>	<b>Legibility</b>	<b>Safety</b>
Local		Quality of interior finishes Presence of visually pleasing features Architectural articulation of stair/elevator	Tread/riser dimensions & ratios Number of steps between landings Stair width/occupancy load Stair/Elevator vibration and operational stability	Visual/Physical accessibility Connectivity of stairs/elevator to destinations within building Angular orientation of stair/elevator to path of travel Motivational/Directional signage	Stair imageability Visual accessibility Identification signage	Uniformity & intensity of lighting levels Visibility of tread edge Slip-resistant treads Maintenance level Presence of hazards/graffiti
	Relational	Views from & to stair/elevator	Shelter/Access to outdoors History of elevator operations disruption	Relative distance & time of travel between walking routes using stair or elevator Elevator speed & capacity	Visibility of stair from path of travel Visibility of other spaces from stair or elevator	Surveillance into/from stair/elevator Security provisions/devices
Global				Location of stair relative to most integrated paths Integration value of stair	Intelligibility of building's circulation paths	Conformance to building codes

# Constructs of Voluntary Stair Use



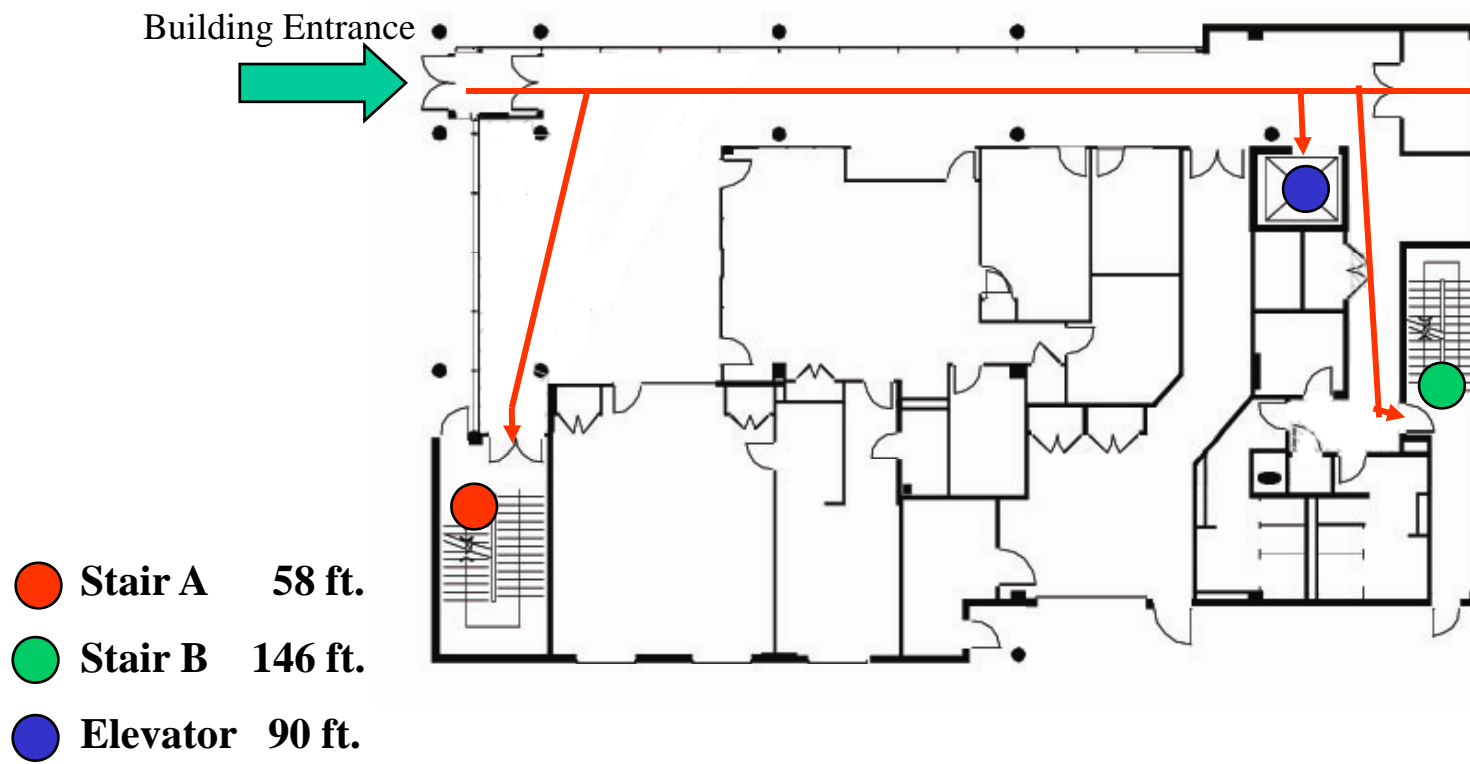
# Constructs of Voluntary Stair Use





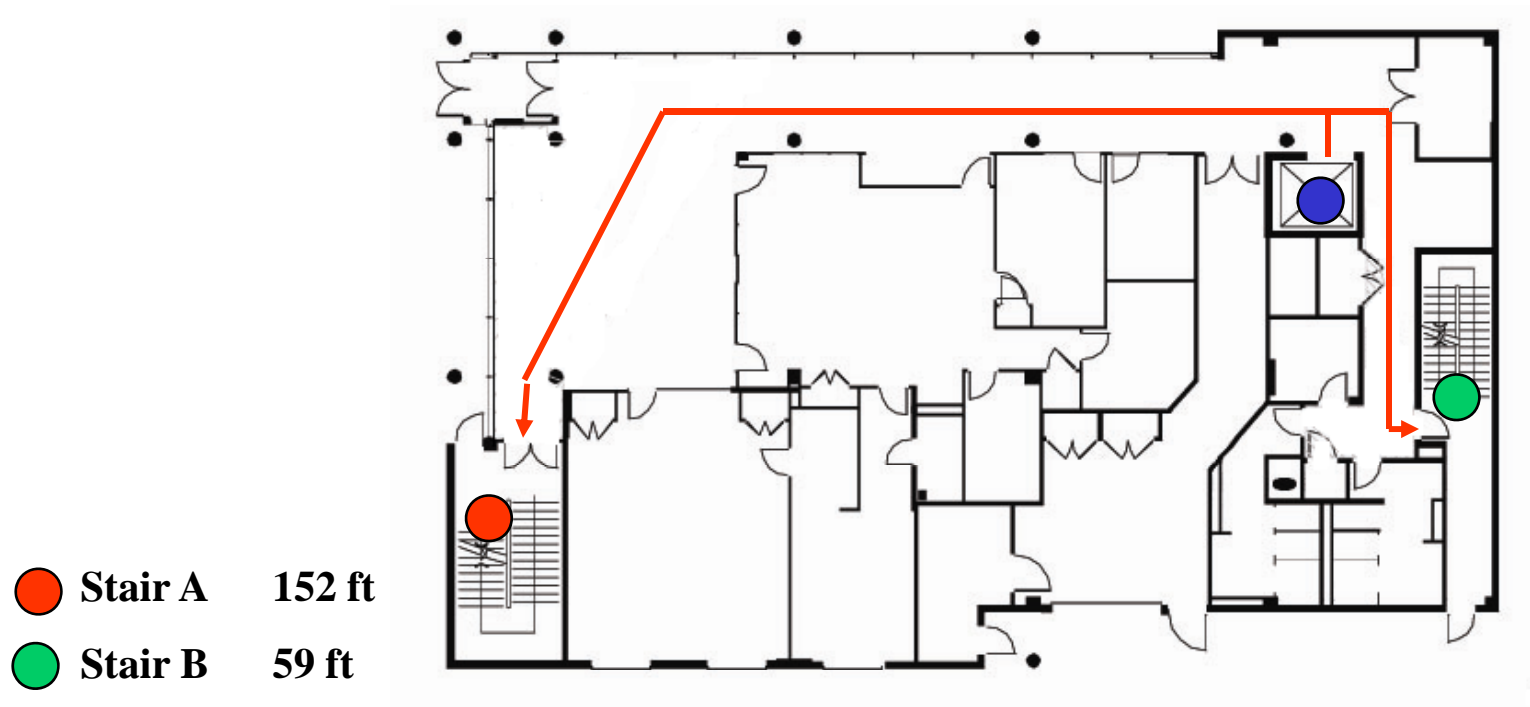
# Proximity

## Distance between Stair and Building Entrance



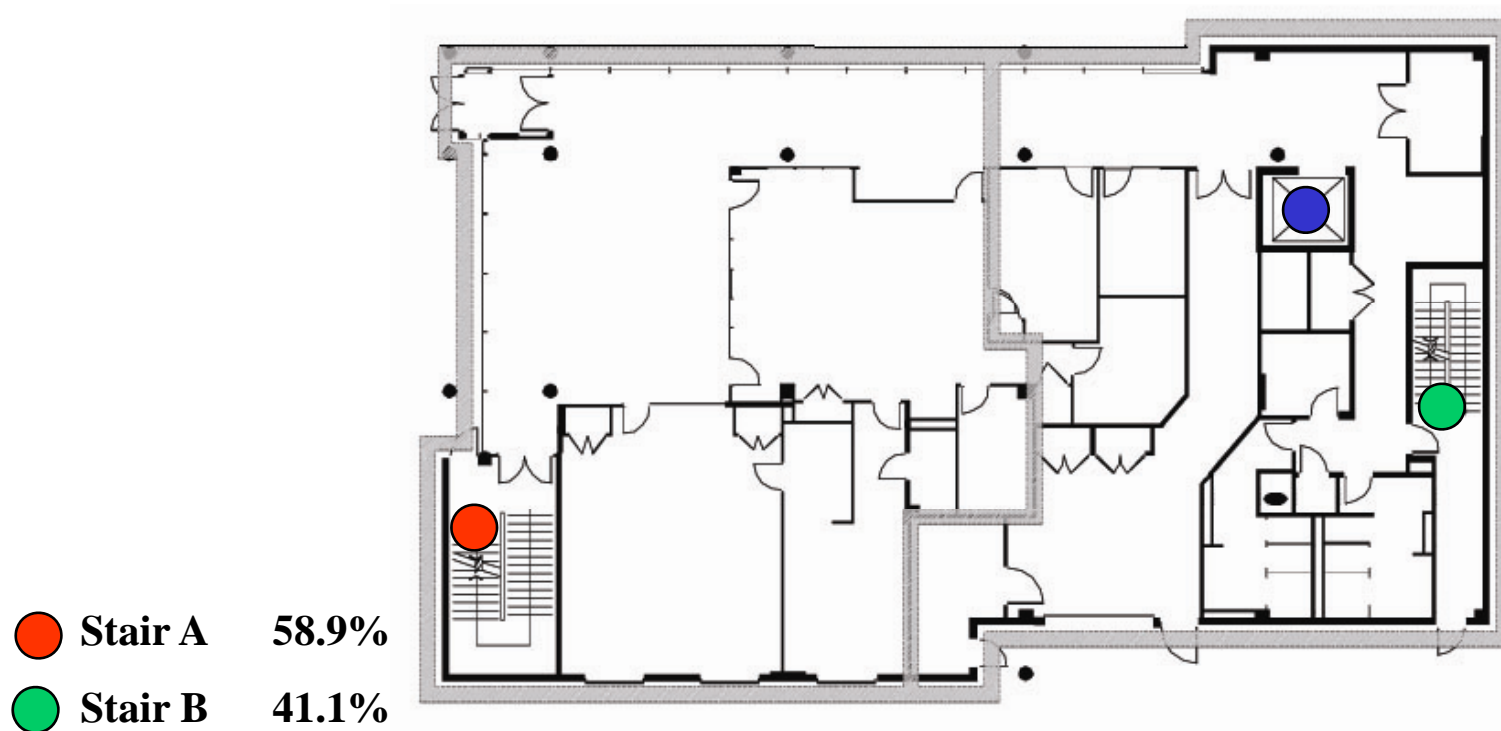
# Proximity

## Distance between Stair and Elevator



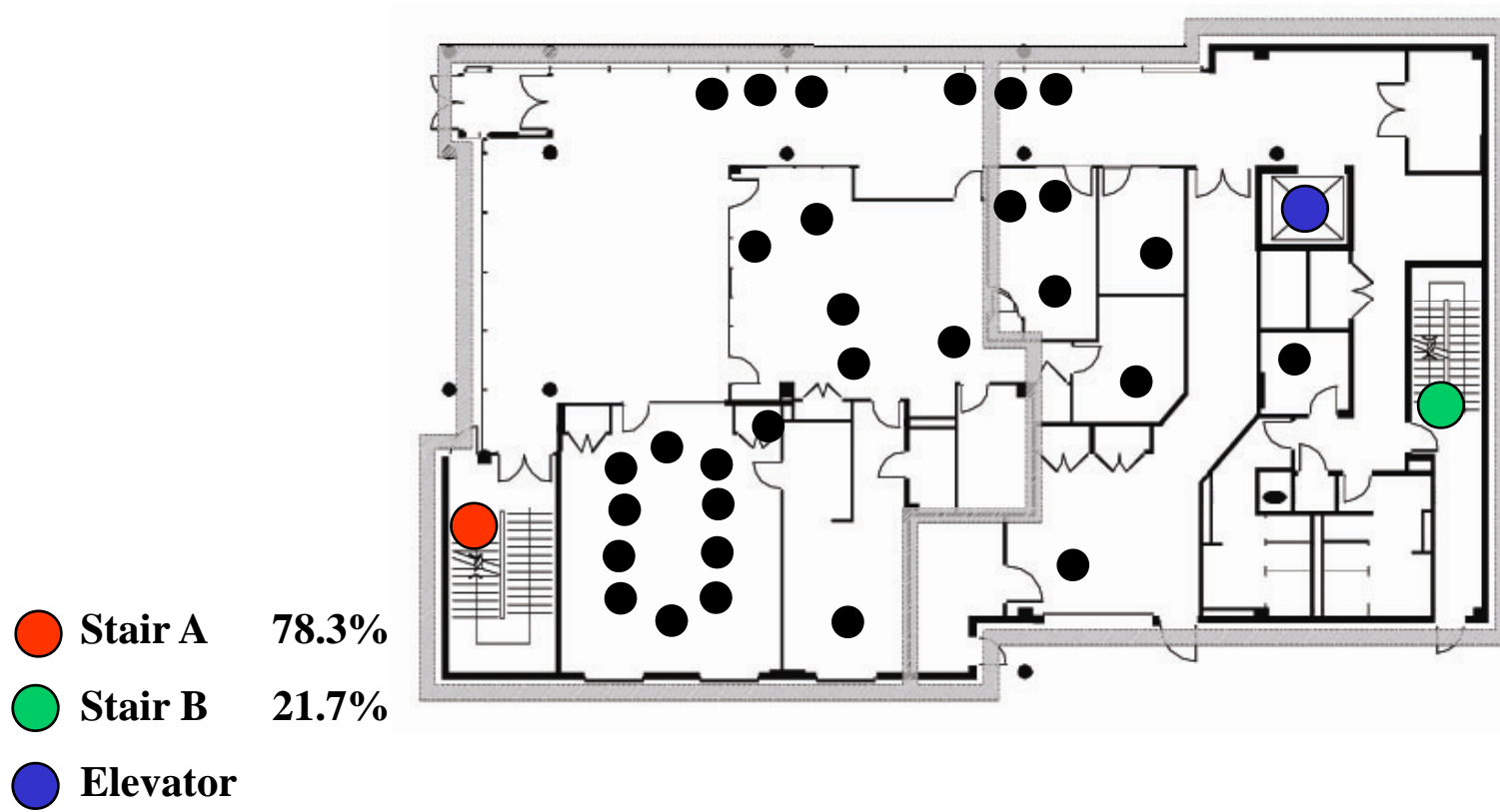
# Distribution

Effective Area of each Stair



# Distribution

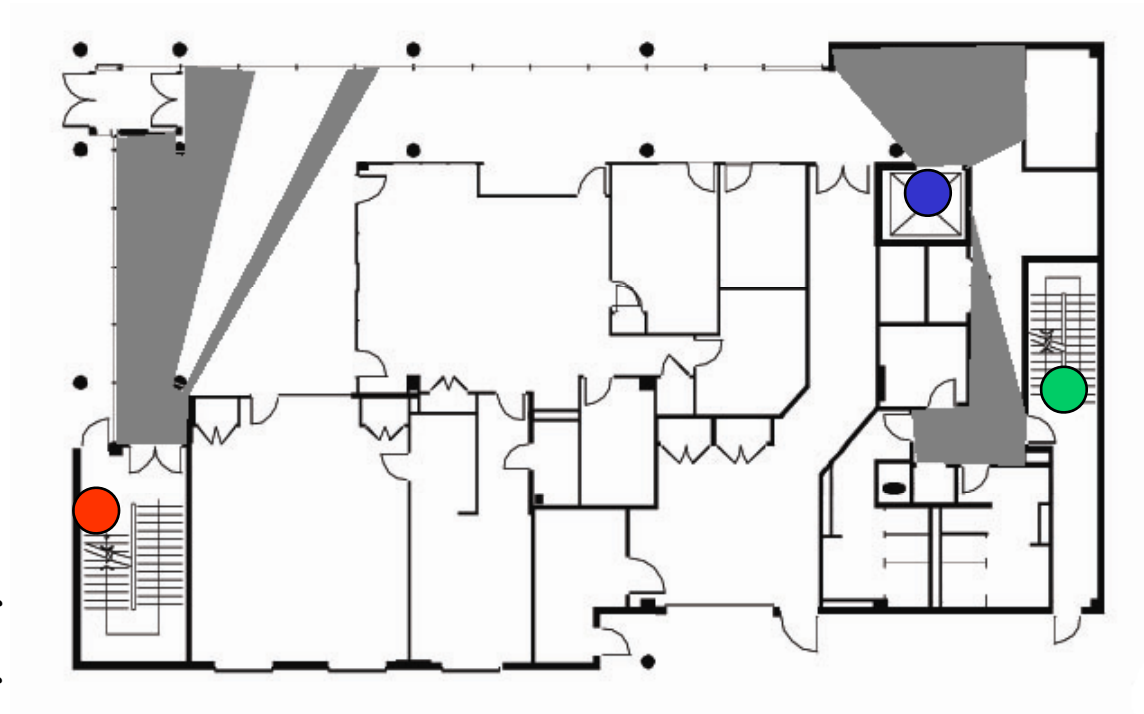
Occupant Load within Effective Area of each Stair



# Visibility

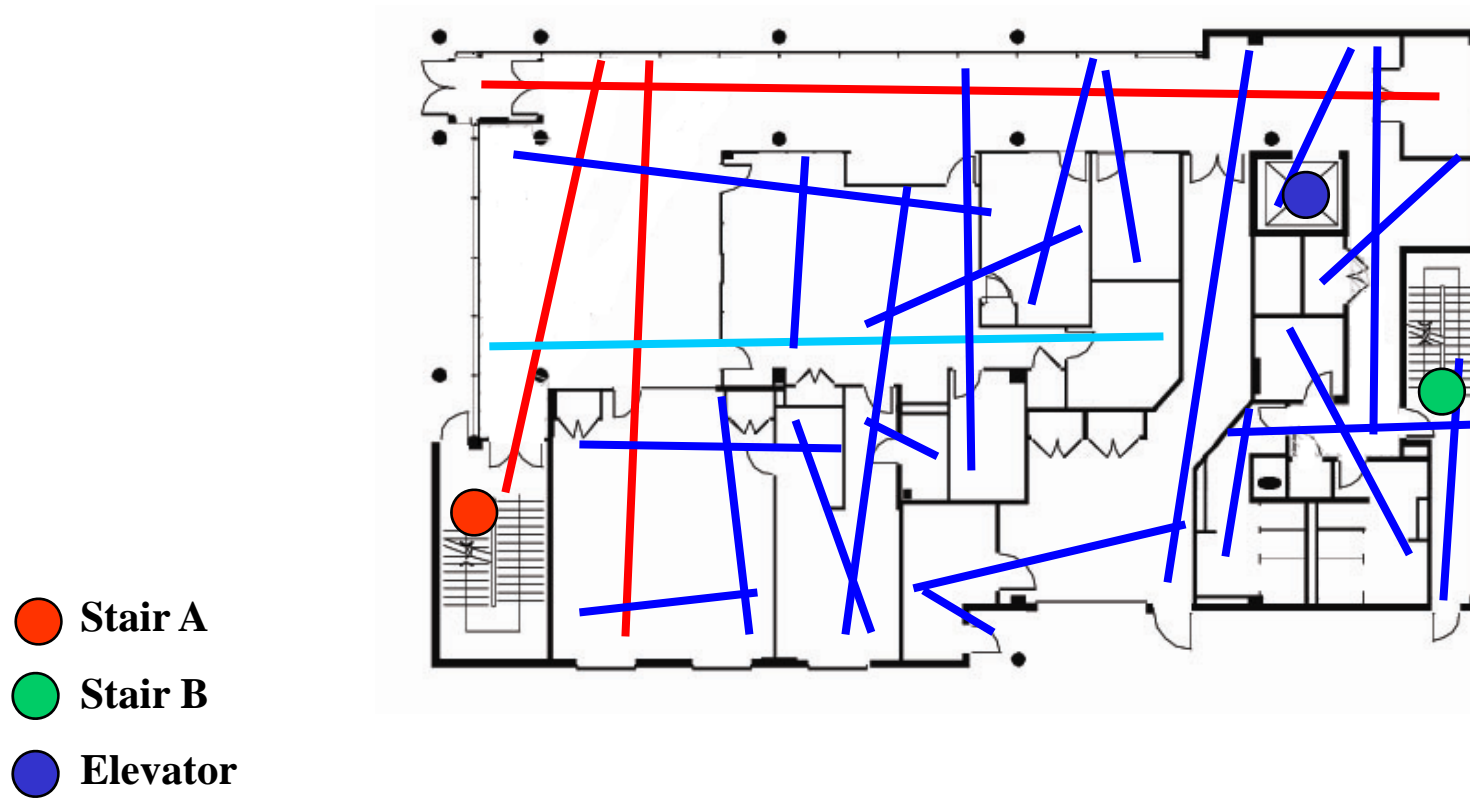
## Area of Isovist

- Stair A 467 sf
- Stair B 178 sf
- Elevator 250 sf



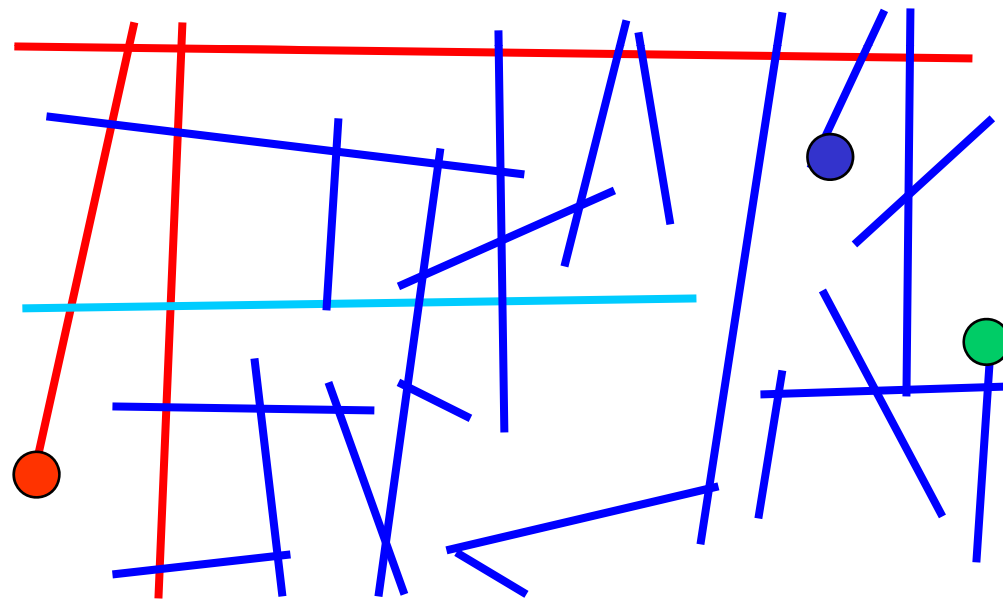
# Intelligibility – Space Syntax

## Integration Plan



# Intelligibility

Most Integrated Path (MIP)  
(Red line)

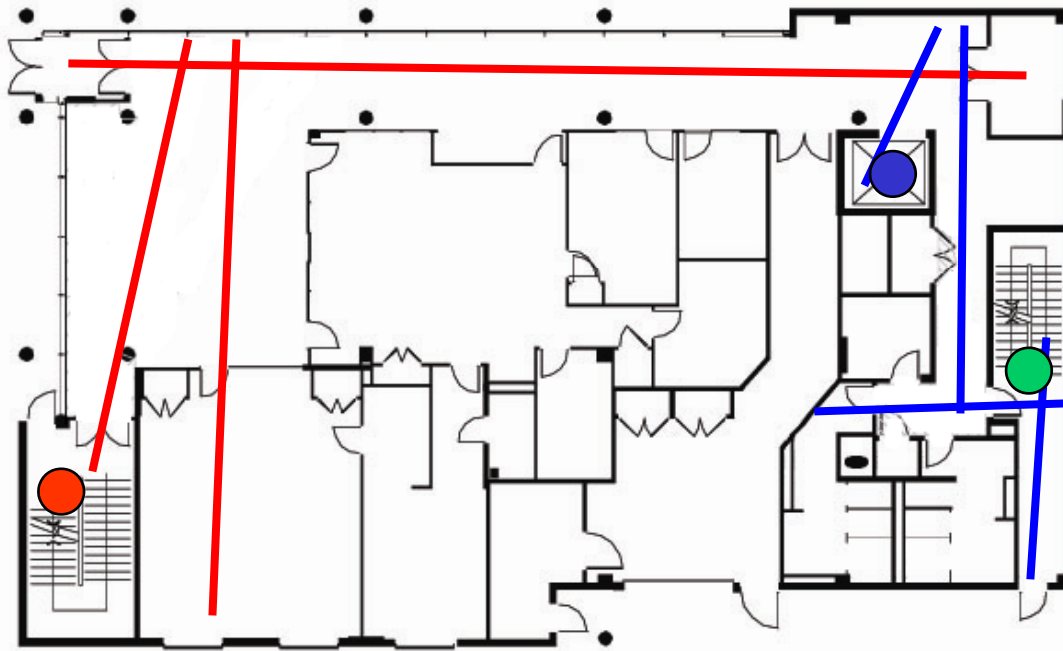


- Stair A
- Stair B
- Elevator

# Intelligibility

Number of Turns from the MIP

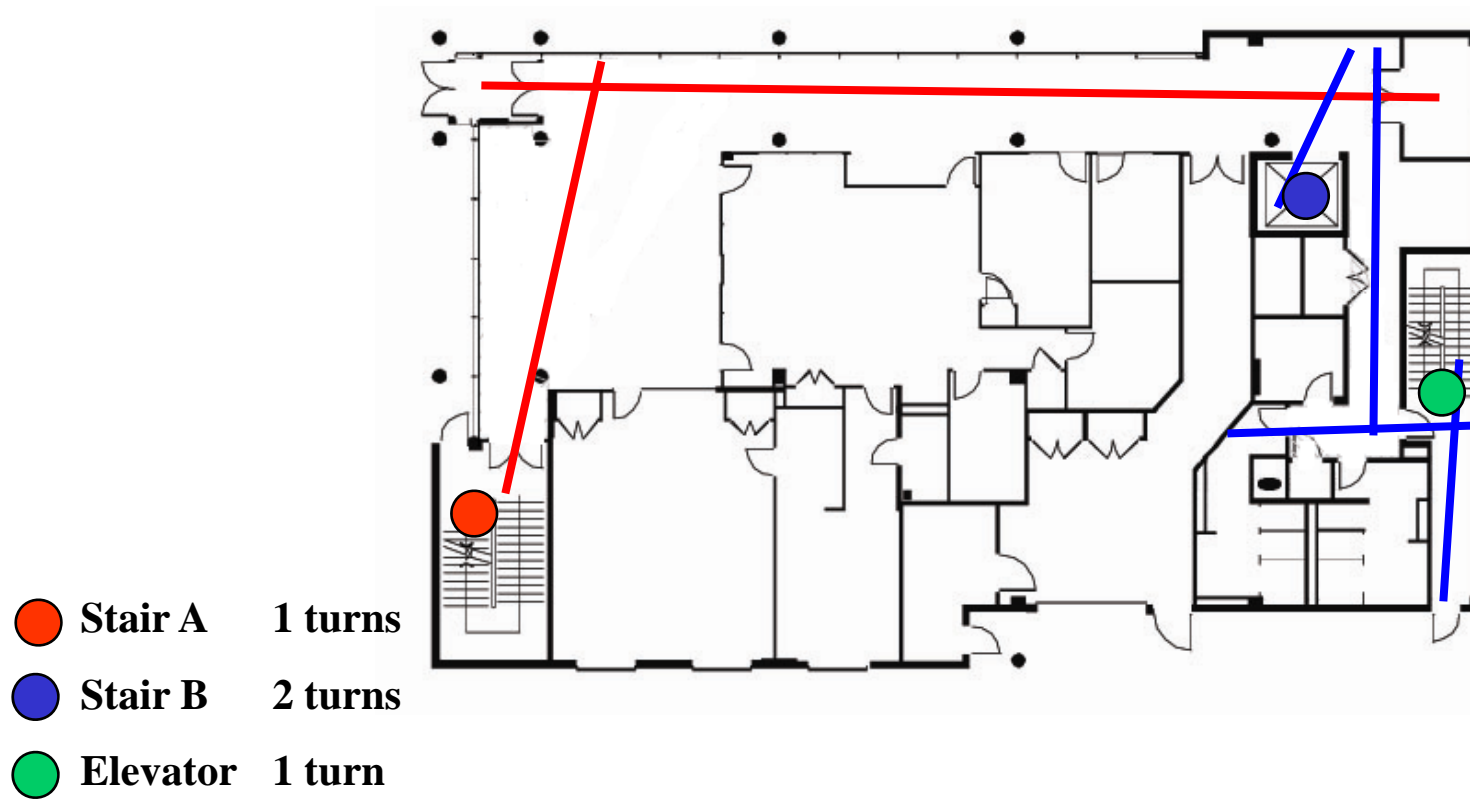
- Stair A 0 turns
- Stair B 2 turns
- Elevator 1 turn



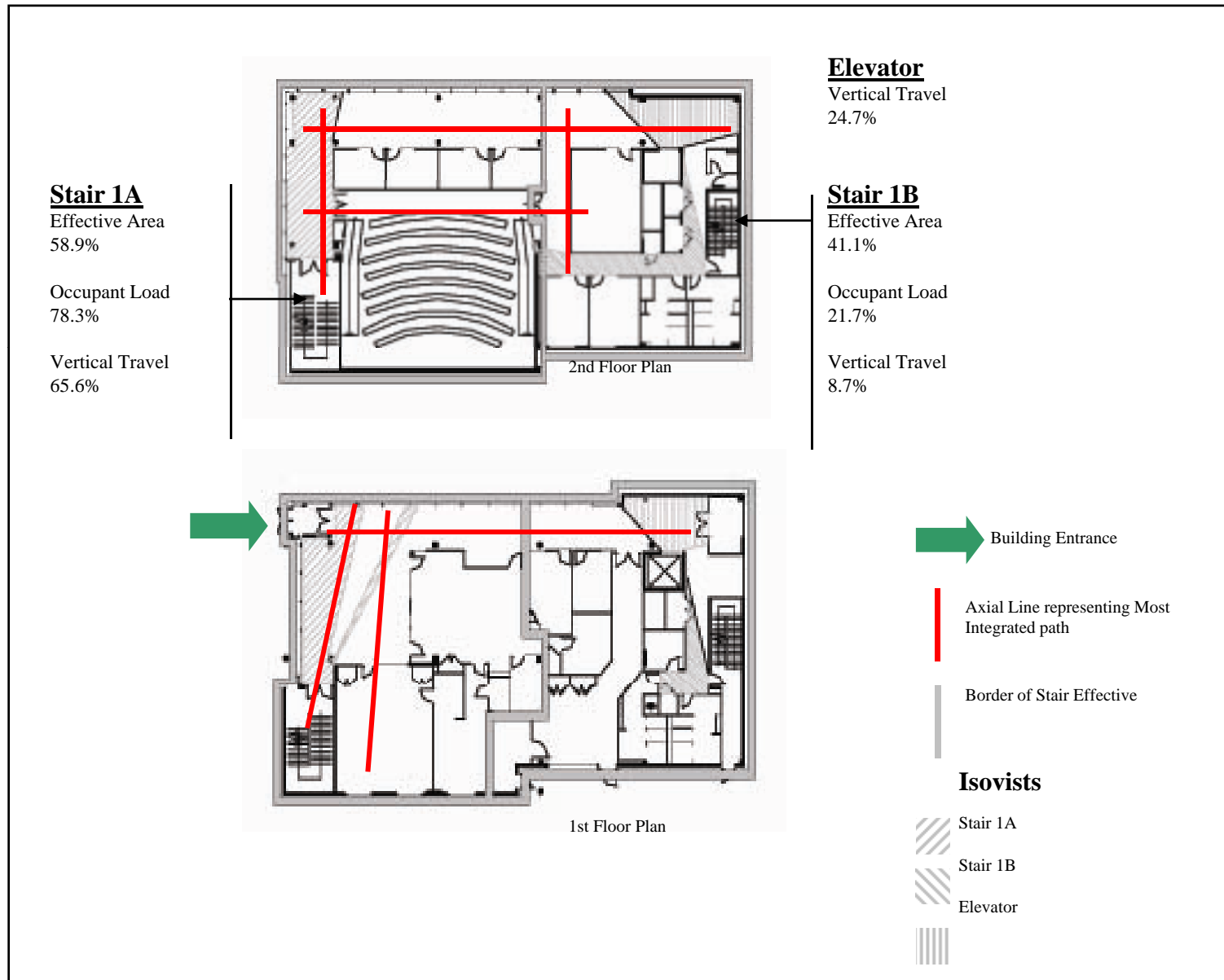


# Intelligibility

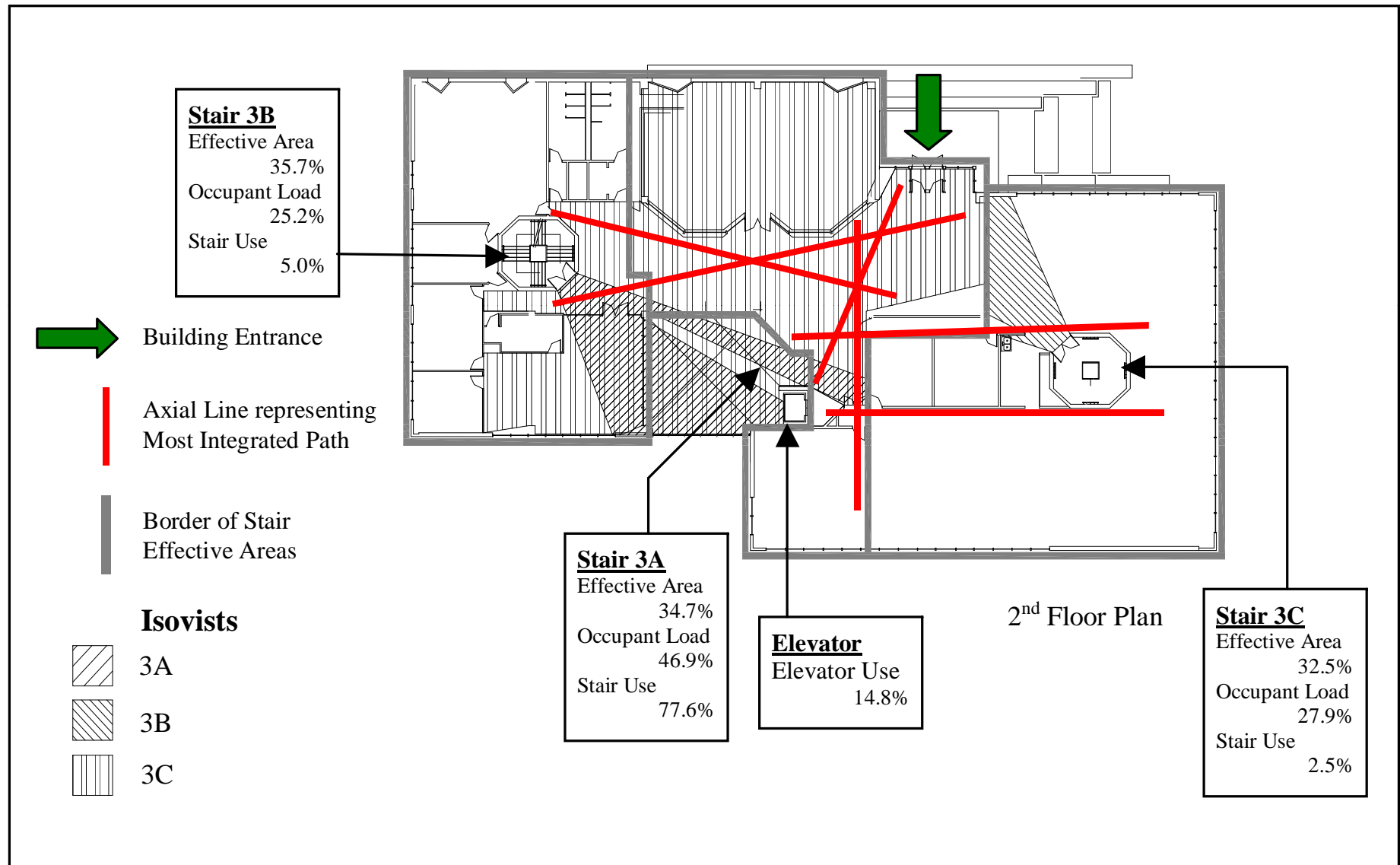
Number of Turns from the Entrance



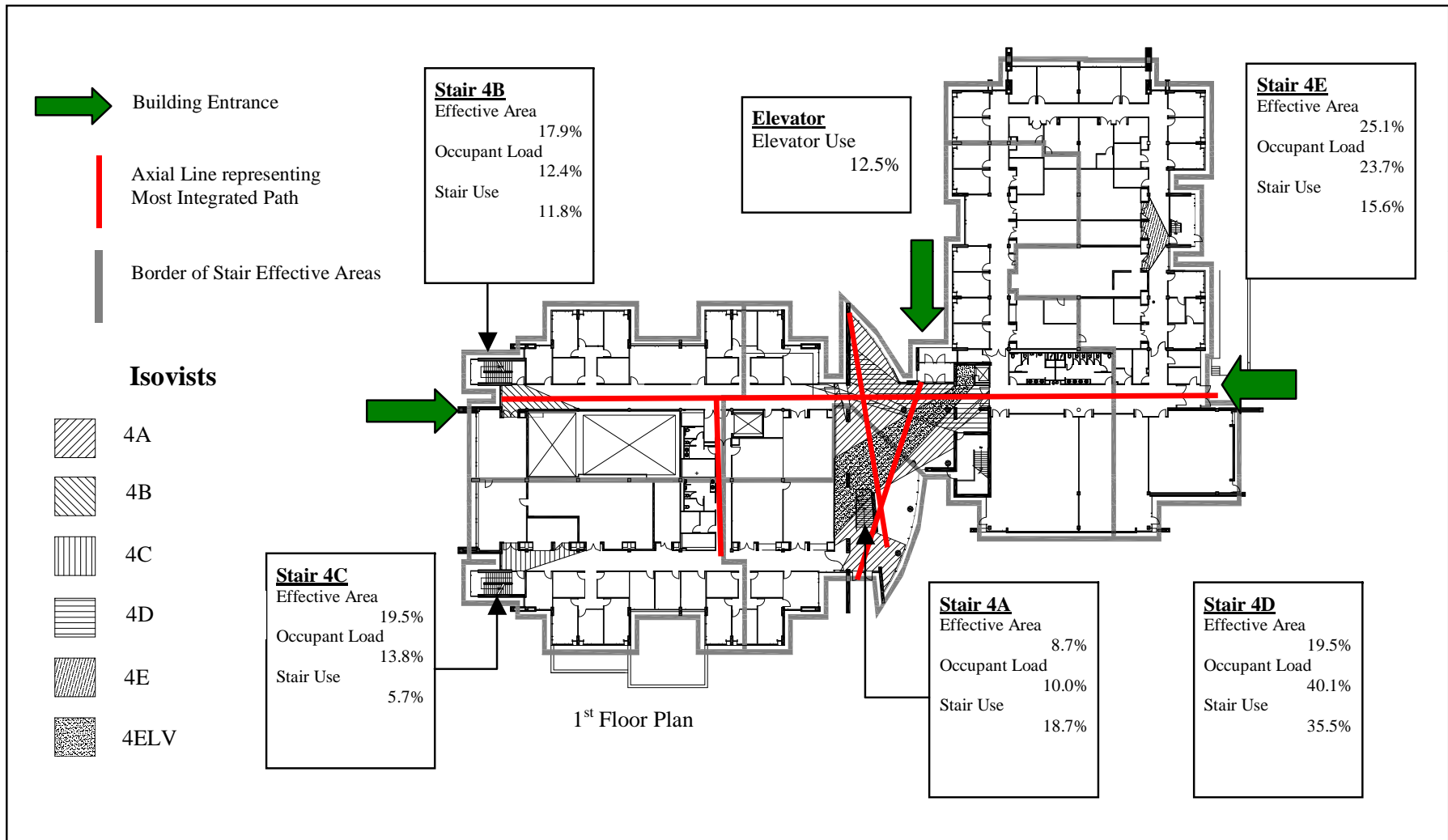
# High Stair Use Concentrated on One Stair



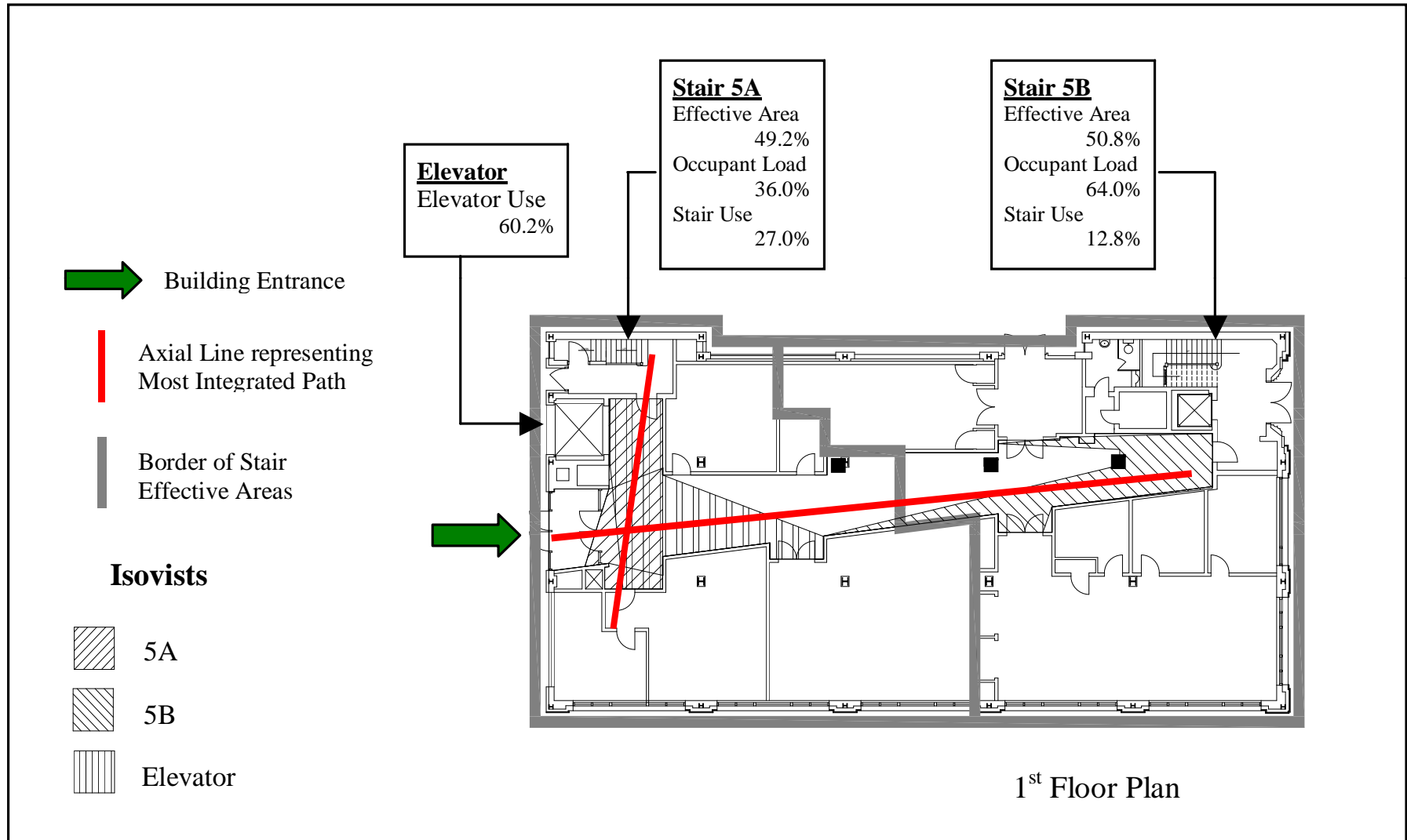
# High Stair Use Concentrated on One Stair



# High Stair Use Distributed amongst many Stairs



# High Elevator Use



# Future Direction in Research

## **Large Sample**

- increase validity
- use multi-level analysis techniques

## **Other Domains**

- government office workplaces
- Examine the relevance of all variables of the 5 thematic concepts of stair use in older, less active populations

## **Refine the Spatial Variables**

- Determine relative influences, refine variables
- understand the interrelationship between variables