

# Neighborhood food stores and restaurants: (how) do they influence diet and obesity?

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# Will more supermarkets equal more access to healthy food in underserved communities?



Fast food restaurants



Supermarkets



Smaller grocery stores



# Key questions

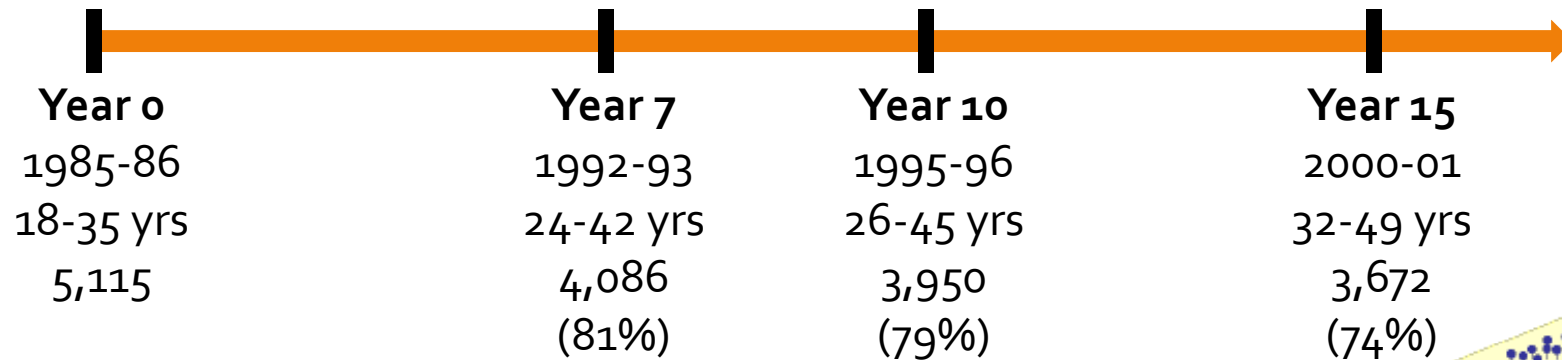
- **What types of resources are most strongly related to diet behaviors?**
  - Supermarkets?
  - Smaller grocery stores?
  - Fast food restaurants?
- **Which resources are “neighborhood” resources?**
  - How far would you travel for fast food? For groceries?
  - How does this differ in lower vs. higher income, or men vs. women?
- **Do relationships between specific types of resources and diet behaviors hold when we follow the same people over time?**

# Coronary Artery Risk in Young Adults (CARDIA) Study

Black & white young adults

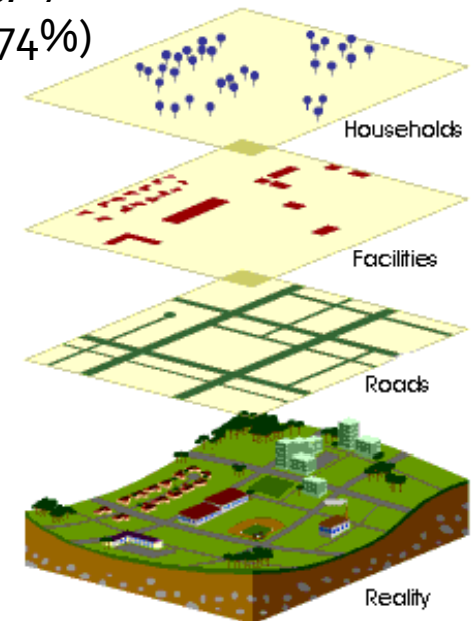
Age-, sex-, race-, and education- balanced

Recruited from: Birmingham, AL; Chicago, IL; Minneapolis, MN, Oakland, CA

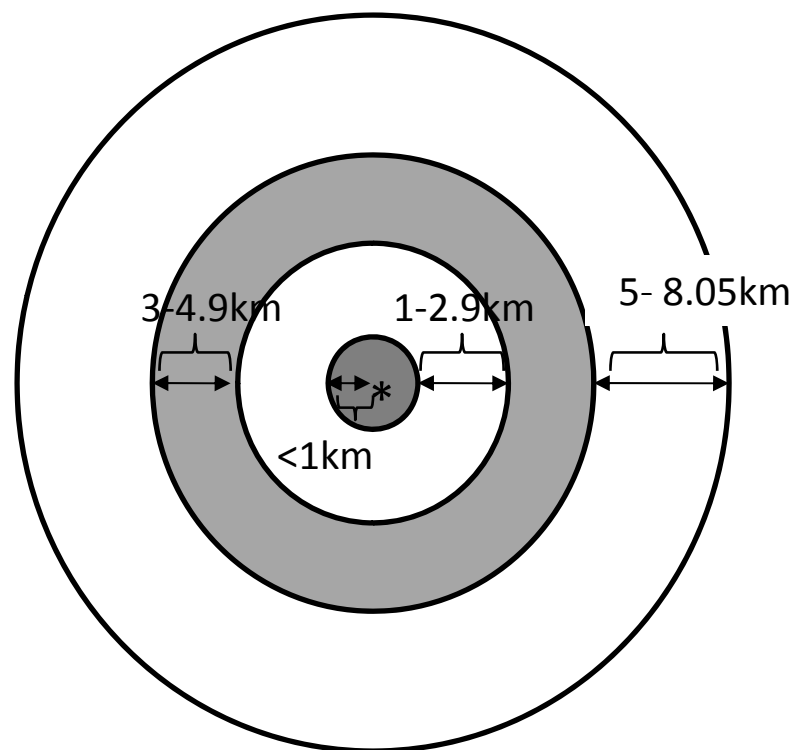


## Geographic Information System

- Food stores, restaurants, census, other data
- Spatially linked to CARDIA respondent home locations
- **Temporally** matched to time of CARDIA exams



# Which food resources and diet behaviors did we examine?



## Neighborhood food resources

Fast food restaurants<sup>1</sup>

Supermarkets<sup>2</sup>

Smaller grocery stores<sup>1</sup>

## Individual diet behaviors

Fast food consumption (frequency)

Diet Quality<sup>3</sup>

Diet Quality<sup>3</sup>

<sup>1</sup> Facilities per 10,000 population (3km Euclidean buffer)

<sup>2</sup> Supermarkets per 100,000 population (3km Euclidean buffer)

<sup>3</sup> **Diet Quality Index** summarizes 10 components of the 2005 Dietary Recommendations for Americans ascertained from an interview-administered, quantitative diet history of foods consumed over the past month and a questionnaire on usual diet practices

# What neighborhood and individual characteristics did we address in our analysis?

## **Estimated the effect of the food environment independent of:**

Income, smoking status, marital status, children

Neighborhood poverty

Analyzed separately in men and women

## **Used best analytic tools to examine our longitudinal data**

We can capture changes in each individual's food environments over time, as well as corresponding changes in their diet behaviors

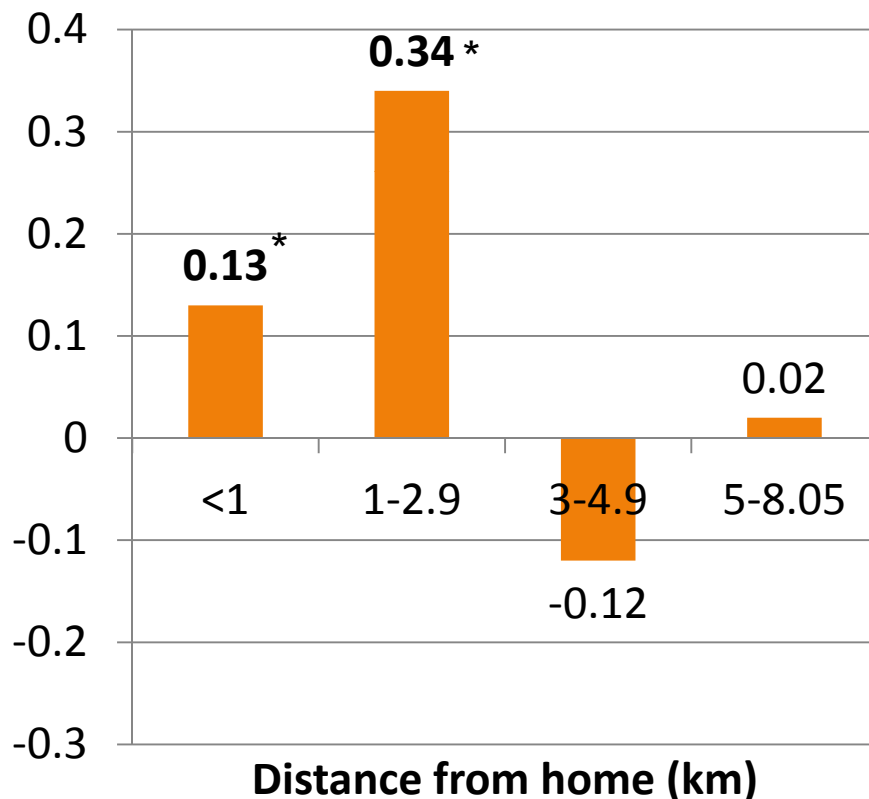
Characteristics that do not change over time (race, study center, education) are adjusted implicitly

## **Tested if relationships were different across income groups**

# Greater availability of fast food restaurants was related to greater consumption of fast food among low income men

% increase in weekly frequency of eating fast food with 1% increase in fast food availability:

Low income (\$2.5-17.6k) men

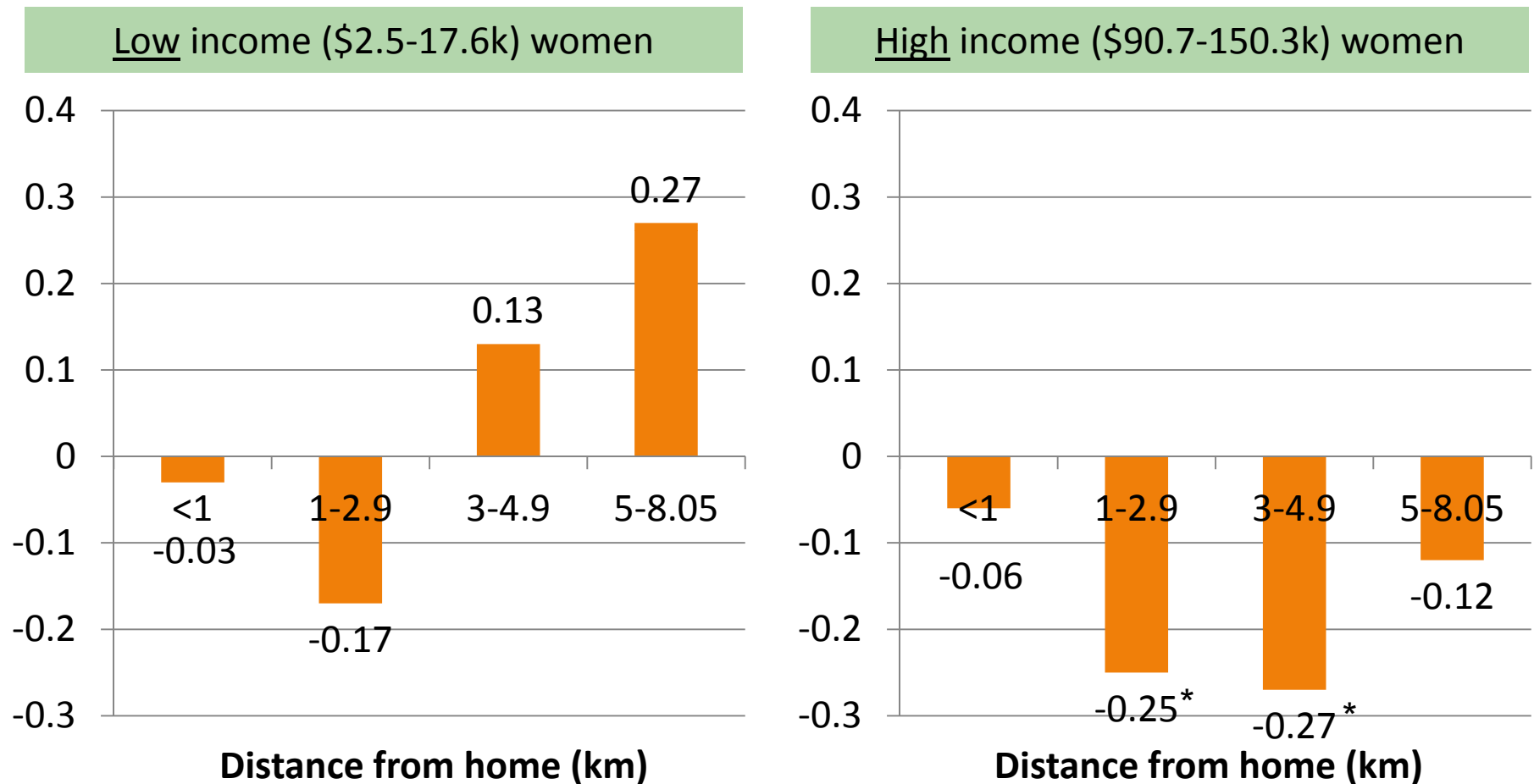


Findings in medium (\$20.3-89.4k) and high income (\$90.7-150.3k) men were weak and generally not statistically significant

Low income men may be particularly sensitive to inexpensive, convenient foods close to their homes

# The relationship between fast food availability and fast food consumption was more complex in women

**% increase in weekly frequency of eating fast food with 1% increase in fast food availability:**



Key drivers of diet decisions may vastly vary across subgroups



# Supermarkets may need to be accompanied by other approaches to improve diets

## Men

| Distance from home (km) | Change in diet quality [mean: 46.5] | Relative odds of meeting fruit & vegetable recommendations [overall : 5.6%] |
|-------------------------|-------------------------------------|---|
| <1                      | <b>-0.1</b> (-0.6, 0.5)             | <b>1.1</b> (0.8, 1.5)   |
| 1-2.9                   | <b>-0.4</b> (-1.2, 0.4)             | <b>2.1</b> (1.2, 3.8)*  |
| 3-4.9                   | <b>-0.0</b> (-1.0, 1.0)             | <b>1.0</b> (0.5, 2.0)   |
| 5-8.05                  | <b>0.6</b> (-0.5, 1.7)              | <b>0.6</b> (0.3, 1.2)   |

## Women

| Distance from home (km) | Change in diet quality [mean: 53.0] | Relative odds of meeting fruit & vegetable recommendations [overall: 8.7%] |
|-------------------------|-------------------------------------|--|
| <1                      | <b>-0.2</b> (-0.7, 0.3)             | <b>0.9</b> (0.8, 1.1)  |
| 1-2.9                   | <b>-0.3</b> (-1.1, 0.5)             | <b>0.8</b> (0.6, 1.1)  |
| 3-4.9                   | <b>-0.4</b> (-1.3, 0.5)             | <b>0.9</b> (0.6, 1.3)  |
| 5-8.05                  | <b>0.6</b> (-0.4, 1.6)              | <b>1.5</b> (1.0, 2.2)  |

Diet Quality: index from 0-100 (higher is better)

# Summary of findings

- We found a strong relationship between greater availability of fast food restaurants and greater consumption of fast food among low income men.
- Our food store findings suggest that we may need multiple types of strategies to accompany environmental changes
  - It may not be enough to simply introduce a supermarket or grocery store - need to accompany a new store with promotion, education, incentives for healthier options
  - Our findings tell us that we need to look at many ways of changing diet behaviors.
- Our study improves on past studies by using national, longitudinal data – but we need much more work to understand the nuances of how neighborhood environments impact behavior

# What are the major gaps in our understanding?

- Specific characteristics of restaurants and food stores
  - Are all fast food restaurants equivalent? All supermarkets and small grocery stores? Are we interested in access to specific types of resources, or to specific types of foods?
    - In-store/restaurant availability: specific products sold
    - Affordability, Quality
    - Social aspects
- Convenience stores
- “Food mirages”
- “Food swamps”
- Food resources beyond the residential neighborhood
  - Nearby workplace
  - Between home and workplace
- Access via public transportation



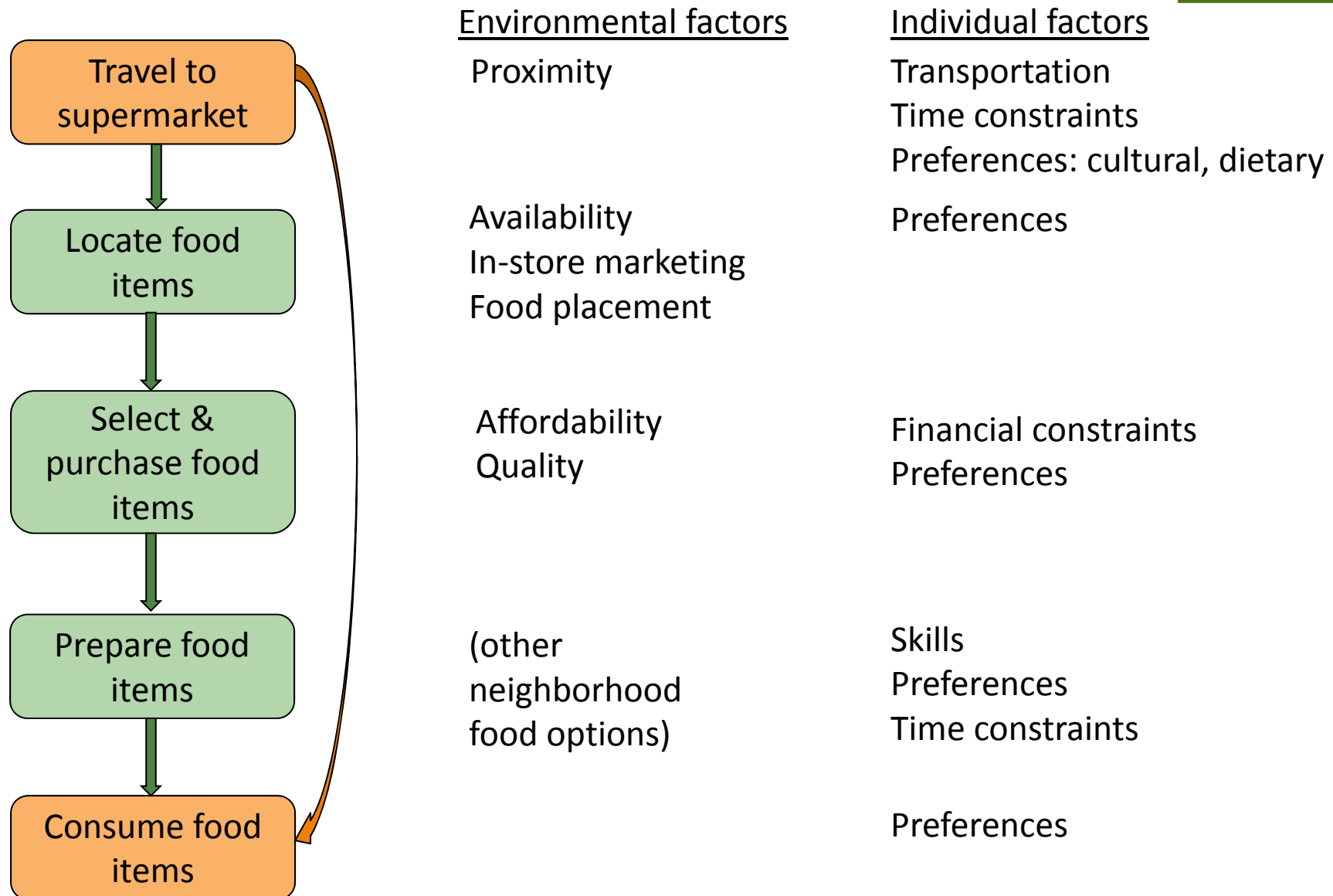
Traditional convenience store



Village Market (Portland, OR)

Photo: Rebecca Koffman, The Oregonian

# Many steps between neighborhood availability and diet



# Acknowledgements

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# Thank You!!!

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