

Predicting physical activity with perceived and objective recreational facility measures

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Abstract

- **Objectives:** To explore the relationship between adolescent girls' perceptions of recreational facilities and their number and presence in neighborhoods; and to determine if these facility measures were associated with girls' met-weighted moderate-to-vigorous physical activity (MW-MVPA) outside of school hours.
- **Methods.** Girls participating in the Trial of Activity for Adolescent Girls reported whether it was easy to get to 9 types of recreational facilities. The girls' addresses were then geocoded and all facilities in parks, schools, and commercial sites within a mile of the girls' homes were documented. Accelerometers recorded each girl's MW-MVPA.
- **Results.** The number of facilities within a half-mile of girls' homes strongly predicted the perception of easy access to 7 of 9 facility types. Both individual facility perceptions and the total number of facilities perceived were associated with increased physical activity. With the exception of basketball courts, objective facility measures were otherwise unrelated to physical activity.

Existing literature on physical activity, recreational facilities, and youth

- Perception of facilities

 more physical activity

(Evenson et al. 2006; Timperio et al. 2006; Dunton et al. 2003)

- Number of facilities

 more physical activity

(Cohen et al. 2006; Norman et al. 2006; Gordon-Larsen et al. 2006)

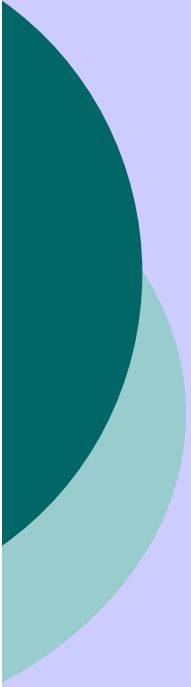
Number/Proximity of Facilities

→ Perception ???

- Most studies show low-levels of agreement

(Kirtland et al. 2003; Boehmer et al. 2006; Michael et al. 2006)

- No studies of youth perception



Which measures better predict PA in youth?

- Implications for public policy:
- Need to build/provide more facilities?

OR

- Need to better promote existing ones?



What is TAAG?

- Multi-center group-randomized trial to test intervention for decline in physical activity in adolescent girls
- 1603 middle-school girls at baseline
- 36 schools
- 6 sites: AZ, CA, MD, MN, LA, SC



Data from TAAG

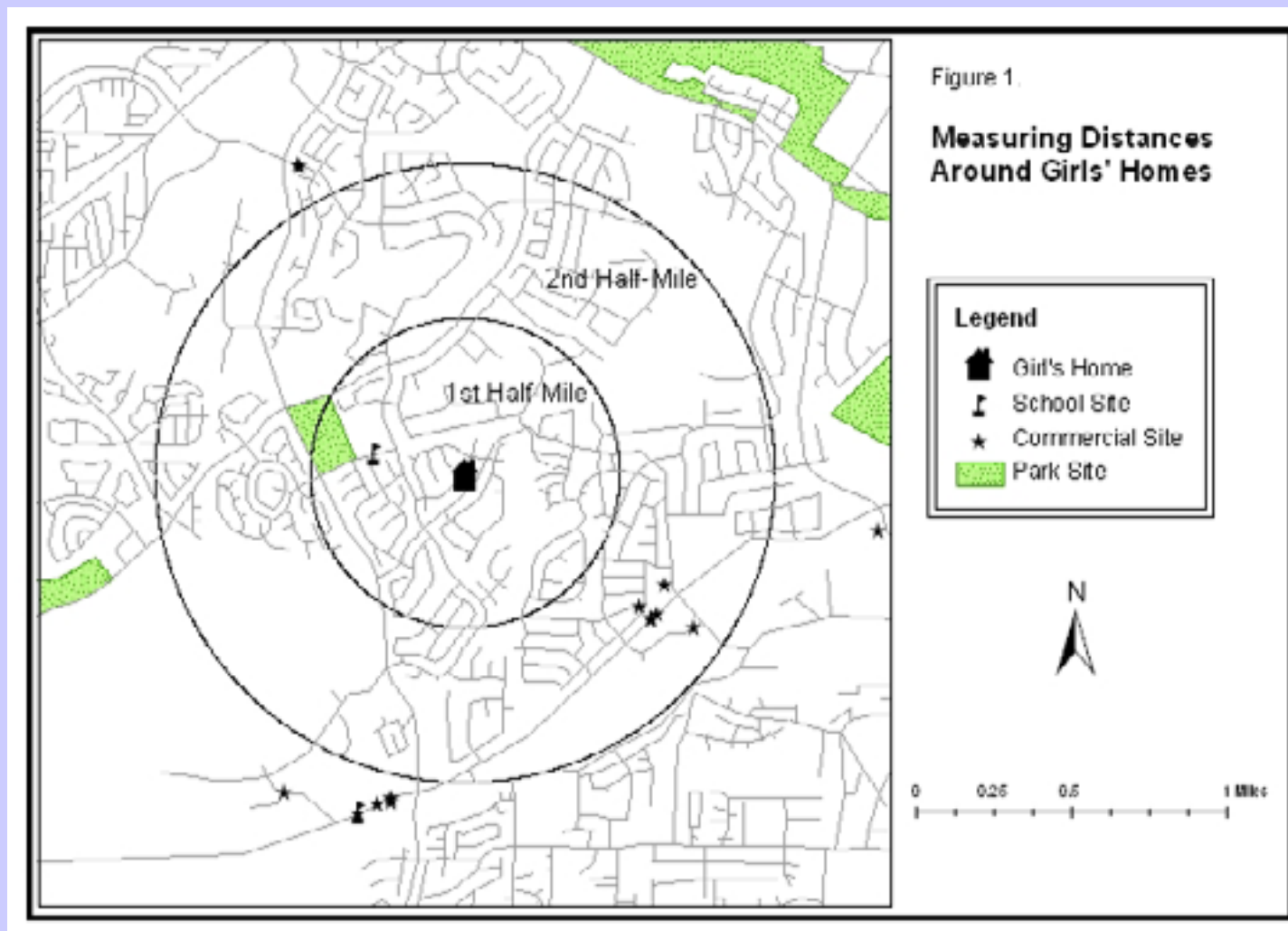
- Accelerometer measurements of moderate-to-vigorous physical activity
- Self-report variables
 - perceived access to recreational facilities
 - participation in recreational classes/teams
 - parent provided transportation to recreational facilities
 - race and Hispanic origin
 - Address information



GIS Data

- Park data– existing GIS shapefiles where available; hand digitized polygons
- Schools- addresses from NCES databases
- Commercial facilities- Smartpages queries, InfoUSA
- TIGER files for interpolation of socioeconomic index

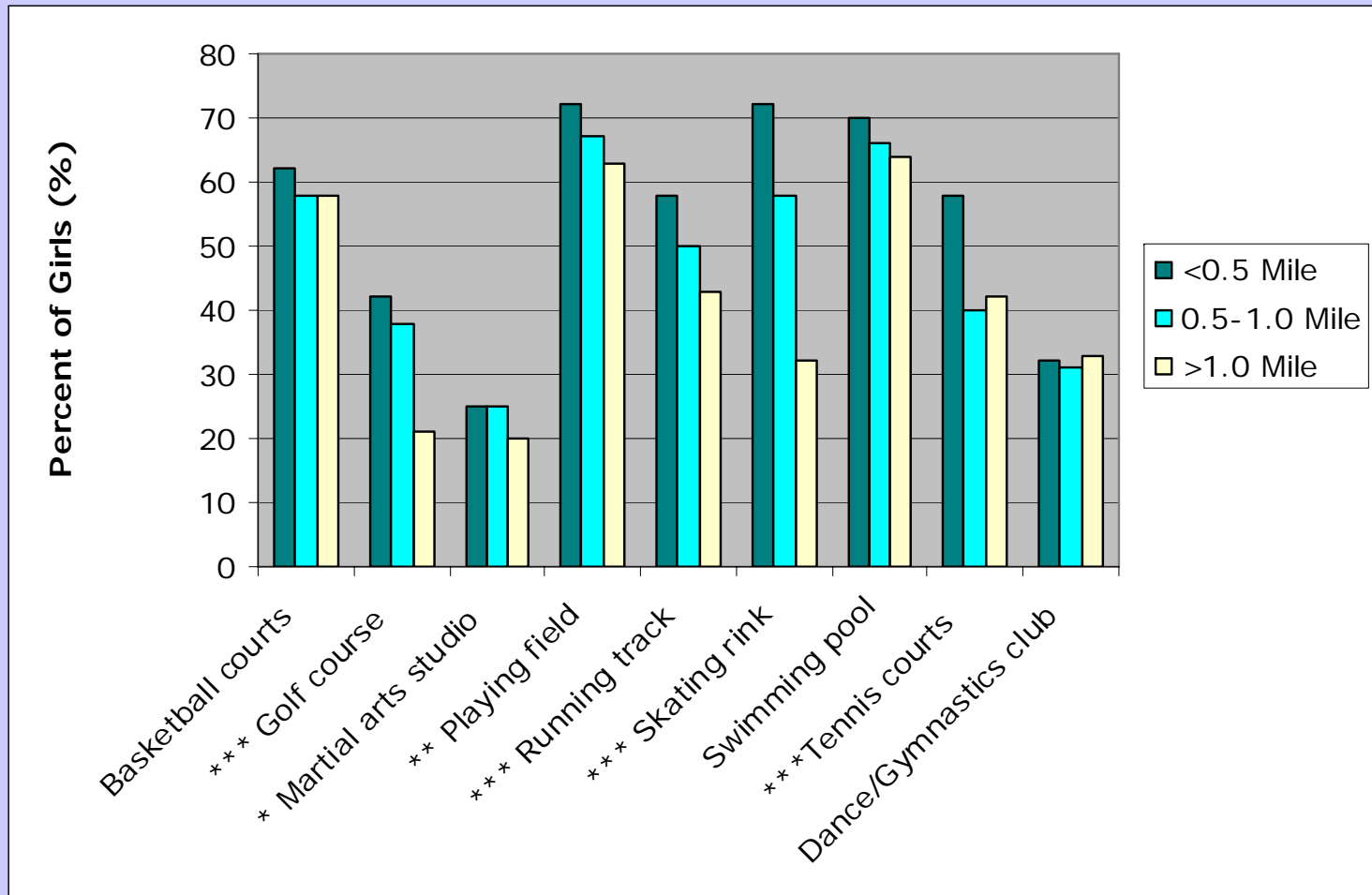
Identifying Facilities in Girls' Neighborhoods



Facility-related variables and data sources

Perceived Facility	Participation in Community Teams/Classes	Sources for Objective Measures		
		Schools	Parks	Commercial
Basketball courts	basketball	X	X	
Golf course	golf		X	X
Martial arts studio	martial arts			X
Playing field	baseball field hockey lacrosse soccer	X	X	
Running track	track and field	X	X	
Skating rink	figure skating ice hockey	X	X	
Swimming pool	swimming	X	X	X
Tennis courts	tennis	X	X	X
Dance/gymnastics club	cheerleading/dance gymnastics dance			X

Differences in proportion of girls perceiving easy access by distance to nearest facility



*** $|p| < 0.01$, ** $|p| < 0.05$, * $|p| < 0.10$ for Chi Square of differences in the proportion of girls who perceive facilities by objectively measured distance

Predicting perception with the number and proximity of facilities

Type of facility perceived	Predictors of Facility Perception: Odds Ratio			
	Number of Facilities		Team or class	Family transport
	<=0.5 mile	0.5-1.0 mile		
Basketball court	1.30**	1.02	1.94***	1.33***
Golf course	1.95***	1.62***	3.57***	1.21***
Martial arts studio	1.15	1.22	3.71***	1.11*
Playing field	1.46***	1.44**	1.59***	1.37***
Running track	2.10***	1.43**	2.00***	1.33***
Skating rink	1.87**	0.77	1.97***	1.20***
Swimming pool	2.05***	1.48**	1.64***	1.32***
Tennis court	2.07***	1.00	2.20***	1.21***
Dance/gymnastics club	0.94	0.84	3.66***	1.21***

Note: Each row displays results for an individual model. All models control for the population density and SES of girls' neighborhoods as well as girls' race as fixed effects. School and site are treated as random.

*** |p|<0.01, ** |p|<0.05, * |p|<0.10 for log odds estimates from individual logistic regressions for each type of facility perceived

Predicting weekly non-school MW-MVPA with individual facility measures

Type of facility	Estimate (Min/Wk for Avg Girl)		
	Perception of Easy Access	Number of Facilities	
		<=0.5 mile	0.5-1.0 mile
Basketball court	0.10 (68.1)***	0.03 (21.2)*	0.03 (18.5)**
Golf course	0.14 (96.7)***	-0.01 (-5.7)	0.00 (-3.25)
Martial arts studio	0.02 (13.6)	-0.02 (-12.7)	-0.01 (-6.2)
Playing field	0.10 (69.4)***	0.01 (4.4)	0.01 (8.7)
Running track	0.13 (93.5)***	0.01 (7.5)	0.02 (12.4)
Skating rink	0.01 (8.5)	-0.02 (-16.6)	-0.00 (-1.58)
Swimming pool	0.12 (85.8)***	-0.01 (-4.8)	0.01 (6.7)
Tennis court	0.10 (73.1)***	-0.04 (-26.4)	0.00 (-2.0)
Dance/gymnastics club	0.06 (43.6)*	0.01 (6.3)	-0.03 (-24.4)

Note: Each row displays results for a separate model. All models control for the population density and SES of girls' neighborhoods as well as girls' race as fixed effects. School and site are treated as random. Weekly MW-MVPA was log-transformed, thus the estimates are expressed as % difference (in decimal form). Average differences were calculated by multiplying the estimate by mean weekly MW-MVPA (704).

*** |p|<0.01, ** |p|<0.05, * |p|<0.10 for estimates from individual mixed model regressions for each type of facility

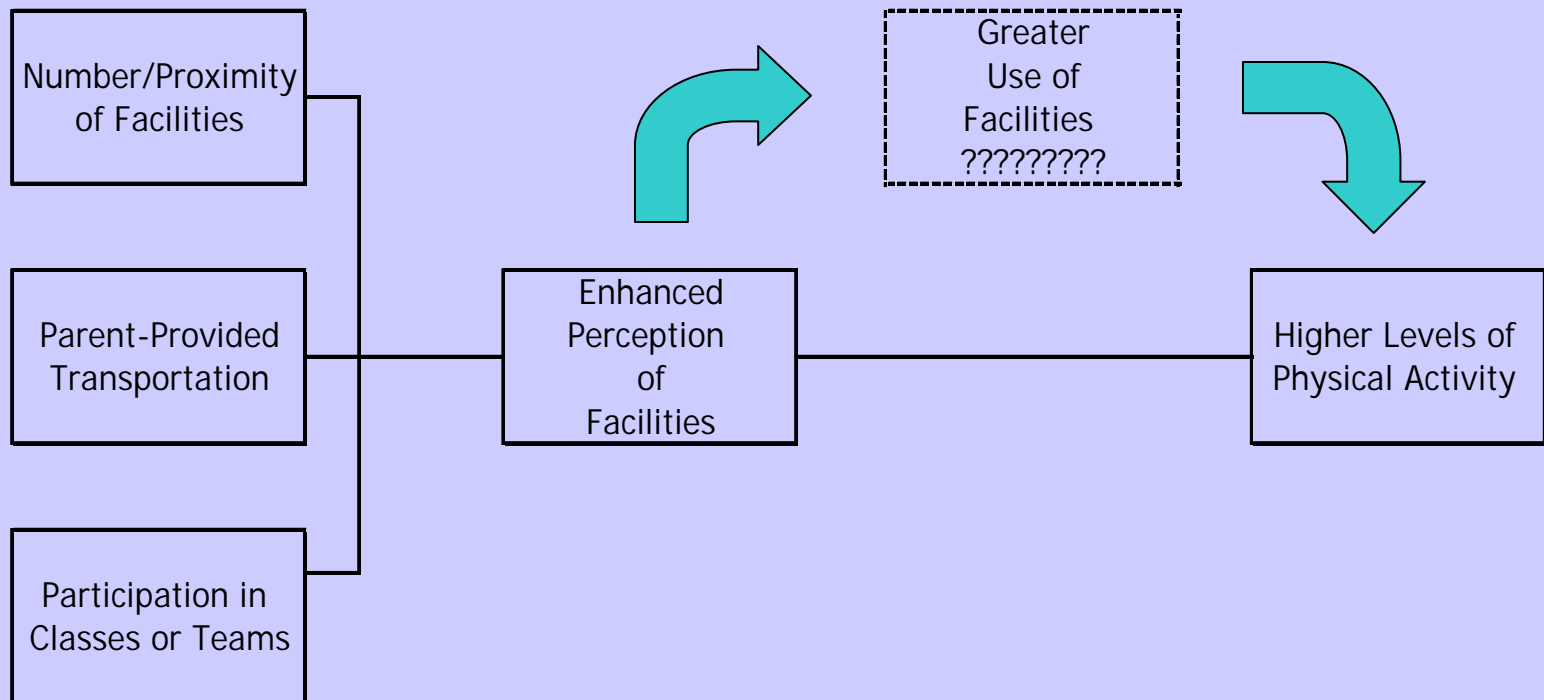
Predicting weekly MW-MVPA with total perceived and objectively measured facilities

Variable	Estimate	Min/Wk for Avg Girl	Probability
Intercept	536.84	.	0.00
Number of facility types perceived	0.03	22.23	0.00
Number of objectively measured facilities within 1 mile	0.00	2.45	0.26
Standardized Socioeconomic Index	-0.01	-5.68	0.76
Population Density	0.00	0.00	0.80
Race/Ethnicity			
Hispanic	-0.13	-90.42	0.01
African American	-0.09	-63.91	0.09
Other	-0.16	-111.25	0.00
White	0.00	0.00	.

Note: School and site are treated as random. Weekly MW-MVPA was log-transformed, thus the estimates are expressed as % difference (in decimal form). Average differences were calculated by multiplying the estimate by mean weekly MW-MVPA (704).

*** |p|<0.01, ** |p|<0.05, * |p|<0.10

General model of relationships





Not all facilities are created equal

- Strictly commercial facilities
 - objective measures unrelated to perception
 - perception unrelated to PA
- Basketball courts
 - only facilities directly related to both perception and physical activity



Possible strategies for increasing PA

- Raise youth perception of community recreational facilities
 - better promote existing facilities
 - work to enroll youth in programs/activities
 - provide transportation/support services



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