

Transit use, physical activity, and body mass index changes: objective measures associated with complete street light rail construction

Active Living Research, 2/23/2015, San Diego, CA

Barbara B. Brown, Carol M. Werner, Calvin P. Tribby, Harvey J. Miller, & Ken R. Smith

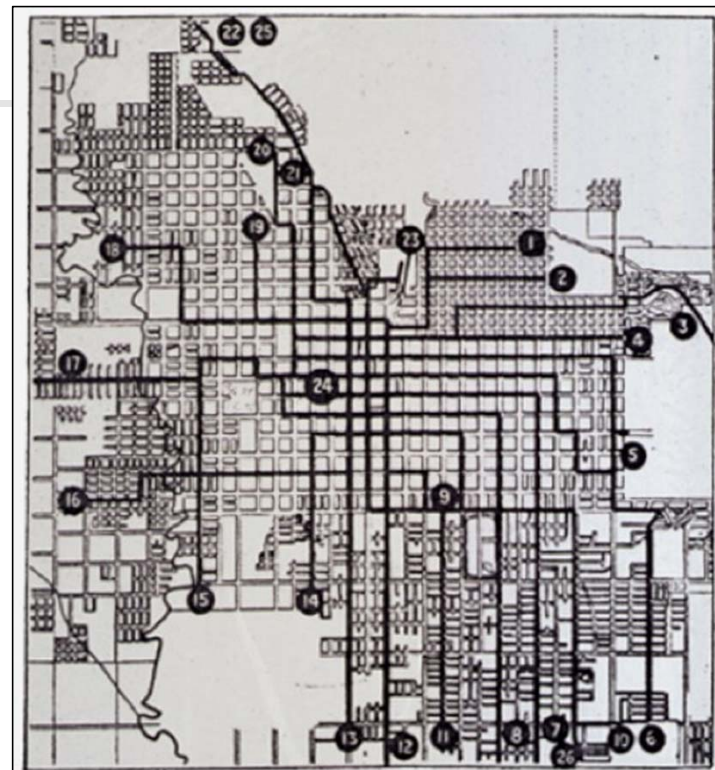
Funding: Research reported in this publication was supported (in part) by grant number CA157509 from the National Cancer Institute at the National Institutes of Health and the Robert Wood Johnson Foundation.

Forthcoming, *American Journal of Public Health*

Salt Lake City historically had lots of active transportation & healthy weight



1941

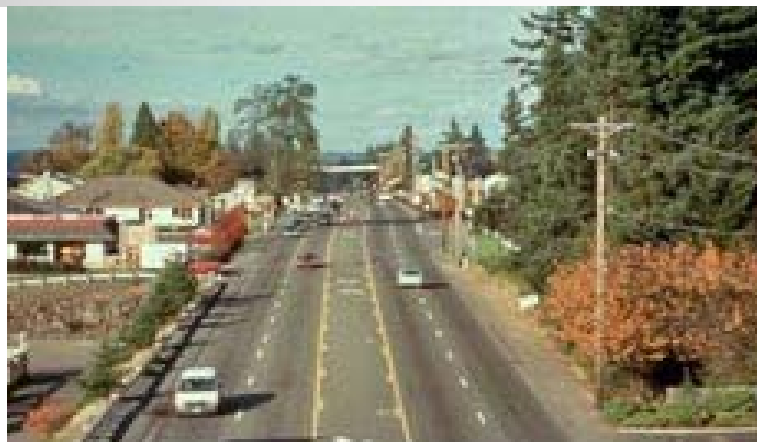


MAP OF SALT LAKE CITY SHOWING STREET CAR ROUTES
Key numbers show patrons the route to take to a desired destination.
Electric Railway Journal - Sept. 3, 1921

- Undated, Main St. Salt Lake City

Might the current “Complete Streets” movement provide better PA support?

- Complete Streets reconceptualize roads as habitats for pedestrians & cyclists—not just cars



Complete Streets policies increasingly popular

Policy supports adopted by

- 30 states
- 665 regional or local jurisdictions
- Implementation is still a work-in-progress
- Evaluation for health benefits is rare



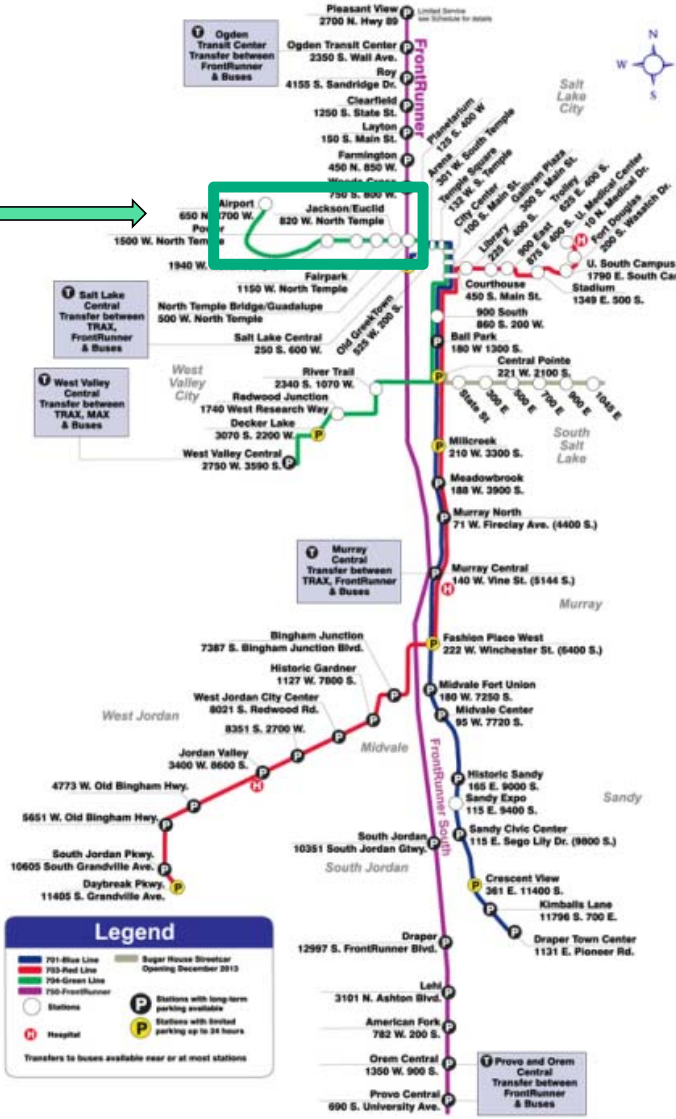
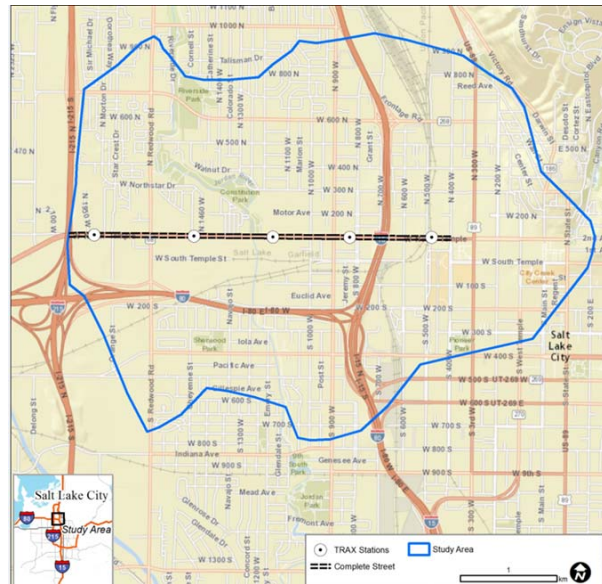
National Complete Streets Coalition



Key: **Blue:** Laws & Ordinances | **Red:** Resolutions | **Yellow:** Tax Ordinances | **Purple:** Internal Policies or Executive Orders | **Magenta:** Plans | **Green:** Design Manuals or Guides | **Cyan:** Policies Adopted by Elected Boards

TRAX green line light rail extension: airport to downtown

- We studied 5 residential stops within 2km of those stops
- And adults within 2km of those stops



Before & after “Complete Street” intervention

Before (2012)



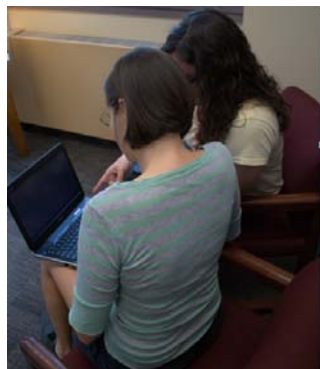
- No TRAX light rail
- No bike lane
- Narrow sidewalk
- 3 lanes, each direction
- No pedestrian lighting
- Overhead power lines

After (2013)



- TRAX light rail
- Bike lane
- Wide sidewalk
- 2 lanes, each direction
- Landscaping
- Pedestrian lights
- No overhead power lines
- One connection to Front Runner commuter rail

Method: In-home recruitment & data collection, 2012 & 2013



- 2 home visits each year
- Typically 1-week apart
- Height, weight, surveys at home
- Instructed to wear devices

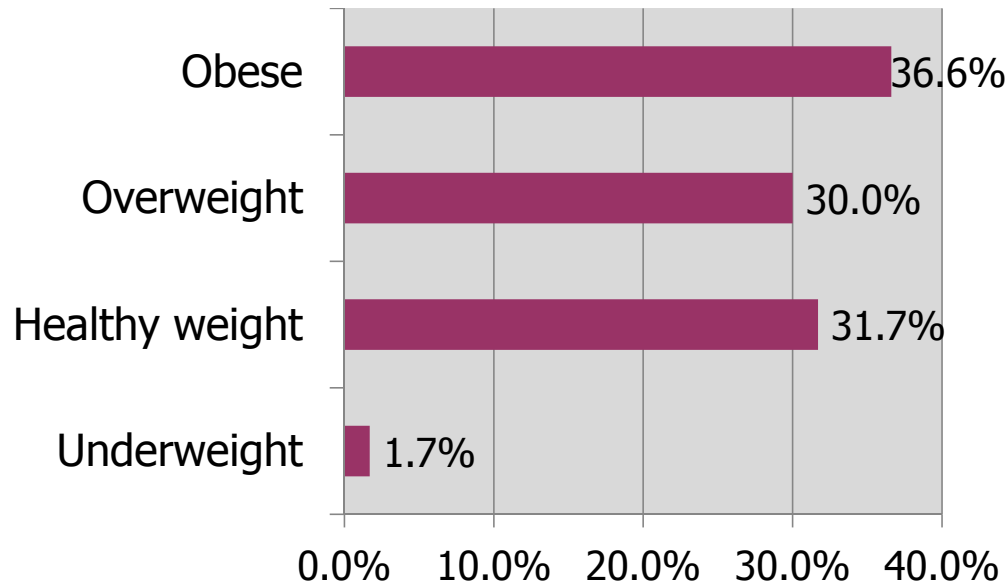
Our sample *(537 w GPS data both years)*

- 51% female, 25% Hispanic
- Lived in home 7.5 years
 - But 25% only 1 year
 - 57% in single family detached housing
 - 47% rent their dwelling
- 68% employed
- 24% up to high school completed;
37% college grads
- \$30-40,000 median household income



Weight status of the sample

- BMI = (Pounds /Inches² * 703) or Kg/meters²)



Weight category	BMI measure
Obese	≥30
Overweight	25-29.9
Healthy weight	18.5-24.9
Underweight	≤ 18.5

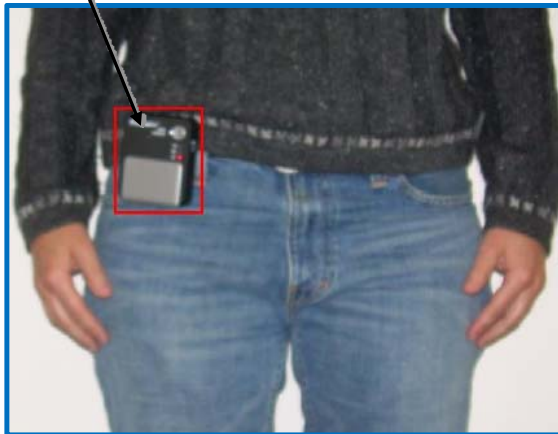
(N=537)

Travel patterns measured by GPS data loggers & accelerometers

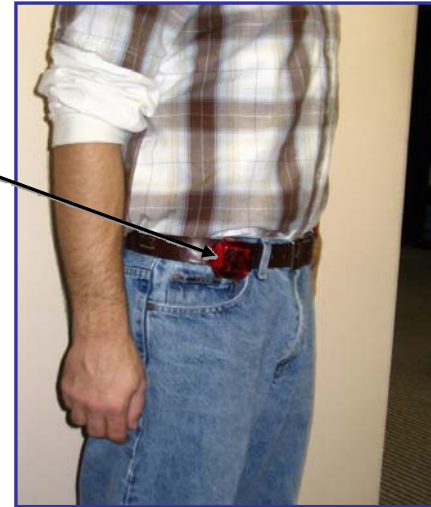
Worn together for about a week each time



Wearable GPS
GlobalSat DG-100

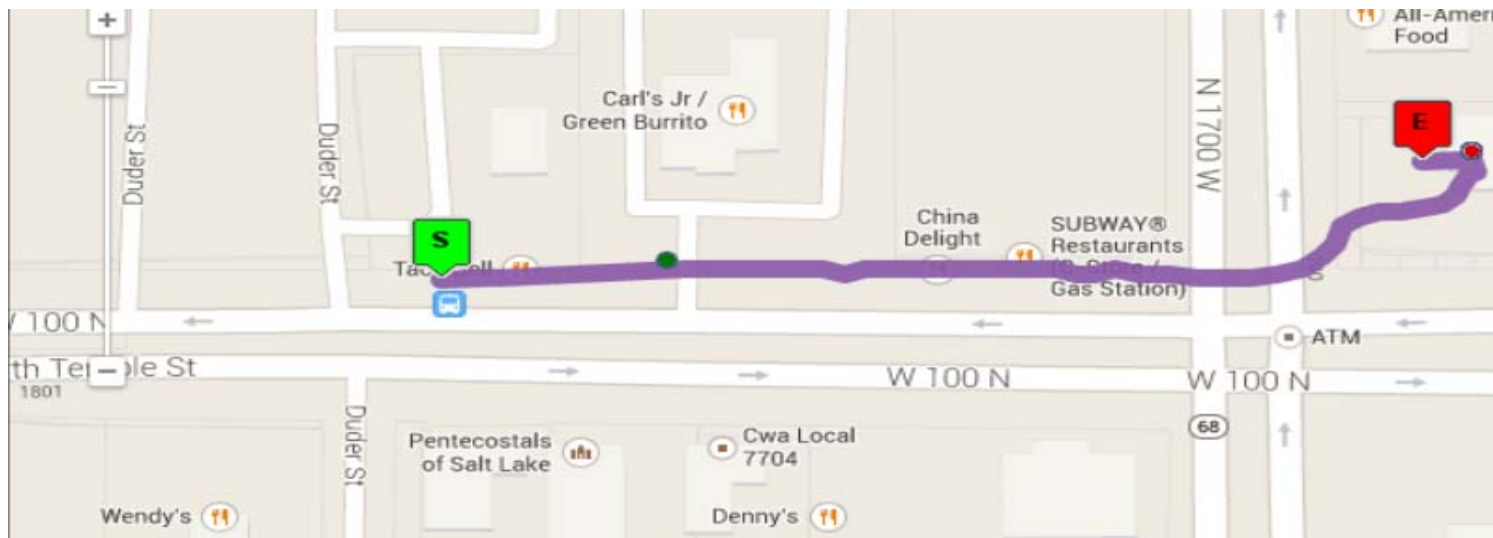


Activity Monitor
Actigraph GT3X+

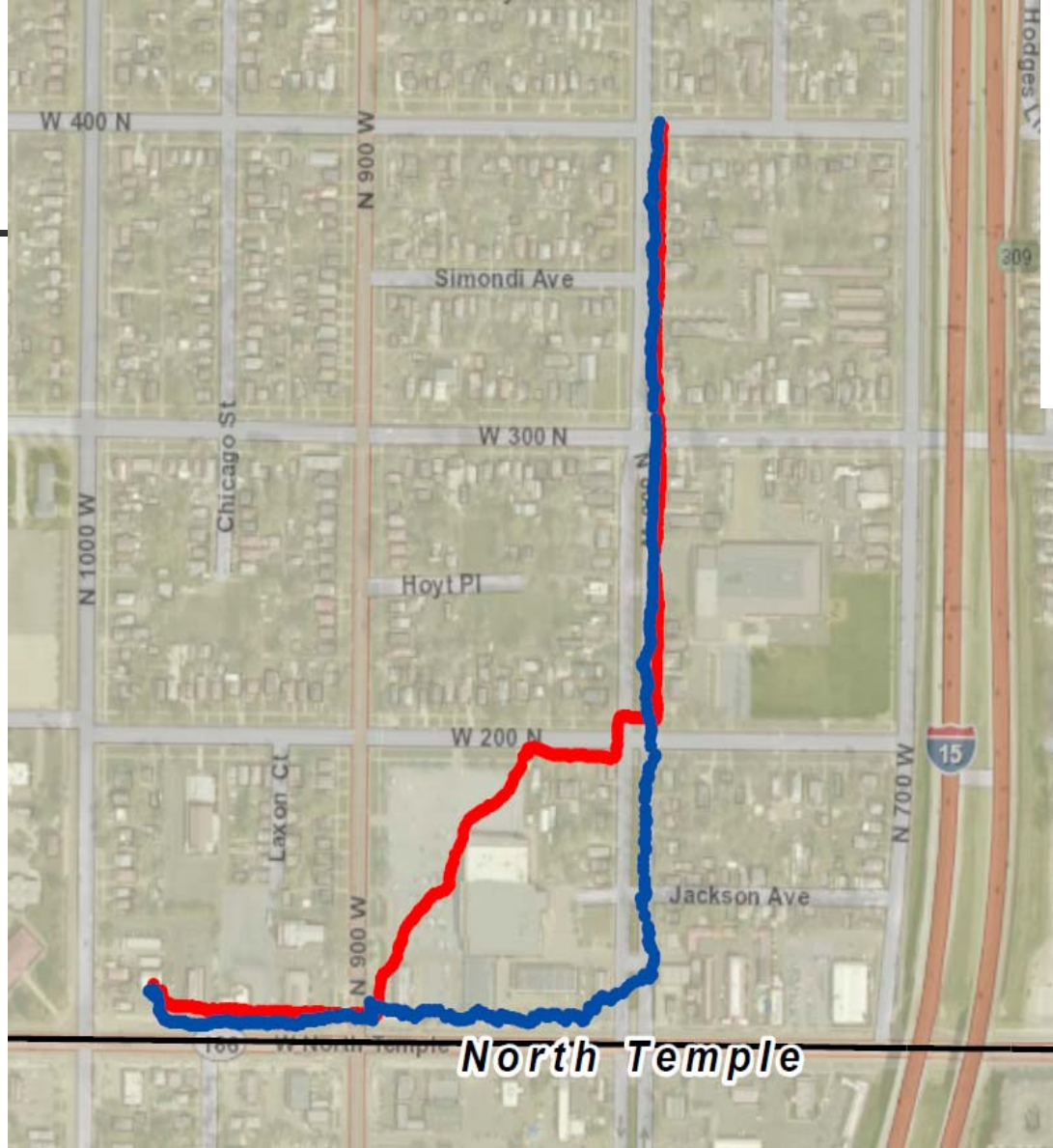
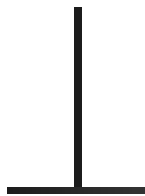


End of the week data upload at home reveals the natural ecology of healthy activity bouts

- The resident sees this 3-min bout
- To help with recall
- This example = 0.1 mile or .16 km





GeoStats
application



GeoStats used GPS traces and speed to define Complete Street transit-related trips

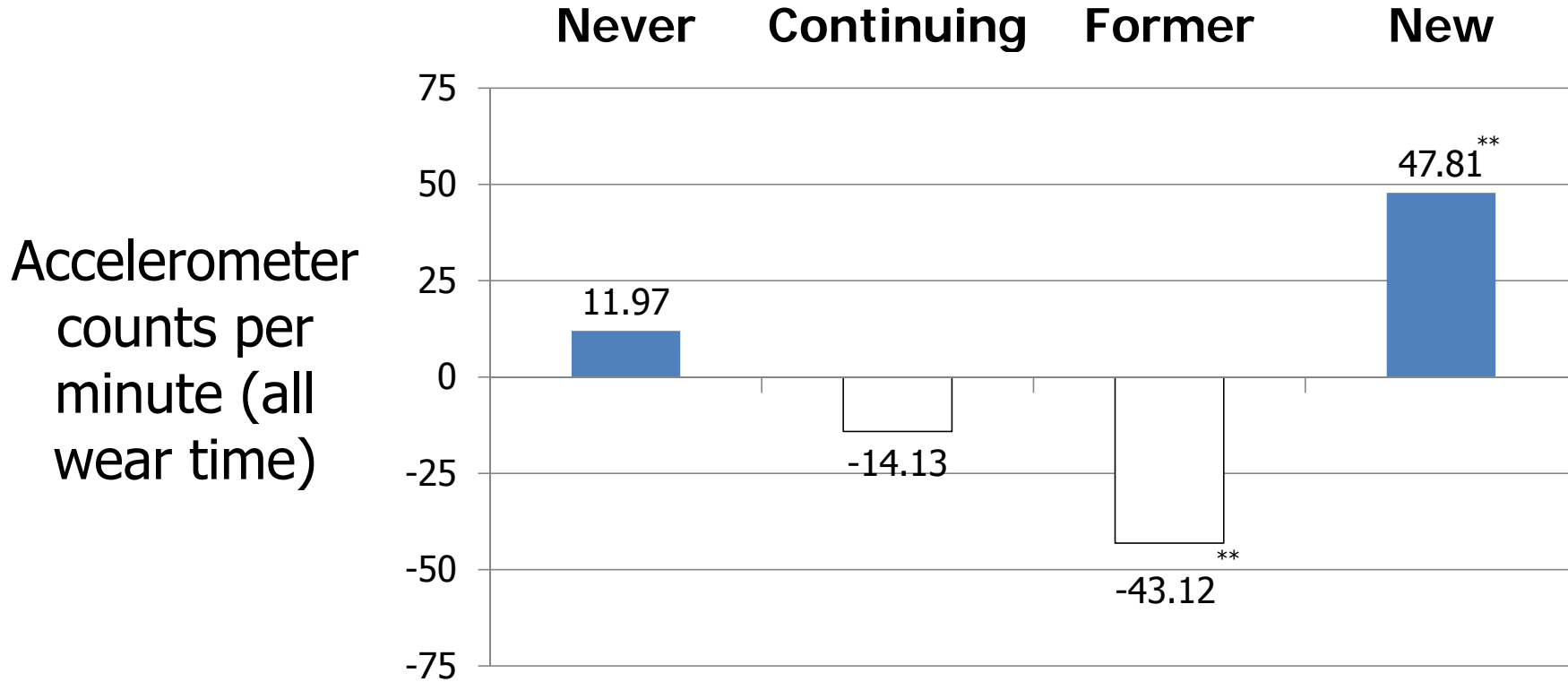
- A "N. Temple trip" = one that intersected an area 40 meters above or below North Temple
- And involves TRAX, bus, or Front Runner ride
- Includes active transit somewhere along the whole trip, not just Complete Street section

4 key groups contrasted based on any Complete St. transit use (bus, TRAX light rail, or Ft Runner rail)

	Never (n=393)	Continuing (n=51)	Former (n=41)	New (n= 52)
Transit-related corridor trips:				
in 2012?	N	Y	Y	N
in 2013?	N	Y	N	Y
Expected activity change (2013 PA – 2012 PA):				
	None	None		
All analyses control for age, female, Hispanic, college graduate, married, self-reported health, days & temperature differences between measures				

Transit ridership groups & activity change (2013-2012)

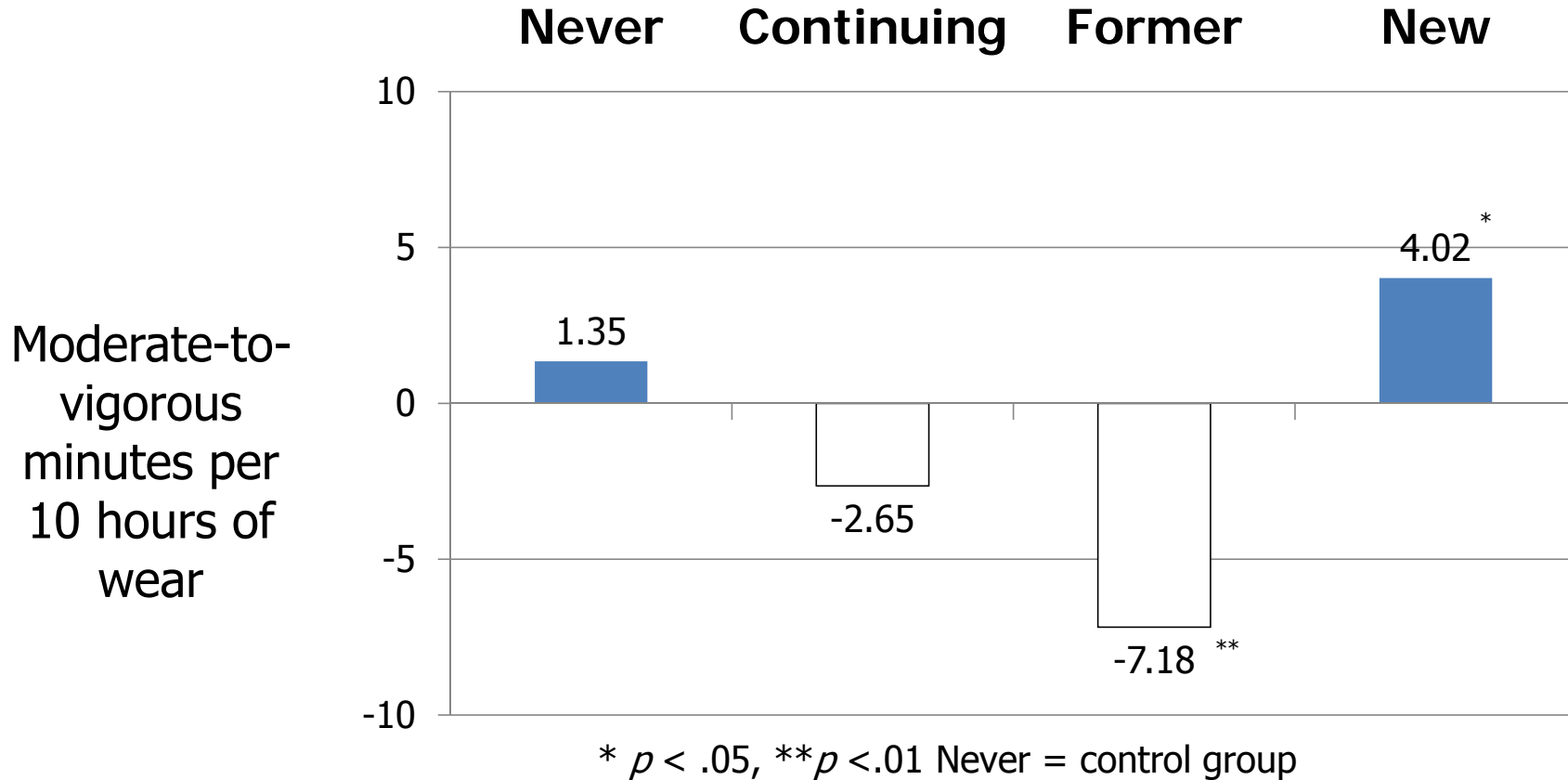
accelerometer counts/min.)



** $p < .01$ Never = control group

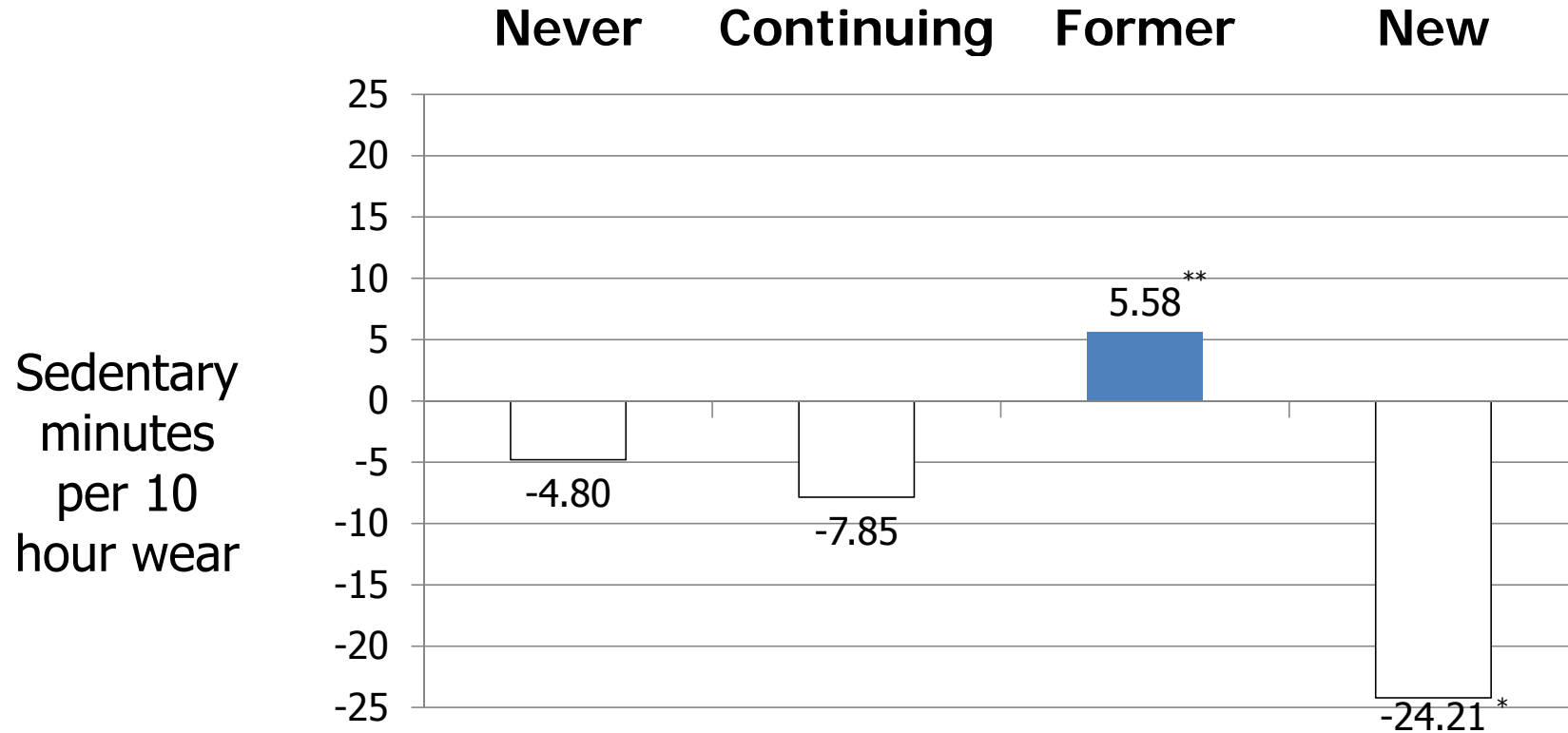
Transit ridership groups & MVPA change (2013-2012)

MVPA of ≥ 2020 accelerometer counts/min.)



Transit ridership groups & sedentary activity change

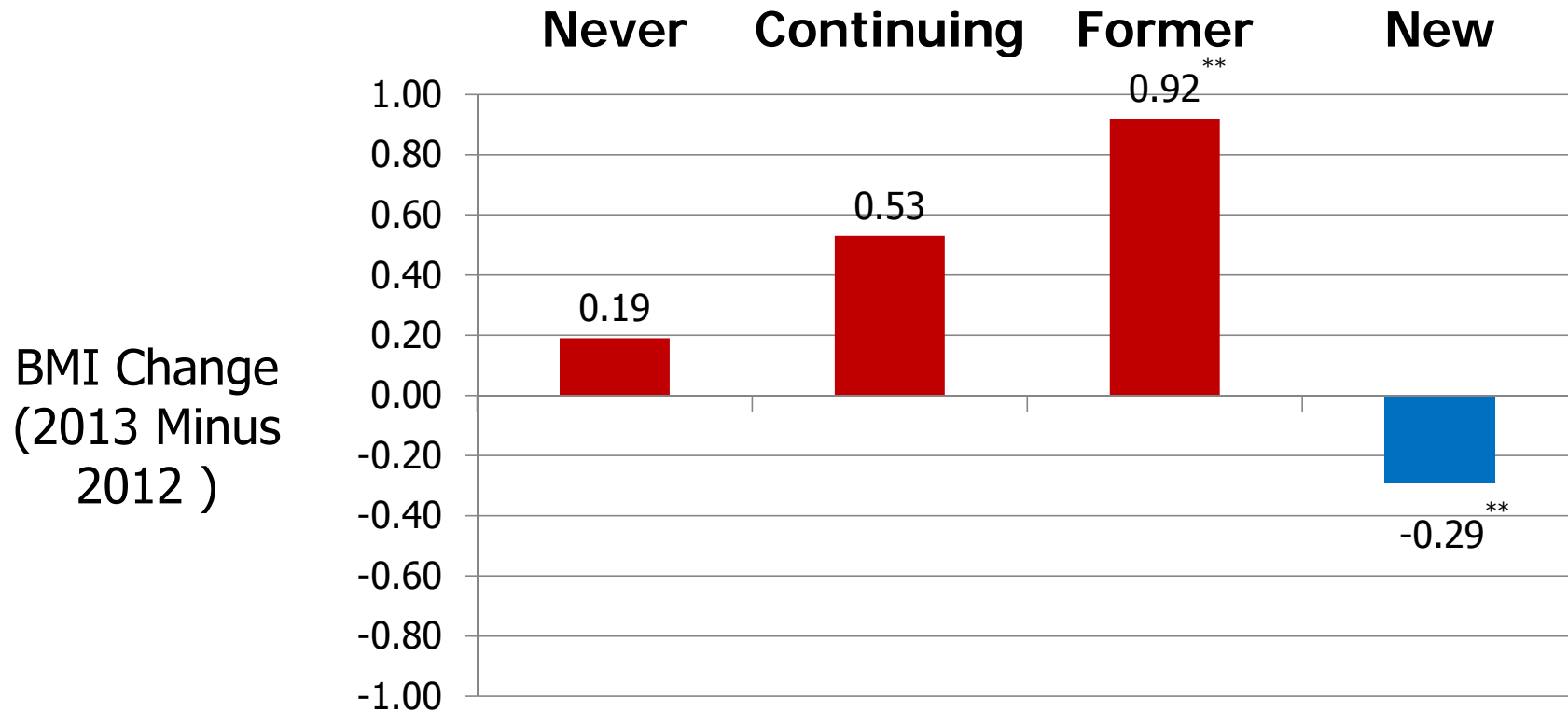
(2013-2012 Sedentary PA of < 100 accelerometer counts/min.)



* $p < .05$, ** $p < .01$ Never = control group



BMI changes echo PA changes for transit rider groups (2013-2012)



** $p < .01$ Never = control group

Active transportation is “stealth exercise”

- Health/exercise benefits = by-products of getting where you want to go (Brown & Werner, 2008)
- Community design can foster stealth exercise



Complete Street proponents advocate for:

- Public health
 - Physical activity, obesity prevention, but also cleaner air & water
- Transportation alternatives
 - Youth & elder mobility; social equity
- Downtowns
 - Pro-transit & Transit-oriented development
- Compact development over sprawl
 - Open space preservation; fewer taxes for roads & sprawl; energy efficient housing & infrastructure



Advantages of complete street interventions

- Broad support across interest group lines
- Wide reach
- Embedded in policy & environmental changes
- Thus long lasting...





...and more appealing
Then...

Now....





Thank you!

barbara.brown@fcs.utah.edu

Thanks to MAPS Staff & Grad Students:

Staff: Kristi Flick, Doug Tharp

Additional staff: Ryan Burns, Jonathan Gallimore, Ashlie Gilbert, Nancy Joyce, Victor Solis, Amelia Wilson

Graduate students: Wyatt Jensen, Calvin Tribby



AND THANKS TO THE EXCEPTIONAL RESEARCH ASSISTANTS

Eric Abbenante

Lori Burke

Juan Carlos Gonzalez

Anne Leppert

Lizbeth Martinez

Londy Oliva

Georgette Stormont

Johanna Tovar

Ted Adams

Matt Damon

Julie Harper

Danielle Long

Fernanda Martins

Mariana Perez

Emily Stone

Nathan Zick-Smith

Austen Anderson

Amanda Fountain

Lauren Jensen

Heidi Luft

Brian Robison

Austin Strebel

Megan Carson

Michael Billings

Sam Gnanasundaram

Craig Johnson

Leslie Lund

Sarah Noall

Dianna Slater

Nicolas Tang