The use of framing to highlight differences between transport-related CO_2 amounts.

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Growing concerns over climate change and environmental issues are leading governments and citizen groups to take action to change the way people travel. The provision of information on transport-related carbon dioxide (CO_2) emissions to the traveller can be seen as an instrument to increase the likelihood of more sustainable choices being made by individuals. While there is little empirical evidence on the effect of such information, it is widely accepted that without providing information on CO_2 emissions, it is less likely that individuals will make climate-friendly travel choices. At the level of the individual traveller, their environmental behaviour will be governed in part by how they perceive the differences between amounts of CO_2 emissions associated with alternative travel choices.

A research team from the Centre for Transport & Society (CTS) led the grounding, research and evaluation activities of the European Commission's Framework Seven project "Carbon Aware Travel Choices" (CATCH; www.carbonaware.eu). Working with an international consortium of partners from Italy, Belgium, Spain, China, Brazil, and the UK, the CTS research team explored the behavioural processes related to travel and climate change, and identified the potential for behavioural change to support sustainable mobility and related policies. Targeting travellers and mobility stakeholders, and applying research methods developed by behavioural scientists, the CTS research team explored how different presentation formats and measures of CO2 information affect perception

and understanding of the environmental impact of travel. Also explored was how 'nudges' might be incorporated in the design of information on travel behaviour and its environmental impact to influence behavioural change. Based on the research, design recommendations were made to the developers of the CATCH online tools.

One of the concepts that was explored in this study is the effect of framing of CO_2 amounts on the perceived differences between alternative modes of travel. People treat positive impacts, or gains, and negative impacts, or losses, differently. Through the use of positive and negative terms, information can be framed to focus attention either on the potential to provide benefit (positive frame) or on the potential to increase costs (negative frame). Across many contexts, the impact of negatively framed information has consistently been found to be stronger than the impact of the same information framed in positive terms of the same magnitude (Kahneman and Tversky, 1979). The concept of loss framing refers to semantically restructuring (or framing) a choice so that the tendency for people to avoid losses guides them towards a particular choice.

In this research, different amounts of CO_2 emissions produced by a short trip (5 miles) were compared using both positive and negative framing (Figure 1). Participants were asked whether a first amount was 'about the same', 'slightly different', or 'much different' in comparison to a second amount. The study tested whether the negative framing of the CO_2 information may have a stronger impact on individuals, and would result in people perceiving the differences to be larger than for the positive framing.

Comparison Set 1 (132g against 500g)

i. Positive framing for comparison set 1:

Mode X produces 500g of CO_2 for a 5 mile trip.
The amount produced by mode Y is 368g lower (i.e. better).

ii. Negative framing for comparison set 1:

Mode X produces 132g of CO_2 for a 5 mile trip.
The amount produced by mode Y is 368g higher (i.e. worse).

Comparison Set 2 (500g against 3400g)

iii. Positive framing for comparison set 2:

Mode X produces 3400g of CO_2 for a 5 mile trip.
The amount produced by mode Y is 2900g lower (i.e. better).

iv. Negative framing for comparison set 2:

Mode X produces 500g of CO_2 for a 5 mile trip.
The amount produced by mode Y is 2900g higher (i.e. worse).

FIGURE 1 The two comparison sets and the positive and negative framing used in this experiment.

The descriptive results are shown in Figures 2 and 3. As can be seen, in both comparison sets, the negative framing resulted in a greater percentage of individuals responding that the amounts were 'much different'. The findings imply that negative framing is more effective than positive framing in highlighting differences between CO_2 amounts. The research findings are discussed in details in a paper Avineri & Waygood (n.d.), forthcoming in the journal Transportation Research A.

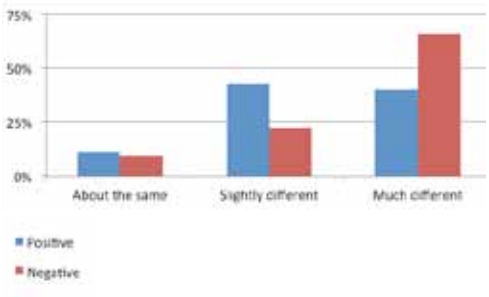

FIGURE 2 The results of the perceived difference for comparison set 1 (132g vs 500g). (ngain = 96, nloss = 94)

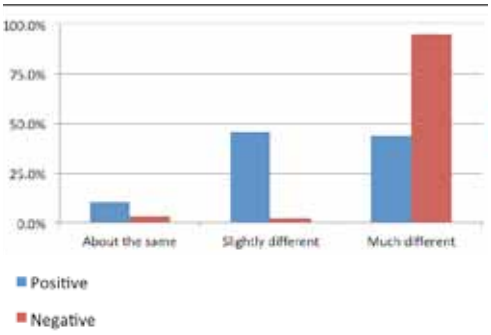

FIGURE 3 The results of the perceived difference for comparison set 1 (500g vs 3400g). (ngain = 94, nloss = 96)

Following recommendations of the CTS research team, a range of design techniques, including framing, have been used to improve awareness and motivation to reduce local urban transport CO_2. As an example of the CATCH tools, the 'My City' online tool provides ranking and benchmarking of European cities, according to a variety of performance indicators associated with co-benefits that a low carbon transport might bring to health, safety, the economy and to planning. In the example shown (Figure 4) Manchester is shown as a peer city to Bristol that is performing better. On the far right, the top performers can be seen. The data that feeds the tool was estimated by researchers at the University of the West of England (Waygood et al., 2012).

The results suggest that in order to increase the effect of information on travel choices, designers of Advanced Traveller Information Systems (ATIS), Personal Travel Plans (PTPs), or other information services, could frame information so that the less desirable choices have their negative effect highlighted.

Avineri, E and Waygood, E O D (n.d.) Applying valence framing to enhance the effect of information on transport-related carbon dioxide emissions. Forthcoming in Transportation Research Part A: Policy and Practice.

Kahneman, D and Tversky, A (1979) Prospect theory: An analysis of decision under risk. Econometrica 47(2), 263-291.

Waygood, E O D, Chatterton, T, and Avineri, E (2012) Leaders and Laggards in Transport CO2 Emissions: The Challenges and Outcomes of Benchmarking Sustainable Urban Transport Systems across Europe. Paper presented at the Universities' Transport Study Group (UTSG) 2012 Conference, Jan. 4th-6th, Aberdeen.

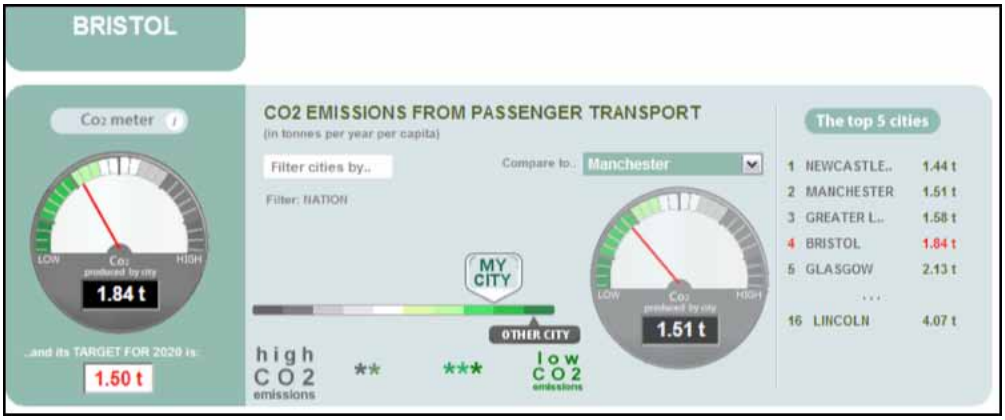

FIGURE 4 Example of per capita road transport CO2 amounts for Bristol and Manchester in the CATCH project tool My City.