School Policies and Active Commuting among Elementary Students: A Dose Response Association

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Acknowledgements

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  - Melissa Valerio, PhD
  - Bill Kohl, PhD
  - Casey Durand, PhD
  - Adriana Perez, PhD
  - Shelton Brown, PhD
  - Deborah Salvo-Dominguez, PhD

- Study Staff
  - Sarah Bentley, MPH, Project Coordinator
• Benefits of active commuting to school (ACS)
  - physical activity
  - cardiovascular fitness
  - mental well-being

• In 2017, 9.6% of students 5–17 years old usually walked and 1.1% biked to school.
  – Elementary school students
    • 10.0% walk
    • 0.9% bike

Background

• Correlates of ACS
  – Previous literature has focused on individual, social, & environmental
  – School as setting for policy-related health promotion strategies to increase ACS (Safe Routes to School programs)
    • Most study implementation of only one program or policy
• Programs and policies do not exist in isolation within schools

Study Purpose

To examine the association between the number of school policies and practices for active commuting at elementary schools in Central Texas and student travel behavior.
Methods – Study Design

- Safe Travel Environment Evaluation in Texas Schools (STREETS) Study
- 5-year NIH funded natural experiment
- Evaluation of the health effects of City of Austin Safe Routes to School infrastructure
- 94 elementary schools recruited
- Two study designs:
  - **Serial cross-sectional**
    - ACS tally collected each semester
    - School health policy surveys collected annually
  - Subset of schools participating in quasi-experimental cohort
Methods – Measures

School policies and programs

– Baseline STREETS School Health Policy Survey
  • Completed by principals, assistant principals, PE/health teachers
  • 2018 – 2019 school year

– **Aggregate school policy score** developed from 7 survey items:
  • Curriculum encouraging walking and biking to school
  • Existence of crossing guard programs
  • Signage in the school promoting walking/ biking to school
  • Existence of school-wide SRTS policy
  • Walk/Bike to School Day initiatives
  • Walking School Bus
  • Other policies or programs to increase walking/ biking to school
    – i.e. pick up and drop off policies
Methods – Measures

Active commuting to school

– Baseline STREETS ACS Tally
  • 2018 -2019 school year
  • Measured using the standard Safe Routes to School student tally method
    – Students asked by classroom teacher about transport to/from school
    – Collected across three weekdays in 3rd, 4th and 5th grade classrooms
  – Percentage of students using active transport modes averaged across the three weekdays
Methods – Statistical Analyses

• School level confounders: economic disadvantage, racial/ethnic distribution, neighborhood connectivity

• Multilevel linear regression models with classrooms nested within schools
  – Three models were run:
    • Main effects, unadjusted
    • Main effects, adjusted for the school-level confounders
    • Interaction model for school policy x grade

• All analyses in R (RStudio Version 1.3.959)
Results – School Characteristics

77 elementary schools with tally data and policy surveys at baseline

Number of participating students: **16,379**

Racial/ethnic distribution of participating schools:

- Hispanic: 49.0%
- White: 27.8%
- Black/AA: 8.4%
- Other: 14.8%

Number of participating classrooms:

- 3rd Grade: 291
- 4th Grade: 292
- 5th Grade: 222

Average percent students eligible for free/reduced lunch: **46.4%**

Average percent students who walk/bike to school: **14.5%**
### Results – Policy and ACS

<table>
<thead>
<tr>
<th></th>
<th>Unadjusted Main Effects Model Coefficient (SE)</th>
<th>Adjusted Main Effects Model Coefficient (SE)</th>
<th>Interaction Model Coefficient (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Policy Index</strong></td>
<td>0.008 (0.004)*</td>
<td>0.007 (0.004)</td>
<td>0.005 (0.004)</td>
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<td>Economic disadvantage</td>
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<td>Percent minority students</td>
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<td>Neighborhood connectivity</td>
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<td>3rd Grade</td>
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<td>Index x 3rd Grade</td>
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<td>Index x 4th Grade</td>
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<td>Index x 5th Grade</td>
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Notes: * p<.05
Results – Interaction

• Association of school policy and student active commuting varied significantly by grade
Conclusion & Implications

- Highlights importance of school policy environment to increasing ACS in elementary students.
- “More is better”
- Older students may be more influenced by school policies than younger students.
  - Independent mobility
  - Parental safety concerns
- Limitations
  - Predominantly one school district
  - Limited in determining the length of time these policies and practices have been in place
  - Implementation of policies
Thank You!

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## Conclusion & Implications

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survey Question</th>
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<tbody>
<tr>
<td>Active Commuting Program&lt;sup&gt;19&lt;/sup&gt;</td>
<td>Have any of the following improvements been made (or will be made) at your school this year? (2018-2019) Program to increase walking/biking to and from school?</td>
</tr>
</tbody>
</table>
| Both<sup>12, 20</sup>             | Has (or will) any curriculum encouraging walking and biking to school (i.e. Safe Routes to School) been (or will be) taught in the classroom this year (this includes bicycle and pedestrian safety education and encouragement)?  
  a. Third Graders  
  b. Fourth Graders  
  c. Fifth Graders |
| Practice                          | Is there signage in the school promoting walking and/or biking (active commuting) concepts, practices, and objectives?                           |
| Both<sup>13</sup>                 | Has your school adopted a policy that supports or promotes walking or biking to and from school?                                                  |
| School Practice<sup>14</sup>      | Does your school have crossing guards?  
  If so, how many paid?  
  If so, how many volunteers? |
| Active Commuting Program<sup>16</sup> | Walking School Bus  
  Participated/conducted 2017-2018 school year?  
  Participated/conducted 2018-2019 school year? |
| Active Commuting Program<sup>17</sup> | Walk to School Day  
  Participated/conducted 2017-2018 school year?  
  Participated/conducted 2018-2019 school year?  