

Influencing Home Location Choices for Sustainable Transport Outcomes – A Practical Approach

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1 Introduction and Background to location choice and transport outcomes

The Home Location Choice Project is a voluntary social marketing intervention set in a transport planning environment. The project tests whether it is possible to influence people to live where they will have better accessibility. It does not change the spatial arrangement of origins or destinations; rather it is about influencing people to live closer to the major transport destinations that they commonly use. The project's success is measured in transport planning outcomes such as accessibility rather than mode shift or green house gas reduction. However; some transfer to active transport modes and reduced green house gas emissions may be expected to arise from reduced vehicle kilometres travelled.

"Slip, Slop, Slap", "QUIT" and "Life Be In It" are examples of voluntary social marketing interventions to reduce skin cancer, reduce smoking and increase fitness and health. These initiatives have developed from a growing body of knowledge applicable to a variety of behaviours. They have been accepted by the Australian community and have delivered sound results.

Goudie, (2001) found that home location is a good predictor of distance travelled. Queensland Transport (2004) found that transport information is also known to be a strong consideration when people choose a home location.

The project combines voluntary social marketing tools and transport information to influence where people choose to live so they enjoy better accessibility. The reasoning for this approach is well set out by Levine, J., Rodríguez, D., Song, J., Weinstein, A. (2006).

1.1 Context

The home location work is a project of the Transport Planning Branch within Queensland Transport. The branch improves or maintains accessibility using a range of integrated land use and transport planning tools. Ideally, the project will lead to another tool to assist with the branches work to improve accessibility

The branch's work sets the framework for future accessibility. Transport and land use planning sets the context for future provision of transport infrastructure and transport services.

In a similar way, choice of home location largely determines a household's ongoing levels of access to the major destinations they commonly use. A tool to influence home location choice would directly influence the branch outcomes of accessibility as measured through reduced trip numbers, shorter trips and increased mode choice. It is not anticipated that a home location tool would impact on trip generation or increased mode choice in substantial ways. A substantial reduction in trip length is anticipated.

1.2 Some other projects, approaches and studies

There have been various approaches to influencing people to live in specific places.

In Canberra, there was a project called "Households on the Move". [Ampt, E., Stopher, P., Wundke, J. 2005] A presentation was made on that project in this forum in 2005. The presentation discussed intervention during "life change moments", the benefit of face to face contact in behaviour change initiatives and recruiting of participants, among other things.

In the USA, Levine et al (2006) conducted a simulation experiment to investigate impact on home location selection of delivery of transport information packaged with real estate information.

Globally, TravelSmart is a highly developed suite of tools to deliver transport outcomes through behaviour change. These are well understood tools with predictable results. TravelSmart interventions are often implemented using filters to identify targets with a propensity to change.

In the UK, the home relocation decision making process has been investigated by Stanbridge (2005). A finding of this work is that consideration of transport commences well before the move.

2 Objectives

While the project had a number of specific objectives and hypotheses, the core objective of the project was to determine whether it was possible, through specific and targeted messages to influence the home location choice of new residents to Townsville. In other words, by providing messages about travel costs, greenhouse gas emissions and health impacts, the objective was to determine if these messages could be used to influence people to live closer to the major transport destinations that they commonly used.

3 Method

The project was web based and was developed using an experimental design. A web site was designed with the web address www.movetotownsville.com. A benefit of having the project web based was that it allowed word-wide participation of those people intending to live in Townsville.

The webpage was advertised using Google advertising. Advertising using the Google search engine places a link to the project webpage on webpages displaying search results. For example, a user intending to move to Townsville may search the internet using the Google search engine for specific keywords or phrases including "accommodation in Townsville". Google will not only display a list of potential websites against this phrase, but will also display on the same page a direct link to the 'Move-to-Townsville' web page.

On visiting the website potential respondents were offered an incentive to participate, which included \$25 on completion of a telephone interview soon after they arrived in Townsville and the possibility of a further \$25 on completion of a second telephone interview if required.

The first page of the website provided information about the incentive and also identified the eligibility criteria for participation which were (i) that individuals had to move to Townsville within a specific time period as defined by the study and (ii) they would be seeking a location for permanent accommodation at the time they arrived in Townsville. There were no other constraints on the participation of respondents in the study.

If participants met the criteria for participation they completed summary questions in relation to their arrival in Townsville and the location from which they were travelling. On completing this information they were then randomly assigned to two experimental conditions which are referred to as the control and intervention conditions.

In the control condition those who had completed the summary questions were then asked to provide their telephone contact details for when they arrived in Townsville and were informed they would be contacted for a telephone interview shortly after their arrival.

In contrast, those participants who had been randomly assigned to the intervention condition then completed a travel cost calculator which calculated and provided the weekly cost of travel to potential destinations for different Townsville suburbs. Information from the travel cost calculator was also integrated with other messages, which were provided on additional web pages. These messages emphasised that if they lived close to their travel destinations, they could reduce travel costs, greenhouse gas emissions and potentially improve their health.

Those participants in the intervention condition were also sent up to three additional email messages which again emphasised the importance and benefits of living closer to their travel destinations in Townsville. These additional messages included reference to additional maps of Townsville, information about travel costs, Townsville's climate and the health benefits of living closer to major travel destinations. All email messages with participants in the intervention condition also provided opportunities for participants to directly phone or email the project administrator if they required additional information about living in Townsville.

Three weeks after their intended date of arrival all participants were contacted by telephone and completed a telephone interview. This interview obtained information on (i) date of arrival and accommodation on arriving in Townsville; (ii) current home location; (iii) household and family composition; and (iv) household travel behaviours including travel destinations, trips per week and mode of transport.

On all occasions, those undertaking the interviews were not aware of which individuals had been assigned to the control and intervention conditions.

3.1 Data analysis

A preliminary analysis has been undertaken of 133 respondents which included 68 control subjects and 65 intervention subjects. Preliminary data was collected between the 15th of November 2005 and the 7th of May 2006.

The preliminary analysis focuses only on travel distances and whether there are significant differences in travel distances between control and intervention groups.

Travel distances are based on straight line distances between home location and destination. Destinations identified in the interview (i) school locations; (ii) tertiary education; (iii) employment; (iv) main household shopping; (v) sport, recreation or leisure and (vi) other important locations.

In relation to each destination identified, the straight line distance was calculated as the number of trips per week to the destination and return by the distance to the destination.

4 Results

Preliminary results indicate the following;

- Contact can be made with significant groups of households in early stages of the moving process through the web and web recruiting costs are reasonable
- Some people recruited through the web are prepared to provide information before moving, to consider transport cost and other information tailored to their circumstances and to change their home location decision making in response to information provided
- Households in the experimental group appear to be distributed so that they have improved accessibility
- The methodology is a cost effective method of improving accessibility without changing spatial arrangement of residences and destinations or providing additional infrastructure.

4.1 Recruiting

Between 15th of November 2005 and the 30th of June 2006 there were 15,385 visitors to the web site. Figure 1 shows the trend in visitor numbers to the website during the period. Between 15th November 2005 and 7th May 2006, 133 of the people visiting the site had been recruited and completed travel diaries.

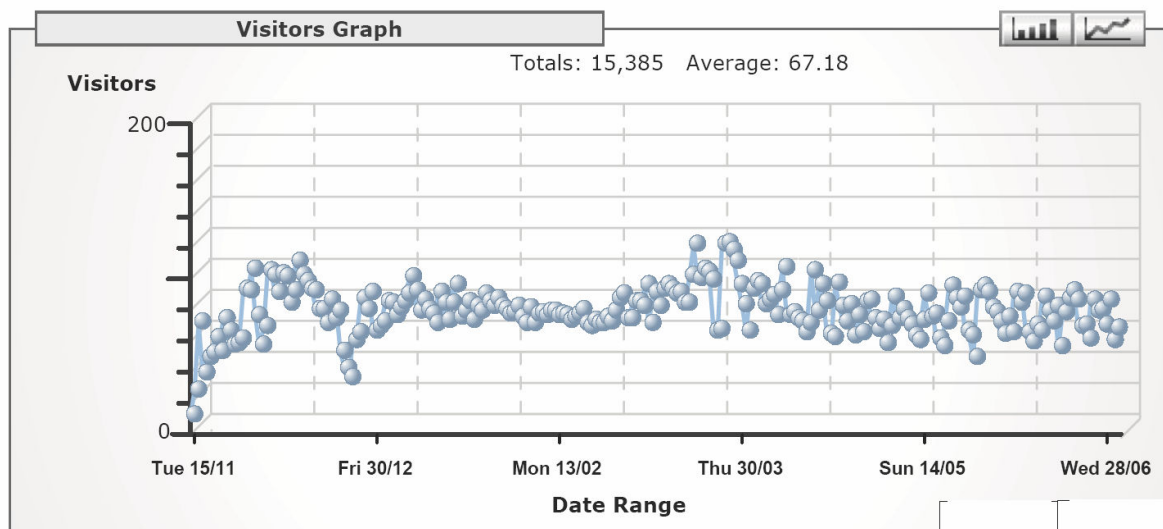


Figure 1. Number of visitors to the website from 15th November 2005 to 30th June 2006

The marginal cost of maintaining the web site is determined by the number of hits on the site. The marginal cost of the web site for 6 months, at less than \$300 per month, is about \$1,800.

Some households that would subsequently move and go on to complete travel diaries would be recruited in the same period. 400 households had provided initial information and indicated that they would participate in the experiment. However, many of these would not complete interviews.

The financial incentive and the disincentive of completing travel interviews are presumed to be major influences as to whether people chose to continue through the web site to

completion of interviews. The rate of completion without financial incentives and without the requirement to complete travel diaries is a key question. That is, effectiveness of web recruitment in an ongoing application situation rather than a research situation is a key question.

At worst, the marginal cost of recruiting 133 households in an ongoing application situation would be the marginal cost of the web plus an incentive. That is, up to \$63 per participating household as demonstrated in this experiment.

At best, removing the deterrent of completing travel diaries would lead to greatly increased recruitment and completion rates and the cost of recruitment would be limited to the marginal costs of the web site. An optimistic recruitment cost would be the \$1,800 in web costs for 400 households recruited. That is, optimistic recruiting costs would be about \$4.50 per household.

In practice, it is anticipated that the implementing agency can set the cost of recruiting households by fixing the incentive. A lower incentive would attract participants more slowly. However, it would seem that the implementing agency can offer a mix of financial and non financial incentives to achieve desired recruitment rates.

In the case of this experiment, incentives were set at a high level to meet the need to complete the experiment with a significant number of participants within the limited time available.

4.2 Change to home location decisions

The home locations of 133 participants are plotted in figure 2. The centroid of home locations of the control and intervention group is virtually unchanged. Both centroids are centrally located with respect to the central business district, the industrial area of Garbutt and the airport and the university, the army barracks and hospital.

However the experimental group is more closely clustered around the centroid. 68% of the experimental group is within 4.2 Km of the centroid and 68% of the control group is 5.9 Km from the centroid. A significant difference in the distribution of home locations between experimental and control groups is evident. Any change in accessibility is not evident from this data but it demonstrates that the intervention does influence home location choices.

4.3 Transport outcome from changed home location

The affect of the change in home location on accessibility is measured by vehicle kilometres travelled (VKT). Accessibility measures could include trip convenience, cost, transport mode choice over times of day and days of the week, clustering of destinations into nodes and so on. VKT is a proxy for all these measures. Significantly reduced VKT is indicative of improved accessibility where all other factors are unchanged.

Preliminary results from 133 households' trip information indicate that households in the experimental group travel about 15% fewer kilometres. Travel distances for groups in the experiment are shown in Figure 3. It is assumed that the experimental group has accessed the same destinations and services but have travelled less to reach them. And a significant improvement in accessibility has been achieved.

The significance of the VKT results based on data from 133 households is shown in table 1. Final results are expected to be based on about 200 households and have improved reliability. The final results and analysis are expected in September 2006.

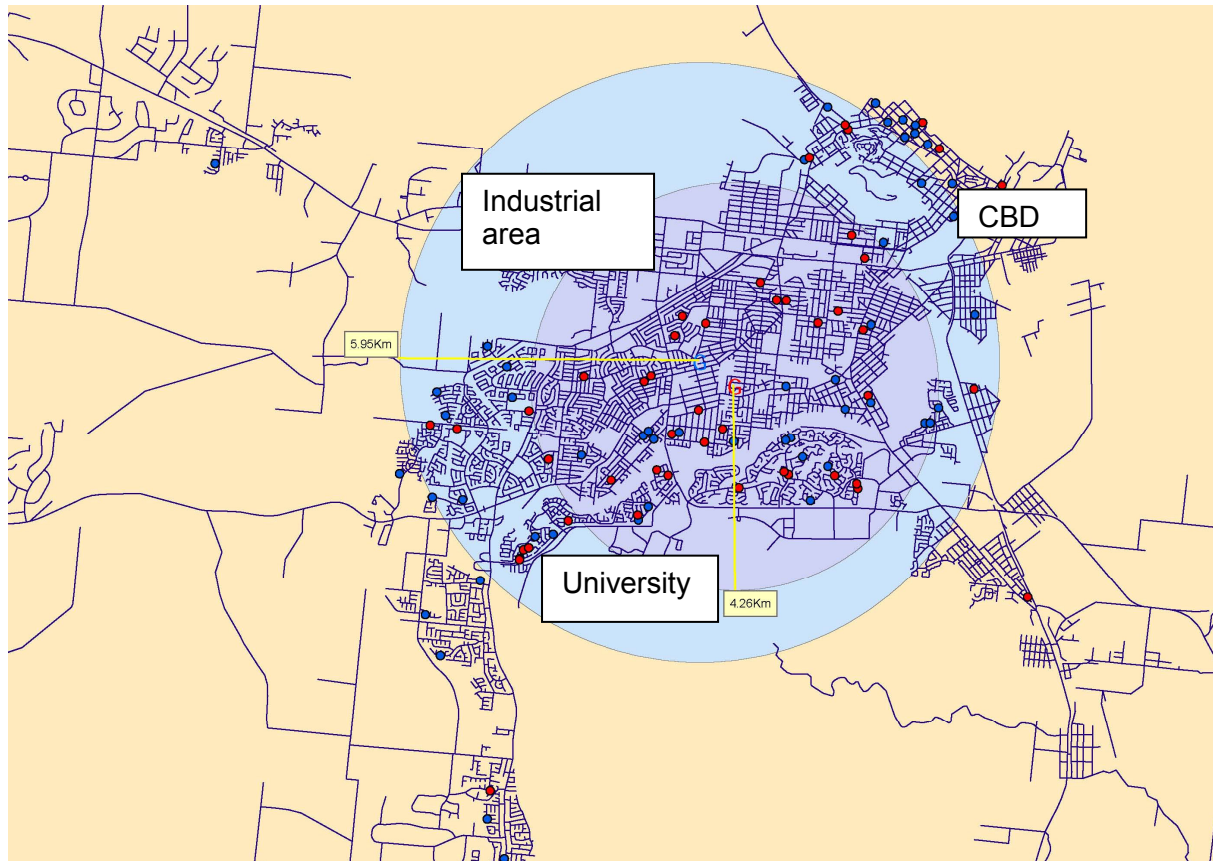


Figure 2 – Distribution of home locations for experimental group (red) and control group (blue).

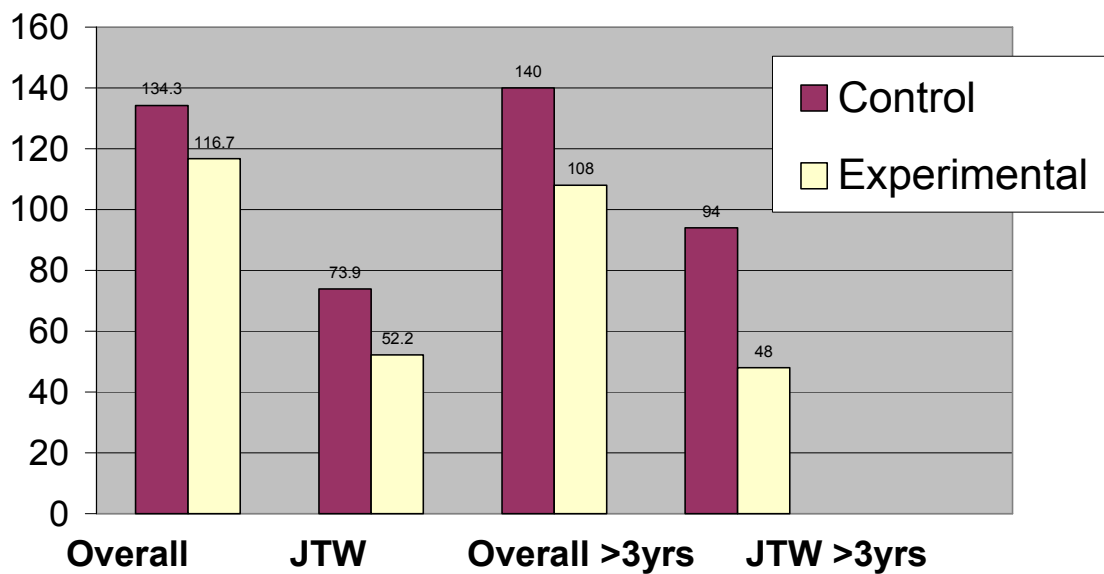


Figure 3. Kilometers travelled per week per household.
[Overall – includes all trips; JTW – Journey to Work trips only; >3yrs – only includes figures for households intending to stay more than 3 years]

Measure (Km)	Significance
All trips and all households	F(1, 120)=1.95, p=0.16
All households, journey to work trips only	F(1, 103)=6.40, p=0.01
All trips, households intending to stay more than 3 years	F(1, 91)=4.10, p=0.04.
Journey to work trips, households intending to stay more than 3 years	F(1, 92)=4.67, p=0.07

Table 1 – Reliability of preliminary VKT results.

4.4 Discussion of costs and benefits

Running an intervention over 3 years is proposed as a model to consider costs and benefits.

Costs for establishing the program in a provincial city are about \$80,000 in the first year and \$20,000 in subsequent years. Over 3 years the costs would be \$120,000. (Environment and Behaviour Consultants, 2006) These costs include web hosting, advertising, methodology development, management, direction, implementation and evaluation at consultancy charge out rates.

The first year would replicate the intervention carried out in Townsville. 100 experimental households would be recruited in the first year. In this year, high levels of data collection would continue and a control group would be established to ensure that the intervention delivers expected results in the subject city. In subsequent years monitoring would be greatly reduced and participation rates are anticipated to be 400 experimental households per annum. A total of 900 households would participate.

Assuming the desired behaviour is maintained over two years, each participating household would save 1800 km in total (18 Km per week for 100 weeks) based on the overall reduction in VKT shown in figure 3. This is a saving of 1.6M VKT from the total program. At an assumed fuel cost of \$1 per 10 Km the saving would be \$160,000 in fuel costs alone. That is, the fuel cost savings alone would fund the intervention.

Targeting the intervention to groups identified as likely to change home location choices, such as those intending to stay more than 3 years, could substantially improve cost benefit figures. Running the program over more than 3 years in a location would also help to recover the initial establishment costs of the program. Applying the intervention to households moving with in a city in addition to households moving to the city is another potential method to improve cost benefit of the program.

Other benefits have not been estimated. Other benefits that are likely to arise include reduced total vehicle running costs, reduced green house gas emissions, reduced travel time costs, reduced congestion and improved urban amenity.

Indications are that the experiment has the potential to be the basis of an application that would have a positive cost benefit ratio.

5 Discussion and future work

Two conceptual models are proposed to consider some of the implications of the work and the potential for unexpected consequences.

At one extreme is an urban area with one employment, education and service node. Households would need to locate nearer to the single node to improve accessibility, developing a consistent pattern of response. Trips to and from the node would not be

reduced and congestion at the node where infrastructure costs are highest would not be reduced.

Choices of home location are limited by the housing stock. An intervention could become so large that the existing housing stock could not provide homes near the single node in response to the changed home location desired by participants. Either prices of homes would rise in response to demand or homes may not be available at all. Resistance to the change and reduced results could occur.

At the other extreme, consider an urban area with many nodes. The range of "good" choices to the participating group is much wider. The number of "good" choices approaches the number of participants in the group. No single pattern is likely to develop in the change to desired home locations. The housing market is more likely to be able to provide for the change. Travel through congested nodes to reach a more distant destination may be reduced and some congestion benefit may arise.

Consideration of these conceptual models indicates that the effect of the experiment on congestion could be complex. It is also possible that large interventions in smaller centres could be impacted on by the housing market in an unpredictable way.

These conceptual considerations are likely to generate detailed questions to be tested in future.

However, a key question is whether the results can be reproduced. It is proposed to replicate the experiment in another city to test if expected results can be obtained elsewhere.

At the same time, it is proposed to develop an application from the experiment in Townsville. The application would use data bases developed for the recently completed experiment with out financial incentives and with out the requirement for all participants to complete interviews.

It is also proposed to consider whether the experiment can be applied to households moving within a city.

6 Conclusion

A method has been developed to influence where people chose to live. Indications from preliminary results from a single experiment indicate that people are influenced in their home location choices by the experiment.

The method provides information to participants through the web. Web based delivery enables participants to be recruited from outside of Australia and wherever there is web access. Web delivery also allows the implementing agency to tailor incentives to manage recruitment rates.

The preliminary results of 133 telephone surveys indicate that households have been influenced to move in ways that improve their access to destinations and services. About 15% reduction in household VKT has resulted from the experiment.

Reductions in travel costs and other benefits indicate that there is potential for a cost effective application to be developed from the findings of the experiment. Positive initial results indicate that further work is justified to replicate the experiment, to develop an application from the experiment and to consider if households moving within a city can be positively influenced.

7 References

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