



A NEW TOOL FOR MEASURING PEDESTRIAN EXPOSURE



COUNTING CHILDREN ON STREETS

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The Need to Count Pedestrians



- Links between walkability ratings of communities and the amount of actual walking
- Assessment of changes in pedestrian activity following modification and/or improvement in network or facility design
- Evaluating behaviour modification programs to encourage walking or use of urban space
- Analysis of differences / changes in accident risks, between communities or over time (exposure)
- Different needs may require somewhat different counting methods



The rationale of the new method



Current methods to count pedestrians include:

- Travel surveys
- Location specific counts: junctions, footpaths, crosswalks, schools, events
- Actual presence on streets in an area of town or in a whole community rarely measured
- Children often excluded

The new method provides estimates that are:

- Representative of an area
- Conceptually related to vehicle traffic and road safety



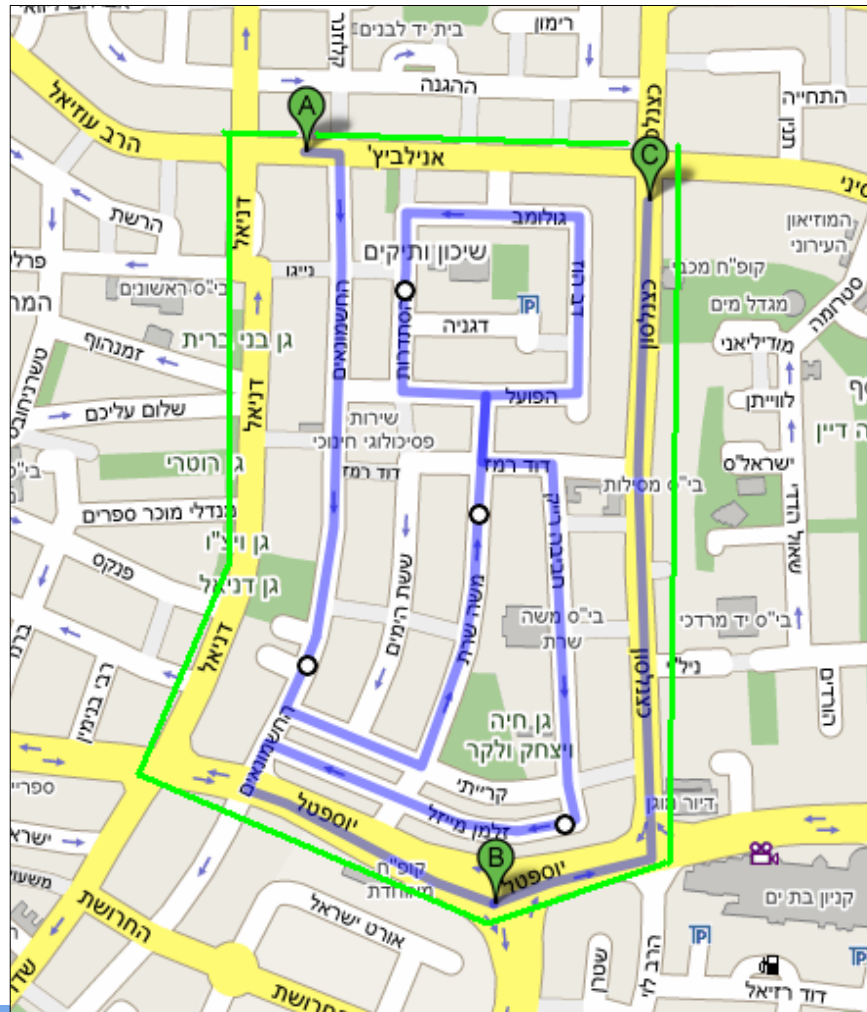
The method applied to counting children on towns' streets



- Part of a walkability (Comfort and Safety) assessment of 16 neighbourhoods in four towns
- Sampling of neighbourhoods with GIS, Census track data
- Walking destinations identified & marked on maps
- A representative Driving Circuit planned
- Observers travel the Circuit at different times and record presence of children. Fixed number of driving cycles
- The standard unit of 'Exposure' is the 'number of child pedestrians (or bike riders, separately) encountered per hour of travel
- The measure is similar to how vehicles are counted in a network- number of vehicles per hour.



Driving Circuit for counting children in a Sample Bat-Yam Neighbourhood





Planning a Driving Circuit



- Identify child- relevant destinations in the neighbourhood
- Plan a representative driving circuit in typical sub- areas of the neighborhood: on a variety of street types, land uses, housing types
- Pass by destinations children in the neighborhood are likely to walk / ride to.
- Take in account practical considerations of traffic controls, congestion, one way streets and specific local conditions
- One driving cycle on the circuit should take 12- 15 min.



Counting Field Work Procedure



- Pair of field observers, one driver and one recorder
- Equipment consists of a car, map, clipboard & plain paper
- Record the number and attributes of pedestrians and bike riders observed. Same people may be observed and recorded at different times.
- Use of simple intuitive codes for recording observations
- Drive at a normal traffic speed, or a little slower when needed.
- Driving cycles are repeated in order to cover different time periods
- Driving cycle duration must be recorded accurately
- Counts may be supplemented with photography or video

Example of a field form after three driving cycles

The field form contains handwritten notes and data organized into a grid. At the top, there is a title in Hebrew: "תצפית בשלבים, פ' ג'". Below the title, the date "6-11" is written. The form is divided into four quadrants, each corresponding to a photograph:

- Top-Left:** A family walking. The form shows a circled "12" and a circled "11".
- Top-Right:** A woman and child walking. The form shows circled "11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22", "23", "24", "25", "26", "27", "28", "29", "30".
- Bottom-Left:** Two men walking. The form shows circled "11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22", "23", "24", "25", "26", "27", "28", "29", "30".
- Bottom-Right:** A boy riding a bicycle. The form shows circled "11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22", "23", "24", "25", "26", "27", "28", "29", "30".



Examples of analysis of counting data in the town of Bat-Yam



- The basic unit of analysis is number of recorded pedestrians (or bicyclists) of a specified characteristic, per unit of time.
- The field form contains the full record of individual pedestrians and bikes, retaining the sequence and makeup of original observations.
- Data may be analyzed in different ways depending on purpose or question.



Children Counted in three cycles in one area in Bat-Yam



Date: 25.06.2010				Cycles: 3 Duration: 45 min.						
Age 12- 17				Age 6-11					Age 0-5	
bike	group	w/ adult	alone	bike	group	w/ older	w/ adult	alone	w/ adult	stroller
3	41	5	11	3	40	4	51	8	37	20



Child “exposure” by age groups in 4 areas in Bat-Yam



Area	Children observed			Children / hour		
	Preschool Age 0-5	Primary Age 6-11	Mid & High Age 12-17	Preschool Age 0-5	Primary Age 6-11	Mid & High Age 12-17
224 + 227	38	71	25	60.0	112.1	39.5
111 + 112	40	61	34	70.6	107.6	60.0
311 + 312	58	102	60	77.3	136.0	80.0
513 + 514	28	77	49	57.9	159.3	101.4



Child street exposure compared to demographics



Neighborhoods	Children living in area	Children counted per hour	Proportion counted relative to children living in area
224 + 227	1440	212	14.7%
111 + 112	1351	239	17.6%
311 + 312	1553	293	18.9%
513 + 514	1306	319	24.4%



Interesting questions



- At what age children of different age walk the streets on their own?
- Do children these days walk less than we did?
- Are children wearing helmets when riding bikes?
- How many children are present afternoon in the center of Den Haag? (counting method may need modification)
- Did a program to encourage walking / biking instead of being driven increased amount of walking?
- Is the relative risk of walking in community A different than in community B?
- Is the amount of street presence and walking by children related to re walkability ratings of a community?



Selected findings about child exposure from all studied towns



- The range of exposure rates in the 16 areas assessed was from less than 100 to nearly 1200 children per hour.
- The proportion of children on the streets relative to their population size had a smaller range, of 10% to 27%.
- Within a town, the neighbourhoods had a very similar proportion.
- The most frequent age group counted on the streets were primary school (6-11) kids.
- Large street presence of children of all ages during late afternoon hours, shopping hours, on and around shopping streets (surprise...)
- Primary school kids often walked in pairs or groups of same gender.
- Most bikers were on sidewalks or footpaths, with no helmets



Conclusions: How Useful Is the New Method for Counting Pedestrians



- Provides good estimate for the presence of (child) pedestrians on the street network of a community
- In addition to providing interesting raw count data the method provides a measure of pedestrian exposure that is conceptually similar to vehicle exposure measures and their use in road risk assessment.
- Sampling areas and planning of a Driving Circuit can be easily learned by non- researchers at community level
- The counting procedure is intuitively simple, requires little training and no special equipment. It can handle a large range of pedestrian density.
- The method is easily adaptable to accommodate various counting objectives, road network and urban form



BY COUNTING PEDESTRIANS WE MAKE PEDESTRIANS COUNT!



Intensity & intent of
using walking / cycling
network



Improve supply, access
quality and of urban
space, walking /
cycling network

