Do personal-level characteristics moderate neighborhood correlates of physical activity among adult Latinas?

Presentation by Lilian G. Perez, MPH

Joint Doctoral Program in Public Health (Global Health track)
University of California, San Diego/San Diego State University
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The Ecological Model for Physical Activity

**Intrapersonal**
- e.g., age, SES, BMI, acculturation

**Interpersonal**
- e.g., social support, certain cultural norms

**Community/Organizational**
- e.g., media, employer/worksites, community-based orgs

**Environment**
- e.g., neighborhood aesthetics, perceived safety, accessibility, land-use mix, street connectivity, residential density

References:
1. Sallis et al., 2006
2. McLeroy et al. 1988
3. Evenson et al., 2002
4. Lopez et al., 2008
5. Evenson et al., 2003
6. Martinez et al., 2009
The Ecological Model for Physical Activity

- **Intrapersonal**
  - e.g., age, SES, BMI, acculturation

- **Interpersonal**

- **Community/Organizational**
  - e.g., neighborhood aesthetics, perceived safety, accessibility, land-use mix, street connectivity, residential density

- **Environment**
Background

• Latino population in the US:
  • 2013: 54 million (17.1%); 2060 projection: 128.8 million (31%) ¹
  • 64% of Mexican background ¹

• Latinos physical activity (PA):
  • Low levels leisure-time PA ² and high levels transportation PA ³
  • High activity counts as assessed by accelerometer ⁴

• Many Latinos reside in communities that inhibit healthy lifestyles. ⁵

• Environment – PA relation among Latinos?

1. U.S. Census Bureau, 2012
4. Troiano et al., 2008
5. Flores, 2008
Objectives

1. To examine the association of perceived neighborhood environmental factors with domain-specific PA (leisure-time and transportation) and accelerometer-assessed PA among a sample of Latina women (N=437).

1. To test interactions of individual-level factors (e.g., income and acculturation) with perceived neighborhood environmental factors on each PA outcome.
Methods

• Data source: baseline data from *Fe en Acción* [Faith in Action]
  – Randomized controlled trial for PA promotion among inactive Latina women in San Diego County
• Data collection: May 2011 - September 2013
• Recruitment: 16 churches and 437 Latinas (18-65 y)
• Measures:
  – Accelerometer-assessed PA
  – Self-report PA, demographics, and neighborhood environment
  – Objectively-measured anthropometrics
Measures

• Outcomes:
  – GPAQ \(^1\) for leisure-time & transportation PA (9 items total)
    – Low to moderate validity compared to accelerometer among Latina women (\(r=0.35\)). \(^2\)
  – Actigraph for moderate-to vigorous PA (MVPA)

• Independent variables:
  – NEWS-A \(^3\) and *US Determinants of Exercise in Women Phone Survey* \(^4\) (9 items total)
    – Neighborhood aesthetics, safety from crime, safety from traffic, access to services within walking distance of home, and sidewalk maintenance
    – Higher scores indicative of more favorable perceptions

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1. Armstrong & Bull, 2006
2. Hoos et al., 2012
3. Cerin et al., 2006
4. Evenson et al., 2006
Covariates

• Demographics – education, employment, income, # cars & adults per household (proxy for car access)
• BMI – objectively measured height and weight
• Acculturation – Bidimensional Acculturation Scale (BAS) for Hispanics \(^1\) (24 items)
  – High internal consistency with Mexican Americans and Central Americans
  – Scores on non-Hispanic domain dichotomized (≥2.5 indicative of high levels of Anglo-acculturation)

1. Marin & Gamba, 1996
Statistical Analyses

• Ordinal regression for leisure-time MVPA
  – Categorized: 0, 1-119, and ≥120 min/wk

• Logistic regression for transportation PA
  – Dichotomized: 0 vs. any walking/bicycling-related min/wk

• Linear regression for accelerometer-assessed MVPA (min/wk)

• Models adjusted for church clustering, age, & car access.

• Tested interactions: individual-level factors x each neighborhood variable, e.g., income x neighborhood aesthetics
Results
Table 1. Descriptive characteristics of Latinas in San Diego, CA (N=437).

<table>
<thead>
<tr>
<th>Physical activity levels</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerometer-assessed MVPA, mean (min/wk)</td>
<td>103.1</td>
</tr>
<tr>
<td>Leisure-time MVPA (min/wk) (%)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>55.6</td>
</tr>
<tr>
<td>1 – 119</td>
<td>20.8</td>
</tr>
<tr>
<td>≥ 120</td>
<td>23.6</td>
</tr>
<tr>
<td>Transportation PA (min/wk) (%)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>67.7</td>
</tr>
<tr>
<td>Any</td>
<td>32.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual-level characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (y)</td>
<td>44.4</td>
</tr>
<tr>
<td>Anglo-acculturated, (%) a</td>
<td>32.1</td>
</tr>
<tr>
<td>Monthly household income &lt; $2,000 (%)</td>
<td>58.4</td>
</tr>
<tr>
<td>Less than high school completed (%)</td>
<td>54.9</td>
</tr>
<tr>
<td>Overweight or obese (%) b</td>
<td>83.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neighborhood-level characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Has access to places within walking distance of home (%) (yes)</td>
<td>79.9</td>
</tr>
<tr>
<td>Neighborhood feature (mean scores) c</td>
<td></td>
</tr>
<tr>
<td>Safety from traffic (1-5 point rating)</td>
<td>3.6</td>
</tr>
<tr>
<td>Safety from crime (1-5 point rating)</td>
<td>3.8</td>
</tr>
<tr>
<td>Neighborhood aesthetics (1-5 point rating)</td>
<td>3.1</td>
</tr>
<tr>
<td>Sidewalk maintenance (1-4 point rating)</td>
<td>3.4</td>
</tr>
</tbody>
</table>
Table 2. Associations of neighborhood characteristics with self-report leisure-time and transportation PA.

<table>
<thead>
<tr>
<th>Neighborhood characteristic</th>
<th>Leisure-time MVPA (n=377) OR (^a) (95% CI)</th>
<th>Transportation PA (n=379) OR (^a) (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to places within walking distance of home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>0.78 (0.45-1.34)</td>
<td>2.35 (1.12-4.94)</td>
</tr>
<tr>
<td>Safety from traffic</td>
<td>1.00 (0.79-1.27)</td>
<td>0.97 (0.74-1.27)</td>
</tr>
<tr>
<td>Safety from crime</td>
<td>1.21 (0.95-1.54)</td>
<td>1.06 (0.81-1.40)</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>1.25 (1.02-1.54)</td>
<td>1.11 (0.88-1.41)</td>
</tr>
<tr>
<td>Sidewalk maintenance</td>
<td>0.96 (0.78-1.18)</td>
<td>0.90 (0.71-1.14)</td>
</tr>
</tbody>
</table>

Table 3. Associations of neighborhood characteristics with accelerometer-assessed MVPA (n=381).

<table>
<thead>
<tr>
<th>Neighborhood characteristic</th>
<th>(\beta) (^a)</th>
<th>SE</th>
<th>(t)-value</th>
<th>(p)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to places within walking distance of home</td>
<td>15.41</td>
<td>8.81</td>
<td>1.75</td>
<td>0.08</td>
</tr>
<tr>
<td>Safety from traffic</td>
<td>-1.87</td>
<td>3.82</td>
<td>-0.49</td>
<td>0.63</td>
</tr>
<tr>
<td>Safety from crime</td>
<td>4.35</td>
<td>3.83</td>
<td>1.13</td>
<td>0.26</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>5.25</td>
<td>3.28</td>
<td>1.60</td>
<td>0.11</td>
</tr>
<tr>
<td>Sidewalk maintenance</td>
<td>-3.29</td>
<td>3.36</td>
<td>-0.98</td>
<td>0.33</td>
</tr>
</tbody>
</table>
Moderation Results

• Latinas with higher household income and more favorable perceptions of sidewalk maintenance had significantly higher amounts of leisure time MVPA than those of lower household income (OR = 1.54; 95% CI: 1.10-2.16).
Figure 1. Interaction between Anglo-acculturation status and perceived safety from crime on Latina’s accelerometer-assessed MVPA.

Interaction beta = 12.50, p = 0.05
Figure 2. Interaction between household income and perceived safety from crime on Latina’s accelerometer-assessed MVPA.

Interaction beta = -12.91, \( p = 0.04 \)
Conclusions

• Among this large sample of inactive Latina women, most important environmental-level correlates of PA were:
  – Leisure-time MVPA: better neighborhood aesthetics
  – Transportation PA: having access to places within walking distance of home
Conclusions

• Better sidewalk maintenance (+) associated with leisure-time MVPA only among higher-income Latinas.

• Increasing levels perceived safety from crime (+) associated with accelerometer-assessed MVPA only among Latinas with higher levels of acculturation.

• Another study reported (+) associations between levels of perceived safety and PA among more affluent/advantaged groups ¹.

• Unexpectedly, increasing levels of safety from crime (+) associated with accelerometer-assessed MVPA among lower-income Latinas.

¹. Carlson et al., 2014
Limitations

• Cross-sectional design does not allow evaluation of cause-and-effect relationship.

• Focus on Latina women living in a US-Mexico border community does not allow generalization of findings to Latino men or women of other Latino ethnicity in the US.
Strengths

• One of the first studies to examine interactions between individual-level and neighborhood environment variables on multiple PA measures among Latina women.

• Focus on environmental variables deemed relevant to Latina women. ¹

¹ Martinez et al., 2009
Public Health Implications

• Improvements to neighborhood environment may only increase PA among certain subgroups of Latinas.

• Interventions aimed at improving neighborhood environment to increase PA levels among Latinas should consider individual-level factors.

• Inconsistent moderation effects of income on neighborhood-PA relation needs further study.
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References

References


• Saelens BE, Sallis JF, Frank LD. Environmental correlates of walking and cycling: findings from the transportation, urban design, and planning literatures. *Annals of Behavioral Medicine.* 2003;25(2):80-91.
