ASSOCIATIONS BETWEEN NEIGHBOURHOOD WALKABILITY, NEIGHBOURHOOD SES AND PHYSICAL ACTIVITY: ADULTS VERSUS ADOLESCENTS

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Faculty of Medicine and Health Sciences
Department of Movement and Sports Sciences
BACKGROUND

Ecological models

- demographic factors
- psychosocial factors
- environmental factors
  e.g. walkability

- differences in physical environments
  USA, Australia, Europe
- differences in PA behaviour
- European studies needed
Ecological models

- demographic factors
- environmental factors (e.g. walkability)
- psychosocial factors

- differences in physical environments
  USA, Australia, Europe

- differences in PA behaviour

- European studies needed:

*BELGIAN ENVIRONMENTAL PHYSICAL ACTIVITY STUDY*
**BACKGROUND**

**Walkability – PA**

- **in adults:** clear link
  
  (United States: Sallis et al. 2009; Australia: Owen et al. 2007 and Europe (Belgium): Van Dyck et al. 2010)

- **in adolescents:** more inconsistencies in the evidence
  
Are neighbourhood walkability and neighbourhood SES to the same extent related to the levels of PA in an adolescent and adult population?
Are *neighbourhood walkability* and *neighbourhood SES* to the same extent related to the levels of PA in an adolescent and adult population?

Comparison of the association between neighbourhood walkability, SES and levels of PA in adolescents and adults living in the same neighbourhoods.
**METHOD**

**BEPAS:** Belgian Environmental Physical Activity Study

→ design similar to NQLS* and PLACE** studies

**Neighbourhood selection:**

**Ghent, Belgium:**

neighbourhoods selected based on walkability and SES

- **GIS:** connectivity, residential density, land use mix
- **neighbourhood SES (median annual household income):**
  national institute of statistics (NIS)

METHOD

24 neighbourhoods:
- 6 high WALK / high SES
- 6 low WALK / low SES
- 6 low WALK / high SES
- 6 high WALK / low SES

Legend:
- Yellow: high SES low walk
- Grid: low SES low walk
- Red: high SES high walk
- Purple: low SES high walk
Selection participants

**Stage 1:** potential participants (adolescents aged 13 to 15 and adults aged 20 to 65) received a letter

**Stage 2:** potential participants were visited at home
   → IPAQ or FPAQ interview, NEWS, 7 day accelerometer, demographic and psychosocial questionnaire, anthropometric measures

**Stage 3:** 1 week after first visit: collection of the accelerometers
Measures and instruments

(used for results presented here)

**PA**: - *adults*: long IPAQ interview version (last 7 days)
  - *adolescents*: FPAQ interview version
  - *adults + adolescents*: 7 day accelerometer
METHOD

Analyses

• Multilevel regression analyses (MLwiN 2.20)
• 2 levels: level 1: individual-level variables
  (group: adolescent / adult, PA, educational attainment)
  level 2: neighbourhood-level variables
  (WALKABILITY / SES)
• Analyses controlled for possible confounders: educational attainment (individual SES)
• Skewed variables were logarithmic transformed
• Statistical significance  $p < 0.05$
RESULTS: DESCRIPTIVES

**Participants:**
- 478 adolescents (response rate 59.5%)
- 1200 adults (response rate 58.0%)

<table>
<thead>
<tr>
<th></th>
<th>Adolescents</th>
<th>Adults</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% )</td>
<td>50.3 %</td>
<td>47.9 %</td>
<td>48.6 %</td>
</tr>
<tr>
<td>SES (% high SES)</td>
<td>70.7 %</td>
<td>60.9 %</td>
<td>63.6 %</td>
</tr>
</tbody>
</table>
RESULTS: GROUP x WALK

<table>
<thead>
<tr>
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<tr>
<td>Moderate to vigorous PA</td>
<td>n.s.</td>
</tr>
<tr>
<td>(obj.)</td>
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* p<0.05; ** p<0.01; *** p<0.001

→ The association between *neighbourhood walkability* and MVPA is *similar* in adults and adolescents
→ The association between *neighbourhood walkability* and *active transport* is *different* in adults and adolescents
→ The association between *neighbourhood walkability* and *sport during leisure time* is *similar* in adults and adolescents
RESULTS: GROUP x WALK

Adolescents + adults

<table>
<thead>
<tr>
<th></th>
<th>High WALK mean (SD) (min./day)</th>
<th>Low WALK mean (SD) (min./day)</th>
<th>β (SE)</th>
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<tbody>
<tr>
<td>MVPA (obj.)</td>
<td>37.4 (24.4)</td>
<td>31.6 (22.7)</td>
<td>0.076 (0.019)***</td>
</tr>
</tbody>
</table>

→ For the total group (adolescents + adults) living in a high walkable neighbourhood is associated with more moderate to vigorous PA (obj. measure)

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<tr>
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<tr>
<td></td>
<td>High WALK</td>
<td>Low WALK</td>
</tr>
<tr>
<td></td>
<td>mean (SD) (min./week)</td>
<td>mean (SD) (min./week)</td>
</tr>
<tr>
<td>AT</td>
<td>179.5 (132.4)</td>
<td>191.4 (159.9)</td>
</tr>
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→ **For adolescents no difference** in active transport was found between high and low walkable neighbourhoods

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<tr>
<td>AT</td>
<td>199.0 (210.8)</td>
<td>81.6 (126.5)</td>
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→ **For adults living in high walkable** neighbourhoods was associated with more active transport

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RESULTS: GROUP X WALK

Adolescents + adults

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<tr>
<td>sport</td>
<td>121.6 (206.9)</td>
<td>106.7 (147.4)</td>
<td>0.021 (0.061)</td>
</tr>
</tbody>
</table>

For the total group (adolescents + adults) no difference in sport during leisure time was found between high and low walkable neighbourhoods.

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*p<0.05; **p<0.01; ***p<0.001
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* p<0.05; ** p<0.01; *** p<0.001

→ The association between **neighbourhood SES** and **moderate to vigorous PA** is **different** in adults and adolescents
→ The association between **neighbourhood SES** and **active transport** is **similar** in adults and adolescents
→ The association between **neighbourhood SES** and **sport during leisure time** is **similar** in adults and adolescents
RESULTS: GROUP X SES

**Adolescents**

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<thead>
<tr>
<th></th>
<th>High SES mean (SD) (min./day)</th>
<th>Low SES mean (SD) (min./day)</th>
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<tr>
<td>MVPA</td>
<td>35.1 (25.2)</td>
<td>29.2 (21.3)</td>
<td>0.114 (0.048) **</td>
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→ For adolescents living in high SES neighbourhoods is associated with more moderate to vigorous PA.

**Adults**

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<tr>
<td>MVPA</td>
<td>33.4 (22.1)</td>
<td>37.1 (25.2)</td>
<td>-0.026 (0.048)</td>
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→ For adults no difference in moderate to vigorous PA was found between high and low SES neighbourhoods.

**Moderate to vigorous PA (MVPA) (obj.)**

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## RESULTS: GROUP X SES

### Adolescents + adults

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<tr>
<td>Active transport (AT)</td>
<td>128.3 (150.7)</td>
<td>180.1 (194.5)</td>
<td>-0.164 (0.063) **</td>
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→ For the total group (adolescents + adults) living in high SES neighbourhoods is associated with less active transport

### group x SES

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* p<0.05; ** p<0.01; *** p<0.001
# RESULTS: GROUP X SES

**Adolescents + adults**

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<tr>
<th>Activity</th>
<th>High SES mean (SD) (min./day)</th>
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<tr>
<td>Sport</td>
<td>124.1 (193.7)</td>
<td>103.4 (163.0)</td>
<td>0.185 (0.058) ***</td>
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→ For the total group (adolescents + adults) living in high SES neighbourhoods is associated with **more sport during leisure time**

**group x SES**

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DISCUSSION

Walkability – PA

- active transport: adolescents ≠ adults
  
  **adolescents:**
  
  - no difference between low and high walk neighbourhoods ≠ Frank et al. 2007, Kerr et al. 2007, Van Dyck et al. 2009

  **adults:**
  
  - 118 min./wk more active transport in high walk neighbourhoods
    ~ Sallis et al. 2009 (walking), Saelens et al. 2003

  ➔ possible explanation:
    walkability index = defined using adult criteria: other important variables that determine youth’s active transport?
    OR Belgian youth use active transport if the distance is feasible?
**DISCUSSION**

**Walkability – PA**

- **Sport and MVPA: adolescents = adults**
- **adolescents + adults:**
  - **no difference for sport during leisure time**
    - **hypothesis:** higher land use mix/greater access to recreational facilities - more sport during leisure time = not supported

- **6 min./day more MVPA in high walk neighbourhoods**
  ~ Kligerman et al. (2007), Sallis et al. (2009)

→ **important result for future PA interventions!**


**Discussion**

**SES – PA**

- **AT and sport: adolescents = adults**

  **adolescents + adults:**

  52 min./wk **less AT** in **high SES** neighbourhoods


  ➔ **possible explanation:** motorized transport and public transport = expensive

  21 min./wk **more sport** in **high SES** neighbourhoods


  ➔ **possible explanation:** low SES neighbourhoods: less places to exercise land limited resources
DISCUSSION

**SES – PA**

- **MVPA:** adolescents ≠ adults

  **adolescents:**
  6 min./day more MVPA in high SES neighbourhoods
  ~ Drenowatz et al. 2010, Borraccino et al. 2009

  **adults:**
  no difference between low and high SES neighbourhoods
  ~ Sallis et al. 2009

→ neighbourhood SES inequalities contribute to differences in PA
CONCLUSION

High walkability associated with higher levels of MVPA in adults and adolescents

High SES is associated with more sport during leisure time and less active transport in adults and adolescents

Important to consider when selecting key elements for PA interventions
Clear differences between adults and adolescents

- Active transport x neighbourhood walkability
- MVPA x neighbourhood SES

important to consider when selecting key elements for PA interventions
**CONCLUSION**

- **Strengths**
  - use of self-reported and objective PA data
  - adolescents and adults living in the same neighbourhoods

- **Possibilities for future research**
  - context specific research: specific populations, specific continents/countries, specific PA behaviours
  - individual GIS: measuring environmental characteristics within a buffer
  - longitudinal studies: causal relations
  - comparison interaction SES X WALK between adults and adolescents
Thank You!
Questions?
Suggestions?