

Investigating the Impact of a Smart Growth Community on Children's Physical Activity Contexts Using Ecological Momentary Assessment

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Smart Growth Planning Principles



1. A range of housing opportunities
2. Walkable neighborhoods
3. Community and stakeholder collaboration
4. Distinctive community with sense of place
5. Cost effective development decisions
6. Mixed land use
7. Preservation of open or green space
8. Variety of transportation choices
9. Development of existing communities
10. Compact building design (increased density)

Lack of Awareness of Available Environmental Resources



- Poor agreement between self-reported perceptions and objective assessment (GIS) of built environment (Kirtland et al., 2003).
- Mismatch is more common among:
 - Younger women
 - Low income and less educated individuals
 - People with low self-efficacy for physical activity, who are less active, who are overweight
 - People who had lived in their neighborhood for less than 2 years (Ball et al 2008; Gebel et al.,2009; Reed, 2007)

Lack of Use of Available Environmental Resources



- Lack of time (Salmon et al., 2007)
- Lack of transportation (Hoefler et al., 2001)
- Lack of independent mobility (Irwin et al., 2007)
- Lack of safety (Carver et al., 2008)
- Lack of shade/vegetation
- High traffic volume

Availability ≠ Awareness ≠ Use

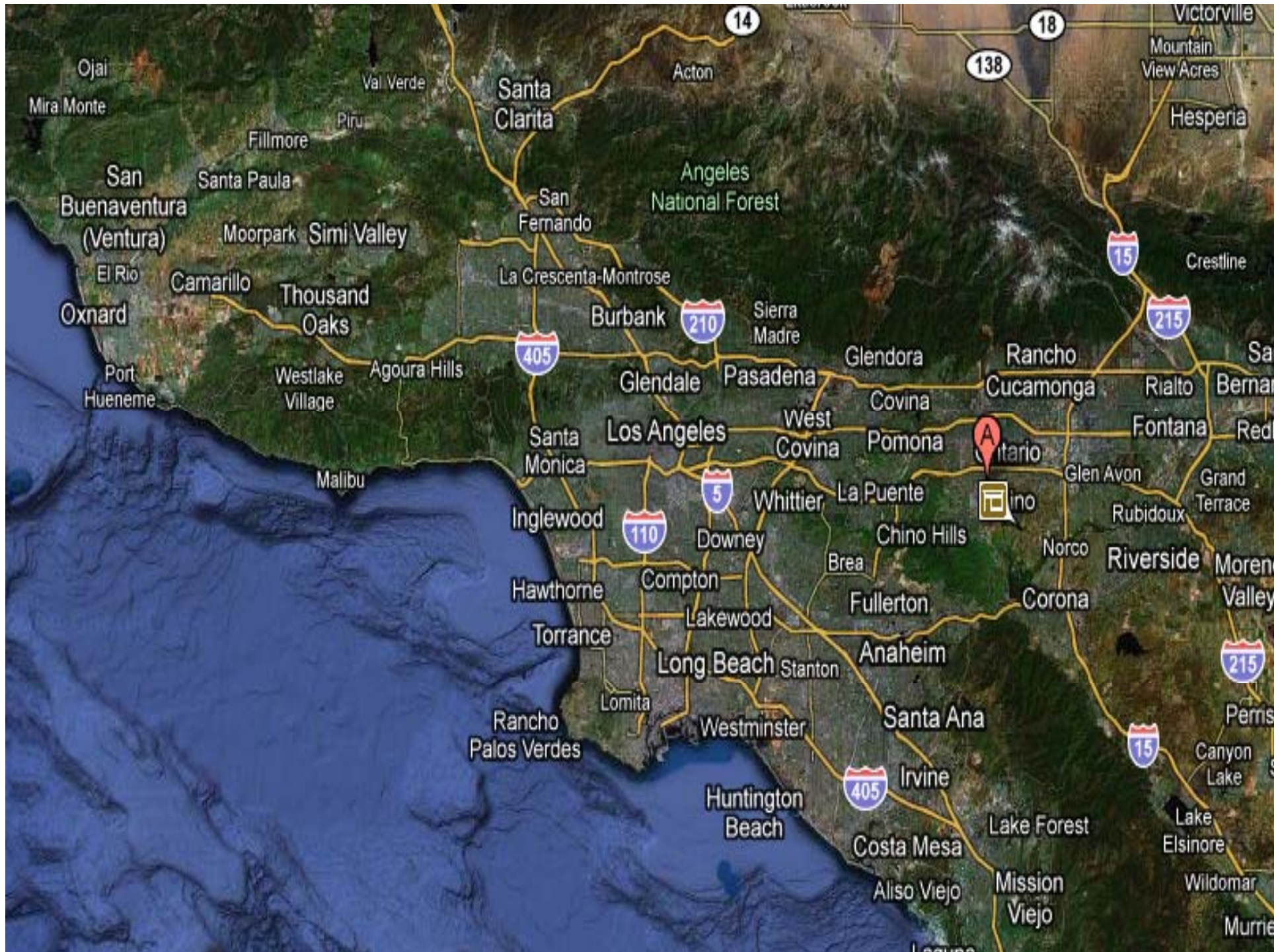
Ecological Momentary Assessment (EMA)



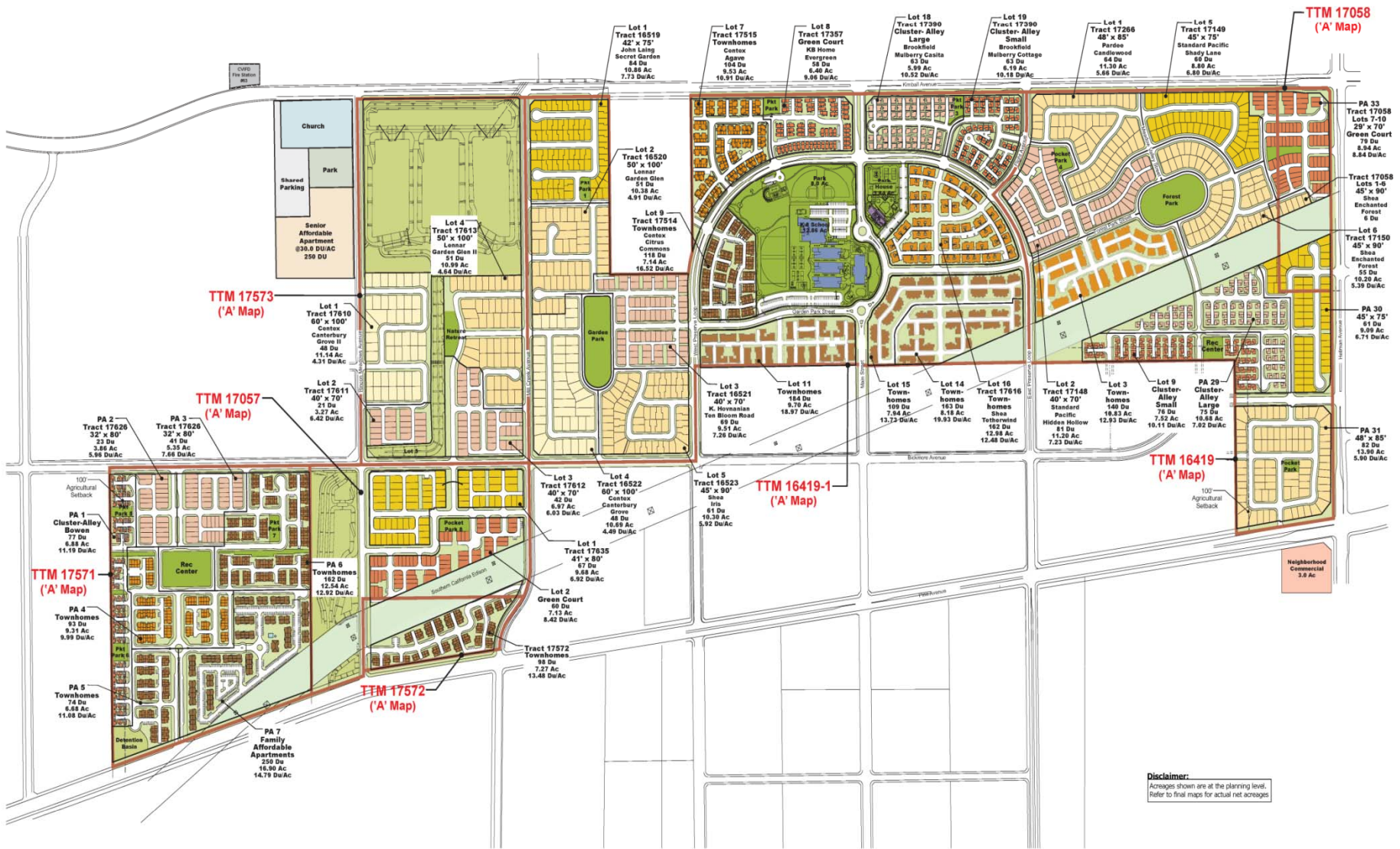
- Real-time responses in naturalistic settings
- Can simultaneously measure:
 - 1) Specific location (playground, trail, sidewalk)
 - 2) Perceived characteristics (safety, traffic, etc)
- Without recall bias

Research Goals

- 1) Determine whether the PA contexts of children living in a SG community differ from children living in conventional low-density suburban communities (control)
- 2) Determine whether 6-month changes in PA contexts lead to greater increases in PA for children living in the SG vs. control communities.



Preserve Community Plan



The Preserve at Chino - North of Pine Avenue
 Lewis Planned Communities
 Chino, California

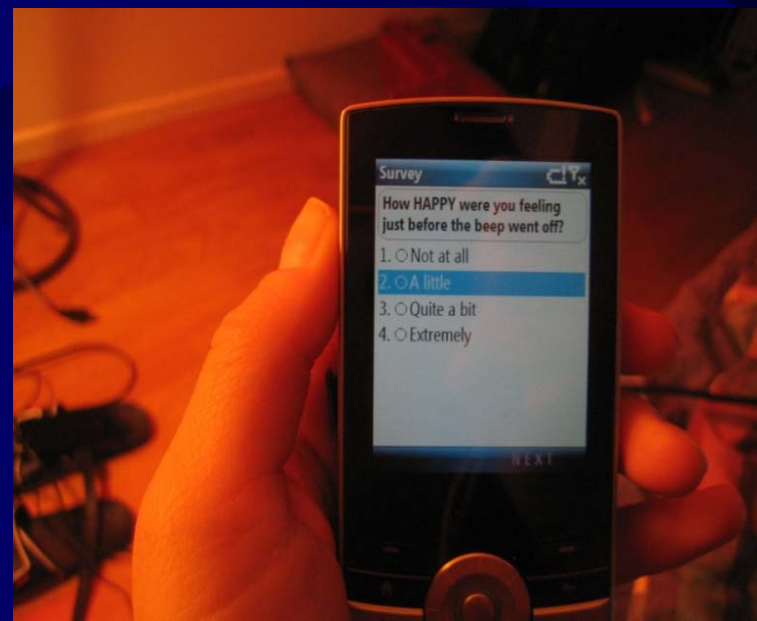
Amendment To Master Plan Concept
 for Phase 1 and 2



EDAW
 June 22, 2006

EMA Equipment

- Mobile phone (HTC Shadow, T-Mobile)



EMA Data Collection Platform

myexperience

BSD-licensed open source mobile data collection tool developed for Windows Mobile devices using .NET CF 2 and Microsoft SQL Compact Edition.

(<http://myexperience.sourceforge.net/>)

EMA Prompting Schedule

- Two EMA waves (separated by 6 months).
- Monitoring occurred across 4 days (Fri-Mon) for each wave.
- No prompts during school hours on Fri or Mon.
- Children paid up to \$40 (\$20 for returning phone and \$1 x 20 for each complete survey)

Ecological Momentary Assessment Prompting Schedule

Day	8:30-10am	10am-12pm	12-2pm	2-4pm	4-6pm	6-8pm	8-8:30pm
Friday					X	X	X
Saturday	X	X	X	X	X	X	X
Sunday	X	X	X	X	X	X	X
Monday					X	X	X

Note: Question sequences were prompted at a random time within each interval.

EMA Items

Please stop what you are doing for a survey. Press the button under the word BEGIN to get started.

BEGIN

Survey

What were you DOING right before the beep went off? (Choose your main activity)

- Reading, Computer, or Homework
- Watching TV/Movies
- Playing video games
- Active Play, Sports, or Exercising
- Other

NEXT

Survey

What was this OTHER activity?

- Eating/Drinking
- Talking/On the phone
- Chores
- Riding in a car
- Something else

NEXT

Survey

WHERE were you just before the beep went off?

- Home
- School
- Car/Van/Truck
- Outdoors
- Other

NEXT

Survey

WHERE were you OUTDOORS just before the beep went off?

- Park or Trail
- Road
- Sidewalk
- Parking Lot
- Other

NEXT

Survey

WHERE was this OTHER place?

- Restaurant
- Store/Mall
- Someone else's house
- Gym/Rec center
- Someplace else

NEXT




EMA Items

Survey   

WHERE were you at the **PARK** just before the beep went off?

1. Playground
2. Sports field
3. Basketball/tennis court
4. Picnic Area
5. Beach
6. Other




NEXT

Survey   

How many **TREES AND PLANTS** are there in the area where you are right now?

1. No trees or plants
2. Some trees and plants
3. A lot of trees and plants




NEXT

Survey   

How much **TRAFFIC** is on the closest street to where you are right now?

1. No traffic
2. A little traffic
3. A lot of traffic




NEXT

Survey   

How **SAFE** do you feel where you are right now?

1. Unsafe
2. Somewhat safe
3. Very safe




NEXT

Survey   

How **FAR** are you from your home right now?

1. At home
2. A few blocks away
3. More than a few blocks away

NEXT

Survey   

How did you get here?

1. Walked
2. Rode my bike
3. Car/Van/Truck
4. Bus/Subway/Train

NEXT

Accelerometer



- Actigraph 7164 and GT2M (30-sec. epoch)
- Four days (Fri-Mon)
- MVPA \geq 4 METs (Age-specific activity count thresholds)
- Meet PA recommendations = at least 60 min/day of MVPA

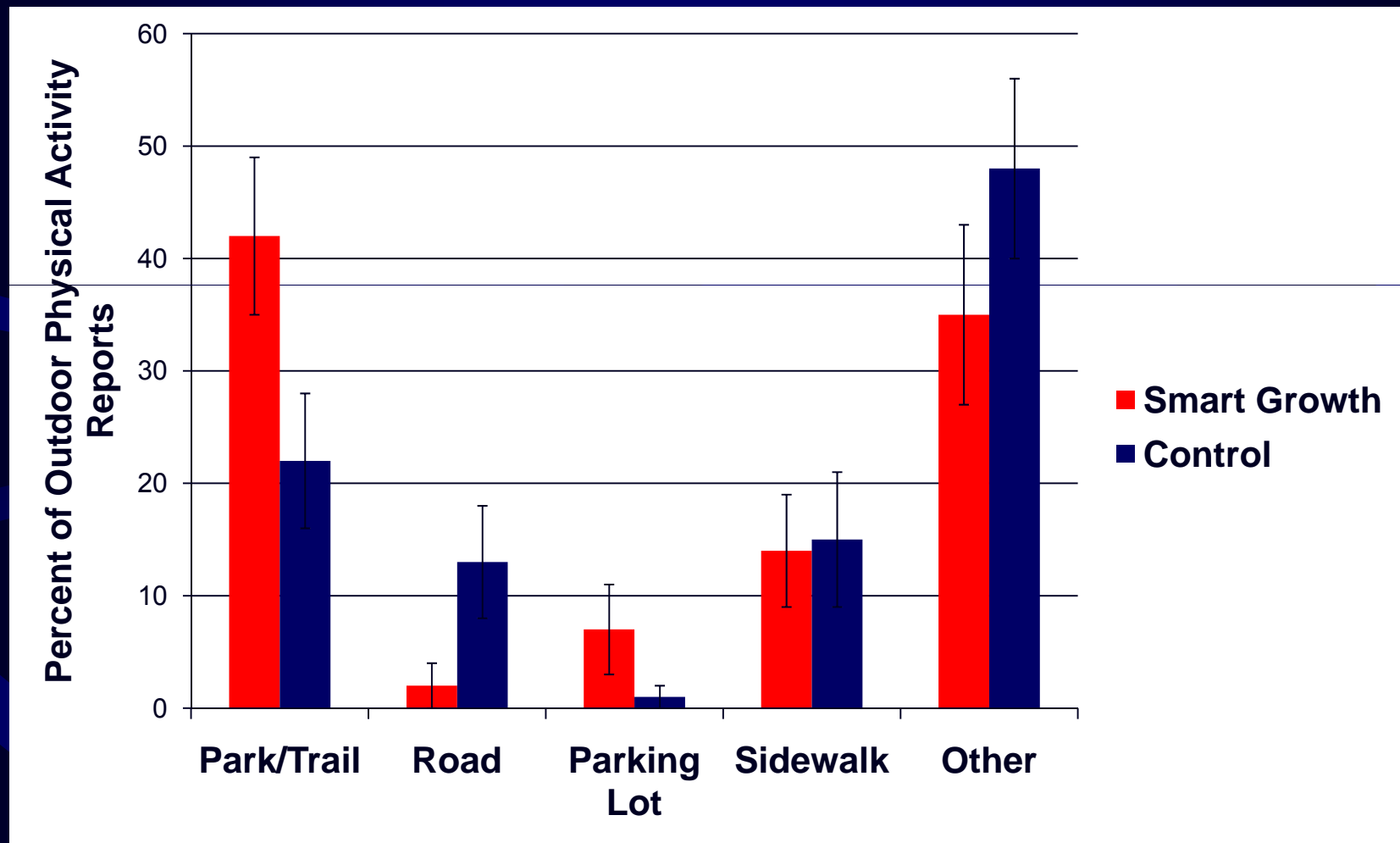
Results

- 120 children completed time 1 and 102 children completed time 2
- Of these, N = 94 (46 smart growth and 48 control with at least one EMA survey report of PA)
- Median residency (12 months SG and 96 months Control)
- Children responded to 78% of EMA prompts
- Accelerometer data unavailable (n = 3 time 1 and n = 8 time 2)

Participants

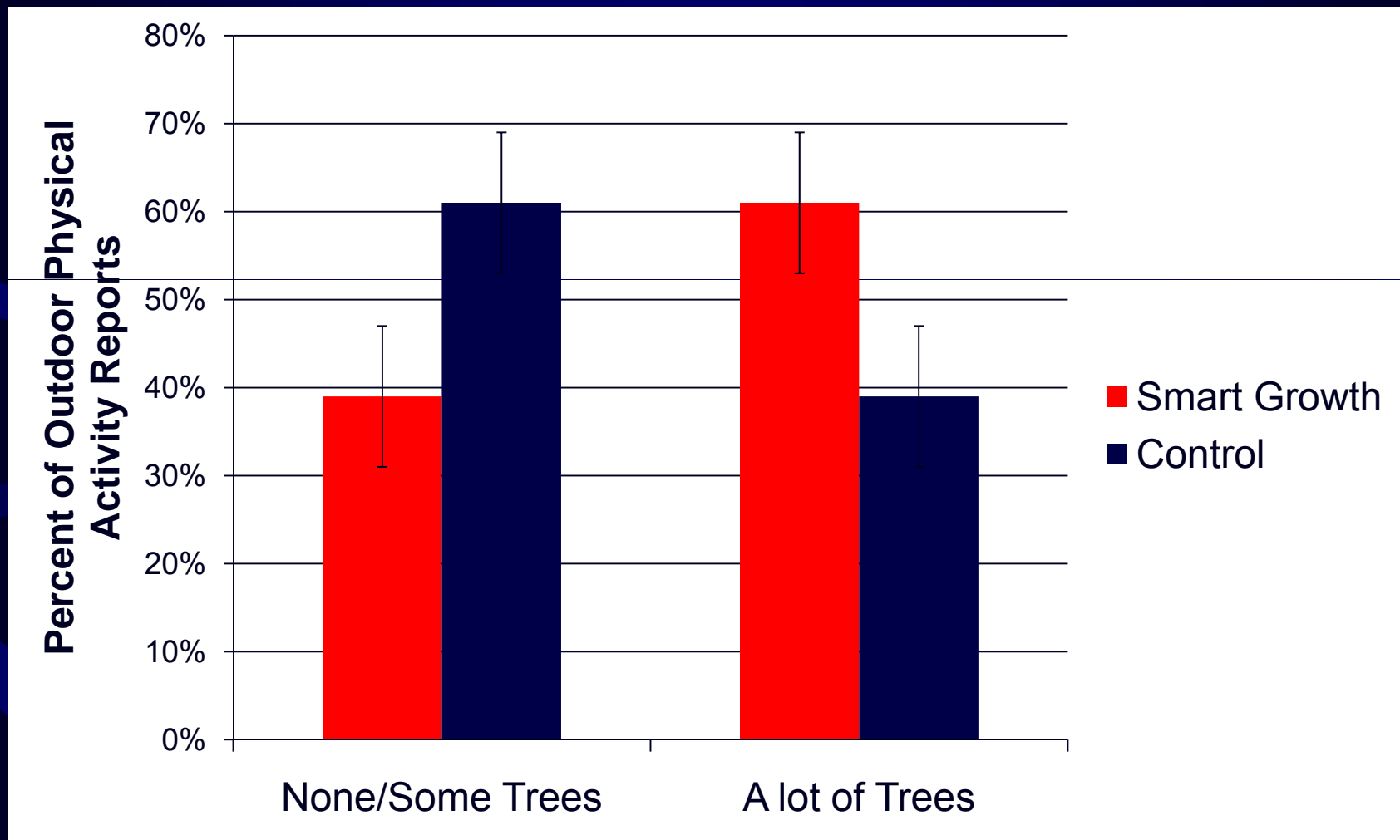
	Smart Growth	Control
N	46	48
Age	9-13 years (M = 10.9)	9-13 years (M = 11.0)
Sex	50% Male	54% Male
Ethnicity	33% Hispanic 22% White 15% African-Am. 13% Asian 17% Other	31% Hispanic 31% White 2% African-Am. 6% Asian 27% Other
Income	22% < \$45,000 24% ≥ \$100,000	29% < \$45,000 21% ≥ \$100,000
Weight Status	43% Overweight/ At risk	21% Overweight/ At risk

Outdoor Physical Activity Locations (by Group)



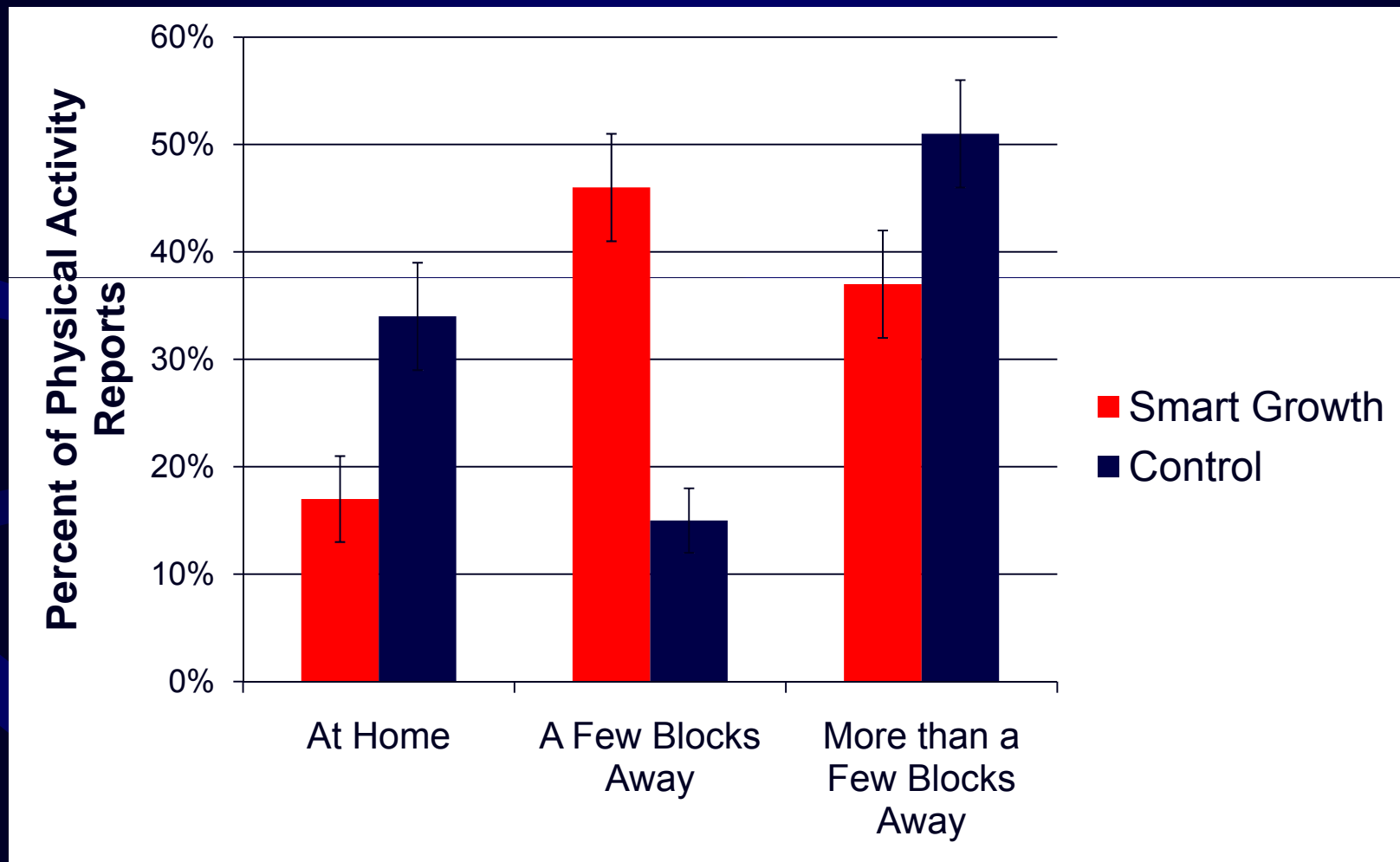
n = 60. Adj. Wald F = 2.90, df = 4, p = .026
Adjusted for sex, age, and annual household income.

Characteristics of Physical Activity Contexts- Vegetation (by Group)



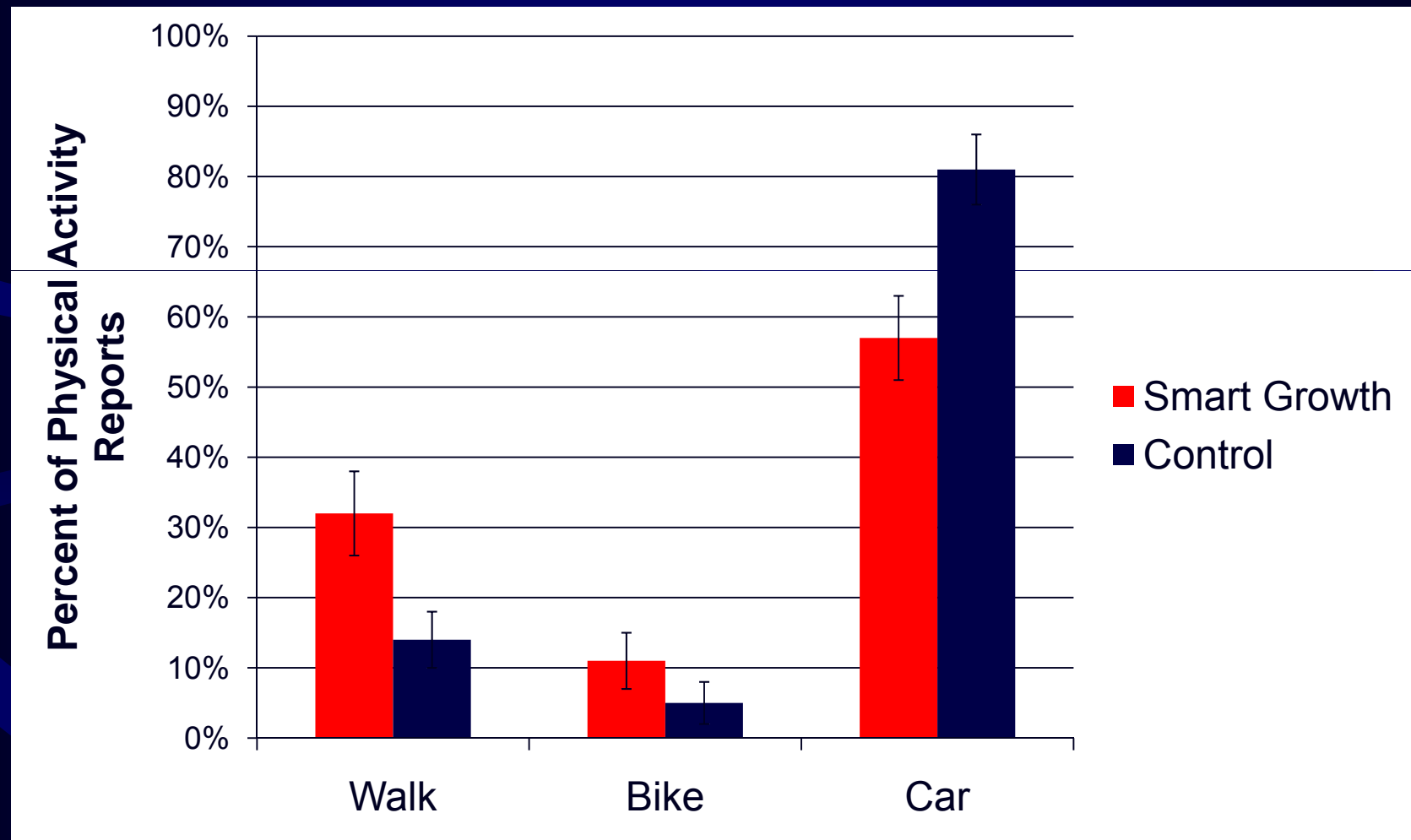
n = 63. Adj. Wald F = 3.66, df = 1, p = .059
Adjusted for sex, age, and annual household income.

Characteristics of Physical Activity Contexts- Distance from Home (by Group)



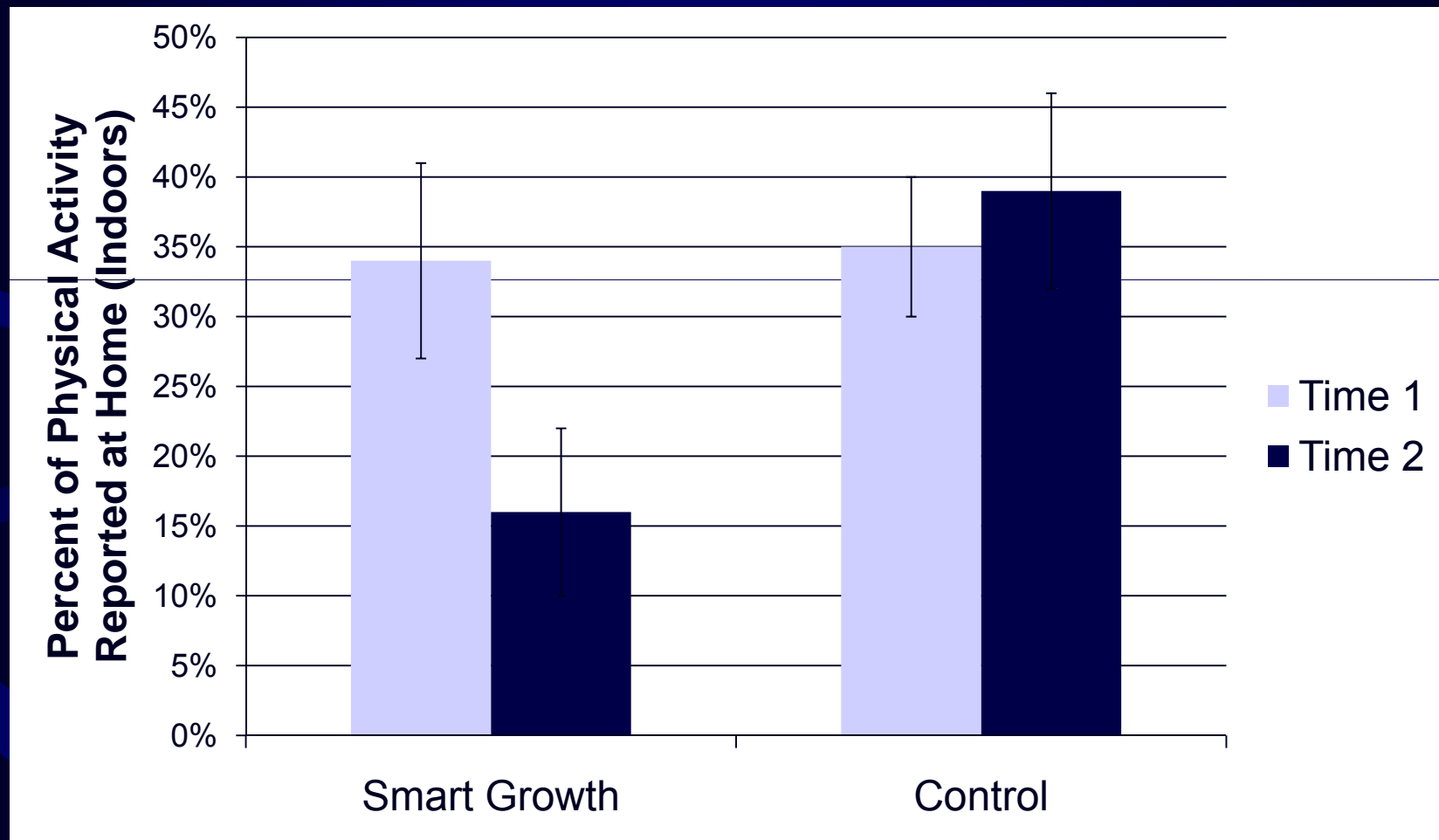
n = 81. Adj. Wald F = 13.43, df = 2, p < .001
Adjusted for sex, age, and annual household income.

Characteristics of Physical Activity Contexts- Transport Mode (by Group)



n = 69. Adj. Wald F = 4.68, df = 2, p = .011
Adjusted for sex, age, and annual household income.

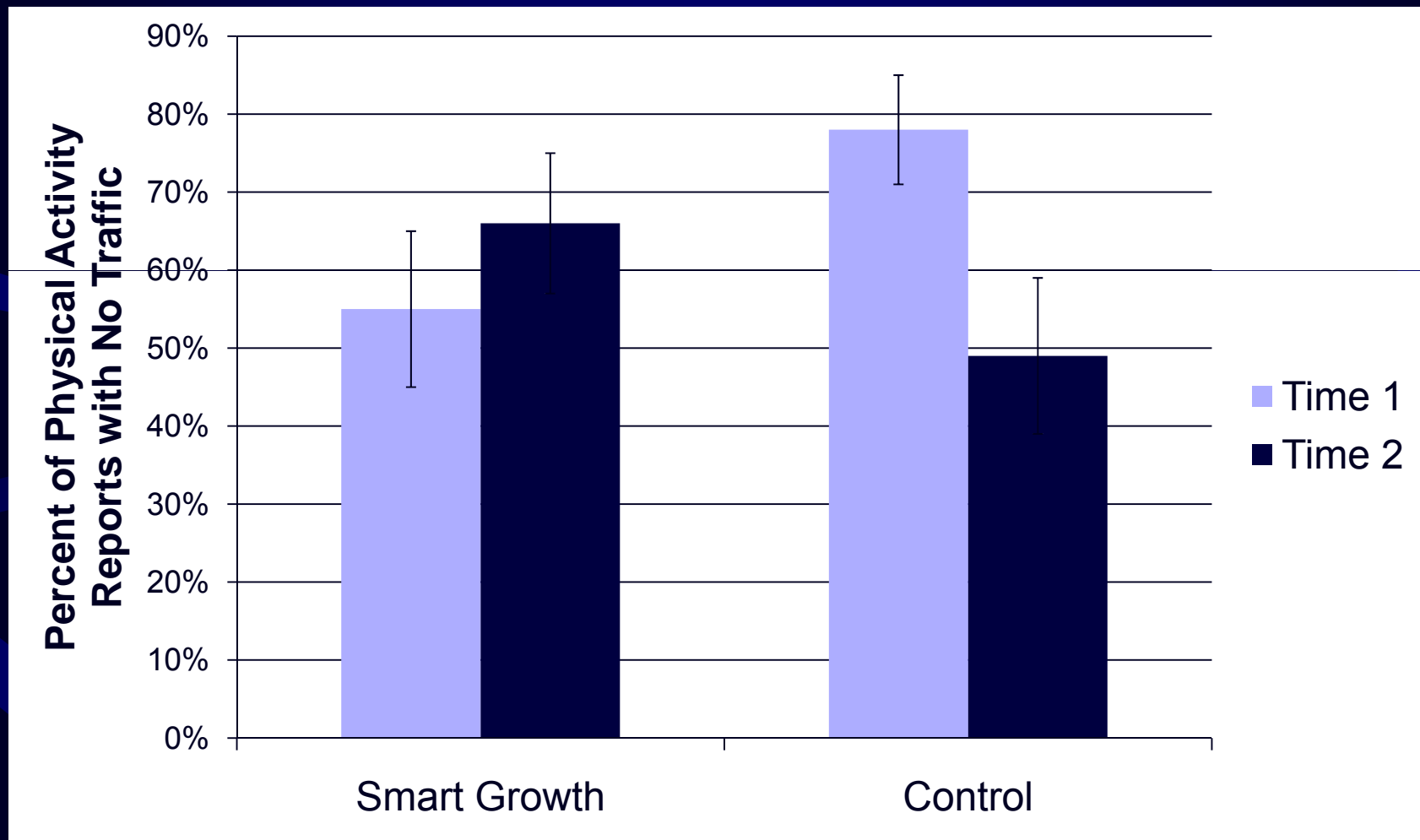
Home-Based Physical Activity (Group x Time)



N = 83. Adj. Wald F = 3.43, df = 1, p = .07

Adjusted for sex, age, annual household income, and days between assessment.

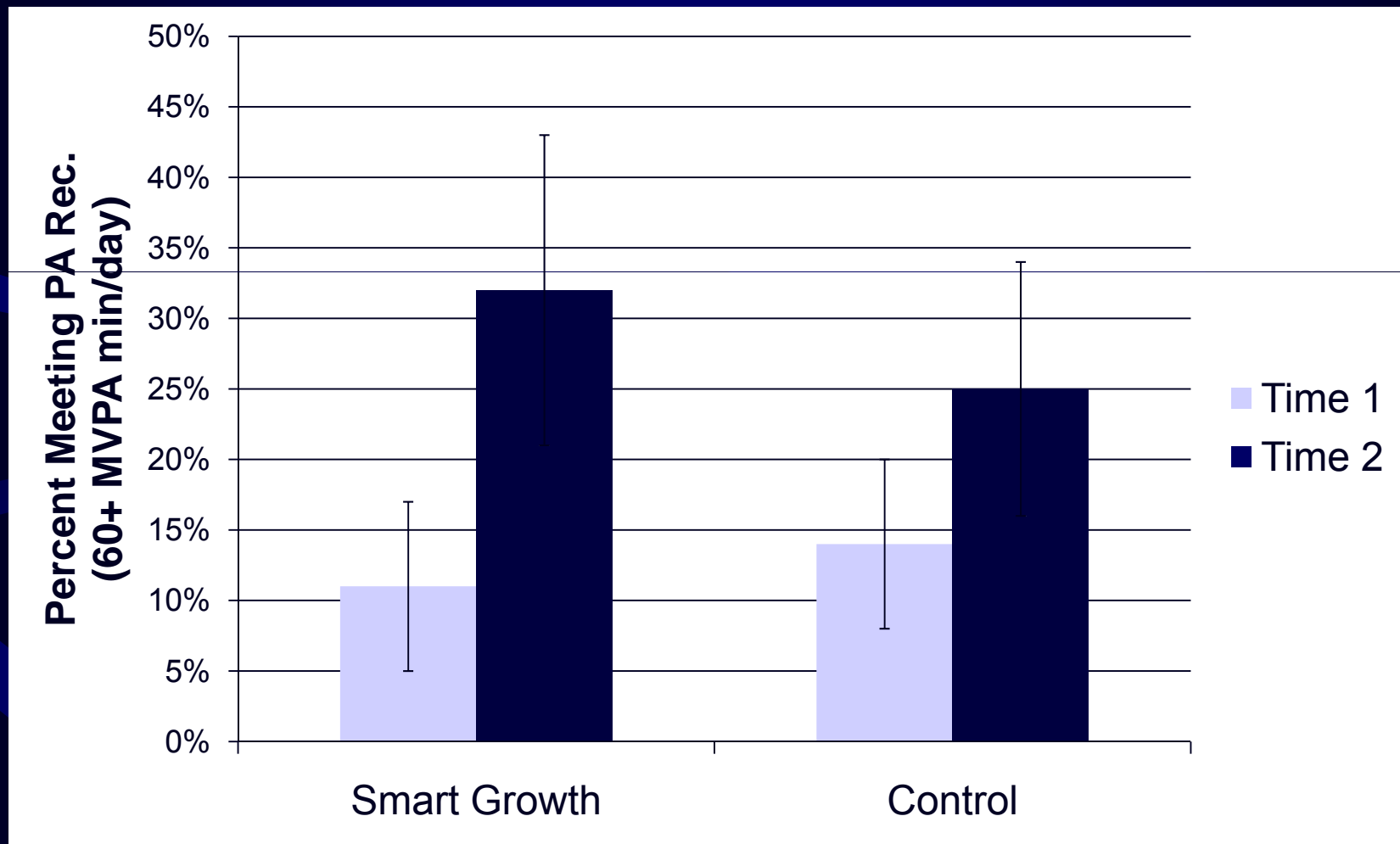
Characteristics of Physical Activity Contexts- Traffic (Group x Time)



n = 61. Adj. Wald F = 4.51, df = 1, p = .036

Adjusted for sex, age, annual household income, and days between assessments.

Meeting PA Recommendations (Group x Time)



n = 61. Adj. Wald F = 0.46, df = 1, p = .50

Adjusted for sex, age, annual household income, and days between assessments.

Limitations



- Not all PA captured (due to interval-contingent sampling).
- Missing data.
- Short monitoring period (4 days).
- Leisure-time only.

Conclusions



- PA contexts differ between children living in SG vs. Control communities.
- PA contexts showed little change over the 6 months of the study.
 - Children may have changed prior to enrolling.
- Differences in PA contexts did not lead to greater overall PA.
 - More than 6 months may be necessary to impact their behavior.

Acknowledgments

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Thank You

