Food Insecurity and Obesity: The Role of the Physical and Social Environment

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Link Between Food Insecurity and Obesity

- Least expensive food options typically high in calories and low in nutrients.
- High-calorie foods are easy to over-consume and promote weight gain if they are part of a regular diet.
- Households with limited resources tend to spend less on food overall and, more specifically, less on healthy foods that are lower in energy but more costly (e.g., fruits and vegetables).

Other Factors?

- Distribution of Food Assistance Benefits
- Contributes to Maternal Stress and Poor Family Functioning
  - Physiological/Metabolic Pathways
  - Adverse Coping Behaviors (ex. Overeating)
  - Disrupt Family Routines

Sources: Gundersen et al., 2010; Anderson and Whitaker, 2010
What is the Role of the Food Environment?
## Risk Factors for Food Insecurity, Obesity, and Low Resource Food Environments

<table>
<thead>
<tr>
<th>Risk</th>
<th>Food Insecurity</th>
<th>Obesity</th>
<th>Low Resource Food Environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racial Minority</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Low SES</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Single Female Household</td>
<td>+</td>
<td>+</td>
<td>+?</td>
</tr>
<tr>
<td>South/Midwest</td>
<td>+</td>
<td>+</td>
<td>Midwest Only</td>
</tr>
<tr>
<td>Rural</td>
<td>+/−</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Sources: MMWR, 2010; Grow et al., 2010; Chen and Escarce, 2010; Ogden et al., 2010; Nord et al., 2008; Powell et al., 2007; Blanchard and Lyson, 2002?; Olson et al., 1996
What is the Relationship?

- Neighborhood Environment
- Food Security
- Obesity
Possible Mechanisms

<table>
<thead>
<tr>
<th>Link Obesity and Food Insecurity</th>
<th>Proposed Neighborhood-level Contributors</th>
</tr>
</thead>
</table>
| Least expensive food options typically high in calories and low in nutrients | • High availability of energy dense options (+)  
• Low Cost of unhealthy food options (+) |
| High-calorie foods are easy to over-consume and promote weight gain if they are part of a regular diet. | • High availability of energy dense options (+)  
• Low cost of unhealthy food options (+)  
• Stress of living in low food resource environment (+) |
| Households with limited resources tend to spend less on food overall and, more specifically, less on healthy foods that are lower in energy but more costly (e.g., fruits and vegetables) | • High cost and low quality of healthy food options (+) |
## Possible Mechanisms

<table>
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<tr>
<th>Link Obesity and Food Insecurity</th>
<th>Proposed Neighborhood-level Contributors</th>
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</thead>
<tbody>
<tr>
<td>Distribution of Food Assistance Benefits</td>
<td>• Targeting marketing (e.g. cost-related promotions) during time of benefit distribution (+)</td>
</tr>
</tbody>
</table>
| Contributes to Maternal Stress and Poor Family Functioning | • Unfair treatment (e.g. customer service, racism)  
• High availability of energy dense options (+)  
• Low cost of unhealthy food options (+)  
• Neighborhood Violence limits choice of food outlets (+) |
Availability Unhealthy vs. Healthy

- Less access to Supermarkets and Diverse Food Outlets in Low-income and Communities of Color.

- Lower Availability of Healthful Options in Low-income and Communities of Color (most FV).

- Access to Supermarkets linked to Healthy food Consumption and Overall Dietary Quality.

Sources: (Cheadle, 1991; Morland, Wing and Diez Roux, 2002; Morland et al., 2002; Laraia et al., 2004; Blair et al, 2005; Zenk et al, 2005)
Availability Unhealthy vs. Healthy

Source: Algert et al., 2006
<table>
<thead>
<tr>
<th>City</th>
<th>Availability Unhealthy vs. Healthy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chicago</strong></td>
<td>“You go all the way out to the suburbs where the white people live at and you find everything...It’s even a better variety in [chain supermarkets] when you go to their stores. There’s a difference.”</td>
</tr>
<tr>
<td><strong>Detroit</strong></td>
<td>“You’ve got to go out in the suburbs now to get some decent food. And therefore, it’s not available for us in this community. By the time you get to that store and get some fresh fruits and vegetables, you’re going to pass about 30 fast food joints and about 100 liquor stores.”</td>
</tr>
</tbody>
</table>
Low Cost of Unhealthy vs. Healthy Food Options

Higher SES

Lower SES

Source: Townsend et al, 2009; Monsivais and Drewnowski, 2009
Low Cost of Unhealthy vs. Healthy Food Options: Impact on BMI


10% increase in the price of fruits and vegetables was associated with a 0.7% increase in child BMI.

Fast food prices were not significant in the full sample but were significantly negatively associated with BMI among adolescents.

The impact of prices on BMI was stronger both in magnitude and significance for children of low compared with high-SES.

Source: Powell et al. 2010
# Marketing: High-Calorie/Low-Nutrient Promotions

## Ads for High-Calorie/Low-Nutrient Products (e.g., fast food, sugary beverages, alcohol)

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Sheets</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sheets/1,000 Pop.</td>
</tr>
<tr>
<td>Afr. Am. low</td>
<td>94</td>
<td>720</td>
<td>7.64</td>
</tr>
<tr>
<td>Afr. Am. high</td>
<td>24</td>
<td>154</td>
<td>2.82</td>
</tr>
<tr>
<td>Latino low</td>
<td>170</td>
<td>1,490</td>
<td>11.05</td>
</tr>
<tr>
<td>Latino high</td>
<td>73</td>
<td>300</td>
<td>3.12</td>
</tr>
<tr>
<td>White low</td>
<td>61</td>
<td>555</td>
<td>2.83</td>
</tr>
<tr>
<td>White high</td>
<td>57</td>
<td>138</td>
<td>1.23</td>
</tr>
<tr>
<td>All low income</td>
<td>325</td>
<td>2,765</td>
<td>6.50</td>
</tr>
<tr>
<td>All high income</td>
<td>154</td>
<td>592</td>
<td>2.25</td>
</tr>
<tr>
<td>All Afr. Am.</td>
<td>118</td>
<td>874</td>
<td>5.87</td>
</tr>
<tr>
<td>All Latino</td>
<td>243</td>
<td>1,790</td>
<td>7.75</td>
</tr>
<tr>
<td>All white</td>
<td>118</td>
<td>693</td>
<td>2.25</td>
</tr>
</tbody>
</table>

*Source: Yancy, et al., 2009*
Marketing: Cost-related Promotions

Source: Odoms et al., 2010
Marketing: Cost-related Promotions

Source: Odoms et al., 2010
Marketing: Cost-related Promotions

<table>
<thead>
<tr>
<th>In Neighborhood</th>
<th>Outside Neighborhood</th>
</tr>
</thead>
<tbody>
<tr>
<td>“So you’d about spent all you stamps on the junk food, cause you ain’t even got to the meat and stuffs. You are still over here in this one aisle. But there is how it is. All the pop stacked up against the wall right there, you got your box of cookies, big box of cookies over here.”</td>
<td>“Cause I went to an Jimmy’s on 87th Cicero and they don’t have it like that. They don’t have the junk right there. It’s like you got to find it. You walk in there, they got the frozen food section; they have the bread, the can goods”</td>
</tr>
</tbody>
</table>

Source: Odoms et al., 2010
Stress of negotiating in low food resource environment

“That’s the thing that kills us most because most of us don’t watch what we eat you know… Most of us in this area are stressed beyond belief. Because they are trying to make ends meet, they’re trying to figure out how they’re gone feed their families or how are they gone get their kids to school next week off the $54 paycheck they just got. So you know high blood pressure is a big thing and diabetes is another big thing because of again we don’t watch what we eat and we don’t exercise properly.

Source: Odoms et al., 2010 APHA
Stress of negotiating in low food resource environment

**Neighborhood Context**

I: If you were going to tell a friend about John’s what would you say?

S: Go in the daytime and don’t go at night because people get robbed up there.

I: They’ve got good food though.

**Personal Experiences**

“In the morning maybe, but it would have to be early morning. Not like in the evening. I used to work over here…And there was like a really serious thing that goes on over there. There was like shooting and they actually shot at the gas station while I was there. They shot up my car.”
Unfair treatment

Results:

- Both greater everyday unfair treatment and an acute experience of unfair treatment in the past year were positively associated with comfort food intake in the presence of a convenience store in the neighborhood.
- Among those with a large grocery store in the neighborhood, greater everyday unfair treatment and neighborhood physical environment stress were negatively related to comfort food intake.
- Neighborhood physical environment stress was positively associated with comfort food intake among those with a small neighborhood mom-and-pop store.

Source: Zenk et al., 2010 ISBNPA
Conclusions/Implications

- Evidence suggests environment impacts the relationships between food insecurity and obesity
- Most evidence is related to cost
- More work needs to be conducted to identify other factors, including community stressors and marketing
- More research needed on how impact varies based on social, economic, and geographic factors including race/ethnicity and urban/rural.