Travel patterns & socio-demographic correlates of global positioning system (GPS) derived walking & vehicle trips among churchgoing Latinas

Natalicio Serrano, BS
San Diego State University (SDSU)
Institute for Behavioral and Community Health (IBACH)

Introduction: Travel behaviors in Latinos

- Travel behaviors play an important role in public health.
    - *Vehicle Time*: linked to increased obesity[1].
    - *Walking*: Increased walking reduces the risk of CVD[2].

- Latinos:
    - Spend about 59 min/day in a vehicle[3].
    - More likely to walk for leisure related travel than their white counterparts[4].

1) McCormack & Virk, 2014
2) Boone-Heinonen, et al.,2009
3) US National Household Transportation Survey, 2009
4) US Dep. Of Transport., 2000

Study Overview
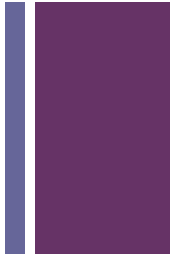
- **Faith in Action/ *Fe en Acción*:** An ongoing randomized controlled trial to promote physical activity (PA) among church-going Latina adults in San Diego County, CA (N=437).

  - **PALMS Study:** Using PALMS software, Global Positioning System (GPS) and accelerometer data were collected and integrated (N=91).

Faith in Action
Fe en Acción

Physical Activity and Location Measurement System (**PALMS**)

- A web based software designed to merge and process time stamped data (HR monitors, accelerometers, and GPS devices)[1].

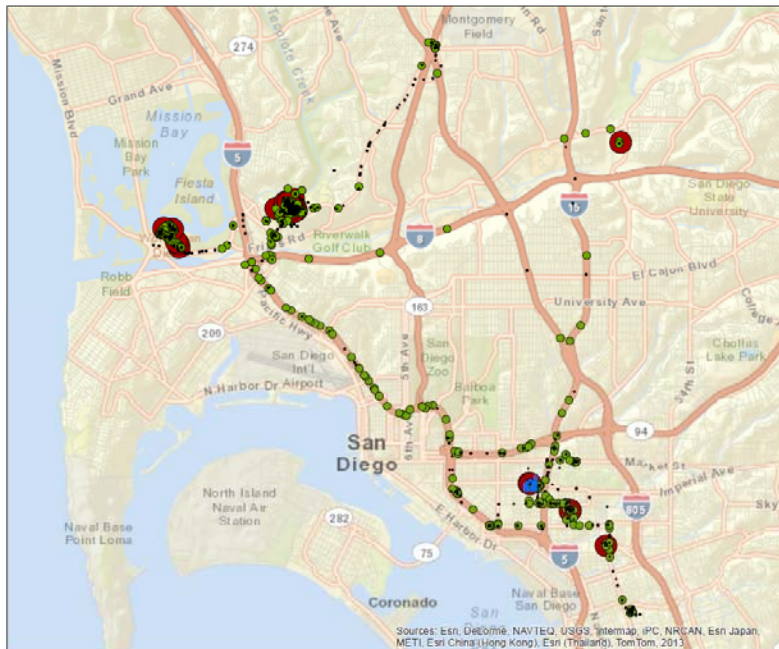- Calculations can be used to look at variables of interest (transportation modes)[2,3]

1) "UCSD-PALMS-Project - PALMS Overview,"
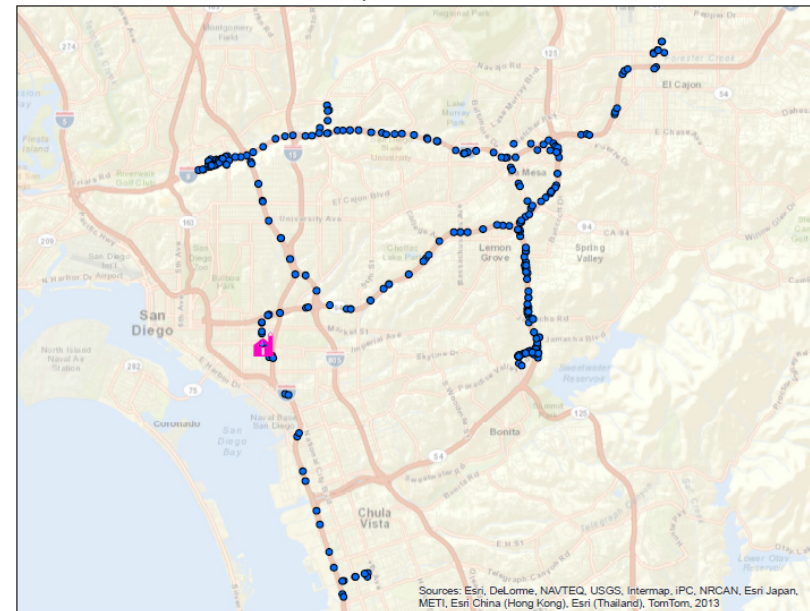2) Carlson et al., 2015
3) Kerr et al., 2012

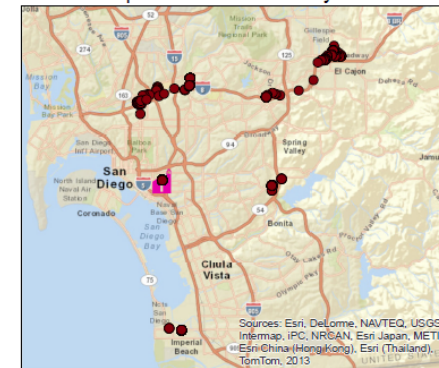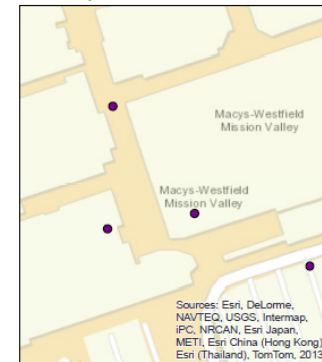# PALMS/*Fe en Acción*

Activity Intensity for One Participant

Activity Intensity
- Sedentary
- Light
- Moderate

Fe En Accion 11/8/2013. WGS 1984.

Transport Mode: Vehicle

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Transport Mode: Stationary

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

Fe En Accion 11/8/2013

Transport Mode: Pedestrian

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013
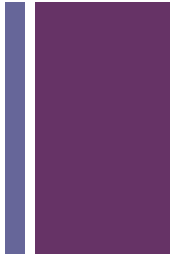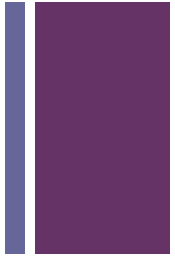
Fe En Accion 11/8/2013

+ Objectives

(1) **To** characterize walking and vehicle trips (number of trips, time, and distance) in adult Latinas living in a border community and

(2) **To** examine socio-demographic correlates of these transportation-related behaviors.

Measures: Individual Level

- Survey data was collected at baseline that included:
  - Socio-demographic variables (from survey):
    - *Education*: categorized into below high school and completed high school or above
    - *Income:* categorized into less than $2,000 and $2,000 + per month
    - *Employment Status:* categorized into being employed or not
    - *Children living in the household:* children < 18 living at home
    - **Acculturation:** Bi-dimensional Acculturation Scale (BAS) Scale for non-hispanic domain, that was dichotomized into low/high adherence[1]
    - *Drives Vehicle:* yes or no
  - Body weight status: calculated BMI from objectively measured height and weight, then categorized into normal , overweight, and obese.

1) Marin & Gamba, 1996

Measures: Walking & Vehicle Patterns
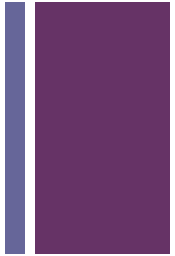
- Integrated GPS and accelerometer data using PALMS
  - From PALMS, a **Participant level** dataset was created which summarized data for travel modes.
  - For analysis, at least **2** days of device wear, minimum **8** hours/day were required
  - Final sample of 88 participants

- Transportation Variables (**separate variables for walking and vehicle trips**):
  - # of trips (**trips/day**)
  - distance traveled across days (**km/day**)
  - time in trips (**min/day**)
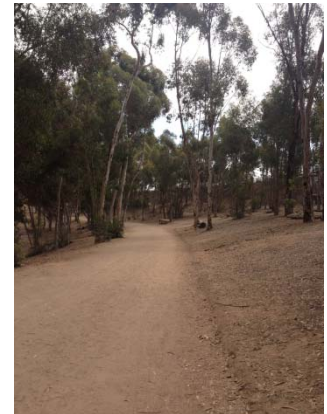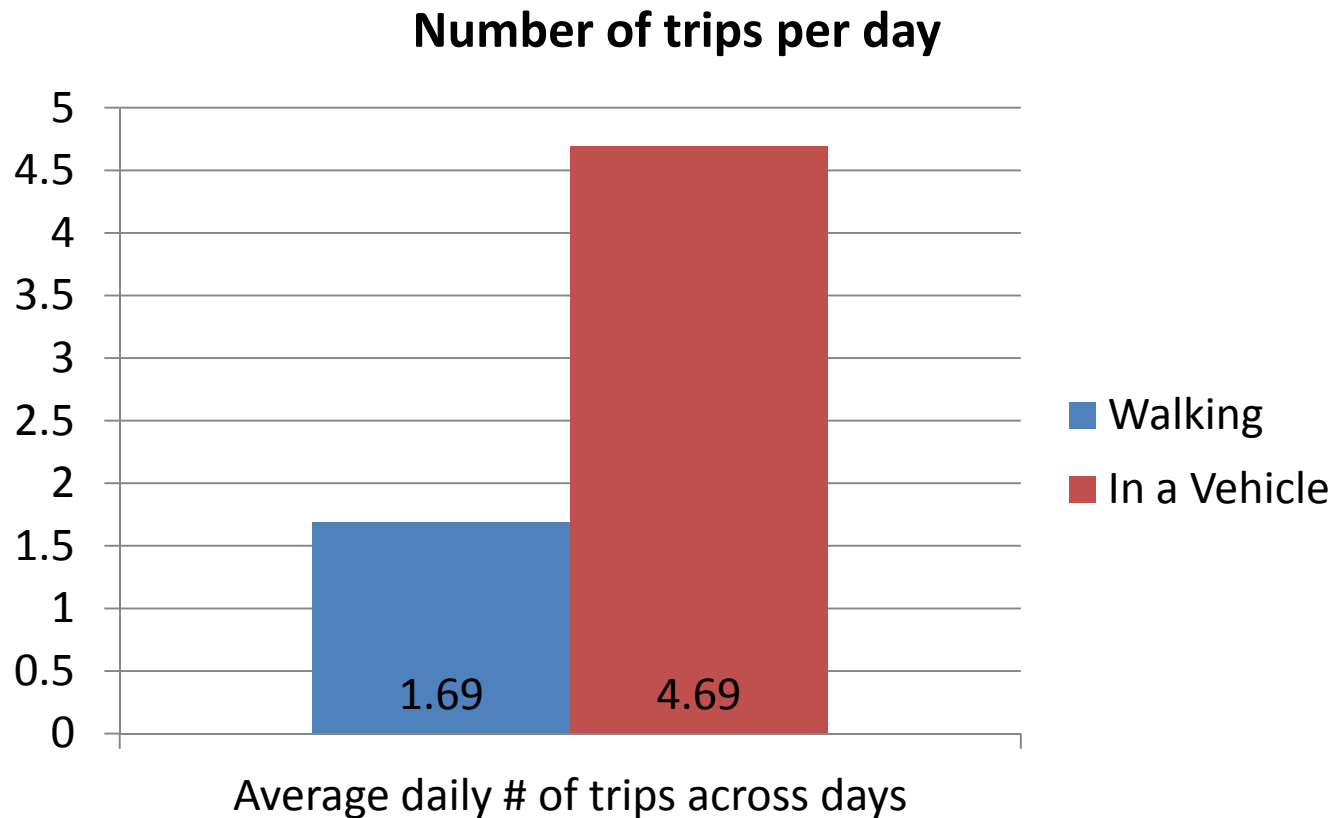
Statistical Analyses

- Descriptive statistics and frequencies for demographics and walking/vehicle patterns

- Bivariate associations to test for relationship between individual level characteristics and walking & vehicle time
  - Controlling for church as a covariate

Table 1. Characteristics of Latina women (N=88), *Fe en Acción*/PALMS, San Diego, CA.

	Mean or %
Age (years)	45.3
Mexico-born	84.1%
Married/Living as married	72.7%
Employed (yes)	67.05%
Monthly household income < $2000	59.09%
< High School Education	55.68%
Anglo-acculturated (yes)	31.82%
Overweight or obese	85.23%
Drives vehicle (yes)	73.86%

Results

Number of trips per day

Walking: 1.69
In a Vehicle: 4.69

Average daily # of trips across days

Distance traveled per day

Walking: 0.67

In a Vehicle: 41.13

Average daily distance traveled across days (km/day)

Minutes per day

Average daily time in trips (min/day)

- Walking: 15.09
- In a Vehicle: 65.74
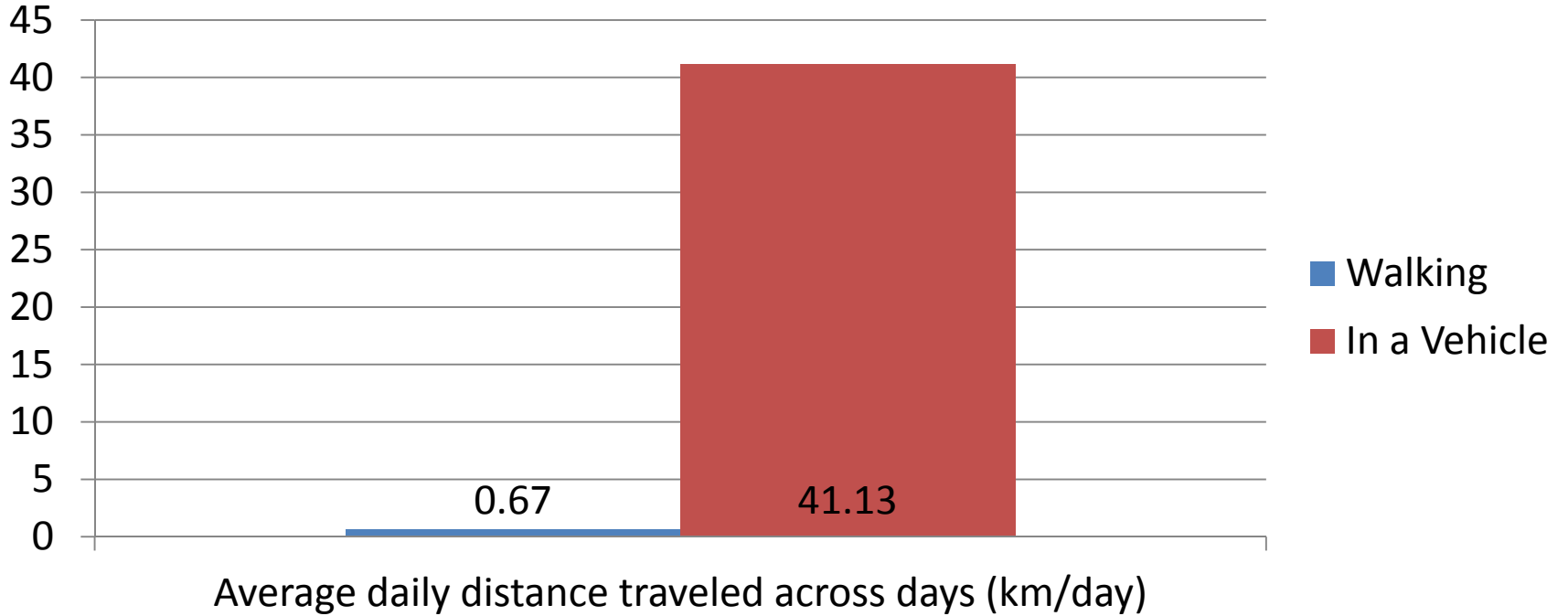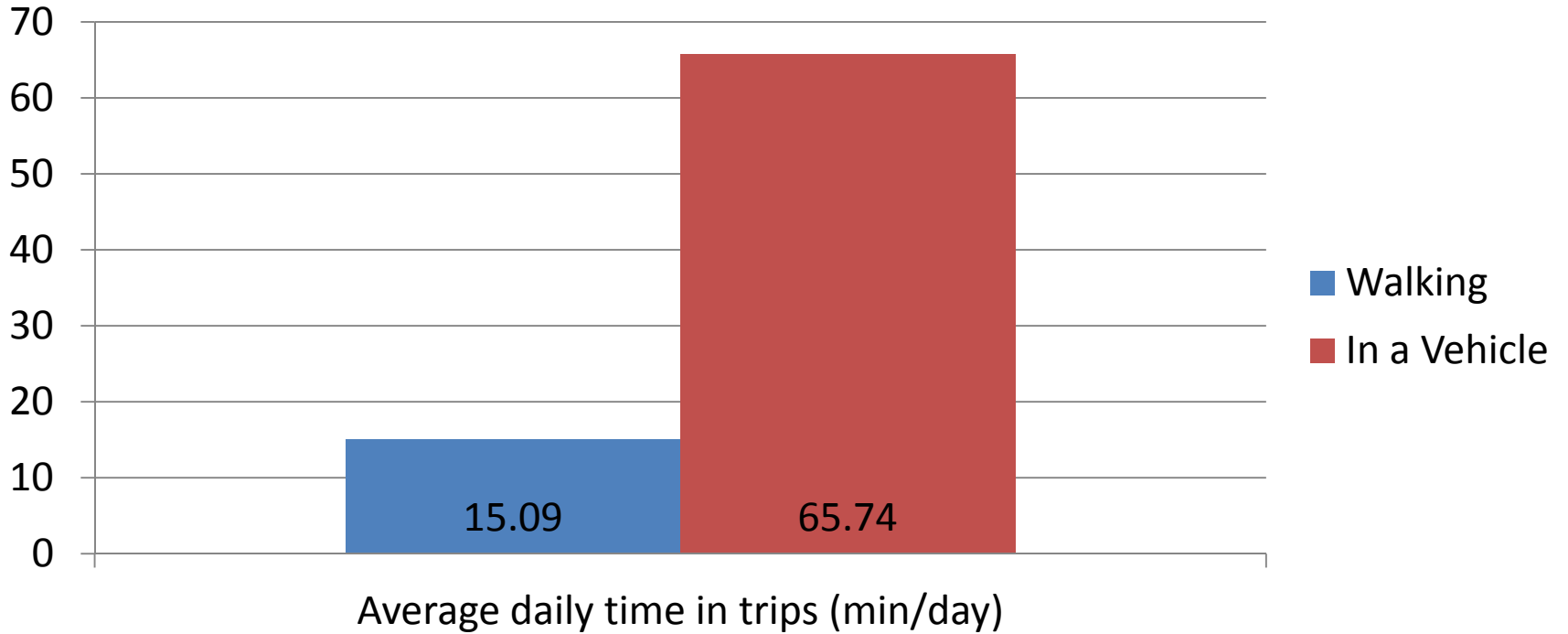
Relationship between walking (min/day) and individual level characteristics (controlling for church)

| Category	Group	Walking minutes per day
Acculturation (BAS Scale)	low adherence	16.58
Acculturation (BAS Scale)	high adherence	12.44
Education	Below High School	15.75
Education	High school or above	14.4
Income	>$2000	16.24
Income	≥$2000	13.49
Employed	No	14.83
Employed	Yes	14.82
Drives Vehicle	No	19.83
Drives Vehicle	Yes	13.41
Body Weight Status	Normal	22.87
Body Weight Status	Overweight	13.77
Body Weight Status	Obese	13.71
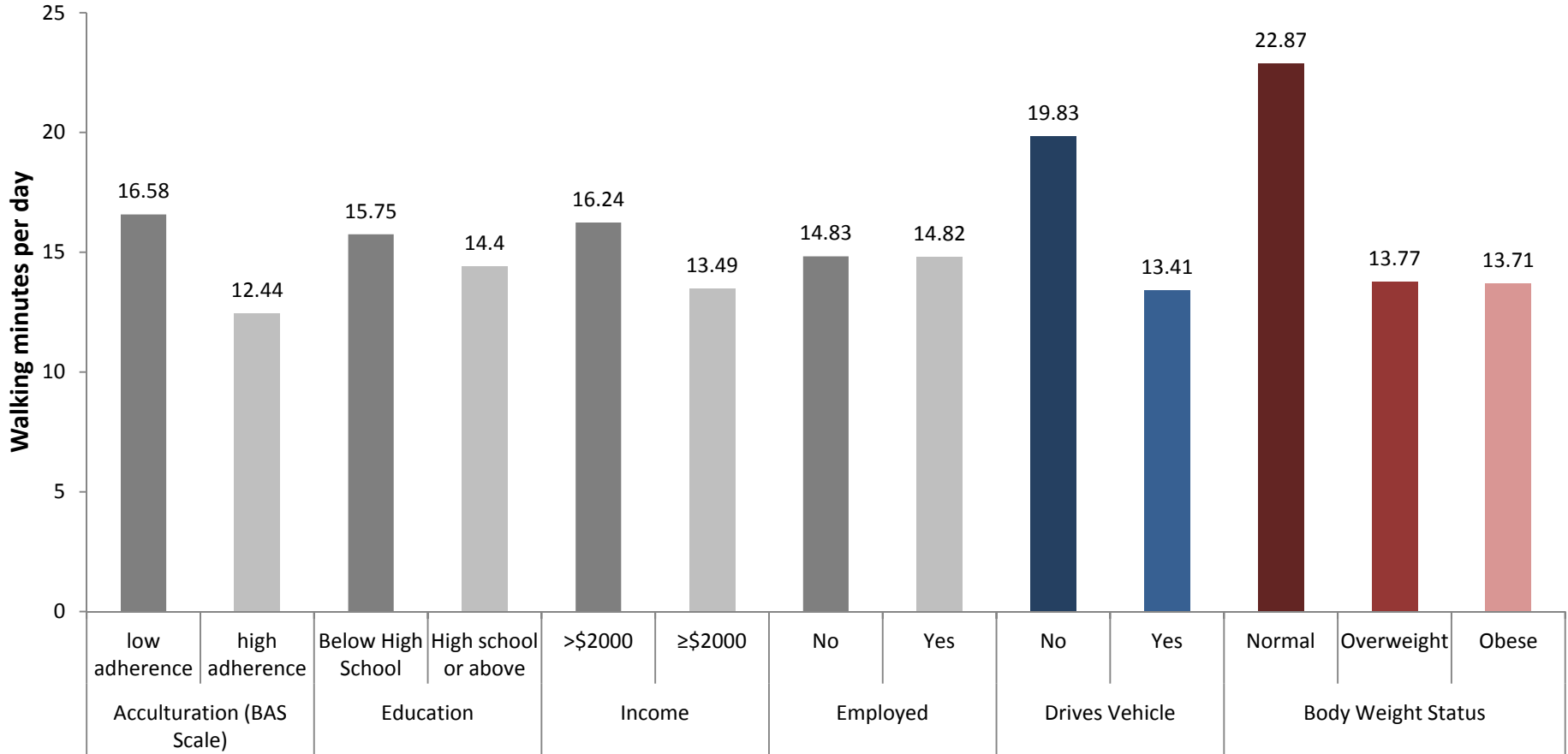
Relationship between vehicle time (min/day) and individual level characteristics (controlling for church)
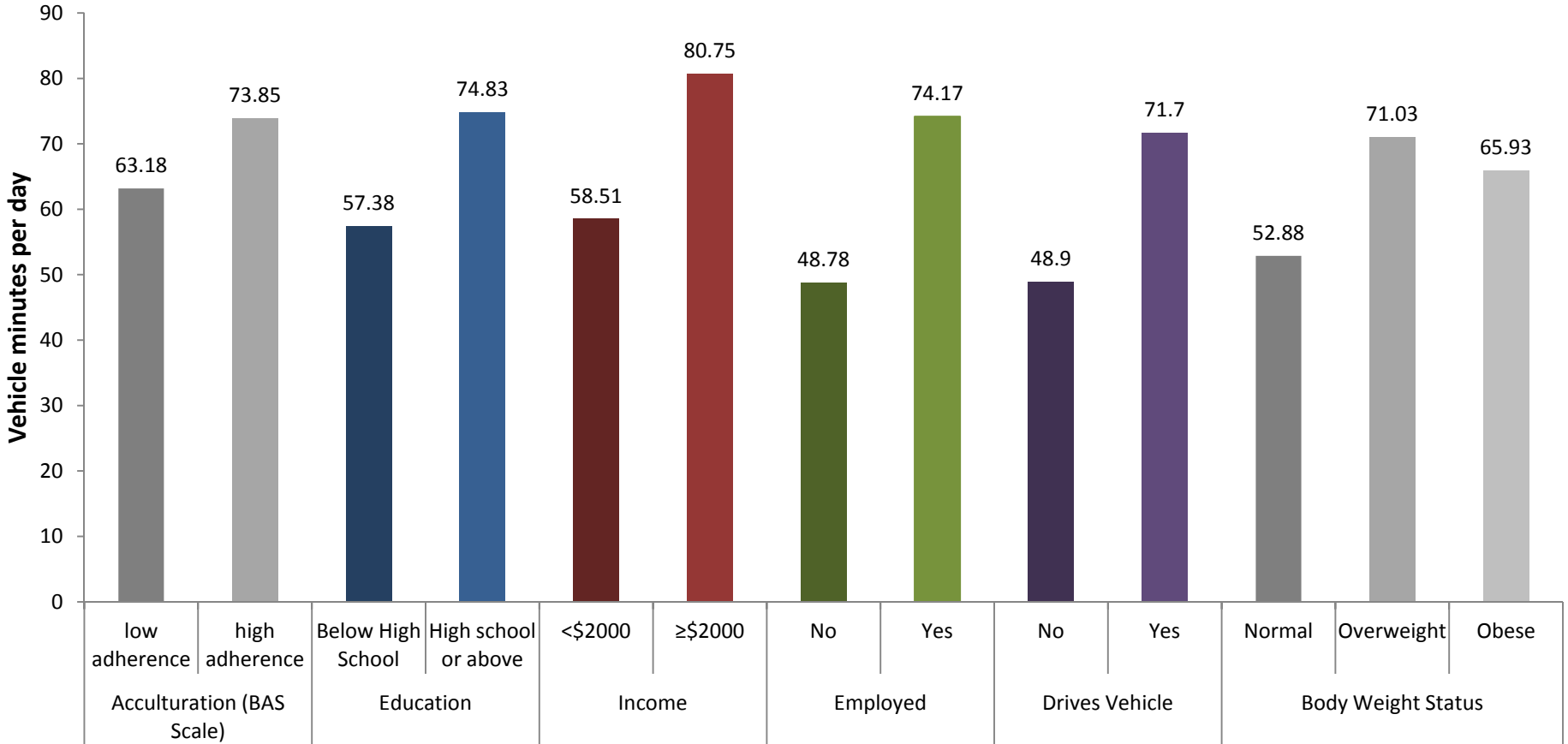
Conclusions
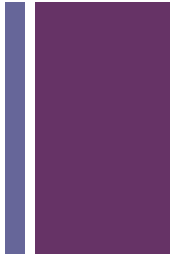
- Latinas are doing more walking, but also more driving than the average population (National Transportation Household Survey, 2009)

- Target overweight/obese participants for walking promotion

- Health promotion messages should be tailored to reach higher SES populations, due to their high amount of vehicle time.

Strengths/Limitations

- Strengths
  - Use of accelerometer/GPS devices to objectively assess transportation-related variables
  - One of the first to objectively assess travel patterns in a Latina sample

- Limitations
  - Use of cross sectional data limits ability to examine causality
  - Small sample size
  - Potential misclassification error

Implications for Practice & Policy

- Walking is an important contributor of PA in Latinos, especially among normal weight Latinos
  - Infrastructure that is supportive of walking is needed
  - Although walking is beneficial to health, other forms of PA are needed to help meet guidelines

- Vehicle time is high, especially among those of higher SES
  - Why is this going on?

- Next steps include examining environmental and psychosocial factors

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Thank You!

Faith in Action
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nserrano@mail.sdsu.edu

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