



# Walkable Community Design & Physical Activity in Children

---

Barbara B. Brown, PhD  
& Robert B. Stevens, MPP

Contact: [barbara.brown@fcs.utah.edu](mailto:barbara.brown@fcs.utah.edu)

Funded by a Synergy Grant (Craig Forster, PI), Urban Systems Research, University of Utah, Office of the Vice President of Research

# National problem: Low child PA, especially for girls

- Only 35% of girls & 48% of boys meet MVPA\* standards
  - (60 min. X 5 days/week; ages 6-11)
  - (Troiano, et al., 2007)

\* Moderate to Vigorous Physical Activity



Dailymail, UK

# Community solution? Daybreak, UT



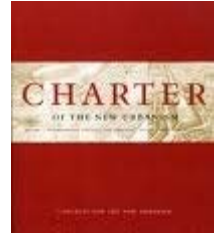
# Daybreak is

- 1 of 500 New Urban places (Steuteville, 2008)
- a LEED-ND pilot community (Leadership in Energy and Environmental Design-Neighborhood Development)



D.H. Horchner, DesignWorkshop

# New Urbanist design goals congruent with PA



- Walkable neighborhoods
  - "Neighborhoods should be compact, pedestrian-friendly, and mixed-use"
- Walkable schools
  - "Schools should be sized & located to enable children to walk or bicycle to them"

(Leccese & McCormick, 2000, p. 105).



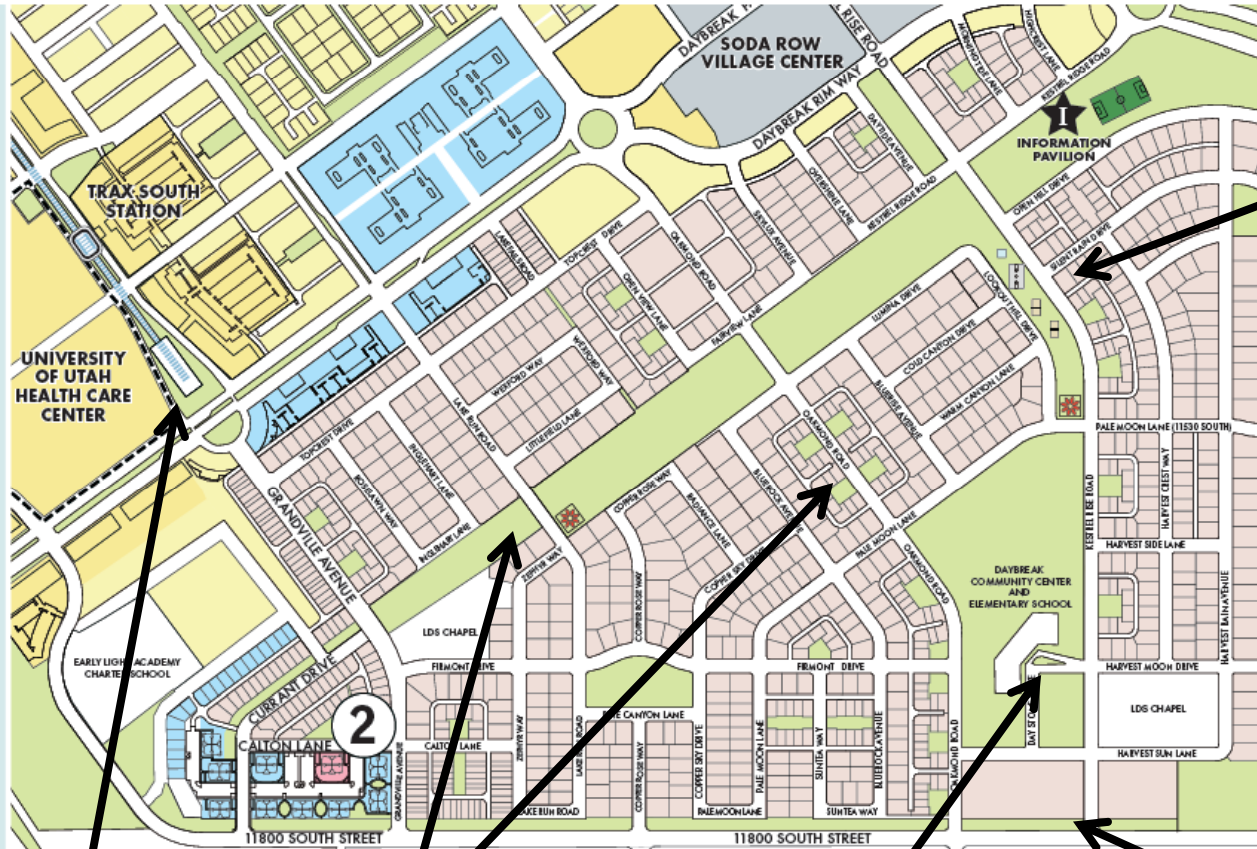
# LEED-Neighborhood Development goals congruent with PA

- Points awarded for energy efficiency + greater density & less auto dependence
- Daybreak would likely get points for
  - School proximity
    - Example: 1/2 residences w/in 0.5 mile (Smart Location/Linkage credit 7)
  - Walkable streets
    - Example: sidewalks, calmed traffic (Neighborhood Pattern & Design credit 7)
  - Street network
    - Example: interconnected (Neighborhood Pattern & Design credit 8)

# Daybreak has the 3Ds of walkability: Density, Diversity, & pedestrian friendly Design

Compact homes;  
garage in back,  
porches in front

Daybreak village map.



Diverse  
uses  
planned

Green  
spaces

School & community  
center

Higher density town homes

No cul-de-  
sacs!



# Walkable Daybreak community

- Planning by New Urbanist Peter Calthorpe





# Selection problem: Does Daybreak's walkable design attract active families?

---

- Selection (resident prior preferences) or environment (walkability) → PA?
  - Hi PA people → choose Daybreak → stay hi PA?
  - OR, Move to Daybreak → more PA?
- We address 2 ways
  - Control for parent preference for child PA
    - “Ideally my child would walk to school”
  - Compare Daybreak kids with non-Daybreak classmates
    - If selection exists, Daybreak kids would be more active at school than others

# MVPA compared for 3 groups of 5<sup>th</sup> graders

- Walkable →
  - Students living in and attending Daybreak school
- Mixed →
  - Students attend Daybreak school, live outside community boundaries
- Less walkable →
  - Neither school nor neighborhood is walkable



# Research questions for MVPA minutes

---

- Community:
  - Walkable > less walkable groups
    - For walk to & from school?
    - After school & on weekends?
- Selection:
  - Walkable > mixed group at school?
    - Lunch & other times?
    - If yes, selection exists

## Nearby mixed & less walkable communities were similar

- Controlled parent preferences for child to walk, # rooms in home, & parent education



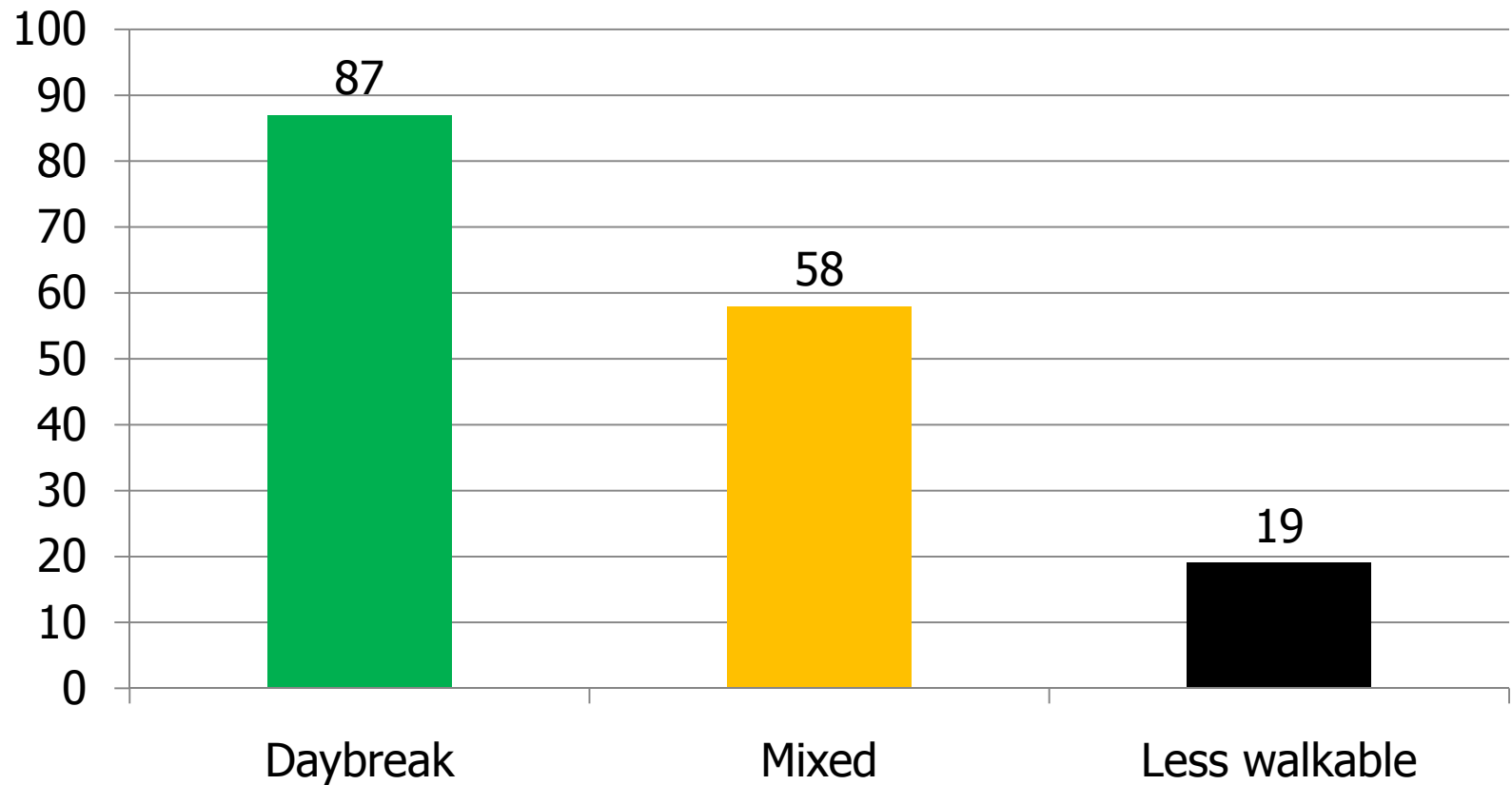
# Accelerometer & survey data



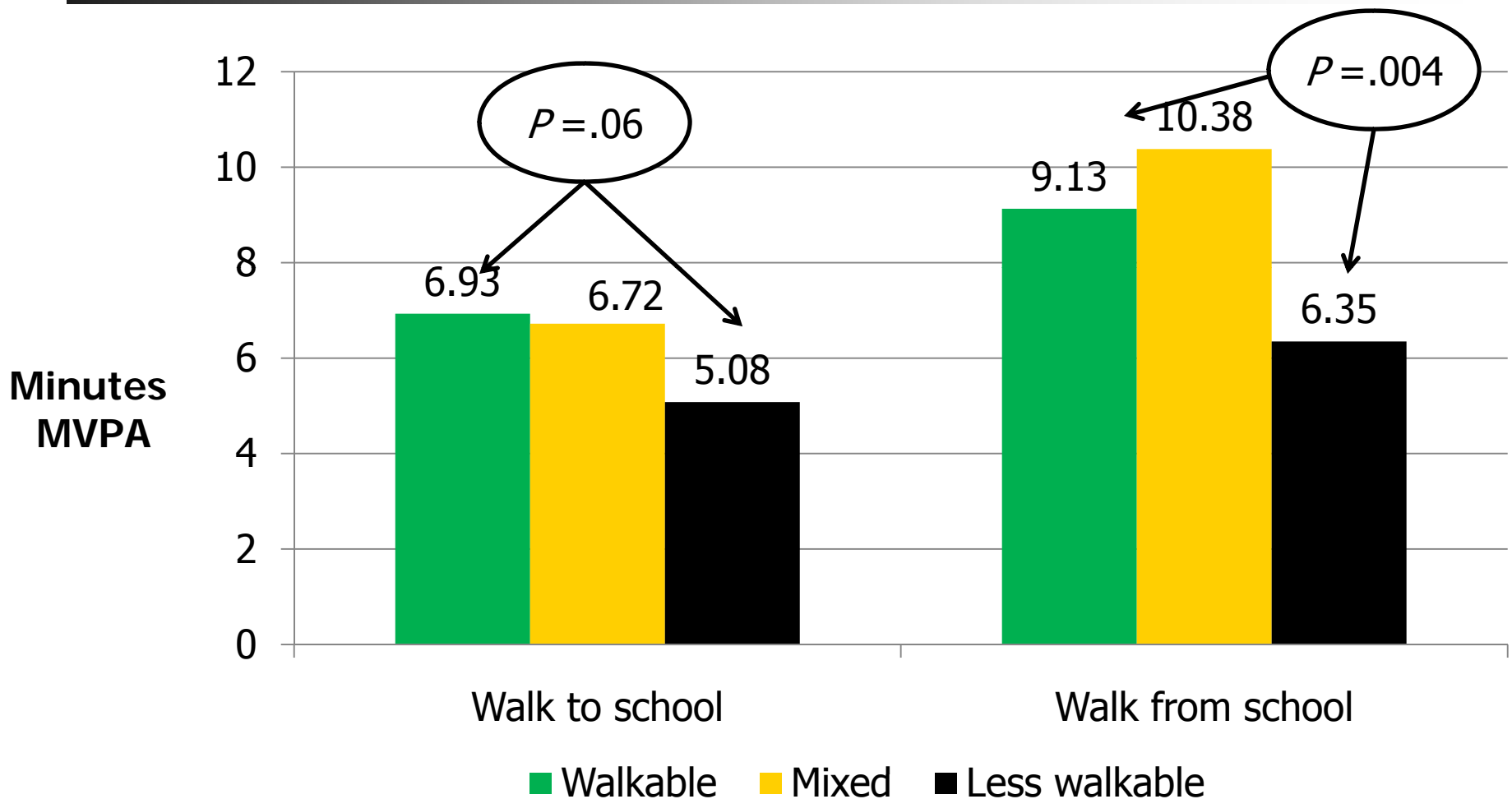
- Accelerometer data details:
  - 7:55 AM -9:00 PM
  - 30-sec. epochs measured, minutes analyzed
  - MVPA: Freedson's age-adjusted scoring
  - Valid hour >30 mins. activity; valid day  $\geq 4$  hrs
  - $\geq 2$  days for week analyses;  $\geq 1$  for weekend
- Parent & child surveys: controls & self-reports
- Ns = 203 (of 211) accelerometers good
  - Weekday accelerometer + parent survey: n=185
  - Weekend accelerometer + parent survey: n=148

# Student self-report: % walk weekly ( $\geq$ 1 X wk)

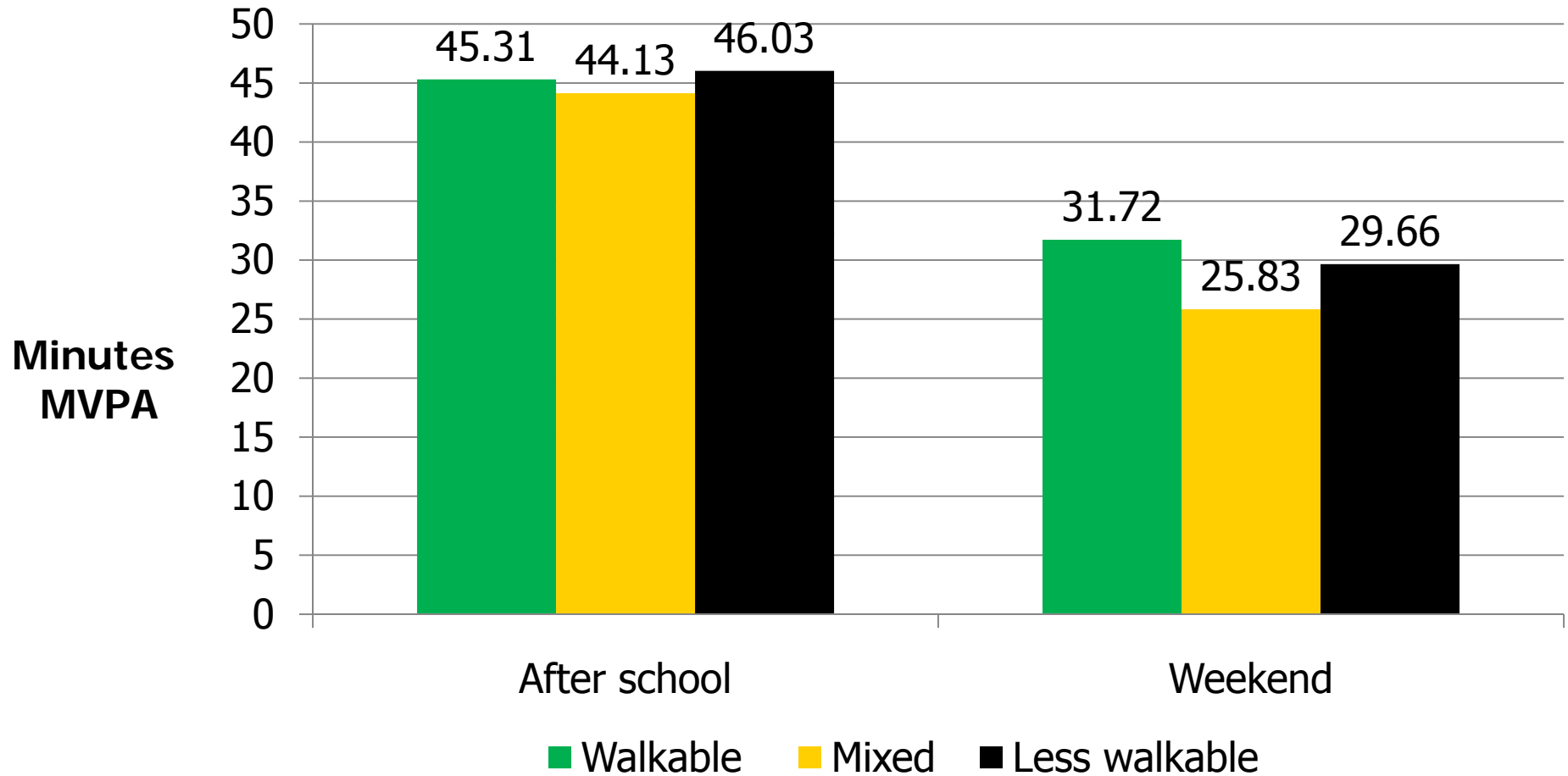
## Walks weekly



# Community effects: Daybreak kids get more MVPA during ½ hr. before/after school



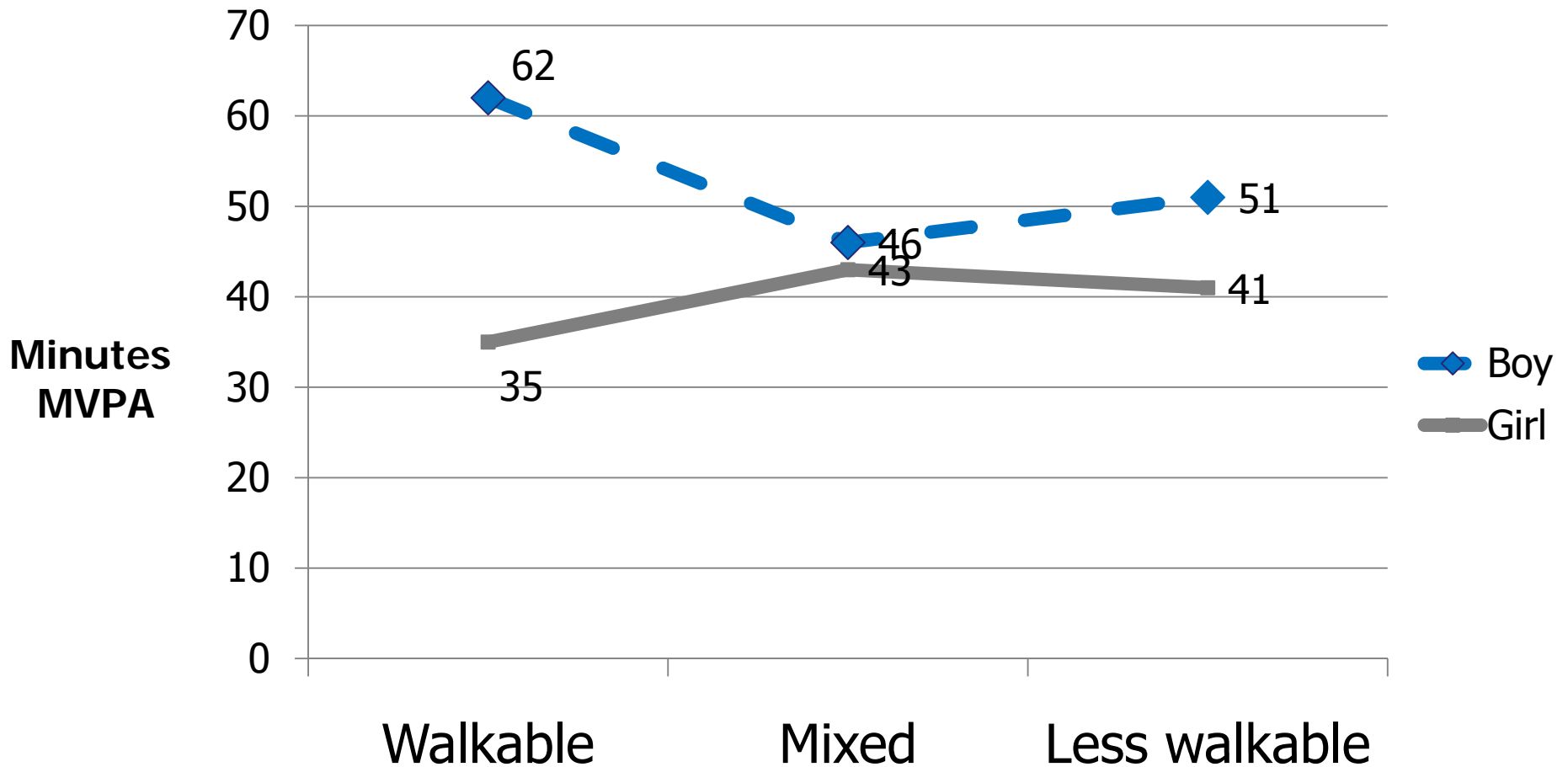
No main effect for community after school, on weekends. But...





# Daybreak boys especially active after school

(Gender X Community signif.)

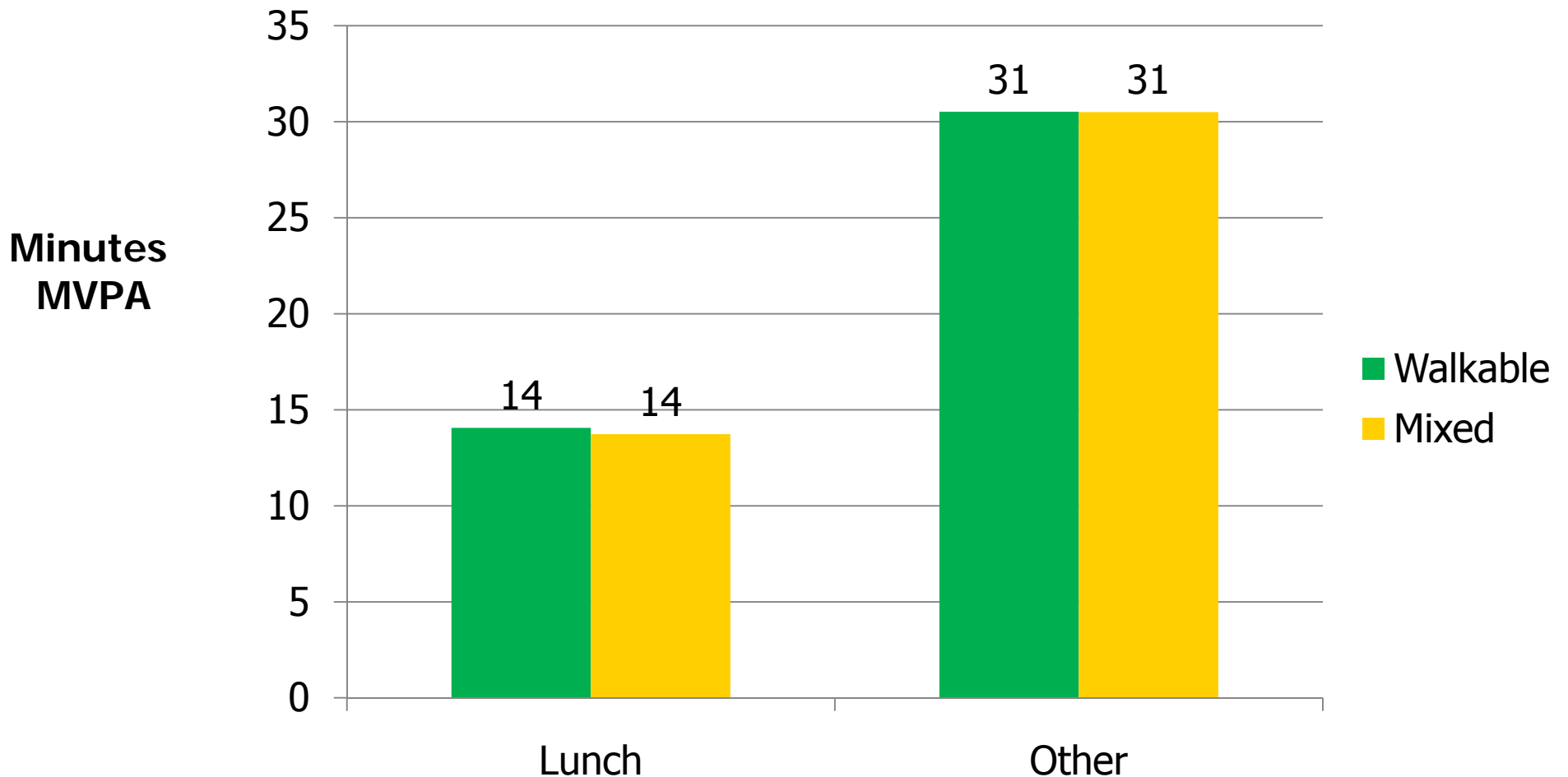


## Boys are often more active than girls— Except for walk from school

	Boys	Girls	F	Partial eta <sup>2</sup>
Out of school MVPA				
<b>Walk to school</b>	7.01	5.47	4.90*	0.027
Walk from school	8.83	8.42	0.39	0.002
<b>After school</b>	51.64	37.68	14.61**	0.077
<b>Weekend</b>	34.33	23.82	8.12**	0.055
In school MVPA				
<b>Lunch</b>	16.98	11.11	37.74**	0.178
<b>Other school day</b>	32.28	26.25	8.04**	0.041
* p < .05; ** p < .01				

# Are Daybreak kids more active than others in the same classrooms?

- No: no evidence of selection bias



# Summary

---

- Community effects
  - Favor Daybreak for walk to/from school MVPA
  - After school, Daybreak boys especially active
  - No community effects on weekends
- Boys often more active than girls
- Controlled or assessed for selection 2 ways

# Still need more PA for girls especially

- But at least the walk from school MVPA was gender neutral



# Difficult to fight car culture



Dorsey, 2007, TBO



# But walkable design seems to matter

- Here is the less walkable area...



# A quick look at walkability at Daybreak...



Gold medallion homes



# Sociable porches



Calthorpe Associates

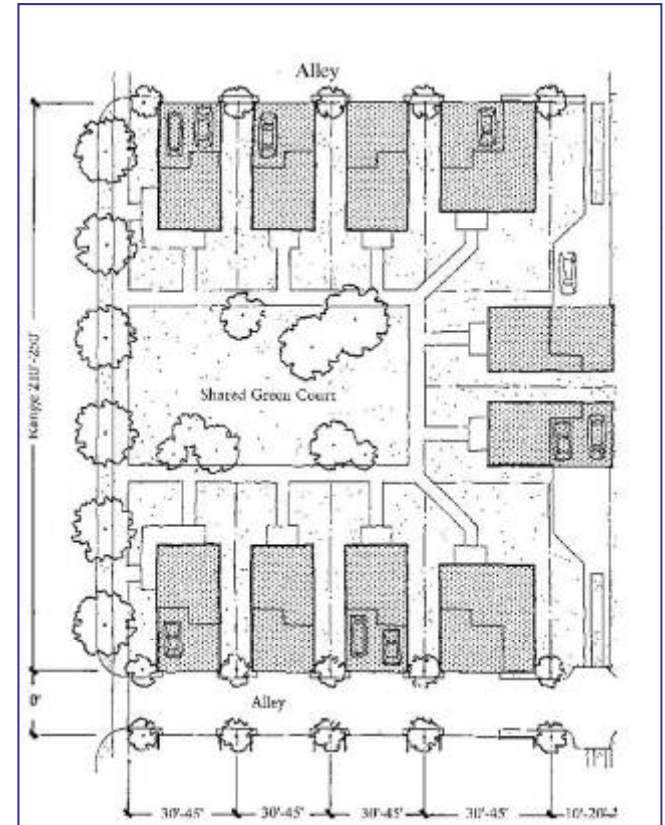


Small lots, but  
variety of  
open spaces



Brown; Kennecott Land

# Some houses share a green court





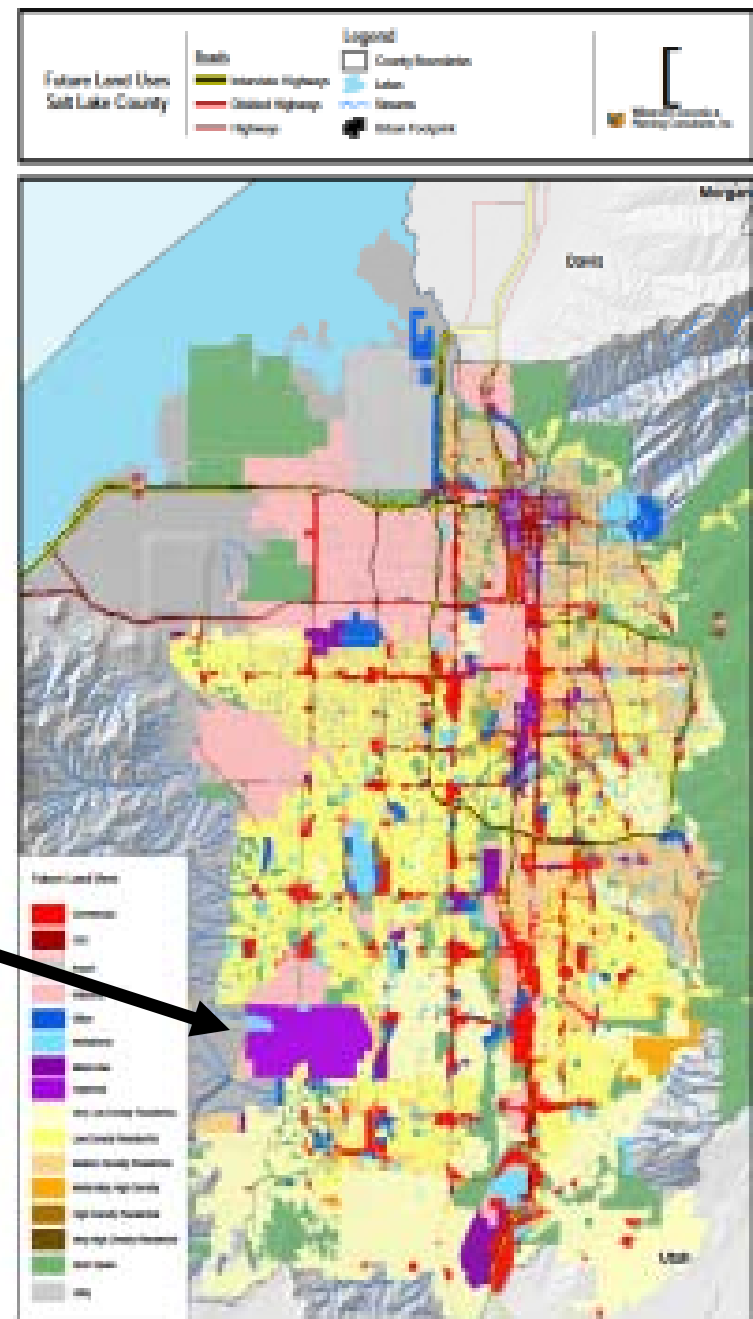
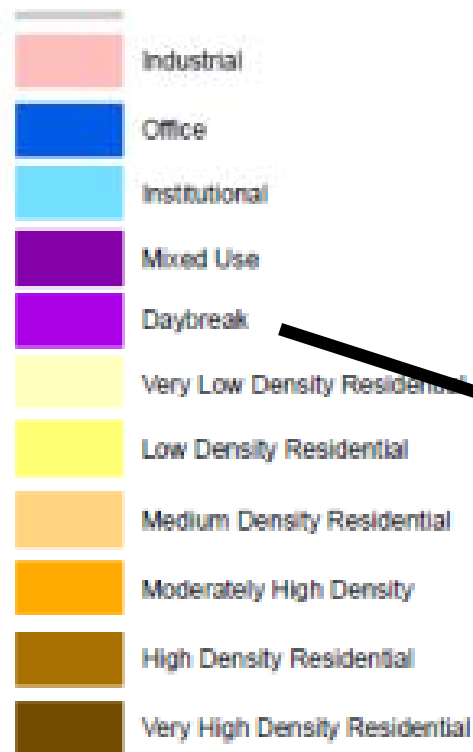
Kennecott Land

# School & community center together



# Daybreak is

- A promising active living community
- Making compact development attractive
- Deserves investigation for multiple potential benefits



Future growth: may be 200,000+



Future TRAX

# Appendices: (hidden slides)

## Description of control variables

Table 1

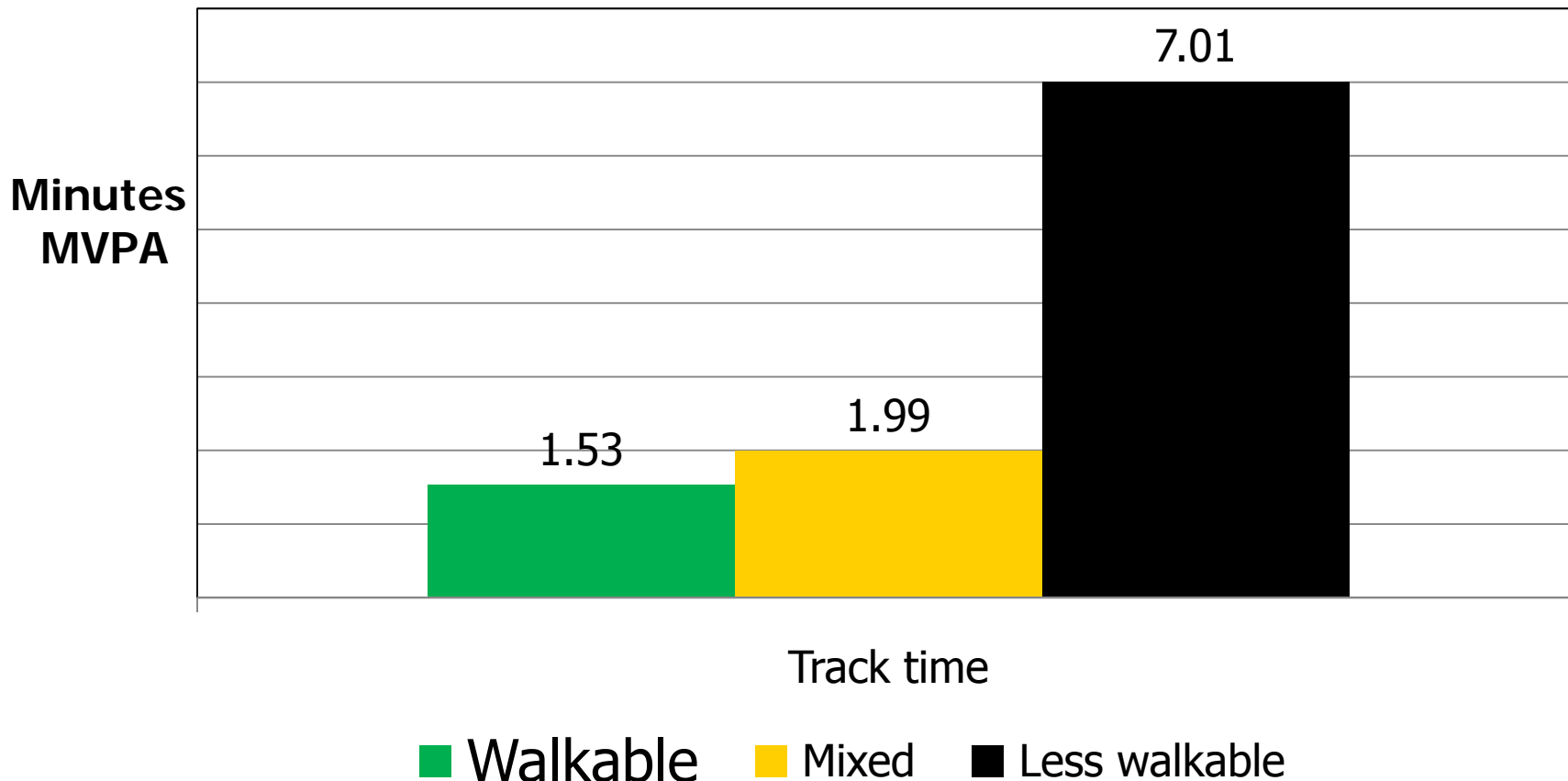
Means (M) and standard deviations (SD) for covariates

	Walkable community		Mixed community		Less walkable community		Boys		Girls	
	(n= 26)		(n = 74)		(n=84)		(n=77)		(n = 107)	
	M	SD	M	SD	M	SD	M	SD	M	SD
Parent ideally wants child to walk (1-4)	3.89	0.58	3.07	1.14	2.57	1.20	3.05	1.14	2.90	1.22
# rooms in home	7.93	2.77	8.08	2.32	9.12	2.35	8.32	2.60	8.68	2.34
Parent has some college	0.81	0.40	0.83	0.38	0.74	0.44	0.78	0.41	0.79	0.41

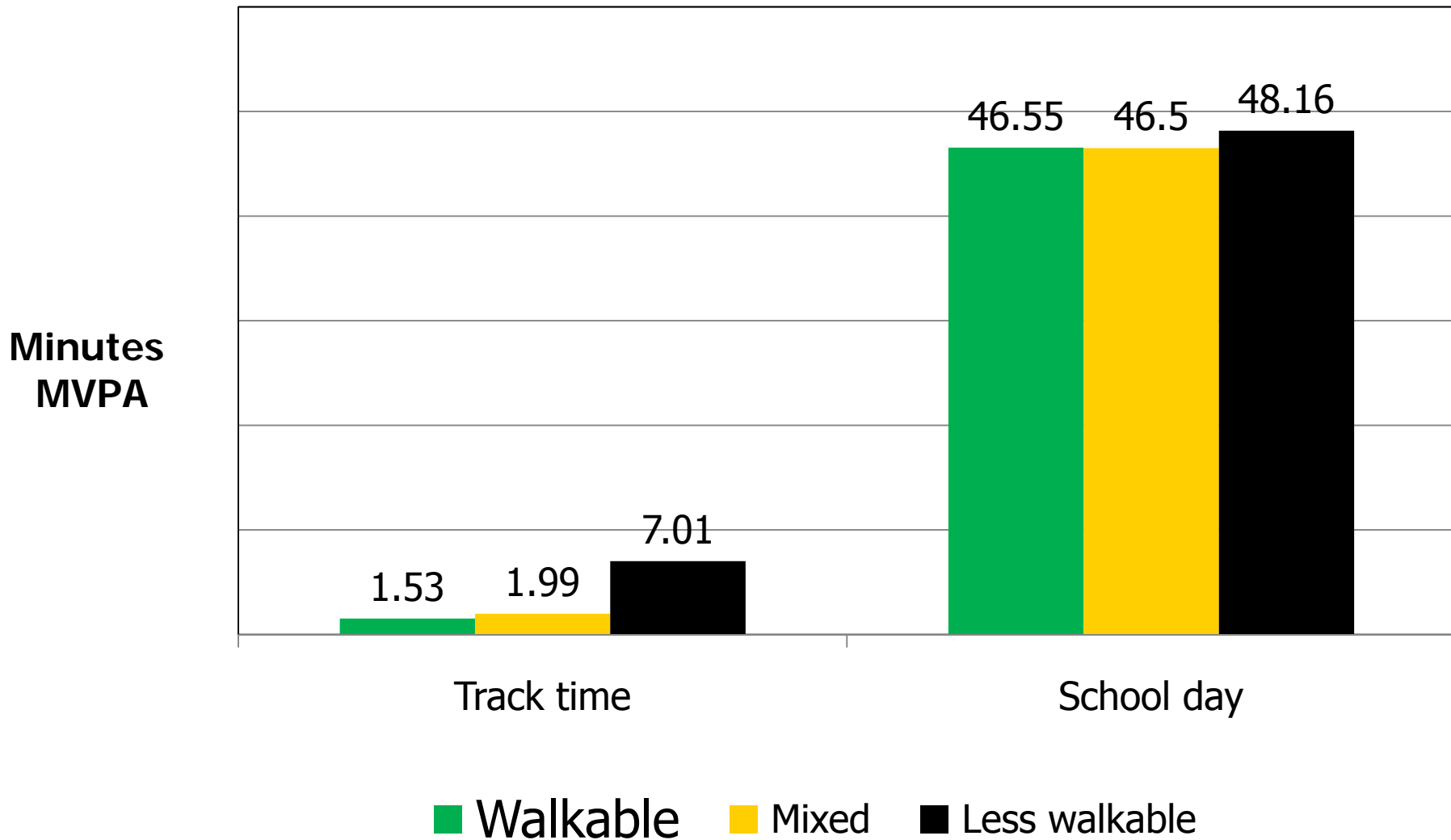


# Less walkable school had an extra 15 minute track time

- Effects during track time are noticeable
  - & no significant gender effect



...but no MVPA boost across the whole school day



## How our results compare

- Most compare: walkers vs non
  - We compared communities
- Walkers get 3.5 to 14 more MVPA min.
  - Denmark 3.5 (Cooper, 2005)
  - England 5.6 to; 8-14 to & from (Cooper, 2003)
  - U.S.: to 3.7; from 4.7, to & from 9.5 (Saksvig, 2007)
  - So. Carolina, regular walkers: to 5; from 5 (Sirard, 2005)