

ENHANCING THE EFFECTIVENESS OF TRAVEL AWARENESS CAMPAIGNS VIA THE INCLUSION OF THEORETICAL-BASED CONTENT

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Abstract. Travel awareness campaigns are one of the most commonly used ‘mobility management interventions’, which aim to change individuals’ travel choices and behaviour to more sustainable transport modes. However, despite the widespread uptake of this measure and associated costs, the extent to which awareness campaigns work, and also how they can be best designed to increase their effectiveness, remains unclear. We begin by providing an overview of current understanding of individuals’ modal choice decision making processes, and how this knowledge can be applied to the design of awareness campaigns. To illustrate the benefits of including psychological-based content in the design of travel awareness messaging, an overview of a theoretical-based randomised controlled personalised travel planning intervention study conducted in Hammersmith, UK, is presented. The results obtained show that those people who were exposed to theoretical-based materials reported a significantly greater change in behaviour and theoretical stage-movement, compared to those who received non-theoretical materials and also the control group. Based on the results of this study, we conclude by suggesting how future awareness campaigns can be improved via the inclusion of theoretical-based content.

Keywords: Mobility management, travel awareness, behavioural change, sustainable travel choices.

1. Introduction

This paper begins by providing a brief definition of ‘travel awareness’, using examples of campaigns that have recently been implemented in the UK, Lithuania and Germany. An overview of current understanding of individuals’ modal choice decision making is then presented, followed by an overview of a theoretical-based randomised controlled travel awareness campaign implemented in Hammersmith, London. The paper concludes with suggestions as to how future travel awareness campaigns can be improved.

2. Travel awareness: definition

According to the European Platform of Mobility Management, Mobility Management (MM) is defined as “A concept to promote sustainable transport and manage the demand for car use by changing travelers’ attitudes and behaviour. At the core of Mobility Management are “soft” measures like information and communication, organising services and coordinating activities of differ-

ent partners. “Soft” measures most often enhance the effectiveness of “hard” measures within urban transport (e.g.; new tram lines, new roads and new bike lanes)’- (see www.epomm.eu/).

One of the most popular and widely implemented MM measures are Travel awareness campaigns, which can be defined as; “Travel awareness campaigns use a wide range of media aimed at improving general public understanding of problems resulting from transport choices and what can be done to solve these problems including changing their own behavior” (Cairns *et al.* 2004 161).

The instruments used in travel awareness campaigns take numerous forms, including posters, leaflets, advertising on press, local radio and television, high profile events aimed to focus attention on wider environmental issues, activities in schools and neighbourhoods, and provision of factual information on websites or at local travel centres.

For example, as part of the BUSTRIIP Project which aimed to promote sustainable transport choices in the city of Kaunas (Lithuania) a range of promotional material

and media was used, including t-shirts with printed logos (see Figure 1), and adverts on local buses (Figure 2).



Fig 1. T-shirt logos designed by BUSTRIP project campaign in Kaunas



Fig 2. Bus advertising designed by BUSTRIP project campaign in Kaunas

Similarly, a recent campaign in Germany used a wide range of advertising media, including billboards (see Figure 3) posters, cinema/radio ads and banners to promote the campaign message “Head on- engine off” in order to persuade residents in 4 German cities to switch to more sustainable travel modes for their ‘short’ trips.



Fig 3. Billboard advert to promote German ‘Head on- engine off’ campaign

However, despite the widespread uptake of awareness raising campaigns, more recently their effectiveness in changing peoples’ travel behaviours has been questioned. Möser & Bamberg (2008) and Brög 2010 for example, suggest that the impacts of awareness raising campaigns are often overestimated due to several factors, including the weak evaluation methods typically used

(i.e. one-group pre-post test evaluations), failure to take into account general population trends or seasonal effects (due to lack of control groups), and weak analytical techniques to synthesize the data obtained (e.g. narrative-style analysis) which all restrict the accuracy and validity of any conclusions that can be made (see also Cairns *et al.* 2008; Bonsall 2009; Stopher *et al.* 2009). More recently it is also recognized that MM interventions, including travel awareness campaigns could ‘theoretically’ be enhanced by the inclusion of theoretical content (Carreno & Welsch 2009). However, for practitioners to design such campaigns, it is important for them to understand the behavioural change process.

3. Understanding the behavioural change process

In order to successfully change people’s travel behaviour, it is essential for practitioners and policy makers to understand the underlying processes necessary for behavioural change to occur, and to use this knowledge in both the design and evaluation of MM projects (including awareness campaigns). Most relevant to this paper are two key facts, as follows:

Firstly, in any given population some people are more susceptible, or ready to change their travel behaviour than others (e.g. Curtis & Headicar 1997; Anable 2005). This partly relates to more subjective factors such as peoples’ attitudes, perceptions and level of confidence towards their current travel mode choices, and towards alternative travel choices, as well as their wish to actually change their travel mode behaviour.

The role of MM interventions should be to attempt to change these attitudes and perceptions, and instill confidence in a positive way in order to motivate people to try out, and ultimately adopt new travel mode behaviours. For other people the barriers to modal shift are more objective: for example, if there is no bus service operating on the route for their journey they could not switch to local buses for that journey, or if they have a mobility-impairment that prevents them from switching car trips to traditional bus services, cycling or walking. In this instance MM interventions alone would be unlikely to change people’s travel behaviour, and ‘harder’ more infrastructural measures would have to be implemented first or simultaneously, e.g. such as the addition of new bus services, or Demand Responsive Services for mobility-impaired people.

The role of MM would be more supplementary in ways such as increasing awareness of these new services e.g. via travel awareness campaigns, or provision of free tickets to entice people to try new services. Secondly, it is increasingly acknowledged that in many instances behavioural change does not occur as a one-step process and can instead be viewed as a series of transitional stages (or steps) which individuals progress through in order to reach the final stage of behavioural change (e.g. Bamberg 2007).

Accordingly, the implications are that any MM intervention is likely to affect people in different ways based on their susceptibility to change behaviour and

stage position within the behavioural change process (Bamberg et al. 2010).

However, despite knowledge of these facts there remains no consensual theoretical framework that explains the behavioural change process involved in modal shift (see Anable *et al.* 2006; Darnton 2008; MAX-SUCCESS, 2008a for recent reviews). Previously, researchers have attempted to ‘explain’ modal choice decisions using a range of pre-existing theoretical frameworks, including the Theory of Planned Behaviour (Heath & Gifford 2002; Bamberg *et al.* 2003); Norm Activation Model (Hunecke *et al.* 2001); Transtheoretical Model (Gatersleben & Appleton 2007); and Model of Action Phases (Bamberg 2007).

The lack of consensus as to which framework is the most appropriate remains due to the lack of validation studies that have applied these theoretical principles in actual modal choice studies. The relatively few studies that have attempted to test theoretical based interventions typically focus on individual behavioural change model constructs, such as Goal setting (Fujii & Taniguchi, 2005); Attitudes towards non-car modes (Beale & Bonsall, 2006; Fujii, 2007); Goal feasibility (Oja *et al.*; 1998); Implementation intention (Bamberg, 2000), rather than actual behavioural change process models as a whole.

4. MaxSEM (MAX-Self Regulation Model)

MaxSEM is a newly developed theoretical model designed to explain individual’s modal choice decisions. MaxSEM has evolved following an extensive literature review of existing theoretical models and applied research (see Bamberg *et al.* 2010 for details) which resulted in the identification of the most important aspects (constructs) that are relevant in explaining individuals’ modal choice decisions and the underlying process that are involved in switching from car-use to more sustainable transport choices. MaxSEM provides a theoretical framework describing the behavioural change process and explains individuals’ readiness to change travel mode by categorizing them in one of four stages (see Figure 4 below).

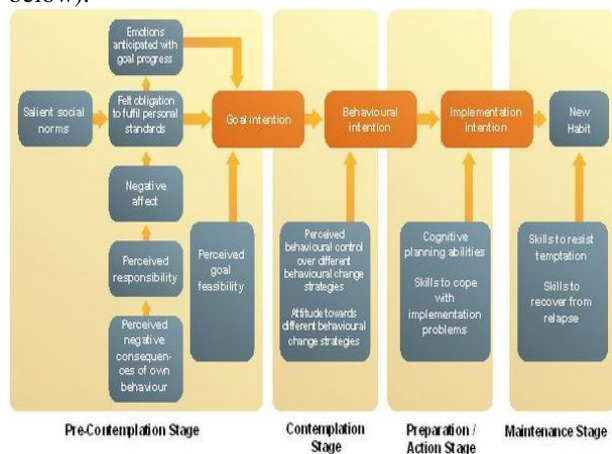


Fig 4. Overview of MaxSEM

- **Stage 1: Pre-contemplative stage.** Individuals in this stage typically make most of their trips by car, are quite happy with the way they currently travel and at the moment have no wish, or desire to change to another mode, or feel that it would be impossible for them to do so at the present time, whether this be through subjective or objective reasons (see earlier).
- **Stage 2: Contemplative stage.** Individuals in this stage also typically make most of their trips by car, but are not as content with their current travel behaviour as pre-contemplators. They would like to reduce their level of car use and change to another way of travelling, but at the moment are unsure of which mode to switch to, or perhaps don't have enough confidence to do so. They are not really sure which alternative mode [s] they could use, or when they will begin replacing their car trips.
- **Stage 3: Preparation/Action stage.** Individuals in this stage also typically make most of their trips by car, but have decided which replacement mode they intend to switch some or all of their car trips to, have the confidence to do so and may have already tried this new mode for some of their trips.
- **Stage 4: Maintenance stage.** Individuals in this stage typically make most or all of their trips by non-car alternatives (public transport, walking, cycling etc.). These can either be people who do not own or have access to a car for their trips (and therefore dependent on non-car modes for travelling), or people who do own/have access to cars but for various reasons use them very infrequently, or not at all.

These stages can be viewed as a series of steps, leading up to the final step of actual behavioural change. Although the steps are fundamentally different from each other and follow on from each other in a logical way, it is possible for some stages to be missed (e.g. pre-contemplators could move directly to preparations/action or maintenance stages) or backward movement (stage regression) could occur.

In order for people to progress from earlier to later stages, key **threshold** points have to be ‘satisfied’. So for pre-contemplators to become contemplators the key is the formation of a ‘**Goal Intention**’ (i.e. they have to recognize their current level of car use is ‘problematic’ and want to reduce it). For people to form a goal intention, several factors (constructs) are known to be important, although the importance of each construct will differ on an individual basis. For example, for some people the key factor may be for them to ‘feel bad’ about their current level of car use (Negative affect) and for others they may feel that to reduce their car use at the current time is not a realistic option (goal feasibility) etc. Once in the contemplative stage, they then have to identify which would be the most suitable option (mode) for them to reduce their

car use, and feel sufficiently positive towards (Attitudes towards different behavioural change strategies) and/or confident (Perceived behavioural control) to use this alternative non-car mode and a **Behavioural Intention** is formed. The transition into the final Maintenance Stage involves individuals making definite plans and/or possibly trying out the new mode choice, which is conceptualised by an **Implementation intention**, and ultimately this new behaviour becomes their new normal dominant mode behaviour.

In order to objectively measure individuals' stage positions within MaxSEM a set of six simple questions have been developed. The questions (shown in Table 1) require respondents to indicate which **one** of the six statements best reflects their current attitudes towards their current level of car use and intentions towards future car use.

Table 1. MaxSEM standardised stage diagnostic questions

<i>Which of the following statement best describes how you currently feel about your level of car use for*.....and whether you have any plans to try and reduce any of these car trips?</i>	Stage allocation
At the moment I use the car for most of my trips. I am happy with my current level of car use and see no reason why I should change it.	PC
At the moment I do use the car for most of my trips. I would like to reduce my current level of car use, but feel at the moment it would be impossible for me to do so.	
At the moment I do use the car for most of my trips. I am currently thinking about changing some or all of these trips to non-car modes, but at the moment I am unsure how I can.	C
At the moment I use the car for most of my trips, but it is my aim to reduce my current level of car use. I already know which trips I will replace and which alternative transport mode I will use, but as yet have not actually put this into practice.	PA
As I do not own/have access to a car, reducing my level of car use is not currently an issue for me.	M
As I am aware of the many problems associated with car use, I already try to use non-car modes as much as possible. I will maintain or even reduce my already low level of car use in the future.	

*The question can be changed for specific trip types (e.g. shopping, commuting) or for everyday car use. PC = Pre-contemplative; C = Contemplative; PA = Preparation/ Action; M= Maintenance.

According to the answers given (which box did they tick), respondents can then be grouped into one of MaxSEM's four stages (see final column).

5. Putting theory into practice: Hammersmith study

To illustrate the benefits of including MaxSEM-based attitudinal and perceptual measurement questions in awareness campaigns, an overview of a theoretical-

based randomized controlled awareness-raising intervention study conducted in the London Borough of Hammersmith and Fulham, UK, is presented below. For full details of the study see Carreno *et al.* 2010.

The main aims of the study were to investigate whether theoretical-based awareness materials are more effective than 'traditional' (non-theoretical based) materials in facilitating modal shift, and in addition to measuring overt behavioural change, explore more subtle attitudinal/perceptual changes, i.e. changes in MaxSEM stage position.

Respondents were recruited for the baseline part of the project over a 1 month period, from 20/03/09 until 20/04/09. Potential respondents were approached as they left the main Hammersmith car park (Kings Mall) by one of a team of 6-8 surveyors. They were asked if they had driven into Hammersmith that day, and if yes provided with a brief introduction to the study and asked if they could either; spare 10 minutes to fill out a questionnaire there and then; take a questionnaire and return it later (to surveyors at car park); or take a questionnaire away and return via a pre-paid postal envelope. The questionnaire included amongst other items, the MaxSEM stage diagnosis questions, reasons for car use, potential for mode shift and frequency of car trips into Hammersmith. Returned questionnaires were grouped according to stage position (Pre-contemplator or Contemplator) and the one mode they had indicated would be the 'best' option for them to switch some or all of their future car trips into Hammersmith. Respondents were then randomly allocated (on a semi-stratified basis according to total subgroup size, i.e. contemplators who indicated car sharing would be their best option, etc.) into MaxSEM, standard, or to control Groups.

6. Intervention materials

The awareness raising materials used in the study comprised of printed information booklets, supplemented by maps and information guides where appropriate. In total 21 booklet versions were created, 10 for pre-contemplators and 10 for contemplators, subdivided by the one mode respondents indicated would be the 'best option' for them to switch their car trips to (i.e. 5 options) with one emotional and one rational version per mode, and a non-theory, non-mode version was created (for the Standard group).

Information booklets were posted to MaxSEM and standard group respondents at the end of the baseline data collection period. Pre-contemplative booklets were specifically designed to target the 8 MaxSEM Pre-contemplative associated constructs, and Contemplative booklets were specifically designed to target the 3 MaxSEM contemplative associated constructs - See Figure 4 earlier. Non-theory booklets contained publically available information similar to pre-contemplative and contemplative information although not enhanced with any theoretical messages or photographs) about current Transport for London travel awareness campaigns and information resources covering the Hammersmith area.

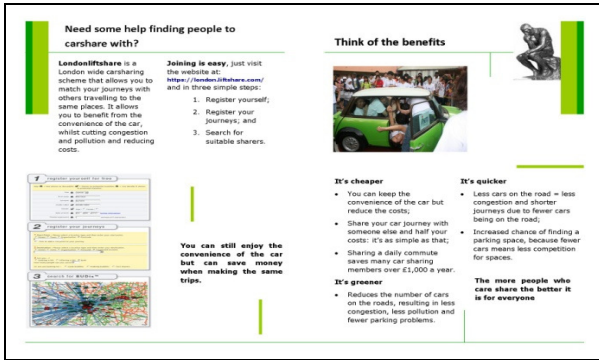


Fig 5. Excerpt of information booklet designed to target contemplative construct's 'perceived behavioural control' and 'attitudes towards behavioural alternatives', targeting potential car sharers



Fig 6. Excerpt from information booklet designed to target pre-contemplative construct 'perceived goal feasibility', targeting potential cyclists

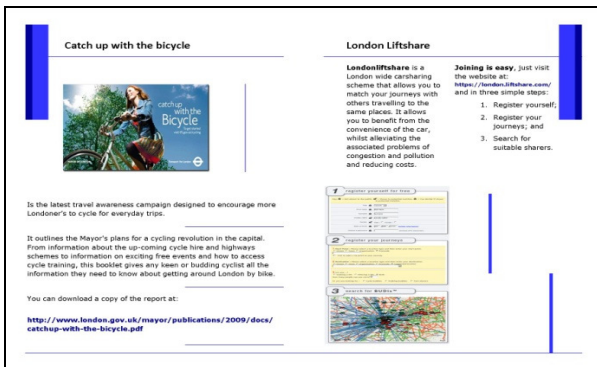


Fig 7. Excerpt from Non theory booklet pages designed for cyclists and car sharers: without theoretical enhancements

7. Response rates

14 days after the information booklets were sent to both MaxSEM and standard group respondents all respondents were sent a second measurement questionnaire, identical to the baseline questionnaire, with additional questions for MaxSEM and standard group respondents asking them to evaluate the information booklets. All respondents were offered a £10 gift voucher if they completed and returned the questionnaires. From the initial baseline sample of 490, 148 usable after measurement

returns were received. The average response rate was 30%, although varied between the respective experimental groups from between 17 to 40% (see Table 3).

8. Main results

One of the primary aims of the study was to investigate the impact of the awareness booklets of respondents travel mode choices, specifically their use of cars for trips into Hammersmith.

As can be seen in Table 2, for the MaxSEM group, in total 15 people (17%) reported reductions in their use of cars for trips into Hammersmith, although 5 people reported an increase in car use. For the Standard group, in total 3 people (9%) reported reductions, although 2 people reported an increase, and for the Control group, 1 person (4%) reported a reduction, although 1 person also reported an increase in car use.

Table 2: Before and after self-reported car driving trip frequency for trips into Hammersmith

Group	Before	After			Total
		Some	Often	V. Often	
Max-SEM	Often	3	44	5	52
	V. Often	2	10	25	37
	Total	5	54	30	89
Standard	Often	1	23	2	24
	V. Often	1	1	4	8
	Total	2	24	6	32
Control	Often	1	16	1	18
	V. Often	0	0	9	9
	Total	1	16	10	27

Green shading = reduction; red shading = increase

9. Stage movement

Of key importance to the study's aims, was to examine the effects of the intervention in terms of individual stage-movement, i.e. would the MaxSEM/theory-based information booklets be more likely (if at all) to progress individuals to later stage of change within MaxSEM, compared to both those in receipt of the standard booklets and control group respondents.

As can be seen in Table 3, in total, 34 respondents were observed to move to higher stages and one person from the control group regressed from contemplation to pre-contemplation. 26 of the 34 upwards 'movers' were MaxSEM group respondents (76 % of movers). In comparison, 5 respondents from the standard group reported stage progression (16 % of group) and 3 of the control group respondents (11 % of group).

Of those 26 that moved stage-position upwards within the MaxSEM group, 6 were pre-contemplators, 4 moving to the Contemplation stage, and 2 to the Preparation / action stage. The remaining 20 ‘movers’ were contemplators, 18 moving to the Preparation / action stage and 2 to the Maintenance stage. Out of the standard group one mover was a pre-contemplator who reported a jump to the maintenance stage and the remaining 4 contemplators were moving to the Preparation / action stage. In the control group, one mover was a pre-contemplator moving to the Preparation / action stage and the remaining 2 were contemplators moving to the Preparation /action stage.

Table 3: Before and after MaxSEM stage position

Group	Before stage	After stage				Total	
		Pre	Con	Act	Main	N	% movers
Max-SEM Group	PC	38	4	2		44	14
	C		25	18	2	45	44
	Total	38	29	20	2	89	29
Standard Group	PC	18			1	19	5
	C		9	4		13	31
	Total	18	9	4	1	32	16
Control Group	PC	9		1		10	10
	C	1	14	2		17	12
	Total	10	14	3		27	11

PC = Pre-contemplation; Con = Contemplation; Act = Preparation / Action; Main = Maintenance Stage; **Green shading** = positive movement; **Red shading** = negative movement

10. Study discussion

Overall the evidence obtained from the analyses of behavioural change for trips into Hammersmith and stage movement offer comprehensive support for the use of theoretical-enhanced awareness materials, compared to non-theoretical materials.

In terms of actual behavioural change the MaxSEM theoretical materials realized an approximate 16% self reported reduction in car use for trips into Hammersmith. This is in comparison to and 9% and 4% reported for car trips into Hammersmith for the Standard and Control group respondents, respectively. Although, some caution must be made due to small group sample sizes, the figure obtained for the MaxSEM groups are similar to the higher levels suggested by Cairns *et al.* (2004) for ‘personalised travel planning’ initiatives. The figures obtained for the Standard and Control Group are more akin to Cairns *et al.*’s lower estimates, although, slightly higher than those suggested by Möser and Bamberg (2008). However, some respondents in all groups reported increases in car use for Hammersmith trips, which are ‘unlikely’ to be as a result of the intervention materials (as also observed for control group respondents), but perhaps reflective of

‘natural’ fluctuations in individuals car use, perhaps due to seasonal (weather conditions) fluctuations, or perhaps changes in individual’s personal circumstances (e.g. requirements for car at the time of the after survey). These increases in car use should be considered in evaluating the positive reductions in overall car use found, ***.

In addition to the overt behavioural changes observed above, considerable positive MaxSEM stage movement was observed following the intervention materials. This was significantly more so for the MaxSEM group whereby on average approximately 29% of respondents were observed to move stage, compared to the standard and control groups, where 16% and 11% respective stage change was observed. The greatest amount of change was observed for contemplators (for all groups) who by stage definition were already considering reducing their car use, and the bulk of movement was to the preparation/action stage, suggesting the main impact of the intervention was to give this group a ‘push’ towards actual behavioural change, but at the time of the after survey not to actually change behaviour *per se*. Whether those people now in the Preparation/Action stage will naturally progress into the final Maintenance stage (i.e. change behaviour), or whether a further ‘push’ measures (perhaps free test travel tickets or other incentives) would be required cannot be established, due primarily to the short timescale (i.e. lack of follow up say after 6 months) of this present study.

11. Conclusions and further research

Although, only a pilot, rather than full intervention study the results obtained from the Hammersmith study have two main implications for future awareness type campaigns. Firstly, the addition of theory-based targeted messaging (with reinforcing photographs) was clearly shown to enhance the effectiveness of the travel awareness materials. Secondly, the inclusion of the MaxSEM stage diagnostic questions allowed a more detailed examination of the effects of the intervention in relation to stage movement. Quite simply, if these additional measures were not included, the only conclusion to be made (as through typical evaluations) would relate to overt behavioural changes, and the more subtle attitudinal and perceptual changes obtained here would remain unknown.

The results of this need study need to be replicated in further studies to validate these findings, as well as to explore further aspects such as cultural differences in the theoretical messages used, and a more detailed examination of emotional and rational messaging.

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