Why do girls’ attitudes about bicycling decline as they get older?

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Active Living Research Conference
February 27, 2017
Longitudinal study aimed at examining the effects of new infrastructure (bicycle boulevards) on active travel.

Data Collection Overview

Pre data collection (GPS+AM+surveys)

Interim data collection (surveys only)

Post data collection (GPS+AM+surveys)

Construction

2 years

1. July-October 2010
2. April-August 2011

2. April-August 2013
Sample size by phase

- **328 households**: 175 kids 11-17, 491 adults
- **253 households**: 114 kids 11-17, 363 adults
- **262 households**: 134 kids 11-17, 354 adults

- **Kids 11-17**
- **Kids 5-10**
- **Adults**
Overview of sample for this analysis

All had access to a working bicycle at home
49% of boys had biked in the past 7 days
42% of girls had biked in the past 7 days
83% in homes owned
30% in households with income under $35k
34% in households with incomes over $75k
All but 3 kids lived in a home with a car

Note: Limited to kids/households with pre- and post- data

<table>
<thead>
<tr>
<th>Age at start</th>
<th>Treatment (mean)</th>
<th>Control (mean)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>14</td>
<td>13</td>
<td>0.49</td>
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<td>12</td>
<td>22</td>
<td>13</td>
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<td>13</td>
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<td>8</td>
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<td>16</td>
<td>3</td>
<td>5</td>
<td></td>
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</tbody>
</table>

| Land area single-family residential (%)a | 83% | 82% | 0.49 |
| Distance to downtown (network, miles) | 5.0 | 5.6 | 0.00 |
| Bike lanes (miles)a | 0.13 | 0.14 | 0.68 |
| Crosswalks (number)a | 4.51 | 3.92 | 0.28 |
| Streets with sidewalk (%)a | 90% | 69% | 0.00 |
| Streets with slope 4% or greater (%)a | 3.4% | 4.6% | 0.33 |
| \(n^b\) | 125 | 121 |

a: Calculated using a 1/4 mile network buffer.
Gender differences: attitude about bicycling

Question: “I like riding a bike”
(1-5, Strongly disagree to strongly agree scale)
Gender differences: attitude about bicycling

Question: “I like riding a bike”
(1-5, Strongly disagree to strongly agree scale)

Mean score for girls fell from 4.1 to 3.6
Girls and boys divided into groups

Girls:
• 19 more negative
• 27 no change
• 8 more positive

Boys:
• 19 more negative
• 34 no change
• 11 more positive

No differences between treatment and control

Change in “I like biking”
### Change in Biking

Differences between girls is significant.

Differences between boys is not.

<table>
<thead>
<tr>
<th></th>
<th>Girls, same or more positive</th>
<th>Girls, more negative</th>
<th>Boys, same or more positive</th>
<th>Boys, more negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean % change in bike trips, Post-Pre</strong></td>
<td>10%</td>
<td>-77%</td>
<td>6%</td>
<td>25%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Girls, same or more positive</th>
<th>Girls, more negative</th>
<th>Boys, same or more positive</th>
<th>Boys, more negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean % change in bike minutes, Post-Pre</strong></td>
<td>-3%</td>
<td>70%</td>
<td>8%</td>
<td></td>
</tr>
</tbody>
</table>

Change in “I like biking”
Change in attitude about biking

Pre
• Attitudes, perceptions
• Objective measures
• Demographics

Post
• Attitudes, perceptions
• Objective measures

Change (Post-Pre)
• Attitudes, perceptions
• Objective measures

Biking Behavior
Physical Environment
Perceptions of traffic in the neighborhood

Difference between girls is significant
Difference between boys is not

CHANGE: Traffic in our neighborhood makes it difficult or unpleasant for me to bike alone in our neighborhood

Agreement went UP

No change

Agreement went DOWN

Girls, same or more positive
Girls, more negative
Boys, same or more positive
Boys, more negative

Change in “I like biking”
Perceptions of crossing aides

Difference between girls is significant
Difference between boys is not

CHANGE: There are crosswalks and signals to help walkers cross busy streets in our neighborhood

Agreement went UP

No change

Agreement went DOWN

Girls, same or more positive
Girls, more negative
Boys, same or more positive
Boys, more negative

Change in “I like biking”
Environment

Correlation with girls’ decrease in positive attitudes

• Perceptions:
  • Increase in traffic making it more unpleasant to bike
  • Decrease in agreeing that there are crosswalks/signals to help cross busy streets

NO Correlation with girls’ change in attitudes

• Changes in perceptions:
  • Traffic speeds
  • Crime
  • Destinations within easy biking distance

• Objective measures (Pre or Post)
  • Street connectivity
  • Bike infrastructure
  • Land use types
Self-efficacy
Having time to bike

Difference between girls is significant
Difference between boys is not

CHANGE: Barrier to biking: It takes too long

Agreement went UP
Agreement went DOWN
No change
Biking and independence

Difference between girls is significant
Difference between boys is not (p=0.09)

CHANGE: Being able to bike places by myself makes me more independent

Agreement went UP
No change
Agreement went DOWN

Girls, same or more positive
Girls, more negative
Boys, same or more positive
Boys, more negative

Change in “I like biking”
Changes in comfort level biking on their own

Difference between girls is significant for:
- Heavy traffic without bike lane
- Heavy traffic with bike lane
- Little traffic without bike lane

Difference between boys is not significant for any

![Graph showing changes in comfort level biking]

- **Comfort went UP**
- **Comfort went DOWN**
- **No change**

CHANGE: Comfort level biking alone on a street with heavy traffic and no bike lane
- ...on a street with heavy traffic with a bike lane
- ...on a street with little traffic and no bike lane
- ...on a street with little traffic with a bike lane
- ...on a path or trail separate from the street

Change in “I like biking”
Self-efficacy

Correlation with girls’ decrease in positive attitudes
• Feeling less comfortable biking alone on the street
• Increase in thinking biking takes too much time
• Decrease in thinking biking makes them feel independent

NO Correlation with girls’ change in attitudes
• Changes in feeling they can’t ride a bike well (p=.09)
• Bike not fitting well
• Fear of getting hurt
• Feeling confident when being physically active
• My parents don’t think it is safe for me to bike by myself
Social
Having someone to bike with

Difference between girls is significant
Difference between boys is significant

CHANGE: Barrier to biking: No one to bike with

Agreement went UP
Agreement went DOWN
No change

Girls, same or more positive
Girls, more negative
Boys, same or more positive
Boys, more negative

Change in “I like biking”
Seeing bicyclists on their street

Difference between girls is significant
Difference between boys is not

<table>
<thead>
<tr>
<th>Agreement went UP</th>
<th>Agreement went DOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls, same or</td>
<td>-0.40</td>
</tr>
<tr>
<td>more positive</td>
<td></td>
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<tr>
<td>Girls, more</td>
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</tr>
<tr>
<td>Boys, same or</td>
<td>-0.20</td>
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<td>negative</td>
<td></td>
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</table>

Change in “I like biking”

- Agreement went UP: Girls, same or more positive
- Agreement went DOWN: Girls, more negative
- No change: Boys, same or more positive
- No change: Boys, more negative
Support from friends and parents may matter for both

Difference between girls is significant for:
- My friends think I should bike more
- My friends would help me bike more if I wanted to

Difference between boys is significant for:
- My friends would help me bike more if I wanted to
- My parents would help me bike more if I wanted to

Change in “I like biking”
Social

Correlation with girls’ decrease in positive attitudes
• Increase in not having someone to bike with being a barrier to biking
• Decrease in seeing bicyclists on their street
• Decrease in support from friends

NO Correlation with girls’ change in attitudes
• Not wanting to be seen biking by other kids
• Other kids my age think biking to school is “cool”

But, there is a correlation with parents’ saying other kids their age thinking biking is cool
Comfort
Weather

Difference between girls is almost significant (p=0.09)

Difference between boys is not

No differences for either group for cold weather

CHANGE: Barrier to biking: Rain (when it is raining)
Helmets are an issue for both girls and boys

Difference between girls is almost significant ($p=0.08$)
Difference between boys is significant

CHANGE: Barrier to biking: I don’t like wearing my helmet

Agreement went UP

No change

Agreement went DOWN

Girls, same or more positive
Girls, more negative
Boys, same or more positive
Boys, more negative

Change in “I like biking”
Comfort

Correlation with girls’ decrease in positive attitudes \( (p<0.10) \)
- Increase in rain being a barrier
- Increase in not wanting to wear a helmet (also for boys)

NO Correlation with girls’ change in attitudes
- Cold weather
- Not wanting to get sweaty
Cars
Cars are safer than bikes

Difference between girls is significant
Difference between boys is not
Cars

Correlation with girls’ decrease in positive attitudes
• Increase in thinking cars are safer than bicycling

NO Correlation with girls’ change in attitudes
• I can’t wait to be able to drive on my own
• Being able to drive on my own will make me more independent
• My family drives most everywhere we need to go
Summary of key factors related to less positive attitudes among girls

• Perceptions of traffic safety and confidence riding with traffic
  • Increased separation in facilities
  • Events to increase confidence cycling in traffic
• Time constraints
• Lack of social support, not having people to bike with
• Comfort (rain, helmet)
Also of note...

• The “cool” factor and desire to drive not a significant factor.
• May indicate the effect of living in a city where biking is normal

Thank you!