Planning and Transport Research Centre

PATREC

The impact of urban design on walking and cycling: the RESIDE Project

Terri Pikora, Billie Giles-Corti, Matthew Knuiman,
Kimberly van Niel, Max Bulsara, Fiona Bull, Trevor Shilton

Abstract

Background:
The RESIDential Environment (RESIDE) project is an ecological longitudinal study designed to examine the impact of elements of urban design on walking for recreation and transport. It will evaluate the effect of the 'Liveable Neighbourhoods (LN) Planning Guidelines' aimed at increasing walking, cycling and public transport use.

Methods:
People building homes in new housing estates were invited to participate in the study and the sample included 24 LN estates and 14 Hybrid estates (i.e., housing estates incorporating many of the LN principles). Baseline data were collected before study participants moved into their new homes, and follow-up surveys will take place at one and three years after they move in. Factors influencing choice of neighbourhood were collected at baseline. In all three surveys, recreational and transport-related walking and cycling undertaken both inside and outside the neighbourhood is measured and a pedometer is worn for 7 days.

Results/findings:
Overall, 1813 people building homes in new housing estates agreed to participate in RESIDE. At baseline, there were few significant differences between the potential LN residents and others ($p>0.05$). Overall, 60% are female, mean age is 40 years (SD 12), 82% work, 45% work 38 or more hours/week and 18% spend one hour or more travelling to and from work. 53% reported usually walking for recreation in their neighbourhood, but only 36% usually walked for transport locally. On average, study participants reported having only 6.3 transport-related destinations within a 15 minute walk from their home. When asked what factors influenced choice of housing estate, the most important reasons cited related to affordability and perceived safety from crime.

Conclusions:
Although the potential LN residents appear more likely to have selected their new neighbourhood because it is more walkable, there is no evidence at baseline that they are more active than residents of other estates. This natural experiment is unique because it evaluates the impact of state government policy designed to increase walking, cycling and public transport use.

Please note that this is an abridged paper as this project and related initial findings are the subject of a separate peer-reviewed paper.

Background

There is growing interest in the relationship between the physical environment and physical activity behaviour. As a result, a range of studies with a focus on a number of aspects of the built environment and walking behaviour have been undertaken. Recent examples include Boehmer et al. (2006), Gordon-Larsen et al. (2006), Lee and Moudon (2006), Leslie et al. (2006), Pikora et al. (2006) and Reed et al. (2006). These studies provide some empirical evidence of which specific aspects of the physical environment are important for walking and cycling.

These previous studies have been criticised because the conclusions relating to the direction of causality may not be determined due to issues related to self-selection. For example, people with positive attitudes toward and a preference for walking in their local neighbourhoods may choose to live in more walkable estates, as opposed to those neighbourhoods which are more walkable influencing whether people walk or not. The RESIDential Environment (RESIDE) project began in 2003 and was designed to overcome this issue of self-selection.

The RESIDE project is a 5-year longitudinal, prospective study designed to examine the impact of urban design elements on walking for recreation and transport. It has been designed to evaluate the effect of the Western Australian Department for Planning and Infrastructure (DPI) 'Liveable Neighbourhoods (LN) Planning Guidelines' aimed at increasing walking, cycling and use of public transport (Western Australian Planning Commission, 2000). The DPI's LN guidelines incorporate four design elements into housing estates with an aim to increase walking:

- community design – for example mix of lot sizes, mixed use planning;
- movement network – for example interconnected street networks, access to public transport;
- public parkland – for example a balance between larger playing fields and neighbourhood parks; and
- lot layout – for example maximising surveillance of streets and parks.

The focus for this paper is to describe the RESIDE study and to provide the results from the baseline survey. The baseline questionnaire was completed by home owners prior to moving into their new housing estate.

Methods

People building homes in new housing estates were invited to participate in the RESIDE study. A total of 18 LN, 11 Hybrid (HN) (ie, housing estates incorporating many of the LN principles) and 45 Conventional (CN) estates are included in the sample. All LN and HN estates that were developed during recruitment for the study were included, while CN estates were matched with the LN and HN based on stage of development, proximity to the ocean and lot value. A response rate of 33.4% was achieved with 1,813 baseline questionnaires returned.

The RESIDE study involves the completion of a self-administered questionnaire, a pedometer being worn for seven days and the recording of daily steps. This data will be collected three times in the same season over a four-year period. Baseline data were collected before study participants moved into their new homes, and follow-up surveys will take place at one and three years after they move in. In all three surveys, recreational and transport-related walking and cycling undertaken both inside and outside the neighbourhood is measured. Transport-related walking is defined as any that is undertaken to get to or from somewhere. In addition, those factors that may influence the choice of neighbourhood were collected at baseline.

A range of factors were measured in the baseline questionnaire. These included:

1. perceptions of neighbourhood environment including perception of time to get from home to a range of businesses or recreational and transport-related facilities;
2. factors influencing their decision regarding neighbourhood choice;
3. participation in walking and cycling; and vigorous and moderate physical activity behaviour;
4. attitude toward being physically active;
5. self-efficacy related to being physically active;
6. social environment: both within their neighbourhood and social support for physical activity behaviour;
7. resources (for example home gym equipment, bicycle ownership) that are available in home environment;
8. psycho-social factors that may influence physical activity participation;
9. participation in sedentary leisure-time activities;
10. self reported health status; and
11. socio-demographic information.

Results

A total of 1813 residents moving into new housing estates completed and returned the baseline questionnaire. This paper uses this data to assess and describe the differences between those moving into the different estate types.

Demographic characteristics

There were few significant differences between LN residents and others ($p>0.05$) at baseline. Overall, 60% of the respondents are female, mean age is 40 years (SD 12), 82% work, 45% work for 38 or more hours per week and 18% spend one hour or more travelling to and from work.

Physical activity behaviour

One-half (53%) reported usually walking for recreation within their neighbourhood, but only 36% reported that they walked for transport locally. Less than one-quarter of the participants reported walking outside their neighbourhood. Among these, 18% reported walking for recreation and 13% walking for transport outside their own neighbourhood. There was no evidence found for any differences in physical activity levels among those moving into LN and CN.

Presence of destinations

On average, study participants reported having 6.3 transport-related destinations and 2.5 recreation destinations within a 15 minute walk from their home. The transport-related destinations included local shops, train and bus stops, while the recreation destinations included parks, fitness and recreation centres, and the beach.

Housing estate choice

When asked about the factors that influenced their choice of housing estate to move to, the most important reasons cited by the participants were affordability (86%) and perceived safety from crime (86%). Other important issues included: being close to a park (67%); that the estate was designed to be safe for children (66%); and that the streets were designed to minimise traffic volume (63%). These issues were rated the same regardless of the type of housing estate.

Some differences were found between other factors and the choice of the housing estate type. When compared with participants moving into CN estates, those moving into LN estates rated living close to shops and services, ease of walking, sense of community, and living close to parks and the beach as more important.

Conclusions

The RESIDE study is a natural experiment that is unique because it evaluates the impact of state government policy designed to increase walking, cycling and public transport use. Although LN residents appear more likely to have selected their new neighbourhood because it is more walkable, there is no evidence at baseline that they are more active than residents moving into other types of estates.

This paper is based on two papers that have been published from the RESIDE team:

Giles-Corti, B., Timperio A., Cutt H., Pikora T., Bull F., Knuiman M., Bulsara M., Van Niel K., Shilton T.(2006). "Development of a reliable measure of walking within and outside the local neighborhood: RESIDE's Neighborhood Physical Activity Questionnaire." Preventive Medicine **42**(6): 455-459.

Giles-Corti, B., Knuiman M., Pikora TJ., Van Niel K., Timperio A., Bull FCL., Bulsara M., Shilton T. (under review). “The impact of urban design on walking: Baseline results from RESIDE – a prospective study.” American Journal of Public Health

References

Boehmer, T., C. Hoehner, K. Wyrwich, L. Brennan Ramirez and R. Brownson (2006). "Correspondence between perceived and observed measures of neighborhood environmental supports for physical activity." Journal of Physical Activity and Health **3**: 22-36.

Gordon-Larsen, P., M. Nelson, P. Page and B. Popkin (2006). "Inequality in the built environment underlies key health disparities in physical activity and obesity." Pediatrics **117**(2): 417-24.

Lee, C. and A. Moudon (2006). "Correlates of walking for transportation or recreation purposes." Journal of Physical Activity and Health **3**(S1): S77-98.

Leslie, E., N. Coffee, L. Frank, N. Owen, A. Bauman and G. Hugo (in press). "Walkability of local communities: using geographic information systems to objectively assess relevant environmental attributes." Health and Place.

Pikora, T., B. Giles-Corti, M. Knuiman, F. Bull, K. Jamrozik and R. Donovan (2006). "Neighborhood environmental factors correlated with walking near home: using SPACES." Medicine and Science in Sports and Exercise **38**(4): 708-14.

Reed, J., D. Wilson, B. Ainsworth, H. Bowles and G. Mixon (2006). "Perceptions of neighborhood sidewalks on walking and physical activity patterns in a southeastern community in the US." Journal of Physical Activity and Health **3**(243-53).

Western Australian Planning Commission (2000). Liveable neighbourhoods: A Western Australian Government sustainable cities initiative. Perth, Western Australian Planning Commission.