
MirrorMe: Increasing Prosocial Behaviour in Public Transport

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ABSTRACT

Public transport can be a place where commuters feel rushed or stressed. Missing your train, a delayed bus or crowdedness at the station does not induce happiness among most people. As a consequence, prosocial behaviour like offering someone a seat is displayed less often.

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KEYWORDS

Public transport; prosocial behaviour; mood induction; empathy games; playful intervention; benevolent behaviour; gamejam



Figure 1. Mirroring another person typically used in social situations to show empathy

We discuss the design and design process of MirrorMe, a simple communal game to induce positive mood of commuters. MirrorMe aims to increase prosocial behaviour through mimicry. Commuters are challenged to “make a face” and thereby connect to other commuters. MirrorMe will be installed in a public display close to a train station enabling access to all commuters and passers-by. This work addresses the need for games and play in public setting to stimulate prosocial behaviour. It exemplifies how multidisciplinary HCI approaches in a gamejam setting can contribute to real life challenges. We conclude with open questions for impact evaluation in future work.

1 INTRODUCTION

Using public transport can be a stressful event. People are in a hurry, rushing to get on the bus or train, or people are upset because they just missed the train. These situations in public transport can lead to people having a bad mood. A bad mood can be contagious, leading to a lack in positive attitudes and actions of people [15]. A good mood, however, can also be contagious and therefore result in more prosocial behaviour [1,15]. Prosocial behaviour can be broadly defined as “active protection or enhancement of the welfare of others” [14].

Changing mood through playful interactions has become an increasingly important research area in the field of games and play, and has great potential [17]. However, a limited number of playful interactions are known that address prosocial behaviour in public setting. This despite the fact that games and playful interactions have a unique way to create new enjoyable experiences and connect people.

The impact of games that target prosocial behaviour and attitude change has received little attention over the years [17]. Moreover, not only in games did this link receive scant attention. As recently argued by Telle et al [20], the link between positive empathy and prosocial behaviour has been poorly understood in the broader scholarly community. Although the link between experiencing empathy and prosocial behaviour has been well established, this is only related to negative emotions. The link between positive empathy and displayed prosocial behaviour has not been intensively investigated so far [20].

We designed MirrorMe, a simple communal game to induce positive mood of commuters by mirroring a face that is displayed on a public display. The underlying assumption of the game is that empathy and connectedness increases through mimicry [15] (Fig. 1), leading to more helping behaviour [1,2,19]. Although a number of studies has shown how facial mimicry can influence a person’s mood [1,2,18] and increases prosocial behaviour of people [1,2,20], it has not been conceptualised in a communal game in the context of public transportation. This paper describes the design process, design and first implementation of MirrorMe, as a first step towards an impact evaluation of prosocial behaviour through a communal mimicry game.

2 GAMES INDUCING POSITIVE MOOD AND PROSOCIAL BEHAVIOUR

Playful interactions can engage, challenge and motivate players [6]. Moreover, play can enhance positive mood and change behaviour of players [15]. Several studies have shown that



Figure 2. field investigation in Montreal at CHI '18



Figure 3. . ideation phase in Montreal at CHI '18

games can support social change, for instance by improving attitudes towards social issues [13], increasing the willingness to help others [12] and supporting prosocial behaviour [9,16,17]. These games often support social change by inducing empathy through the depiction of social issues, and motivating people to take action [16].

A series of games has shown the connection of mood and changing behaviour. The good behaviour game, for example, was used in schools to effectively change behaviour [11]. Another example can be found in the work context, with the Emotional flower concept [3]. The game Emotional Flower made pictures of a person while working, to check the emotional facial expression. If the facial expression was positive, a flower was growing. The mechanism led players to smile on purpose to grow the flower, leading to increased positive mood. What seems critical for the success of such a game using mirror behaviour is that the player immediately has positive feedback about the success of the game [4].

To the best of our knowledge, no games exist to date that target prosocial behaviour in a public transport setting. However, playful interactions in public spaces have shown to promote social encounters [7] and address urban challenges [8,21]. As demonstrated by Tomitsch et al [21], digital communal designs can be used in transportation issues. For instance to raise awareness on the implications of daily habits on carbon emissions, improving ticketing and passenger circulation in public transport environments and tackle crowdedness in the train [21].

3. MIRRORME - DESIGN

3.1 Design process

The game MirrorMe was designed and developed during the GameJam at CHI 2018. The GameJam was held before the conference and had the theme 'All Inclusive'. GameJams are a very particular environment for developing games, as people have to quickly come up with ideas and design and development time is limited. During the GameJam six junior researchers from various fields worked together for forty-eight hours to design and develop the MirrorMe game.

The first phase of the GameJam was the ideation phase in which the team asked inhabitants of Montreal about the challenges they faced in their hometown (Fig. 2). From this quick field investigation we formulated a set of interesting societal problems we could address with our game. After several brainstorm sessions, we decided to focus on so-called echo chambers and increase interaction between people from different social groups.

With this chosen topic in mind, we ideated on several concepts (Fig. 3). After careful consideration, we decided to explore connection and interaction without verbal communication. Based on our list of requirements and our jointed expertise, we developed MirrorMe, a simple game that can be played by everyone, linking to the 'All Inclusive'-theme of the GameJam. Underlying inspiration for MirrorMe was that mirroring could potentially lead to greater empathy. With MirrorMe we want to take a first step in building bridges between people whom would normally not engage in play together.



Figure 4. Impressions from the on-site testing

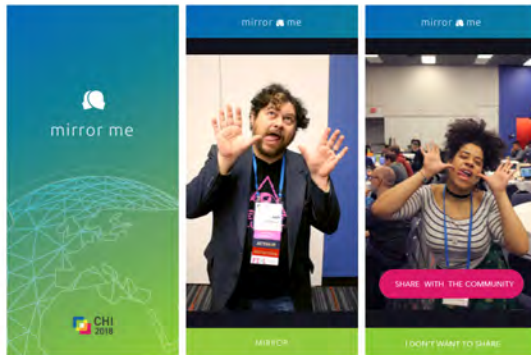


Figure 5. Design of first prototype – 3 frames

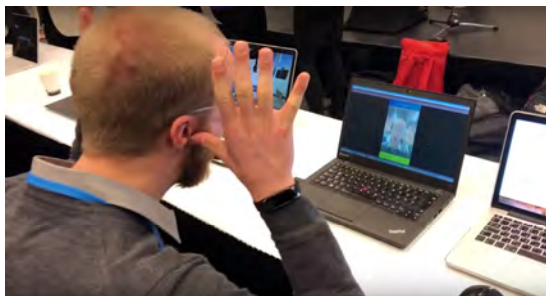


Figure 6. Final Prototype, tested at CHI '18

3.2 Design

MirrorMe has a rather simple game play. A player can take a photo of him or herself making a funny facial expression and the following player has to imitate the facial expression and gesture of the previous player. Then the player receives feedback on how close he or she mirrored the initial facial expression and gesture. This feedback is depicted as an accuracy percentage. The player can then decide to either share the photo with the community or not (Fig. 5).

3.3 Iteration and implementation

The game ideation phase resulted in a first game flow, which was tested using a digital mock-up at the CHI 2018 conference. We asked participants of the conference and passers-by to walk through the game flow, think out loud and verbalize their thoughts. Furthermore, we asked people to mirror a face from a photo and provided feedback on how well they mirrored the facial expression (Fig. 4). Based on the feedback from this mock-up test, we decided to improve the attractiveness of the gameplay by extending the game to multiple players. By including multiple people a chain of people copying each other was formed and was showed in a digital collage to the player after they were given the feedback on accuracy of their mimicry.

The game has a first implementation for PC and mobile phone (Fig. 5 and 6). MirrorMe uses a freely available face comparison API to provide feedback on the accuracy of the faces and postures. Unfortunately, the API was only working to a limited extend during the GameJam.

3.2 Onsite testing

The game was play tested during the CHI 2018 conference. A first technical version was evaluated with a series of GameJam participants in front of a PC (Fig.6). As the technical implementation was not reliable, most of the evaluations were including a Wizard-of-Oz component, wizarding the matching score of the current players picture with the previous picture.

A second evaluation was performed with pictures taken via mobile phone were conference participants were asked to mirror the face from the previous player and were presented the series of faces in a row. The game was well received by the audience. Comments during the game evaluation phase were positive and the game indicated to enhance the overall mood. The game idea seems to be simple enough to be applicable in contexts where people only have few seconds to play a game, and the reaction of participants indicated that mood was (slightly) improved for a short period of time.

4 NEXT STEPS

Following the GameJam we started to iterate on the game idea, to make it fit for public transportation. The design was iterated to include a clearly visible camera in a public display, so people can stand in front of the design to play the game. In terms of implementation we will use and explore Unity for game development and the affective software [22] as solution for the facial expression matching.

The prototypical implementation and first trials are planned for mid 2019 on the campus of the University of Technology Eindhoven, where thousands of students are taking a train to arrive at and leave the university every day. There is still ongoing discussion on how to avoid possible abuse (no appropriate content/pictures taken) and ensure privacy of by-passers (when to activate the camera). As the first evaluation is on campus this does not have to be functional, as there is a separate video-observation policy in place at the University.

While the technical implementation is progressing, the biggest challenge now is how to set up the evaluation. The goal of MirrorMe is to induce positive mood and lead to more prosocial behaviour in a real setting.

Open questions for the method choice for the evaluation are:

- How to measure positive mood and/or affect in terms of duration and lasting effect?
Should we and how can we include measures of community connectedness in our measurements (for instance with pictorial measure of community connectedness [10])?
- How to evaluate the resulting prosocial behaviour in the context of public transportation: central questions are the definition of prosocial behaviour in this context, the clear classification of what is not prosocial behaviour and how to measure the change
- How to ensure and evaluate that such displays are really meaningful, not only as a short-term design intervention, but that they can have an impact on the longer term and can lead to systemic change

MirrorMe is one of the interventions currently planned to investigate how small changes in the environment can change people's behaviours and practices. This concept focuses on the public transportation aspect related to the campus, but we have been working on a series of ideas (Living lab TU/e) focusing for example on inducing healthier life style by proposing walking meetings [5].

5 SUMMARY AND OUTLOOK

MirrorMe is a playful intervention that aims to induce positive mood and thereby increase prosocial behaviour. MirrorMe is built on the principle that mood contagion is an automatic mechanism that induces a congruent mood state by means of the observation of another person's emotional expression. The goal for our future development is to investigate this principle in the area of public transportation. Our game development is currently in progress, with first on-site evaluations planned for mid 2019.

Our main points of interest for the late breaking work presentation concerns evaluation. What type of evaluation can really provide valid results showing that mood induction via mirroring a face or gesture is leading to more prosocial behaviour. This includes an evaluation not only of the installation and device, but also the need for follow up behaviour measurements.

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REFERENCES

- [1] Rick B V A N Baaren and Roos Vonk. 2008. Effects of mimicking: Acting prosocially by being emotionally moved. 976, October 2007: 965–976.
- [2] Rick B van Baaren, Rob W Holland, Kerry Kawakami, and Ad van Knippenberg. 2004. Research Report Mimicry and Prosocial Behavior. *Psychological Science (Wiley-Blackwell)* 15, 1: 71–74.
- [3] Regina Bernhaupt, Andreas Boldt, Thomas Mirlacher, David Wilfinger, and Manfred Tscheligi. 2007. Using emotion in games. *Proceedings of the international conference on Advances in computer entertainment technology - ACE '07*: 41.
- [4] Jason T. Bowey, Max V. Birk, and Regan L. Mandryk. 2015. Manipulating Leaderboards to Induce Player Experience. *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play - CHI PLAY '15*: 115–120.
- [5] Ida Damen, Rens Brankaert, Carl Megens, Pieter van Wesemael, Aarnout Brombacher, and Steven Vos. 2018. Let's Walk and Talk: A Design Case to Integrate an Active Lifestyle into Daily Office Life. *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18* 2012: 1–10.
- [6] J.P. Gee. 2003. *What Video Games Have To Teach Us About Learning and Literacy*. New York.
- [7] Luke Hespahol, Martin Tomitsch, Oliver Bown, and Miriama Young. 2014. Using embodied audio-visual interaction to promote social encounters around large media façades. *Proceedings of the 2014 conference on Designing interactive systems - DIS '14*: 945–954.
- [8] Jun Hu, Mathias Funk, Yu Zhang, et al. 2016. Designing Interactive Public Art Installations: New Material Therefore New Challenges To cite this version: HAL Id: hal-01408522 Designing Interactive Public Art Installations: .
- [9] Sunmin Lee, (Wynnie) Wing Yi Chung, Emily Ip, and Thecla Schiphorst. 2014. The Laughing Dress: Evoking Prosocial Interaction Among Strangers. 2143–2148.
- [10] Debra Mashek, Lisa W. Cannaday, and June P. Tangney. 2007. INCLUSION OF COMMUNITY IN SELF SCALE: A SINGLE-ITEM PICTORIAL MEASURE OF COMMUNITY CONNECTEDNESS. *JOURNAL OF COMMUNITY PSYCHOLOGY* 35, 2: 257–275.
- [11] A. McKenna, J. W., Flower. 2014. Get them back on track: Use of the good behavior game to improve student behavior. *Beyond Behavior* 23, 2: 20–26.
- [12] C. Peng, W., Lee, M., Heeter. 2010. The Effects of a Serious Game on Role-Taking and Willing- ness to Help. *Journal of Communication* 60, 4: 723–742.
- [13] D Ruggiero. 2015. The effect of a persuasive so- cial impact game on affective learning and attitude. *Computers in Human Behavior* 45, 2015: 213–221.
- [14] Shalom Schwartz and Wolfgang Bilsky. 1989. Toward a Theory of the Universal Content and Structure of Values: Extensions and Cross-Cultural Replications. *Journal of Personality and Social Psychology*, 53: 550–562.
- [15] H. Smith, E., Mackie, D., Claypool. 2015. Social Psychology. In Psychology Press, New York, 230–273.
- [16] Sharon Steinemann, Benjamin Geelan, Kristy de Salas, and Klaus Opwis. 2017. Simple Acts for a Better World: A Gameful System for Prosocial Behavior: Preliminary Design and Research Plan. *Extended Abstracts Publication of the Annual Symposium on Computer-Human Interaction in Play*: 305–313.
- [17] Sharon T. Steinemann, Klaus Opwis, and Elisa D. Mekler. 2016. The winner gives it all? Preliminary results on the role of game outcome on the effectiveness of a game for change. 291–298.
- [18] M. Stel. 2005. *The Social Functions of Mimicry: On the Consequences and Qualifiers of Facial Imitation*. .
- [19] Mariëlle Stel, Eric Van Dijk, and Rick B Van Baaren. 2016. When and Why Mimicry is Facilitated and Attenuated. 10: 561–574.
- [20] Nils Torge Telle and Hans Rüdiger Pfister. 2015. Positive empathy and prosocial behavior: A neglected link. *Emotion Review* 8, 2: 154–163.
- [21] Martin Tomitsch and M. Hank Haeusler. 2015. Infostructures: Towards a Complementary Approach for Solving Urban Challenges through Digital Technologies. *Journal of Urban Technology* 22, 3: 37–53.
- [22] Affectiva Software. Retrieved July 14, 2018 from www.affectiva.com.