Phone-based presentation of other commuters' subjective experiences: impact on car-driver intentions

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Abstract — Previous research demonstrates that people using active modes of transport (e.g. walking or cycling) generally report more positive subjective wellbeing than car drivers. This study demonstrates an experiment investigating the impact of this information on car drivers. We designed a smartphone application (CommuterExperience), which captures drivers' subjective experiences (via comments and ratings) after the commute and displays similar data from other people using different modes of transport. After a two week trial, participants (n=18) were interviewed and qualitative data were analysed. We evaluate how the application managed to encourage comparison, foster reflection and ultimately influence opinions, intentions to change and, potentially, behaviour.

Keywords — *behaviour change; sustainable transport; smartphone application; travel behaviours; social comparison; reflection; persuasive technology;*

I. INTRODUCTION

Information and communication technologies (ICT) have the potential to influence people's behaviours towards active modes of transport such as walking and cycling. A number of studies can be found in the literature using ICTs, both to reduce CO_2 emissions [4, 5] and also to promote health physical activities [6].

There is evidence that the modes of transport people use and their individual travel behaviours influence the way they feel. Those who walk and cycle frequently present higher life satisfaction than car drivers and users of public transport [7, 9, 10]. The active commute provides a number of benefits such as a healthily physical exercise, harmony with environmental values, feelings of autonomy, lower costs and less stress [1].

This research tries to influence travel behaviours leveraging on people's wish to improve their own levels of happiness. Instead of nudging travellers using environmental concerns, financial costs or health benefits, this study attempted to show participants the possibility of improving their subjective wellbeing if they opt for active modes of transport.

Social comparison has been shown to motivate behavioural intention to engage in a given behaviour [11]. It is expected that, when car drivers see other people's subjective experiences (SEs), it will foster reflection and make them reconsider the way they travel. Persuasive technology [3] and behaviour change support systems [8] are used as the methods to promote social comparison and stimulate reflection [12].

II. STUDY DESIGN

This was a feasibility study of an intervention delivered via a smartphone application. Car drivers (n=18) were randomly split in two groups of 9 (control/experimental condition). The intervention was deployed for 2 weeks and all participants input comments and ratings about their commutes to and from work. At the end of the trial we conducted semi-structured interviews where participants were asked to comment on other people's SEs and how they would feel if they were to cycle or walk to work. A thematic analysis of interview transcripts was performed using QSR International's NVivo 10 software.

A. Intervention description

1) Self-monitoring of travel behaviour (automatic detection of mode of transport);

The app used combined geolocation data to identify routes, modes of transport and distances travelled.

2) Feedback on past transport behaviour (visualisation of personal behaviours);

The app presented a list of journeys by mode of transport, time and distances.

3) Self-monitoring of outcomes of behaviour (sampling of subjective experience);

The app displayed on the initial screen two elements to capture participant's SE: a 5-point 'smiley face' rating and a text field for comments about their most recent commute.

4) Social comparison, feedback on others subjective experience (visualization of others' subjective experience).

After rating a journey and submitting a comment, the user was redirected to either a thank you page (control condition) or a list of other people's ratings and comments (experimental condition). These ratings and comments were created by the research team based on a previous study. They were controlled to present cyclists and walkers as having higher SE than car drivers.

III. RESULTS AND DISCUSSION

The results of the thematic analysis indicated that the interaction with the app fostered reflection in three main thematic areas as described below:

A. Reflection on own behaviour

The strategies of self-monitoring and feedback on behaviour worked to make participants realise the number and destinations of journeys they make and how active they are, bringing habitual behaviours back into consciousness.

B. Reflection on own Subjective Experience

Having to log and comment on their commutes made participants recall events during the journeys and relate them to their feelings, highlighting the outcomes of travel behaviours.

C. Reflection on others' Subjective Experience

The difference between the control and experimental group was on the presence of other's SE. The visualization of personal and others' SE prompted social comparison, as expected. Also, participants perceived themselves and other car drivers usually displaying a lower SE level than cyclists and pedestrians. The awareness of differences in SE also made participants evaluate and consider other forms of transport.

IV. CONCLUSION

This study constitutes what we believe to be the first intervention to use others' SE as the influencing factor to change opinions and increase motivation to change towards a sustainable transport mode. It demonstrated that the strategies promoted reflection on participants' own travel behaviours and comparison with the (better) experiences of others. Envisioning the possibility of an improved commute experience may be the first step towards the use of active modes of transport. Goal setting and action planning can increase the efficacy of behaviour change interventions [2] and this would be an interesting addition to the intervention tested in this study.

REFERENCES

[1] ANABLE, J. AND GATERSLEBEN, B. 2005. All work and no play? The role of instrumental and affective factors in work and leisure journeys by different travel modes. *Transportation Research Part A: Policy and Practice* 39, 163-181.

[2] ARNOTT, B., REHACKOVA, L., ERRINGTON, L., SNIEHOTTA, F.F., ROBERTS, J.R. AND ARAUJO-SOARES, V. 2014. Efficacy of behavioural interventions for transport behaviour change: systematic review, meta-analysis and intervention coding. *The international journal of behavioral nutrition and physical activity* 11, 133.

[3] FOGG, B.J. 2003. Persuasive Computer: Using Technology to Change What We Think and Do. Morgan Kaufman: SF, CA, USA.

[4] FROEHLICH, J., DILLAHUNT, T., KLASNJA, P., MANKOFF, J., CONSOLVO, S., HARRISON, B. AND LANDAY, J.A. 2009. UbiGreen: investigating a mobile tool for tracking and supporting green transportation habits. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems,* ACM, 1043-1052.

[5] JARIYASUNANT, J., ABOU-ZEID, M., CARREL, A., EKAMBARAM, V., GAKER, D., SENGUPTA, R. AND WALKER, J.L. 2013. Quantified Traveler: Travel Feedback Meets the Cloud to Change Behavior. *Journal of Intelligent Transportation Systems* 1-16.

[6] MAITLAND, J., SHERWOOD, S., BARKHUUS, L., ANDERSON, I., HALL, M., BROWN, B., CHALMERS, M. AND MULLER, H. 2006. Increasing the awareness of daily activity levels with pervasive computing. In *Pervasive Health Conference and Workshops, 2006,* IEEE, 1-9.

[7] MORRIS, E.A. AND GUERRA, E. 2014. Mood and mode: does how we travel affect how we feel? *Transportation* 1-19.

[8] OINAS-KUKKONEN, H. 2013. A foundation for the study of behavior change support systems. *Personal and ubiquitous computing* 17, 1223-1235.

[9] OLSSON, L.E., GÄRLING, T., ETTEMA, D., FRIMAN, M. AND FUJII, S. 2013. Happiness and Satisfaction with Work Commute . *Social Indicators Research* 111, 255-263.

[10] PÁEZ, A. AND WHALEN, K. 2010. Enjoyment of commute: A comparison of different transportation modes. *Transportation Research Part A: Policy and Practice* 44, 537-549.

[11] STIBE, A., OINAS-KUKKONEN, H. AND LEHTO, T. 2013. Exploring social influence on customer engagement: a pilot study on the effects of social learning, social comparison, and normative influence. In *46th Hawaii International Conference on System Sciences (HICSS),* IEEE, 2735-2744.

[12] WUNSCH, M., STIBE, A., MILLONIG, A., SEER, S., DAI, C., SCHECHTNER, K. AND CHIN, R.C. 2015. What Makes You Bike? Exploring Persuasive Strategies to Encourage Low-Energy Mobility. In *Persuasive Technology,* Springer, 53-64.