School Walkability Study
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**Problem Statement:**
What factors decrease the safety of children walking to school and what can be done to eliminate them?

**Practical Dimension:**
This project will be under the direction of Willem Van Vliet and Brian Muller. It will use GPS data to determine the pedestrian routes of children going to and from school. It will assess the risk factors present in the area, including liquor stores, vacant buildings, areas of heavy traffic and pollution. Interviews will be conducted on a sample of children attending the Garden Place Academy. Students in studying Urban Planning at Colorado University at Boulder will create, and conduct the interviews, then enter the data.

**Background:**
The Globeville Neighborhood has greater levels of poverty and housing values than Denver as a whole. It also has more crime and children receiving free school lunches. Globeville does better in these categories than other Denver neighborhoods, and if ranked economically it would be in the lower half but not the bottom quarter. The neighborhood is primarily Latino, and has been since the 1960’s. The residential areas are surrounded by industrial land uses and highways. The neighborhood has two elementary schools. One of which is the focus of this study. The Garden Place Academy is an elementary school, located at 44th and Lincoln. It has grades PreK-5 an enrollment of 468. The principal is Beth Morganfield.

A similar study that involved mental mapping and photography exploring what was important in their neighborhood found six themes: “The family home; opportunities for physical activity and sedentary pursuits; food items and locations; green space and outside areas; the school and opportunities for social interaction.” (Hume) Although the above study focused on physical health and exercise, The mapping element was similar to this project. These themes were to be repeated again in the findings of this report. The following demographic data was also collected, as it has relevance to children in the area.

*Figure 1: Demographics*

<table>
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<th>Indicators</th>
<th>Globeville</th>
<th>Denver</th>
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<tr>
<td>Total Population</td>
<td>3,462.00</td>
<td>572,862.00</td>
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<tr>
<td># Children &lt;18</td>
<td>1,229.00</td>
<td>142,839.00</td>
</tr>
<tr>
<td>% Births to unwed mothers</td>
<td>46.7</td>
<td>33.6</td>
</tr>
<tr>
<td>% Children Living with Single Parents</td>
<td>21.9</td>
<td>28</td>
</tr>
<tr>
<td>% Foreign Born</td>
<td>37.5</td>
<td>17.4</td>
</tr>
<tr>
<td>% Population Latino</td>
<td>77.5</td>
<td>31.7</td>
</tr>
</tbody>
</table>
% Housing Owner-Occupied | 59.8 | 49.9
---|---|---
% Children (< 18) in poverty | 28.8 | 20.8
% Persons in poverty | 23.2 | 14.3
Total jobs | 6,962.00 | 486,669.00
Average household income | 37,063.00 | 55,128.60

**Education**
Denver Public School enrollment (Grades 1 - 12) | 595 | 62,722.00

**Crime**
Crime rate per 1,000 Persons | 176 | 83.4
Confirmed child abuse & neglect rate | 11.7 | 7.4

**Methodology:**

**Data Collection:**
Step 1:
Download TIGER Files for census tracts, census groups, street information and demographics.

Step 2:
Data was collected regarding widely known risk factors for children such as liquor stores, abandoned buildings, gun shops, and correctional facilities. This data was collected from the Piton Foundation Risk Assessment maps. The locations were then attached to the street segment in the GIS base map.

Step 3:
Obtain locational data from children in the area. The first conception was to have the students take pictures of their neighborhood, then meet with undergraduates from the school of CU- Boulder for interviews. First parents were asked for permission to allow their children to take photographs of the route they used to walk home. A recent shooting in the neighborhood prevented any parents from agreeing to this. A second neighborhood shooting two weeks afterward caused the abandonment of the walking portion of this study. Parents were willing to allow interviews on school grounds during the regular school day.

Step 4:
Interviews were held with both 3rd and 5th Grade children at the Garden Place Academy, on two separate days. There were only six subjects in the first interview and five for the second. There was a nearly equal group of males and females from each class.
Step 5:
The interview was held in the Garden Place School Library.

A: Children were asked to draw a mental map of the neighborhood.

B: The interview consists of 20 questions regarding the places in the neighborhood that the children like and dislike, and what boundaries that their parents have placed on them. The interview also includes questions regarding means of travel to school. The full set of interview questions is located in Appendix A.

C: Some of the questions prompted the children to place colored dots on a large aerial map of the area.

Figure 2: Aerial Map

Data Processing:

Step 1:
The locational data was interned into a mapping program called Alternative Growth Futures, or AGF. The data consisted of point data, annotated with the children’s responses and line data, illustrating the route taken to school, and if it was by foot, car or bike. Some subjects also drew a second line that showed the furthest extent that the subject was allowed to go alone. Other subjects were unable to draw such a boundary.

Step 2:
The data in AGF was transferred to GIS shape files. This included the routes and the data points that the subjects had placed on the Aerial Maps. Interview data was simplified
into the locations of points that the children thought were positive factors and points that marked negative factors.

Step 3:
This data was then pared with data for street segments. A database was created that assigned each point a danger rating of -2 for a positive factor, such as favorite hang out spot. Negative areas were assigned a +2 for each factor, such as scary homeless people or heavy traffic. Objective risk factors such as liquor stores, or recent shootings were given a value of +5. The database also included the key field from the shape file of streets. The database was imported to GIS and a raster of all the values was created. (Map of Street Safety).

Step 4:
The danger rating of the streets was also converted to a neighborhood raster, based on average danger rating. This map shows the areas in the neighborhood that are considered dangerous and those that are considered safe (Map of Dangerous Areas in Globeville).

Step 5:
Then the routes were processed. The number of children using each route is shown on the map (Map of Routes Taken to School).

Step 6:
A database of the answers to the interview questions was created. As the rest of the analysis was spatial, this data has yet to be processed. Instead, the notations regarding clusters of points were examined and findings were drawn from this examination.

Findings

The mental maps predominantly consisted of a perspective of the child’s home and the homes of a few neighbors. This corresponds with the conclusions drawn by Pamela Wridt in her paper on blocks. The single block that a child lives on is central to his or her identity and sense of place.

When the routes were compared to the dangerous areas there was little influence. The dominate pattern of route choice was established by the most direct link for home to school.

The boundaries set by parents were a combination of physical barriers and problem areas. All boundaries had the common edges to the south, east and west. These three directions all have major physical barriers. The northern boundary varied, but not by age (as all boundaries were drawn by older students or by location of their home.

The large percentage of ratio of children to adults (1/3 of the population is under 18) and the higher than normal rates of child neglect and poverty imply that parents rarely had time to supervise the children’s routes.
The student ages had little effect on what was considered positive as all points that had more than one student noting it as a good place had students from both grades agreeing.

The factors sited by the children as positive matched with the themes of Hume’s walkability study, that is the points could be categorized as The family home (typically a favorite place); opportunities for physical activity and sedentary pursuits (swimming pool, and recreation centers); food items and locations; green space and outside areas; the school; and opportunities for social interaction (homes of friends and relatives).

There was less agreement on the negative factors, as most of the negative areas were only noted by one or two students, normally of the same age. The exception is the rail yards just south of the school. Six of eleven students noted it as a negative place.

The negative factors cited by the children included – dangerous traffic (6), homeless people (4), Train tracks (6), Guns (1) Dogs (3) and other (4)

**Conclusions**

To improve the safety of children walking to school, the first thing that needs to be addressed is traffic. This is supported by other walkability studies, such as the NUSA and National Child Passenger Safety. Traffic calming is needed both on collectors such as East 45th Street and on busy local streets such as East 44th.

The second problem in this type of low income neighborhood is the number of transients. There are a number of churches in the area which offer meals and bridge underpasses are preferred sleeping quarters. One way to reduce this problem would be to build a shelter away from those areas frequented by children such as schools and neighborhood parks.
Bibliography

Hume, C; Salmon, J; Ball, K “Children's perceptions of their home and neighborhood environments, and their association with objectively measured physical activity: a qualitative and quantitative study”. Health Education Research 20, no. 1 (2005): 1-13


Piton Foundation “Neighborhood Facts” http://www.piton.org

U.S. Census 2000

Appendix A: Interview Protocol

SAFE ROUTES TO SCHOOL

Introduce yourself. Briefly explain the project, what you’ll be asking them to do


MENTAL MAP: To start, would you please make a drawing or map of the area where you live, starting with your home, and show me whatever you know in it?

1. Now, let’s look at this aerial photograph (photo map) of the area where you live. Can you find your home and show me where you live?
   a. Who lives there with you? __________________________________________
      i. If brothers/sisters: ages?________________________________________
         ____________________________________________________________
         ____________________________________________________________
         ____________________________________________________________

2. How long have you lived
   a. In this house? __________years
   b. In this neighborhood? ________years

3. How you usually get to school? [ATTACH THIS INFO TO Q4 BELOW]
   a. Walk
      i. Alone
      ii. With others: who? __________________________________________
   b. Car (who drives?): __________________________________________
   c. Other (specify): __________________________________________
   d. If NOT walking:
      i. Would you like to walk to school? yes/no
         • If NO, why not?
           ____________________________________________________________
           ____________________________________________________________
           ____________________________________________________________
         • If YES, then why are you not walking?
           • Too far __________
4. Can you draw on the map the route you usually take from home to school? (If yes: walk = solid line car = broken line other = dotted line)

5. Do you have a bike? yes/no
   - If NO: would you like to have one? yes/no
   - If YES: are there places you are not allowed to go by bike? yes/no
     - If yes, where and why not? __________________________________________________________________________________________

6. Do you participate in any organized activities after school or in the weekend?
   a. No
   b. Yes: Which ones and where (show on photo): CODE AS 6B
      __________________________________________________________________________________________
      __________________________________________________________________________________________
      __________________________________________________________________________________________

7. What is the farthest you have ever gone by yourself? IF ON MAP
      __________________________________________________________________________________________
      __________________________________________________________________________________________
      a. With other people (who and where?) __________________________________________________________________________________________
      __________________________________________________________________________________________
      __________________________________________________________________________________________

8. Do you use the school grounds after school or in the weekend? yes/no
a. If yes: What for? ________________________________________________

______________________________________________________________

9. Can you show me on the photo map where your best friends live? Are you allowed to visit them by yourself? yes/no

10. Show me on the photo map where you play games or hang out (ask about these places, e.g., playgrounds, vacant lots).

______________________________________________________________

______________________________________________________________

11. Do you ever run errands where you live? (e.g., grocery) yes/no
   a. If yes: Which ones and where? CODE AS 11a

______________________________________________________________

______________________________________________________________

12. Do you ever go to the rec center? yes/no
   a. If yes: how do you get there? ____ IF LOCATIONAL ASPECT= 12A

13. Do you ever go to see a movie? yes/no
   a. If yes: Where and with whom? IF LOCATIONAL ASPECT= 13A

______________________________________________________________

14. Do you ever go to a skatepark? IF LOCATIONAL ASPECT= 14A yes/no
   a. If yes: Where and with whom?

______________________________________________________________

15. Do you ever go to the public library? IF LOCATIONAL ASPECT= 15A yes/no
   a. If yes: where is it, how do you go and with whom?

______________________________________________________________

16. Do you ever go somewhere for adventure? yes/no
   (where and what do you do then? show on photo map)

______________________________________________________________

- 11 -
17. Are you allowed to go on the public buses?  
   a. If YES,  
      i. by yourself?  
      ii. where do you go?  
         __________________________________________________
         __________________________________________________
         __________________________________________________
   b. If NO  
      i. Why not?  
      ii. Would you like to?  
         -No ______  
         -Yes (where would you go?) ________________________
         __________________________________________________
         __________________________________________________

18. Of all these places in your area  
   a. which one(s) do you spend most time?  
      __________________________________________________
      __________________________________________________
      __________________________________________________
      __________________________________________________
   b. Which one is most special to you?  
      __________________________________________________
      __________________________________________________
      __________________________________________________
      i. How would you describe this place to someone who had never been there before and who wanted to know what it is like?  
         __________________________________________________
         __________________________________________________
         __________________________________________________
         __________________________________________________
   c. Are there places in your area where you don’t like to go?  
      Which ones and where are they?  
      __________________________________________________
i. Why don’t you like it there? __________________________________________

ii. Are there places you aren’t allowed to go? yes/no

       __________________________________________
       __________________________________________
       __________________________________________
       __________________________________________

    ii. On the photo map, can you draw a line around the area where you live, where you are allowed to go by yourself? (use red marker) CODE AS 18E

e. Are there dangerous places in your area? yes/no

    i. Which one(s) and where are they? Why are they dangerous?
       CODE AS 18F
       __________________________________________
       __________________________________________
       __________________________________________
       __________________________________________

19. Would you like to live in your neighborhood when you’ll be a grown up? yes / no

    If no: Why not? / If yes: Why?
       __________________________________________________________
       __________________________________________________________
       __________________________________________________________
       __________________________________________________________

20. What would you change in your neighborhood if you could?
Thank them for their interest and time.

➢ Record following information on back of the drawing:

Name:  
Grade:  
Gender:  
Address:  
Nearest intersection:  
Phone #:  
1: Garden Place Academy

2: Lincoln Street Underpass
3: Argo Park

4: Argo Park and Tracks
5: 4703 Washington Street

6: Rail Road Tracks, South of Garden Place Academy
7: Washington Street Underpass

8: East 45th Street