Routes to Dunedin Secondary Schools and Adolescents’ Perceptions of Safety along the Route

J. Rodda, A. Moore, and S. Mandic
Introduction

Background: Perception of the safety of the route to school is one of the key factors determining whether adolescents use active modes of transport to school. This study examined the spatial distribution of adolescents’ routes to schools and the recorded adolescents’ observations regarding the perception of ‘safety’ along those digitised routes.

Methods: High school students (n=744; age: 15.5±1.4 years; 53% females) hand drew their route to school on a paper map which was subsequently digitised. Total area encompassed by digitised routes for each school was calculated. Adolescents were asked to mark ‘safe’ and ‘unsafe’ areas along the route and provide comments for ‘unsafe’ segments.
Convex Hull Measurements for 12 schools

Convex Hull = 84.4 km$^2$
Convex Hull = 61.4 km$^2$
Convex Hull = 27.2 km$^2$
Convex Hull = 21.3 km$^2$
Convex Hull = 69.1 km$^2$
Convex Hull = 67.4 km$^2$
Convex Hull = 53.7 km$^2$
Convex Hull = 41.6 km$^2$
Convex Hull = 67.2 km$^2$
Convex Hull = 65.0 km$^2$
Convex Hull = 63.3 km$^2$
Convex Hull = 15.7 km$^2$
744 Digitised student routes to school
1,411 total digitised segments
329 segments marked as ‘unsafe’
223 with comments why unsafe

\[ n_{\text{total}} = 171 \text{ students recorded 223 comments “why is route unsafe?”} \]
\[ n_{\text{female}} = 98 \text{ female students} \]
\[ n_{\text{male}} = 73 \text{ male students} \]
Active Transport (yellow) Females (pink) Males (blue)
Both males and females (purple)
Vehicle Transport (yellow) Females (pink) Males (blue)
Both males and females (purple)
Perceptions of Safety Issues on Route to School

35% Traffic Safety

55% Built Environment

20% Personal Safety

8% Other

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Built Environment Characteristics -> roads/intersections/lack of footpaths

<table>
<thead>
<tr>
<th></th>
<th># routes</th>
<th>average length</th>
<th>+/- st.dev.</th>
<th>average age</th>
<th>+/- st.dev</th>
<th>Percentage of total routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>123</td>
<td>713.5</td>
<td>1294.3</td>
<td>15.9</td>
<td>1.3</td>
<td>123/223 = 55%</td>
</tr>
<tr>
<td>female</td>
<td>73</td>
<td>843.5</td>
<td>1325.3</td>
<td>15.9</td>
<td>1.3</td>
<td>73/121 = 60%</td>
</tr>
<tr>
<td>male</td>
<td>50</td>
<td>523.7</td>
<td>1223.0</td>
<td>15.8</td>
<td>1.4</td>
<td>50/102 = 49%</td>
</tr>
</tbody>
</table>
### Traffic Safety ➔ vehicles/traffic

<table>
<thead>
<tr>
<th></th>
<th># routes</th>
<th>average length</th>
<th>+/- st.dev.</th>
<th>average age</th>
<th>+/- st.dev</th>
<th>Percentage of total routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>77</td>
<td>884.7</td>
<td>1434.2</td>
<td>15.5</td>
<td>1.4</td>
<td>77/223 = 35%</td>
</tr>
<tr>
<td>female</td>
<td>43</td>
<td>1042.5</td>
<td>1632.4</td>
<td>15.4</td>
<td>1.5</td>
<td>43/121 = 36%</td>
</tr>
<tr>
<td>male</td>
<td>35</td>
<td>690.8</td>
<td>1114.5</td>
<td>15.5</td>
<td>1.2</td>
<td>35/102 = 34%</td>
</tr>
</tbody>
</table>

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## Personal Safety => People/dogs/poor lighting

<table>
<thead>
<tr>
<th></th>
<th># routes</th>
<th>average length</th>
<th>+/- st.dev.</th>
<th>average age</th>
<th>+/- st.dev.</th>
<th>Percentage of total routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>45</td>
<td>576.6</td>
<td>609.0</td>
<td>15.4</td>
<td>1.4</td>
<td>45/223 = 20%</td>
</tr>
<tr>
<td>female</td>
<td>24</td>
<td>531.2</td>
<td>666.1</td>
<td>15.3</td>
<td>1.3</td>
<td>24/121 = 20%</td>
</tr>
<tr>
<td>male</td>
<td>21</td>
<td>628.5</td>
<td>531.7</td>
<td>15.6</td>
<td>1.4</td>
<td>21/102 = 21%</td>
</tr>
<tr>
<td></td>
<td># routes</td>
<td>average length</td>
<td>+/- st.dev.</td>
<td>average age</td>
<td>+/- st.dev</td>
<td>Percentage of total routes</td>
</tr>
<tr>
<td>------------------</td>
<td>----------</td>
<td>----------------</td>
<td>-------------</td>
<td>-------------</td>
<td>------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>total</td>
<td>17</td>
<td>804.0</td>
<td>1204.0</td>
<td>15.9</td>
<td>1.7</td>
<td>17/223 = 8%</td>
</tr>
<tr>
<td>female</td>
<td>4</td>
<td>1632.3</td>
<td>2015.8</td>
<td>15.8</td>
<td>1.5</td>
<td>4/121 = 3%</td>
</tr>
<tr>
<td>male</td>
<td>13</td>
<td>549.1</td>
<td>607.6</td>
<td>16.0</td>
<td>1.8</td>
<td>13/102 = 13%</td>
</tr>
</tbody>
</table>
Conclusions

Built environment features, traffic safety and to a lesser extent personal safety concerns were the main factors influencing Dunedin adolescents’ perception of safety along the route to school. Therefore, modifying built environment and addressing traffic safety is necessary for promoting active transport to school in adolescents.
Thank-you to my colleagues!

Questions?
Routes to Dunedin Secondary Schools and Adolescents’ Perceptions of Safety along the Route

Judith Rodda, Antoni Moore, Sandra Mandic

**Background:** Perception of the safety of the route to school is one of the key factors determining whether adolescents use active modes of transport to school. This study examined the spatial distribution of adolescents’ routes to schools and the recorded adolescents’ observations regarding the perception of ‘safety’ along those digitised routes.

**Methods:** High school students (n=740; age: 15.5±1.4 years; 53.4% females) hand drew their route to school on a paper map which was subsequently digitised. Total area encompassed by digitised routes for each school was calculated. Adolescents were asked to mark ‘safe’ and ‘unsafe’ areas along the route and provide comments for ‘unsafe’ segments.

**Results:** Out of 1462 digitised route to school segments, 347 (23.4%) were marked as ‘unsafe’. Adolescents provided comments about safety of the route to school on 235 (67.7%) of ‘unsafe’ segments (16.1% of all digitised segments). Adolescents comments indicated four distinct perceptions of ‘unsafe’ areas: 1) built environment characteristics (roads/intersections/lack of footpaths; 118 (50.2%) of unsafe segments; 60.2% females), 2) traffic safety (vehicles/traffic; 93 (39.6%) of unsafe segments; 57.0% females); 3) personal safety (people/dogs/street lighting; 60 (25.5%) of unsafe segments, 55.0% females) and 4) other (weather-dependent/winds/glare; 15 (6.3%) of unsafe segments, 20.0% females).

**Conclusions:** Built environment features, traffic safety and to a lesser extent personal safety concerns were the main factors influencing Dunedin adolescents’ perception of safety along the route to school. Therefore, modifying built environment and addressing traffic safety is necessary for promoting active transport to school in adolescents.

**Keywords:** Adolescents; route to school; maps; safety; perceptions
Too much traffic and dangerous crossing(s) on the route to school

Too much traffic: 36% (range: 22% to 58%)

Dangerous crossing(s): 32% (range: 23% to 62%)

Otago Girls
St Hilda’s
Kavanagh College
Otago Boys
Columba College
Kaikorai Valley
Route to School

Too much traffic

- ALL: 36%
- OG: 58%
- StH: 53%
- Kai: 43%
- Kav: 41%
- OB: 40%
- Col: 40%
- Que: 33%
- Tai: 32%
- Bay: 29%
- Kin: 27%
- Joh: 25%
- Log: 22%

Dangerous crossing(s)

- ALL: 62%
- OG: 53%
- StH: 41%
- Kav: 37%
- Col: 37%
- OB: 32%
- Kin: 29%
- Kai: 26%
- Que: 26%
- Log: 26%
- Tai: 25%
- Bay: 23%
- Joh: 23%

n=753

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