IMPACT OF THE BUILT ENVIRONMENT ON YOUTH PHYSICAL ACTIVITY AND OBESITY

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What is the ‘Built Environment’?

- **Built Environment - Community Design**
  - Land Use
  - Transportation system – connectivity
  - Design – aesthetic qualities

- **Physical Environment = built + natural landscape**
How does the built environment affect weight status?

“T’m moving to France to not get fat.”
Built Environment and Diet
Evidence for Adults

- Community design variables related to adult moderate activity levels (Frank et al., 2005).
- County sprawl index associated with minutes walked, obesity, and hypertension (Ewing et al., 2003).
- Transportation and recreational activity related to neighborhood aesthetics (Hoehner et al., 2005).
Gathering Evidence for Youth

• Kligerman, M, Sallis, JF, Ryan, S, Frank, LD, & Nader, PR. *Association of neighborhood design and recreational environment variables with physical activity and body mass index in adolescents*

• Norman, GJ, Nutter, SK, Ryan, S, Sallis, JF, Calfas, KJ & Patrick, K. *Community design and recreational environment correlates of adolescent physical activity and body mass index*
Common Methods

- Accelerometer measures of physical activity (worn for 7-day)
- Geographic Information Systems used to create environmental variables
Neighborhood Buffer

Figure 1. Disconnected and connected community environments.

Walkability Index

• How walkable is a neighborhood?
  • Land use mix
  • Retail floor area ratio (retail density)
  • Intersection density
  • Residential density
Study 1

- Cross-sectional design
- San Diego County
- 98 participants (mean age 16.3)
- .5 mile buffer
Variables

- Physical Activity
  - Minutes of moderate to vigorous activity
- BMI (weight to height ratio)
- Built Environment (12 variable)
Results

- Walkability index related to physical activity
  - $r = .29 \ (p = .004)$
  - Adjusting for gender and ethnicity ($\beta = .278$, partial correlation $= .268$)
- No relationships found for BMI
Study 2

- Cross-sectional design
- San Diego County
- 799 participants (425 girls, 374 boys, 11 15, mean age 12.8, 43% ethnic minority)
- 1 mile buffer
Variables

- Physical Activity
  - Minutes of moderate to vigorous activity
- BMI percentile (age and gender normed)
- Built Environment
  - Residential density, intersection density, Retail-FAR, Land use mix, Walkability index
  - # private recreation facilities, # schools, # parks
## Results

### Physical Activity*

<table>
<thead>
<tr>
<th></th>
<th>Beta</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td><strong>Girls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of private rec facilities</td>
<td>.110</td>
<td>.016</td>
</tr>
<tr>
<td>Intersection density</td>
<td>-.127</td>
<td>.006</td>
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<tr>
<td><strong>Boys</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail floor area ratio</td>
<td>.135</td>
<td>.007</td>
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</tbody>
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### Weight Status

No relationships found for BMI

* Multiple regression models controlling for age, ethnicity (non-white), highest household education level.
Summary

• Some evidence that built environment related to youth physical activity

• Variables explained small amounts of variance in physical activity

• Inverse relationship between girls’ activity levels and street connectivity

• No evidence of relationship between built environment and weight status
Study Limitations

- Cross-sectional designs
- Did not separate transportation activity from leisure activity
- Relatively wide age range of adolescents
- Limited variation of environments
Implications

- Studies represent early investigations of a complex issue
- Further refinement of measures needed
- Only looked at proximity of environment factors
- Need to consider other environment factor
- Need to consider relationship between built environment and perceived environment