Perceptions of Neighborhood Park Quality: Associations with Physical Activity and BMI

Hua Bai, Sonja A. Wilhelm Stanis, PhD, Andrew T. Kaczynski, PhD, Gina M. Besenyi, MPH

SCHOOL OF NATURAL RESOURCES
Parks, Recreation & Tourism

UNIVERSITY OF
SOUTH CAROLINA

K·STATE
Kansas State University
Department of Kinesiology

Background

❖ Parks are increasingly recognized as an important component of the built environment for physical activity

- Low-cost

- Available to a majority of population across ages, cultures, ethnicities, genders, income levels and abilities

(Bedimo-Rung et al., 2005; Cohen et al., 2007; Vinluan, 2005).

Park characteristics and PA

❖ Objective measures (audits, GIS):

- Park proximity

- Park size

- Neighborhood environment

- Access to parks

- Availability of certain park facilities (e.g., wooded areas, trails, & paths)

    (e.g., Cohen et al., 2010; Coombes et al., 2010; Giles-Corti et al., 2005; Kaczynski et al., 2008; Saelens et al., 2006)

❖ Self-reported perceptions may be an equally viable and
 important method to understand how environmental factors
influence active living

      (Brownson et al., 2009)

❖ Subjective measures (interview, questionnaire):

- Perceived accessibility

- Perceived availability of facilities

- *Perceived quality*
  - Perceived safety
  - Perceived availability of facilities
  - Perceived attractiveness
  - Perceived maintenance and condition of facilities
  - Perceived use

(e.g., Babey et al.,2008; Humpel et al., 2002; Ries et al., 2009; Romero, 2005)

❖ Few studies have examined park quality comprehensively and some only looked at the relationship with park use rather than PA and health outcomes

Study Purpose and Objectives

❖ The purpose of this study was to investigate the relationship between residents' perceptions of park quality in their neighborhood and their moderate and vigorous PA, park-based PA, and body mass index (BMI).

❖ A secondary objective was to examine the test-retest reliability of a newly developed neighborhood park quality scale.

Methods

❖ Sample selection

- 60 parks geographically dispersed across Kansas City, Missouri
- 66 randomly selected households within ½ mile of each park
- N=66*60=3906

❖ Data collection

- Self-administered, Mailed questionnaire
- October through December of 2010
- Modified Dillman (2008) protocol:
  - An initial questionnaire
  - A thank you/reminder postcard
  - Three waves of follow-up questionnaires
  - Short retest questionnaire (72/150, 48.0% response rate)

❖ Response rate: n=893; 27.4%

- Comparable to other similar studies with response rates ranging from 21-34% (e.g., Coombe et al., 2010; Tilt, 2010)

❖ Study Instrument
  11 pages long

Variables		
Perceived park quality		
Physical activity	Moderate general	
	Vigorous general	
	Park-based	
Demographics		
Past park use		

❖ Study Instrument
  11 pages long

Variables	
Perceived park quality	
Physical activity	Moderate general
	Vigorous general
	Park-based
Demographics	
Past park use	

✓ 5-point scale (1= strongly disagree, 3= neither, 5= strongly agree)

✓ 7 items:
- Cleanliness
- Availability of facilities of interest
- How well used the parks are
- Attractiveness
- Safety
- Maintenance
- Benefits to the neighborhood
  (adapted from Ries et al., 2009)

❖ Study Instrument
  11 pages long

Variables
Perceived park quality
Physical activity
Demographics
Past park use

Moderate general

Vigorous general

Park-based

✓ Definition of moderate and vigorous physical activities were provided

✓ How many days per week & total time per day participated in physical activity at respectively moderate /vigorous intensity level for at least 10 minutes at a time.

(BRFSS; CDC 2009)

❖ Study Instrument
  11 pages long

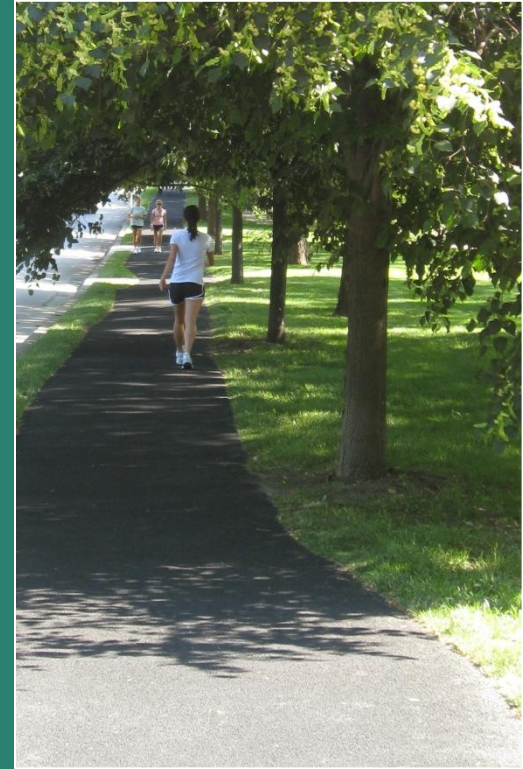| Variables		
Perceived park quality		
Physical activity	Moderate general	
	Vigorous general	
	Park-based	
Demographics		
Past park use		

✓ Park-based weekly PA:

Time (hours & minutes) spent in a park or outdoor recreation area in a usual week.

✓ Park-based PA during last visit:

Time (hours & minutes) spent being physically active during last visit to a park.

(Walker et al., 2009)

❖ Study Instrument
   11 pages long

Variables		
Perceived park quality		✓ Gender
Physical activity	Moderate general	✓ Age
	Vigorous general	✓ Race/ethnicity
	Park-based	✓ Household income
Demographics		✓ BMI (self-report height & weight)
Past park use		

❖ Study Instrument
  11 pages long

Variables		
Perceived park quality		
Physical activity	Moderate general	
	Vigorous general	
	Park-based	
Demographics		
Past park use		

✓ If had visited a park within the <u>last month</u>
  No-> non-visitor   Yes->visitor

✓ If yes, respondents indicated how many days they visited a park in the last month

✓ Median split-> frequent and occasional visitor

✓ - Non visitors
  - Occasional visitors
  - Frequent visitors

❖ Data Analysis and results

- Descriptive Statistics

- Park Quality Scale Reliability

  - Interclass Correlations (ICCs)
  - Cronbach's alpha

- Ordinal Regression

  - IVs of ordinal regression models:
    Neighborhood park quality (7 items)

  - DVs of ordinal regression models:
    Model 1: Moderate PA
    Model 2: Vigorous PA
    Model 3: Park-based weekly PA
    Model 4: Park-based PA during last visit
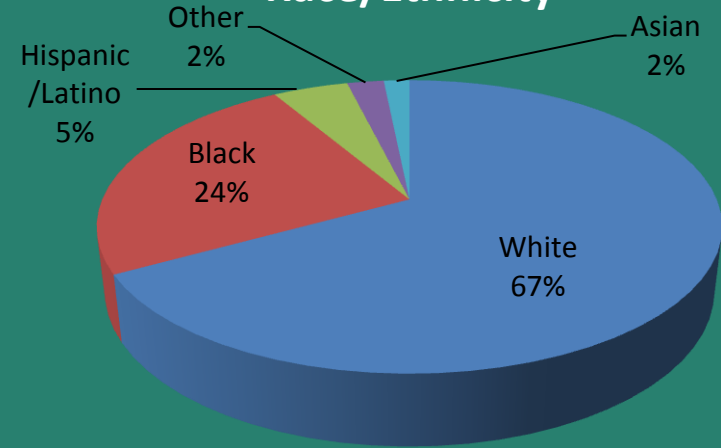   Model 5: BMI
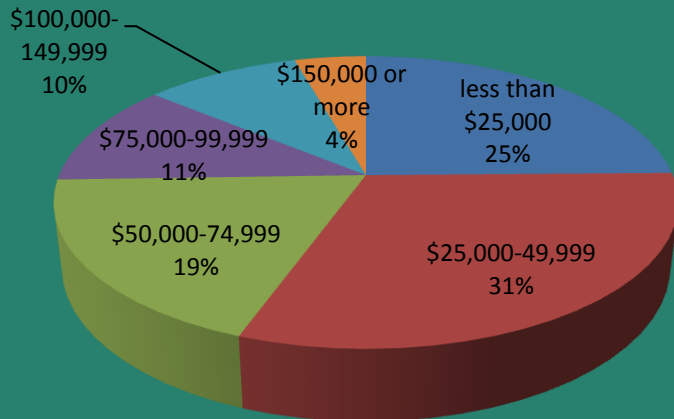
  *Controlling for past park use & demographics

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❖ Respondent characteristics

Gender

Male 39%
Female 61%

Race/Ethnicity

Other 2%
Hispanic /Latino 5%
Asian 2%
Black 24%
White 67%
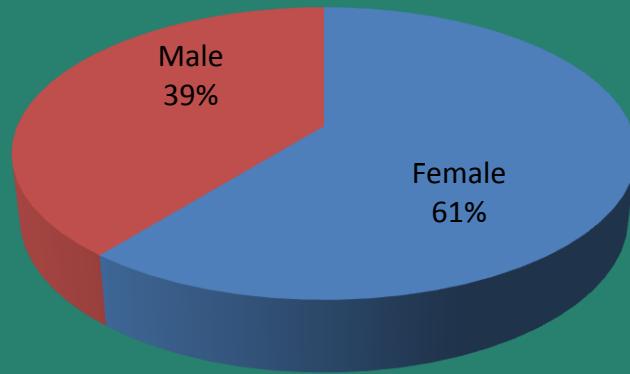
Annual Household Income

$100,000-149,999 10%
$150,000 or more 4%
$75,000-99,999 11%
$50,000-74,999 19%
less than $25,000 25%
$25,000-49,999 31%

Age

M=50.9
SD=16.5

64 years old or older 24%
18-38 years old 27%
51-63 years old 25%
39-50 years old 24%
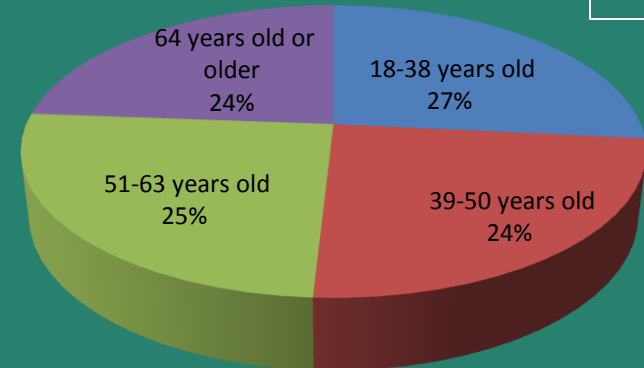
❖ Respondent characteristics

General Physical Activity

- Cannot determine 15%
- No PA 16%
- Insufficient PA 15%
- Meet recommendation 54%

BMI

- Body Mass Index (n = 834) 0%
- Underweight 2%
- Obese 25%
- Normal weight 37%
- Overweight 36%
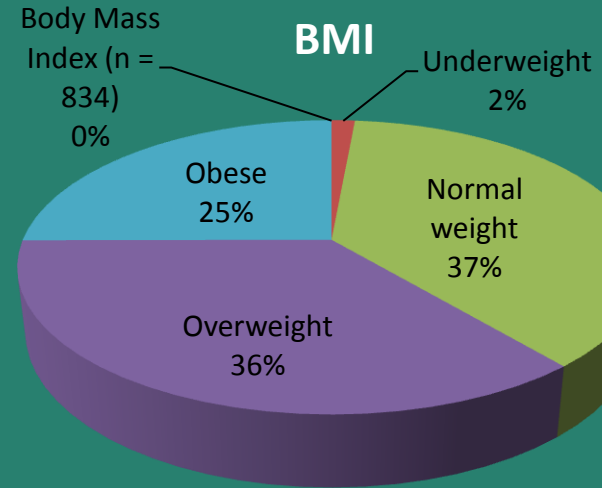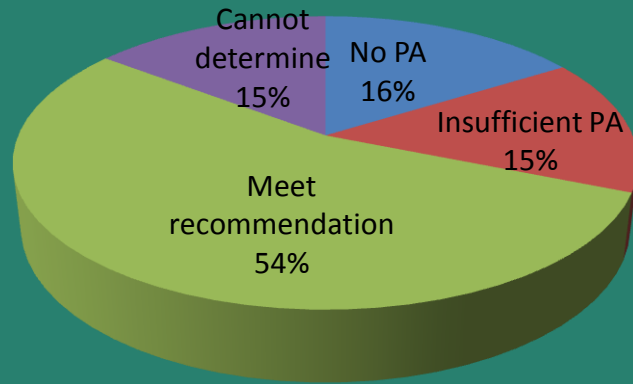
Past Park Use in the Last Month

- Frequent visitors 22%
- Occasional visitors 20%
- Non-visitors 58%
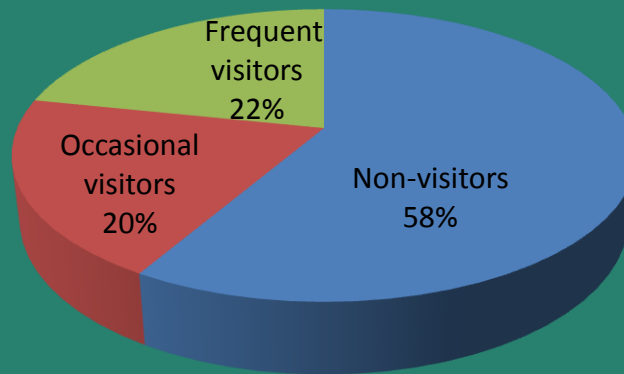
❖ Perceptions of park quality

- Test-retest ICCs of the neighborhood park quality questions ranged from 0.49 to 0.76, indicating moderate to substantial agreement (Landis & Koch, 1977)

- The set of 7 items displayed high internal reliability (α=.91)

Park quality items	N	Mean	SD
A benefit to the neighborhood	662	3.85	0.99
Cleanliness	662	3.70	0.92
How well used the parks are	659	3.58	1.05
Maintenance	649	3.53	1.00
Attractiveness	656	3.50	1.01
Safety	658	3.45	1.04
Availability of facilities of interest	657	3.21	1.10
Overall (α=.91)		3.55	0.81

❖ Ordinal regressions models of park qualities on PA measures

Dependent Variable Models		Moderate PA	Vigorous PA	Park-based weekly PA	Park-based PA during last visit	BMI
-2 Log Likelihood		1449.24	1295.51*	911.18***	607.92	1204.72*
Pseudo R² (Nagelkerke)		0.02	0.04	0.09	0.06	0.03
Independent Variables - Odds Ratio (95% CI)	A benefit to the neighborhood	0.78 (0.60-1.00)	0.71* (0.55-0.92)	0.71* (0.53-0.96)	0.85 (0.58-1.26)	1.45** (1.14-1.84)
	Clean	1.13 (0.85-1.51)	1.07 (0.79-1.43)	1.45* (1.02-2.06)	1.41 (0.87-2.29)	0.82 (0.62-1.08)
	Used by many people	0.94 (0.76-1.15)	0.81 (0.65-1.01)	0.84 (0.65-1.08)	1.70 (1.19-2.43)	0.77* (0.63-0.95)
	Well-maintained	1.17 (0.88-1.57)	1.34 (1.00-1.79)	1.03 (0.73-1.46)	0.96 (0.62-1.50)	1.11 (0.83-1.47)
	Attractive	1.12 (0.85-1.47)	0.97 (0.73-1.30)	0.93 (0.66-1.31)	0.75 (0.44-1.27)	1.11 (0.85-1.45)
	Safety	0.86 (0.69-1.07)	0.91 (0.72-1.16)	0.84 (0.63-1.11)	1.00 (0.70-1.43)	0.97 (0.78-1.21)
	Facilities that I am interested in	0.95 (0.77-1.16)	1.06 (0.86-1.31)	0.86 (0.66-1.12)	0.78 (0.56-1.09)	1.00 (0.82-1.21)

Note: * $p < .05$; ** $p < .01$; *** $p < 001$

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❖ Perception of seeing parks as a neighborhood benefit

- Rated highest

- Has a strong association with increased vigorous and park-based PA and decreased BMI.

➡ Promoting positive attitudes and helping residents understand the numerous benefits of local parks may help promote PA and well-being

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❖ Cleanliness

- Cleanliness is negatively related with park-based PA

- Contrary to a previous finding that cleaner park/facilities increase use (Gobster, 2002). However, that study didn't examine the relationship with PA.

➡ More frequent active users of parks may be more cognizant of park incivilities (e.g., vandalism; Ibitayo & Virden, 1996)

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Independent Variables – Odds Ratio (95% CI)

Note: * $p < .05$; **$p < .01$; ***$p < 001$

❖ How well used the parks are

- Greater perceived park use levels were found to be associated with higher BMI

- Contrary to some studies that surroundings with many people exercising encourage PA participation

  (Brownson et al., 2001)

➡ Popular parks may be viewed as places for more sedentary social gatherings such as picnics

➡ Perceptions of crowded parks discourage use for PA

  (Arnberger & Brandenburg, 2007; Brunt & Courtney, 1999)

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Note: $* \, p < .05$; $**p < .01$; $***p < 001$

❖ Maintenance, attractiveness, safety and availability of facilities of interest

- No significant relationship with physical activity and BMI was found

➡ Objective measures in addition to self-report data

Ex: crime rate, traffic accidents rate, appearance of emergency telephone, and lightening to measure safety
(e.g., Coen & Ross, 2006; Foster & Giles-Corti, 2008)
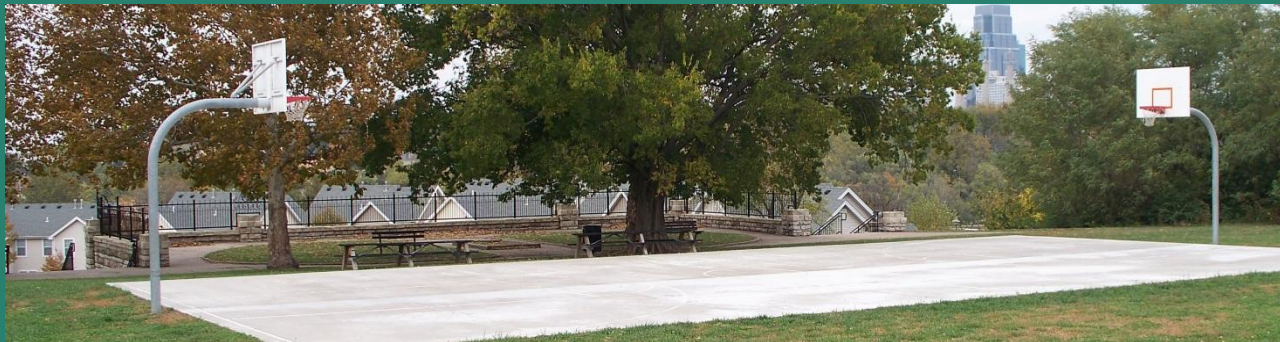
❖ Limitations and future research

- Only measured perceptions of in-park quality aspects of park characteristics
  - Future research could include characteristics of access & policies

- Challenges of self-reported measure of PA (e.g., recall accuracy)
  - Future research could include objective measures of PA

- Given the demonstrated reliability of the neighborhood park quality scale

  - Future research could examine residents' perceptions
  - Further understanding disparities in perceptions of neighborhood park quality
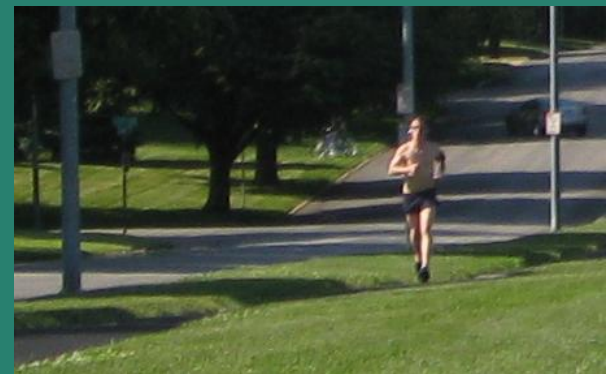
Conclusion

❖ Remains a need to promote PA and health

- About 50% of respondents meet PA recommendation levels

- Over 60% pertain to overweight and obese

❖ Park quality is important to PA and health

- Residents' perceptions of their neighborhood park quality are related to vigorous PA, park-based PA and BMI

- Enhancing the awareness of benefits of parks by residents can help promote PA and community's health

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Team:

Dr. Sonja Wilhelm Stanis, University of Missouri, Co-PI

Dr. Andrew Kaczynski, University of South Carolina, Co-PI

Hua Bai, University of Missouri

Gina M. Besenyi, MPH, Kansas State University

Katherine B. Vaughan, MPH, Kansas State University

Thank you!

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❖ **Physical activity and health**

PA and Health Variables (in minutes)	n	%	Mean (Std.)	Median
Body Mass Index (n = 834)				
Underweight (BMI<18.5)	12	1.4%		
Normal weight (18.5<BMI<25)	312	37.4%	27.3 (5.9)	26.4
Overweight (25<BMI<30)	301	36.1%		
Obese (BMI>30)	209	25.1%		
Moderate PA(n = 748)				
No moderate PA	164	21.9%	-	-
Participate in Moderate PA	584	78.1%	349.8 (541.2)	180.0
Vigorous PA (n = 783)				
No vigorous PA	425	54.3%	-	-
Participate in Vigorous PA	358	45.7%	247.0 (442.8)	120.0
Park-based weekly PA (n = 460)				
No park-based PA	253	55.0%	-	-
Participate in park-based PA	207	45.0%	166.5 (298.5)	120.0
Park-based PA during last visit (*n* = 287)				
No park-based PA during last visit	29	10.1%	-	
Participate in park-based PA	258	89.9%	77.1 (98.6)	60.0