Creating social presence through peripheral awareness

de Ruyter Boris　　　*Claire Huijnen, Panos Markopoulos, Wijnand IJsselstein*

Philips Research Eindhoven
Prof. Holstlaan 4
5656 AA Eindhoven
The Netherlands
boris.de.ruyter@philips.com

Technical University of Eindhoven
PO Box 513
5600 MB Eindhoven
The Netherlands
Chuijnen@cuci.nl, P.Markopoulos@tue.nl,
W.A.IJsselstein@tm.tue.nl

Abstract

This paper describes an experimental assessment of affective user benefits that may result from peripheral awareness of a remote friend or group of friends during a shared viewing of a televised event. The experiment suggests that awareness supported through a visual display enhances the level of social presence experienced and increases the attraction individuals feel towards the remote partners, a sign that social interactions can benefit from this type of technology.

1　Introduction

This research explores the potential user benefits from interconnected CE devices. One such benefit is social presence, which refers to the sensation of 'being together' that may be experienced when people interact through a telecommunication medium. As connectivity permeates our daily lives we expect that network infrastructures will become enablers for social interactions. While communication media such as e-mail, telephony, text messaging services for mobile phones, etc., are common, there is more to system-mediated communication than exchanging information. This paper describes research to assess the potential of attaining social presence by maintaining a peripheral (visual) awareness of a connected person or group of persons, outside the context of communication/information exchange tasks. Further, it is assesses the affective benefits that arise out of this interconnection.

2　Social Presence and Group Attraction

The concept of social presence (Short, Williams & Christie, 1976) can be colloquially defined as "the sense of being together" and communicating with someone. While, the main body of research on social presence has concerned its determinants and the measurement of social presence, this study deals with the consequences and the nature of social presence in the context of the home. In social life people are part of many groups that they interact with. The feeling of being a member of such group is called *group attraction*. In general a distinction can be made between two types of groups: primary and secondary groups (Cooley 1990). Primary groups are small, close-knit groups such as families, friendship cliques, children's playgroups, emotionally close peers, etc. Examples of secondary groups are professional associations, business teams, etc. Primary groups are characterized by frequent face-to-face interactions, interdependency and strong group attraction among their members. According to (Cooley 1990) primary groups are "fundamental in forming

the social nature and ideas of the individual". Earlier studies have shown that people desire more connections to family and close friends, e.g., see (Hindus, Mainwarin, Leduc, Hagström & Bayley, 2001). It is possible that members of such primary groups are distributed over different locations. With systems that are capable of enhancing social presence, we might be able to connect these different members of the group. We anticipated that increased social presence will improve the relations between group members and that this will be reflected in the attraction individuals feel towards the group of persons they are interconnected with. In the remainder of the paper we report an empirical study that was conducted to validate this conjecture.

3   Empirical Study

An experiment was conducted at the Philips HomeLab, at Eindhoven in the Netherlands. The HomeLab is a test laboratory that looks like a normal house, but thanks to an extensive observation infrastructure provides a 'natural situation' to test the behavior of people at home.

Participants and task. 34 participants, who were all Dutch males, participated in the experiment. They were recruited as groups of 3 friends who enjoy watching soccer games, who have no love relationships, as such relations could bias the measurements of group attraction. The friends were split (2-1) and placed in 2 different rooms (there were 2 groups of 2 persons). During the experiment all participants watched the same soccer game.

Design and conditions. A mixed experimental design was adopted. First 2 kinds of viewers were distinguished: single viewer (only 1 person in a room) and group viewer (2 persons in a room). This was a between subjects condition. Then the information offered about the remote friend(s) was a within subjects conditions, where each subject receives every condition (for approximately 30 minutes). The different conditions are the control condition, a silhouette visualisation and a full video condition. In the control condition all participants watched the same match on TV at remote locations. However, the persons could not see any visualization of the remote participant(s). They were told that their friends were watching the same match simultaneously. This condition is a baseline for comparing the visualizations: It may be that people experience a certain level of social presence when they know about each other that they are engaged in the same activity at a certain moment. The second level of visual information was a black and white (silhouette-like) image of the remote match viewers that is updated in real time when there is a movement of the persons in that room (see figure 1.). The processed visual representation of the persons in the remote location was projected on the wall behind the screen/on the TV screen people were watching, to provide the image of the remote friends at the periphery of the attention of the test participants. In the third condition participants were shown full live video images of their friends watching the match. In this visualization, more detail is depicted and the people in the visualization are always visible. This is contrary to the silhouette visualization, where people only see silhouettes when there is a change in activity.

The trials were counterbalanced to avoid any potential sequence effects. Every group watched the same match to prevent any effect from differences in games. The match was a classic game for the national Dutch team that can still be exciting for Dutch soccer enthusiasts, even though it is not a live broadcast. In none of the experimental conditions did we use audio as an experimental condition (audio of the game on television was included in all three conditions). From previous social presence literature it can be expected that adding audio to the visual channel would significantly increase the level of social presence (Short, Williams & Christie, 1976). In this study, however, it was not intended to achieve the maximum level of social presence or to assess the effect of different modalities on social presence. Rather, we were interested to explore minimal and undisruptive means for achieving social presence.

Measures. The independent variables for the experiment are the amount of visual information (none, silhouette or full video) and the group setting (single viewer or 2 persons together). Social presence was measured after each condition by use of the IPO-SPQ (IPO Social Presence Questionnaire) (de Greef and IJsselstein, 2001). The IPO_SPQ makes use of two approaches to measure social presence. It uses the semantic differential items from (Short, et al. 1976) that measures more affective qualities of the medium. Next to these semantic differential items, the IPO-SPQ includes subjective attitude statements about the experience using a 7-point agree-disagree scale. The items from the subjective attitude scale were adapted for the context of this experiment. Another dependent variable is the level of Attraction to Group experienced by the subjects. This was measured by the Group Attitude Scale (Evans and Jarvis, 1986) after each condition. Group Attraction is defined as: 'an individual's desire to identify with and be an accepted member of the group'. The GAS is composed of an equal number of positive and negative statements to guard against response set bias. Finally, some questions were included to asses people's attitudes and experiences about the system they were interacting with.

4   Results

On the basis of the data collected with the IPO-SPQ questionnaire, we observe that social presence increases from the control, to the silhouette and the full video condition (see figure 2, left). The difference in social presence between the control and the silhouette conditions is not significant. The difference between both the control and silhouette conditions with the full video condition is significant. In the full video condition people were constantly aware of the activities of their friends, which was not the case in the silhouette condition. There is no difference in the level of experience of social presence between the single and the group viewers. The effect of the silhouette and full visualizations on group attraction is the same for both kinds of viewers (single and group viewers) (see figure 3.). The silhouette and the full video visualization caused a higher
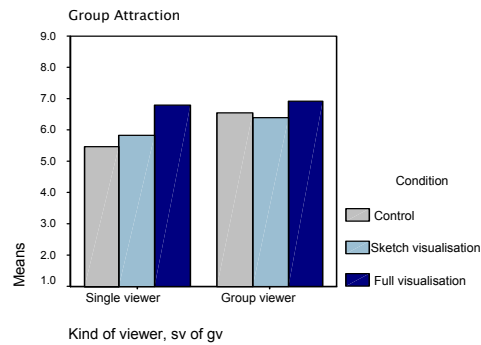
Figure 3. Results for condition on group attraction

group attraction (based on the GAS data) compared to the control. In the control condition there is a difference in the group attraction between the single and the group viewer. The group viewer is more attracted to the group than the single viewer in the control condition. Group attraction increases in the silhouette- and full visualization. The group attraction difference between the single and group viewer disappears when the silhouette or full video representation are displayed.

Some items of the questionnaire gather information about the participant's attitude towards the experimental system. During the full video condition people felt more watched than during both the silhouette and control conditions (see figure 2, right). There was no difference between group or single viewers. People devoted more attention to the television during the silhouette visualization than they did in the full video condition (Figure 4, right) while the silhouette visualization attracted less attention than the full visualization (Figure 4, left). No differences between the single and the group viewer were found.

5   Discussion

The present study investigated if social presence can be established by providing visual display of remote friends that are watching the same television program. By presenting different visualizations of the physical activities in the remote locations in parallel with shared TV content, an experimental condition was created in which the amount of social presence and group attraction could be measured. The results from this study indicate that a low bandwidth visualization of the
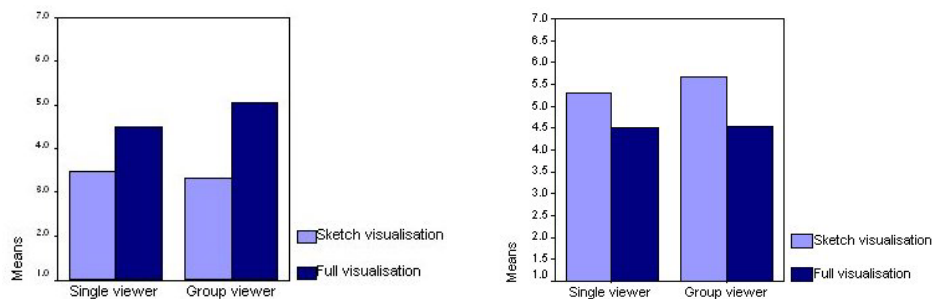

Figure 4: The amount of user attention to the visualisation during the experiment (left) and of user attention on the TV content during the experimental conditions (right).

physical activities from remote locations is capable of establishing a sense of social presence.

Furthermore, the feeling of being part of a group (i.e. group attraction) was increased. When the single viewers did not receive any representation about their friends location, they had a low feeling of belonging to and being an accepted member of the group. The group viewer on the other hand, did have the feeling of belonging to the group in the control condition. When the minimal representation is introduced to the single viewer, this person did experience himself as being an accepted member of the group. The difference between the two kinds of viewers vanished by introducing the visual media.

The silhouette visualization was equally distracting as the full video but it gave participants less the feeling of being observed. This latter aspect of the visualization could be of great importance to create social presence enabling systems for the home environment. Although the full video visualization was stronger in creating the feeling of being together and being part of a group, the low bandwidth visualization using silhouette representations of physical activity is probably more acceptable because it respects user privacy. Further research needs to be conducted for establishing the optimal level of social presence: the present study did not consider whether the amount of social presence created by the experimental visualization was sufficient to be of value for users. Test participants indicated that they would prefer different levels of social presence for different kind of TV programs. People prefer to watch sports and movies in presence of others, whereas they prefer to watch news and documentaries alone. For entertaining programs, viewers enjoy making a cozy atmosphere and experience other person's reactions. More research is needed to investigate the context in which people prefer less or more social presence.

Additional research should assess whether the effects generalise for different relational types. It may be the case that people prefer different levels of social presence depending on the "interaction/communication" partner. Moreover, different kind of activities need to be investigated. It can very well be possible that different kind of activities elicit different levels of social presence. Moreover, it can be interesting to asses the level of enjoyment of the participants during the interaction with different systems. Finally, further research is needed to assess whether differences exist between males and females.

6   References

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