Built Environments, Obesity and Health
Food and Nutrition Environments

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What are food environments & why do we care about them

What do we know – associations

What do we know – strategies for change
  Retail food environments: food stores, restaurants
  School food environments
  Multicomponent community-wide programs

Research gaps, challenges and opportunities

The road forward
The Model: Environment → Behavior

B.F. Skinner
1904-1990
An Ecological Framework Depicting the Multiple Influences on What People Eat

- Individual Factors (personal)
  - Cognitions (e.g. attitudes, preferences, knowledge, values)
  - Skills and behaviors
  - Lifestyle
  - Biological (e.g. genes, gender, age)
  - Demographics (e.g. income, race/ethnicity)
  - Outcome expectations
  - Motivations
  - Self-efficacy
  - Behavioral capability

- Social Environment (networks)
  - Role modeling
  - Social support
  - Social norms

- Physical Environments (settings)

- Macro-level Environments (sectors)
  - Practices
  - Legislative, regulatory, or policy actions

- Home
- Worksites
- School, Afterschool
- Child-care
- Neighborhoods & Communities
- Restaurants & fast food outlets
- Supermarkets
- Convenience & corner stores

- Access
- Availability
- Barriers
- Opportunities

- Societal and cultural norms and values
- Food and beverage industry
- Food marketing and media
- Food and agriculture policies
- Economic systems
- Food production & distribution systems
- Government & political structures and policies
- Food assistance programs
- Health care systems
- Land use and transportation

Story et al., ARPH, 2008
Macro-level Environments (sectors)

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Story et al., *ARPH, 2008*
The Parable of the Blind Men And the Elephant


There are many perspectives, and each may be only part of the picture.

Subjective experience can be true, but may not account for the full truth.
What is the “built environment”? 

- Products of human building activity 
- Part of cultural evolution and construction 
- Characteristics of civilizations 
- Physical, social, cultural constructs 

Related to food: 

- Which foods are where in stores and restaurants 
- Policies within organizations (e.g., school food service policies) 
- Economic drivers (e.g., soda taxes)
Food Environments & Policies: How do they go together?

Policies can shape environments → school food policies, catering policies, price supports, food assistance policies

BUT

Environments often evolve in the absence of specific policies

AND

Policies can be health-promoting or not
Nutrition/Food vs PA Environments

Food is a commodity
Food products are big business
Food is highly regulated
(safety, taxation, hygiene)
Complex (nutrients, foods)
Organizational environments play a large role
The Working Hypothesis (Vastly Simplified)

Influences
- Environments
  - Policies
- Genes
  - Biology
  - Psychology

Behaviors
- Energy Balance
  - Diet
  - Physical Activity
  - Sedentary

Health Outcomes
- Obesity
- Diabetes
- Heart Disease
- Sickness
- Death
- Costs
A Closer Look at the Food Environment Hypothesis (simplified)

Food Supply
Food Production
Food Service

Stores
Supermarkets
New supermarkets
In-store marketing
Corner Stores

Restaurants
Foods available
Nutritional value
Portion sizes
Menu calorie labeling

Schools
Nutrition Standards
Snacks
Water Access

Food Intake
BMI/Obesity
What we know from available research (descriptive and associations)

- Environment-BMI associations
- Environment-diet quality associations and disparities

**EARLY FINDINGS** (retail food environment):
- Supermarkets ➔ healthier
- Fast food restaurants ➔ obesogenic
Obesity in NYC Neighborhoods (2003 & 2007)

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>2007 Percent Obese</th>
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<tbody>
<tr>
<td>Manhattan</td>
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<tr>
<td>Upper East Side, Gramercy Park–Murray Hill</td>
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<tr>
<td>Upper West Side</td>
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<tr>
<td>Chelsea-Clinton, Greenwich Village–Soho</td>
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<td>Union Square–Lower East Side</td>
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<td>Lower Manhattan</td>
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<td>Washington Heights–Inwood</td>
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<td>Central Harlem–Morningside Hts</td>
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<td>East Harlem</td>
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<td>Brooklyn</td>
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<td>Bensonhurst–Bay Ridge</td>
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<td>Borough Park</td>
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<td>Coney Island–Sheepshead Bay</td>
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<tr>
<td>Downtown–Brooklyn His–Park Slope</td>
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<tr>
<td>Greenpoint</td>
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<tr>
<td>Sunset Park</td>
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<tr>
<td>East Flatbush–Flatbush, Canarsie–Flatlands</td>
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<tr>
<td>Williamsburg–Bushwick</td>
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<tr>
<td>Bedford–Stuyvesant–Crown Hts</td>
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<tr>
<td>East New York</td>
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<td>Queens</td>
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<tr>
<td>Flushing–Clearview</td>
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<tr>
<td>Ridgewood–Forest Hills</td>
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<tr>
<td>Long Island City–Astoria, West Queens</td>
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<tr>
<td>Bayside–Little Neck, Fresh Meadows</td>
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</tbody>
</table>
Low PA, Low N  
Low PA, High N  
High PA, Low N  
High PA, High N

BMI in 85th percentile:
- Low PA, Low N: 34.4%  
- Low PA, High N: 31.6%  
- High PA, Low N: 28.7%  
- High PA, High N: 27.3%

BMI in 95th percentile:
- Low PA, Low N: 18.8%  
- Low PA, High N: 15.3%  
- High PA, Low N: 14.4%  
- High PA, High N: 11.7%

NIK Study: Saelens, Sallis, Glanz et al. AJPM 2012
More fast-food restaurants in minority neighborhoods

Some healthy foods less available &/or poorer quality in minority & low income areas

Supermarkets less accessible in poor and Black areas

Review: Beaulac et al. *PCD* 2009
Local Food Environments and Obesity
Systematic Review 2015 (Cobb et al., Obesity)

71 studies representing 65 cohorts

Most-Studied Exposures
- Supermarket availability
- Fast food restaurant availability

Main Findings
- **Associations between outlets & obesity mostly null**
- Supermarket availability more often associated with adult obesity or null findings
- Small stores associated w/ child obesity (in 50% of studies)
- Fast food availability associated w/ child obesity, but many studies were null
- **Overall low quality of studies**
What we know from available research

Strategies to improve food environments

- Retail food environments
  - Supermarkets: access, promoting healthy choices
  - Small food store interventions
  - Restaurants: focus on calorie menu labeling

- School food environments
Do new supermarkets in ‘food deserts’ improve diet and reduce obesity?

Foundation for Healthy Food Financing Initiative (HFFI) & local government and foundation programs

2 recently published studies: T Dubowitz, S Matthews

- Increased awareness of food access
- Healthful food intake, lower BMI not attributed to new stores
- Positive & negative changes in food availability found
Related Findings

- Residents of food deserts buy most of their ‘junk food’ at supermarkets (Vaughn, ... Dubowitz, PHN 2016)

- Interventions AT supermarkets/retail stores have been found efficacious for greater purchase of healthy foods (Adam & Jensen, BMC Pub Health 2016, review of 42 studies)
Healthy Retail Solutions

Evaluate **placement and promotion strategies** to increase sales of healthier items, in supermarkets in low-income, ethnically diverse neighborhoods.

*Sample intervention: Checkout beverage cooler*
Sample Intervention: Milk

Before
(Red=whole milk, Green=skim milk)

After
Main Findings of HRS: Targeted Product Categories

Greater sales:
- skim, 1% milk; water; 2 of 3 frozen entrees

No change in sales:
- cereal, SSBs, diet beverages, whole/2% milk


Placement and promotion strategies to increase sales of healthier products in supermarkets in low-income, ethnically diverse neighborhoods: a randomized controlled trial$^{1-3}$


ABSTRACT

Background: The greater presence of supermarkets in low-income, high-minority neighborhoods has the potential to positively affect diet quality among those at greatest risk of obesity. In-store marketing strategies that draw attention to healthier products may be effective, sustainable, and scalable for improving diet quality and health. Few controlled studies of in-store marketing strategies to studies have found that simply having access to a neighborhood supermarket did not affect residents’ diet quality or risk of obesity (5–8), whereas others found positive effects (9). These data suggest that access alone may be necessary, but not sufficient, to drive healthier choices. Cummins et al recently suggested that complementary interventions, such as in-store stocking policies, are needed to help shoppers move from per.
Small Food Store Interventions (Corner Stores, Bodegas)

- Aim to increase access to healthful foods
- Usually in disadvantaged communities

- Impact on food availability, sales, diet?
  - Review of 16 trials (Gittelsohn et al., PCD 2012)
  - Stocking/availability of healthful foods usually increased
  - Manager-reported increases in sales of promoted foods
  - Limited data on purchase of promoted foods/impact on shopper consumption
  - Design & measurement limitations
  - Most were pre-post assessments
Large Studies of Urban Corner Store Initiatives (Philadelphia)

**CPPW Scale-Up of Healthy Corner Stores Initiative** \( (n=211 \text{ stores}) \)

- Changes in food & beverage environments
  - greater fresh fruit availability & overall healthful availability scores
  - Modest effect sizes (Cavanaugh et al., Prev Med 2014)

- Changes in spending on purchases post-intervention
  - BL purchases mean $ 2.81 and 643 kcal
  - Energy, nutrients, and total spending did not change from BL to FU
    (Lawman et al., Prev Med 2015)

**RCT of a healthy corner store initiative on urban youth purchases**

- No changes in energy content per purchase
- No changes in BMI z scores, obesity prevalence
  (Lent et al., Obesity 2014)
Restaurant Interventions

Calorie Menu Labeling

- Review of 16 studies (VanEpps et al, Curr Obes Rep 2015)
  - 4 studies found reduced energy intake of orders
  - 12 studies found non-significant effects or no effect

- Other considerations:
  - Industry response to calorie menu labeling
  - Current regulations are local; federal ACA rules were postponed from 2017-2018
School Food Environment Interventions

School Meal and Snack Regulations and Interventions

- 2010 Healthy, Hunger-Free Kids Act – updated nutrition standards of National School Lunch Program
- Policies implemented in 2012-2013

Findings from 12 urban, low-income schools
- Increased fruit consumption: 54% → 66% → 74%
- Decrease in vegetable choice but those who chose ate more
- Plate waste was lower
Evidence review: Interventions to Support Healthier Foods and Beverages in Schools (2016)

Meal interventions,
F&V snack interventions + (25 studies)

Policies for healthier snack foods/beverages sold or used for rewards ? (11 studies)

Multicomponent interventions + (13 studies)

Interventions to increase Water access in schools ? (2 studies)
Multicomponent community-wide programs

Findings from a recent systematic review & meta-analysis


- Population, whole-of-community interventions
- Weight gain PREVENTION, main focus on children
- 8 trials, non-randomized with comparison communities
- 7 trials had significant “+” effects
- Mean reduction in BMI z-scores = 0.09 (0.16 to 0.02 95% CI)

Research Limitations
- Hard to assess food environment changes
- Selection bias

Practice Limitations
- Modest changes
- Long-term sustainability?
- Scaling up beyond research
The signal and the noise

Signals of effectiveness

When environmental strategies aren’t found effective....... the reason(s) could be....

Research issues: Design, measures, execution
Strategy issues: implementation, dose/intensity, duration

Or it could be:

*** Wrong assumptions, not addressing key causes ***
Food justice, social justice, and other/unintended consequences

Right to healthy affordable food
Consumer right to know (menu/food labeling)
Hunger-free kids

Tax revenue to improve preschool education (+)
Job losses and net tax losses (-)
Unanswered questions

- How much environmental change is needed?
- How long will it take to improve behavior AND health?
- Who changes after environment/policy interventions? Do they reduce health inequity?
It illustrates the importance of perception
There is a fundamental error in separating the parts from the whole
And the real elephant is the sum of its parts
What we observe is not nature itself, but nature exposed to our way of questioning
(W Heisenberg, 1933)

We must work constantly to prevent the demand for short-term results from undermining long-term process considerations
(JA Belasco, 1990)
Thank you!