Where People Walk:

Assessing the relationship between physical environmental factors and walking behavior of residents in retirement communities

Active Living Research Conference

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Two key issues:

1. Encouraging people to be physically active
2. **Where** people choose to be physically active
    - Implications for designers/administrators
    - Allocation of resources

What aspects of campus path design are related to path choice for walking?

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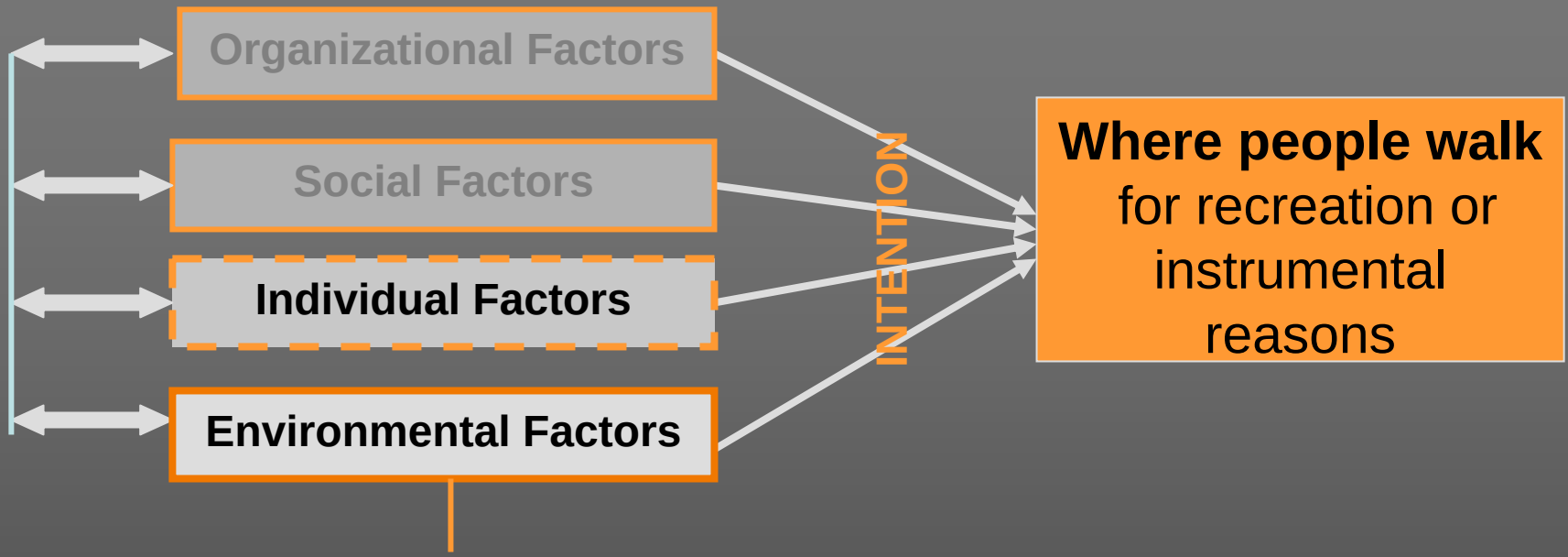
RESEARCH QUESTION


Organizational Factors
Social Factors
Individual Factors
Environmental Factors
INTENTION
Where people walk for recreation or instrumental reasons
Local
Relational
Global

FRAMEWORK

Local

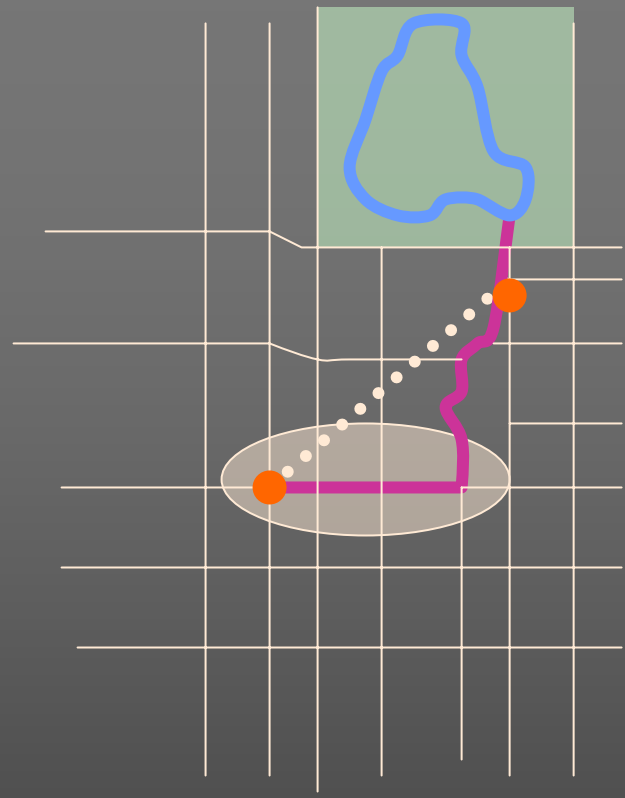
Individual path characteristics

Relational

Relationship between path and surroundings

Global

Systemic properties of path within the network



Moudon & Lee, 2003: Behavioral model of the environment

ENVIRONMENTAL PATH CHARACTERISTICS

Research Design: Case study

Context: Three Continuing Care Retirement Communities (CCRC)

Population: Independent living residents

CONTEXT AND POPULATION

- **Resident Questionnaires**
- **Path assessment checklist**
- **Morphological analysis of plans**

Pilot test at a fourth campus type retirement community

METHODS

Data on path choice obtained through **resident questionnaires**

Path choice for recreational walking

- route taken during last recreational trip (indoor and outdoor) in the last 7 days

Path choice for instrumental walking

- route taken during last trip to two distinct destinations in the last 7 days

Path use categorized by resident type – age, gender, physical activity level etc.

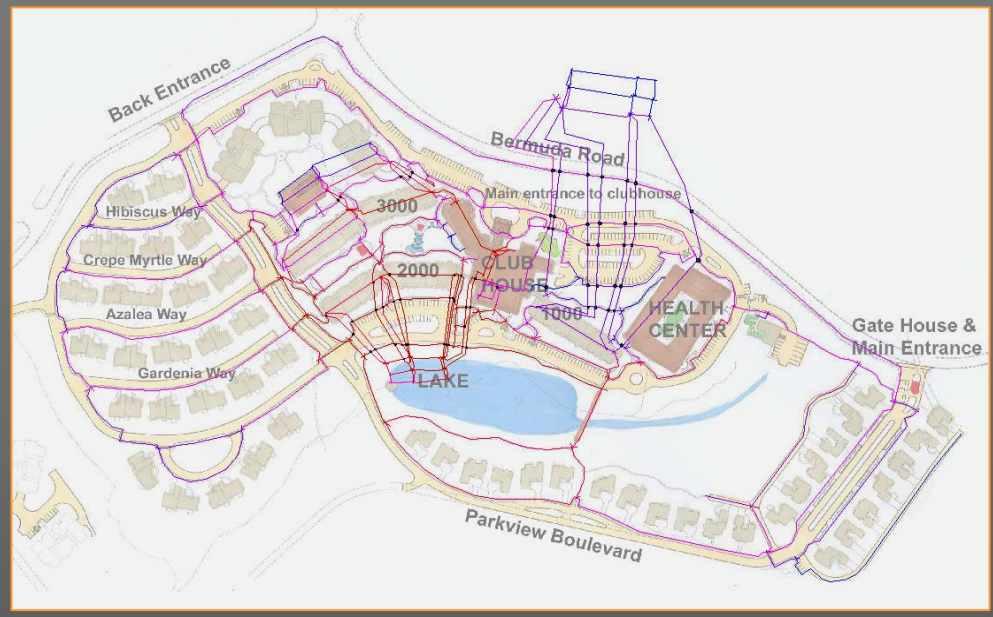
Path assessment checklist used to assess:

Source	Literature: Where older adults walk	Literature Walking – older adults	Other tools	Original
Path segment type				
Path location				
Material				
Gradient				
Street crossing				
Path condition				
Path obstruction				
Steps				
Continuity				
Amenities				
Destination				
Views				

Length of segments – building and campus plans

LOCAL AND RELATIONAL PATH CHARACTERISTICS

Morphological analysis of building and campus plans using COA GIS space syntax extension (Bafna, et al, 2005)



Source	Literature: Where older people walk	Literature Walking – older adults	Other tools	Original
Centrality				
Connectedness				

GLOBAL PATH CHARACTERISTICS

CAMPUS CHARACTERISTICS	Parkview	Lakeview	Greena cres
Year started	2004	2001	1987
Size of campus (acres)	54	87	60
Number of buildings on campus (excluding cottages)	5	4	4
Number of apartment buildings	3	2	1
Connection between all buildings?	Yes	Yes	No
Total number of path segments	258	275	103
Total number of IL residents	350	331	129
Median age of IL residents (years)	78	77	83
Number of survey respondents	38	40	36
Survey response rate (%)	11	12	28
Median age of survey respondents (years)	78	78	84

FINDINGS: CASE STUDY CHARACTERISTICS

Path design characteristic	Relationship with path use walking to destinations at…		
	Parkview (χ^2)	Lakeview (χ^2)	Greenacres (χ^2)
Path location	**16.5****	**8.8****	**ns**
Path length	ns	ns	ns
Outdoor path type- sidewalk	ns	17.2**	14.9**
Indoor path type- between residences	6.9**	ns	ns
Steps- present	3.9*	ns	ns
Path continuity- present	6.8**	ns	12.9**
Amenities- #	ns	4.7*	ns
Destination- present	9.9**	ns	ns
Types of destination: **Administrative- present** **Activity related- present**	 8.3** 6.0*	 8.3** ns	 ns 6.0*
Types of views: **Residential (-)** **Public space** **Art** **Water**	 7.9** 11.5** 31.3** 10.0**	 ns 8.3** 5.4* ns	 ns ns ns ns
Centrality	21.7**	ns	16.3**
Connectedness	**6.5****	**7.5****	**9.3****

PATH SEGMENT USE – instrumental walking

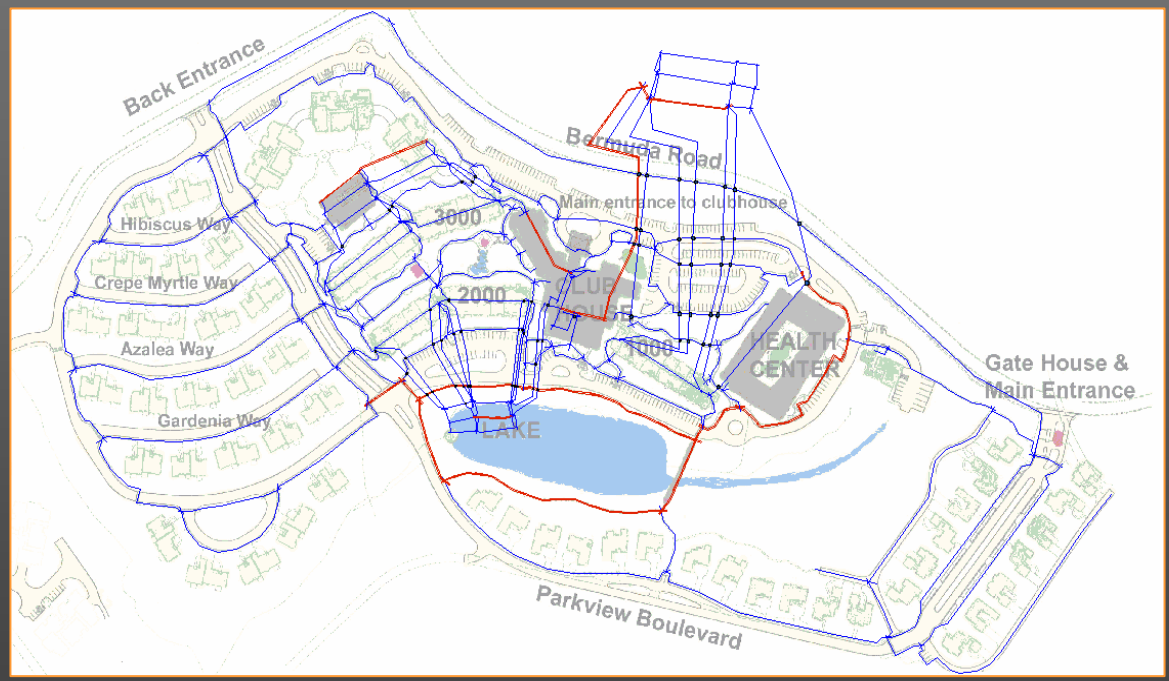
Path design characteristic	Relationship with path use walking for recreation at…		
	Parkview (χ^2)	Lakeview (χ^2)	Greenacres (χ^2)
Path location-outdoor	**8.7****	**8.3****	**16.8****
Path length	**28.2****	**14.6****	**24.2****
Path type (outdoor)-sidewalk	**26.4****	**7.5****	**18.8****
Path type (indoor)- between residences	**7.6****	**15.6****	**8.7****
Path material (outdoor)- bitumen	ns	9.2**	ns
Path slope- moderate or more	ns	4.1*	9.5**
Path condition	7.5**	ns	5.7*
Steps	**5.2***	**11.6****	**5.7***
Path continuity-- present	24.8**	ns	ns
Amenities	4.3*	10.9**	ns
Number of views	**4.8***	**5.8***	**3.9***
Types of views: **Residential (-)** **Public space** **Art** **Water**	 ns ns ns ns	 27.7** 6.7** 8.3** ns	 24.0** 14.4** ns 5.0*
Centrality	5.6*	ns	22.0**
Connectedness	21.1**	7.5**	8.3**

PATH SEGMENT USE – recreational walking

Path segment characteristics that partially explained path segment use for….	Parkview	Lakeview	Greenacres
Instrumental Walking	• being more connected (p = 0.010, 0R = 2.32) • views of water (p = 0.000, OR =5.8) • views of artwork (p = 0.000, OR = 16.2)	• being more connected (p = 0.009, OR = 2.12) • being located indoors (p = 0.002, OR = 2.46) • having administrative destinations (p = 0.035, OR = 3.3)	• being more central (p =0.007, OR=3.8) • having residences along path (p = 0.018, OR = 4.0)
Recreational Walking	• high connectedness (p = 0.000, OR = 4.5) • longer path segments (p = 0.000, OR = 7.3) absence of steps (p = 0.022, OR = 6.3)	• longer path segments (p = 0.007, OR = 1.3) • views of residences (p = 0.001, OR = 3.3)	• path segments being more central (p = 0.000, OR = 14.7) • presence of a residential destination (p = 0.012, OR = 6.5) • path segment having moderate or steep slope (p = 0.000, OR = 28.9)

PATH SEGMENT USE – multivariate analysis

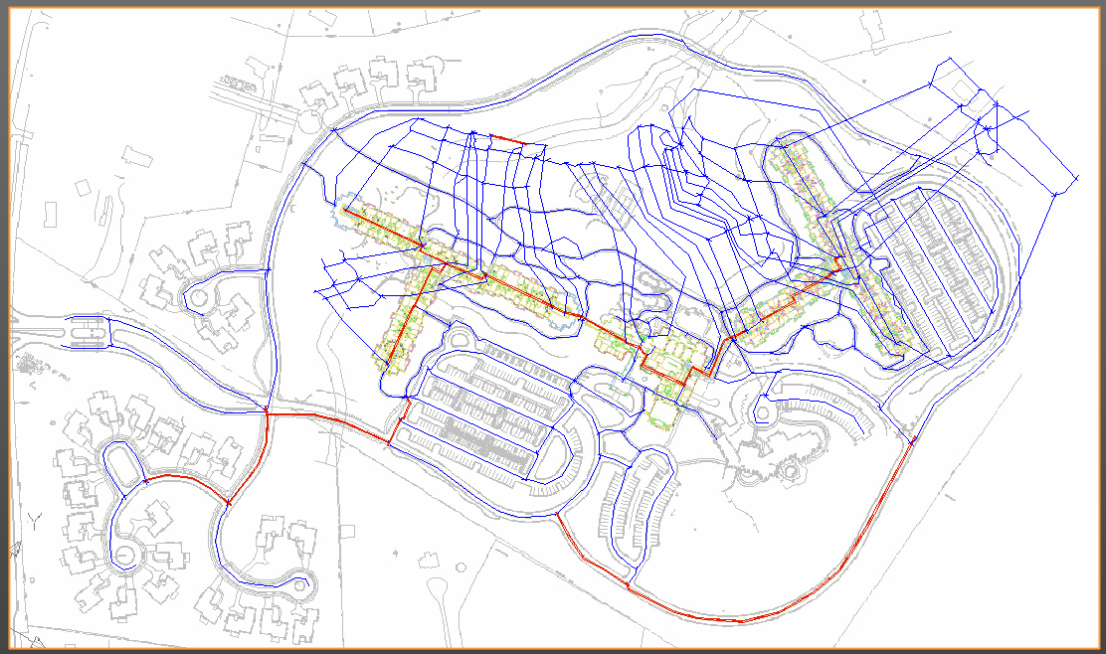
- Indoor segments along floors connecting buildings
- Outdoor segments around lake
- Routes defined by high use segments



Top 20 high used (recreation) segments for at PS

PATH SEGMENT USE : PS CASE STUDY

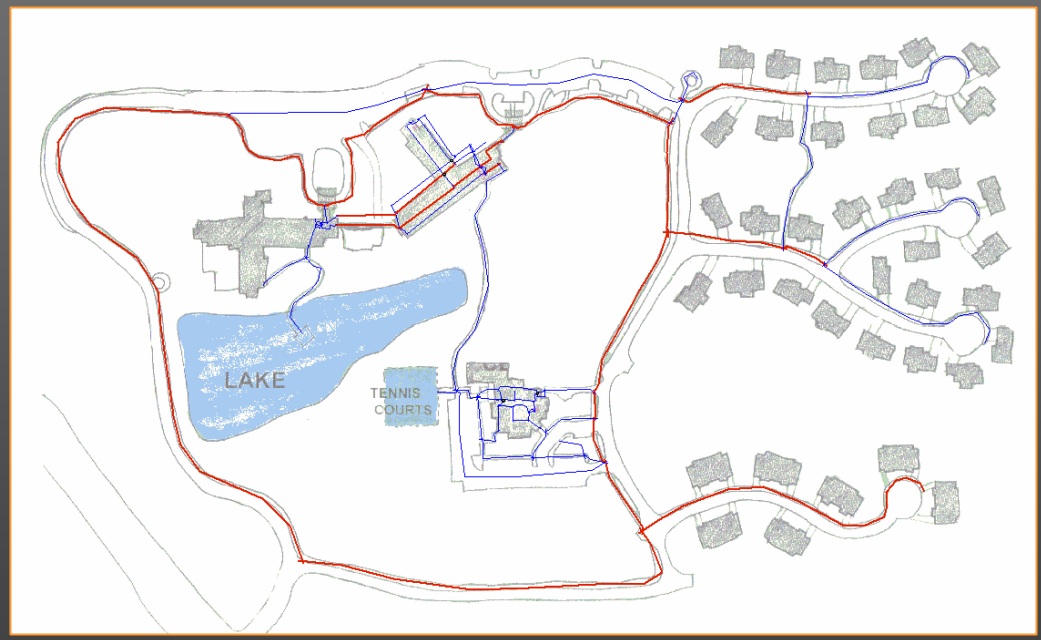
- Indoor path segments on main corridor spine
- Popular indoor route defined by high use segments



Top 20 high use (recreation) segments at LV

PATH SEGMENT USE : LV CASE STUDY

- Indoor path segments along floors connecting buildings
- Path segments around perimeter
- Routes defined by high use segments



Commonly used routes at PV

PATH SEGMENT USE : PV CASE STUDY

Path use for Instrumental walking	Path use for Recreational walking
Location of origin and destination	Indoor and outdoor
Location of path within network	Well connected and central segments
Location of destinations along path	Long smooth segments
Potential for physical activity gains	Change in level avoided
	Pleasure vs. exercise routes

SUMMARY

- Balance distance and convenience
- Consider location of dining areas
- Consider connecting campus buildings
- Design of indoor corridors
- Race tracks or loops
- Routes of different lengths and challenge
- nature trails and loops
- Barriers to transition from buildings
- Access to community physical activity resources

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DESIGN CONSIDERATIONS

- Response rate
- Non random sample
- Number of case studies
- Facility level demographics not available
- Weather

LIMITATIONS

- Active Living Research
- Advisors:
  - Craig Zimring, Ph.D., Sonit Bafna, Ph.D., Georgia Tech
  - Bill Kohl, Ph.D. CDC

ACKNOWLEDGEMENT

Thank you!

Questions?