

## **Policy Brief on the Impacts of Voluntary Travel Behavior Change Programs Based on a Review of the Empirical Literature**

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### **Policy Description**

Voluntary Travel Behavior Change programs are a range of travel demand management techniques that are designed to change the behavior of travelers without changing the options available to them. This is accomplished by targeting individual attitudes, goals, and behaviors, increasing awareness of the impacts of travel choices, and equipping travelers with the skills necessary to analyze and alter their travel behavior (Fujii et al., 2009; Steg 2003). VTBC programs take a variety of forms, but they can be characterized into two broad categories - mass communication campaigns and travel feedback programs (TFP).

Mass communication campaigns distribute information through means such as broadcast media, the internet, newsletters, and public notices. They have been used extensively to influence public attitudes about issues related to transportation, as well as public health and environmental issues (Cairns et al. 2004). The promotion of transit services through marketing and promotions is a typical example of a mass communication campaign.

TFPs are a more sophisticated form of VTBC program. They differ from mass communication campaigns in several important ways. TFPs use feedforward information, such as travel diaries, to encourage participants to actively examine their travel behavior. They also use feedback to convey the consequences of travel behavior change. Feedback provided to participants may include information about reductions in pollution, greenhouse gas emissions, or calories burned from physical activity (Fujii et al., 2009). This information helps individuals and households to quantify the impacts of changes in travel behavior.

Personalized feedback is often based on analysis of travel diaries and surveys that participants complete during the program. This analysis not only serves as a tool for providing feedback, but also as a means of evaluating program effectiveness. By analyzing diary and survey information, changes in vehicle miles traveled (VMT), emission reductions, or use of alternative transportation modes can be examined through before and after comparisons of travel behavior.

Travel feedback programs are often directed toward households, although they have also been used in workplace and school travel plans. They are normally focused on encouraging a switch from car to other modes, but VTBC programs have also been used to encourage more efficient use of automobiles. This can be accomplished by having households identify opportunities to combine trips (trip chaining), change trip timing to avoid congestion, or increase vehicle occupancy rates.

## Impacts of Voluntary Travel Reduction Programs

### *Effect Size*

VTBC program evaluators have reported significant reductions in vehicle use among program participants. Brög et al. (2009) report that 12 TravelSmart programs conducted in 9 U.S. cities have resulted in an average of 8 percent reduction in car use among participants. TravelSmart programs in three cities in Oregon resulted in reductions in solo driving of 3 to 11 percent (Socialdata America, 2007). This corresponded with a 9 percent reduction in VMT among participants. Using a modified version of the IndiMark system, Cooper (2007) reported a 24 to 50 percent reduction in drive alone trips among participants in three urban Seattle neighborhoods.

Various VTBC programs have been used in the UK for the past twenty years. Three large-scale, sustained VTBC programs in medium-sized English cities were evaluated by Sloman et al. (2010). Combined, their estimated impact was a reduction of 9 percent in car driver trips and 5 to 7 percent in VMT. These effects were not only for participant households, but for each study city as a whole.

Möser and Bamberg (2008) recently conducted a meta-analysis of 72 VTBC programs in Europe and Australia. The analysis included personalized travel planning, transit information marketing programs, and travel awareness campaigns. They found that these programs resulted in a statistically significant increase of 5 percentage points in the proportion of trips taken by non-car modes.

Overall, the evidence collected from VTBC evaluations indicates that VMT reductions of 5 to 8 percent are achievable among participants. The effectiveness of VTBC programs on a city- or region-wide level is dependent on participation levels and spillover effects. Spillover may occur when non-participants learn of programs through media coverage or contact with participants. The results of the extensive five-year English VTBC program evaluated by Sloman et al. (2010) appear to indicate that city-wide impacts are achievable through sustained campaigns that target a wider audience.

*Table 1: Summary of VTBC Program Impacts*

Study	Study Location	Study Year(s)	Results	
			Measure Type	Impact
<b>Sloman et al., (2010)</b>	England	2004 - 2009	Vehicle Miles Traveled	5 to 7 percent decrease citywide in three medium-sized English cities
<b>Socialdata America (2007)</b>	Oregon	2006	Vehicle Miles Traveled	9 percent decrease in among participant households in 3 cities
<b>Taniguchi and Fujii (2005)</b>	Japan	2000 - 2003	Vehicle Miles Traveled	12% average reduction for participants in 5 cities

<b>Brög et al. (2009)</b>	USA	2000 - 2005	Reduction in car use	2 to 11 percent (average 8%) decrease in car use among participants in 9 US cities.
<b>Möser and Bamberg (2008)</b>	Europe and Australia	2000 - 2004	Percentage of trips taken by car	5 percent decrease determined through meta-analysis of 72 programs

### *Evidence Quality*

Because of their apparent effectiveness and relatively low cost, VTBC programs have attracted increased attention from policymakers. However, questions have been raised about evaluation methods that have been used in some studies (Chatterjee, 2009; Fujii et al. 2009; Möser and Bamberg, 2008). These include concerns about research design, representativeness of populations included in the studies, quality of the data collected, and the validity of methods that have been used in evaluations (Möser and Bamberg, 2008). In addition, because VTBC programs are often implemented and evaluated by consultants that have been hired by local government, questions have arisen about potential lack of impartiality (Bonsall, 2009).

Partially in response to these criticisms, recent programs have increasingly used research designs and evaluation methods that facilitate independent statistical analysis of their results. This has included the use of control groups to isolate the effects of the VTBC program from those of other factors, such as changes in weather, infrastructure, general travel trends and transportation prices. Wherever possible, studies chosen for this brief used control groups to evaluate before and after effects.

For reported projects in the USA (Socialdata America, 2007; Brög et al. 2009), studies incorporated a pre- and post-program control group to evaluate travel behavior changes in the participating households. Sloman et al. (2010) used household travel survey data from other cities of similar size, as well as control groups, to evaluate impacts in the three English cities in their study. All but three of the Japanese studies cited in Fujii and Taniguchi (2005) did not use control groups, so these results should be interpreted more cautiously. However, the authors found the effect sizes of the programs that used control groups did not differ substantially from those that did not. In addition, the results were similar to those found in similar programs implemented in Western countries.

### *Caveats*

The programs described in this brief have been used primarily in urban areas. The effect sizes given are likely to be lower in areas where alternative forms of transportation, such as transit, walking, and bicycling, are less feasible.

According to Cairns et al. (2004), VTBC is best suited to areas where:

- The community views traffic as a problem.
- Public transportation exists and excess capacity is available.
- Support exists from local government and transit providers.
- Walking and bicycling infrastructure exists and the environment is conducive to using these modes.
- Local employment, shopping, and service destinations are available and accessible.

However, VTBC programs have been used in suburban areas. Car use reductions have been reported from programs conducted in suburban areas of Perth, Australia, as well as more rural areas of Germany and the UK (Brög et al. 2009, Cairns et al. 2004). While examples of suburban and rural programs are few, these results indicate that some impact may be possible. In these cases, encouraging more efficient use of vehicles may be beneficial. For example, programs could encourage the combination of several trips (trip chaining) or higher vehicle occupancy rates.

Because VTBC programs are voluntary, their effectiveness depends on the number of households who elect to participate. This presents obvious difficulties in the planning and evaluation of these programs. This problem, known as self-selection, is discussed in more detail in the background document that accompanies this brief.

### **Greenhouse Gas Emissions**

Relatively few VTBC evaluation reports have quantified greenhouse gas reductions. Sloman et al. (2010) estimate that long-term VTBC programs in three medium-sized English cities resulted in a citywide per capita carbon dioxide emission of approximately 50 kg. Based on UK emissions, this is equivalent to a 4.4 percent reduction in CO<sub>2</sub> emissions from driving.

Fujii and Taniguchi (2005) evaluated 10 VTBC programs in Japan and estimated CO<sub>2</sub> reductions of 19 percent among program participants. Only three of the ten programs used control groups in their evaluation, so this figure should be interpreted with caution.

### **Co-benefits**

While reduced car use from VTBC programs can provide some co-benefits in the form of reduced emissions and traffic, they can also increase transit use. In many cases, increasing transit use is the main objective of such programs (e.g. Cooper, 2007). This is often achieved by including personalized transit schedule information and promotional passes in the package of information provided to participant households.

Other co-benefits include potential health benefits from increased walking and bicycling, improved community interaction, and increased viability of local businesses. (Cairns et al., 2004)

## Examples

In the Spring and Summer of 2006, the Oregon Department of Transportation (ODOT) conducted a VTBC program in the cities of Bend, Eugene, and Salem-Keizer. Socialdata America was hired to conduct the studies and program evaluations using the company's proprietary IndiMark program (Socialdata America, 2007).

Participant households in each city were selected randomly for the program. These households received an announcement letter about the study, followed by a survey. Households that returned the survey but did not express interest in the program were sent a thank you letter, information on efficient car use and park and ride facilities, and a transit day pass. Households with members that regularly used environmentally friendly transportation modes and those that expressed an interest in reducing their travel impact were provided a package of materials designed to encourage conscious consideration of their travel behavior.

One of the items was a one-week travel diary, to be completed by all household members.

The package also included an order form with a list of materials on travel alternatives. Materials selected by the household were provided without charge, along with promotional materials. Participants were encouraged to tailor the order to suit the needs of the household.

Following receipt of the order, materials were packaged and personally delivered to each household. Participating households were also given the opportunity to request a home visit from a transit, walking, or bicycling specialist. During these visits, they were provided with personalized advice and encouraged to try travel alternatives.

To evaluate the effectiveness of the program, participating households were asked to complete a second one-week travel diary at the completion of the study. These diaries were compared to the behavior of a control group of non-participants in the same area, who completed identical diaries.

As a result of the project, participant households reduced their vehicle miles traveled by an average of 9 percent, increased their active travel time (walking and bicycling) by 8 percent, and increased their number of trips by transit, walking and bicycling by 31 percent.

## Suggested Further Reading

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