Influence of Social Setting on Player Experience of Digital Games

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Abstract
Recent studies have indicated that playing games against other people is more fun and more exciting than playing alone. The current study aims to further explore the influence of social setting on player experience in digital games; in particular, it sets out to test the level of social presence of the co-player as a determinant of player experience. Dependent variables include a comprehensive self-report measure of player experience (the GEQ) and state aggression. The first results demonstrate significant differences in playing against a computer, a mediated other, or a co-located other on player experience in terms of positive affect, competence, tension and hostility.

Keywords
Digital gaming, computer mediated communication, game experience, player experience, social setting, social presence.

ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. ; J.4 Social and Behavioral Sciences- Psychology; General terms: Experimentation.

Introduction

Digital games are often played with family, friends and, since the availability of online gaming, with strangers as well. Gaming can be seen as a means to interact with others in an informal way in co-located and mediated settings [6,7] and can be used for establishing or enhancing friendships with others [3]. According to gamers, socializing is the most important motivation for playing digital games [5,12]. Nevertheless, the social component of digital play is often missing in theories and models of player experience and digital gaming platforms are not valued to their full extent as a medium which brings people together [3,6,7]. To underline the social richness of playing digital games and to emphasize the importance of social interaction during games, we approach digital games as social presence technology [6,7].

Social presence is defined here as the sense of being together with a (mediated) other [1,8]. This level of social presence differs between three very common competitive play configurations. First, games are often played with a co-located other; that is with a co-player in the same physical location. Second, gamers frequently play online, i.e., with a mediated other. An important difference with the first setting lies in the opportunities for richer social interaction between players in co-located settings, where non-verbal and verbal behaviors can continuously be monitored. De Kort and colleagues [6] argue that this will impact player experience via social processes such as, immediacy, mirroring and emotional contagion. A third play configuration is single-player mode, where players may compete with a virtual player. A potential difference between the latter two configurations is that agents as competitors may be more predictable than human co-players [10]. In addition, players' awareness of their co-player being human - a sense of human agency - may impact experience due to the social relevance of their performance and actions in general. We therefore expect that differences in social setting moderate player experiences in a game. First indications of these effects were reported by Ravaja and colleagues [13] who made an experimental comparison of playing against a co-located human player versus playing against a computer. Findings show that playing against a co-located human player elicits higher anticipated threat, engagement and challenge, and more positively valenced emotional responses than playing against a virtual adversary [13]. Mandryk and Inkpen [11] reported similar results in collaborative play. Both studies employed physiological measures of emotions, but self-report measures of player experience were rather crude and consisted mainly of one-item scales. Moreover, no causal psychological mechanisms were provided. We expect that the potential for social interaction and sharing experiences is the main cause for the reported differences. However, based on results from previous studies, this explanation cannot reliably be disentangled from potential effects of perceived human agency.

Aim of the Present Study

In the present study we investigate how social setting influences play, employing more comprehensive self-report measures of player experience than earlier studies. In addition we aim to explore which psychological mechanisms potentially account for these differences, by comparing three instead of two play configurations: against a co-located human player, a mediated human player, and a computer. It is

hypothesized that the experience of co-located play differs from mediated play because of the (in)ability to socially interact and share the experiences during the game. Furthermore, experience of mediated play may differ from playing against a computer due to the awareness and recognition of a human as co-player.

Method

Experimental Design

To address the research question a within groups design was employed, where Co-player Presence was manipulated (virtual (computer) opponent vs. mediated human opponent vs. co-located human opponent). Player experience was measured with a combination of self-report measures after each session.

Participants

Sixteen[1] male Dutch graduate and post graduate students, 20 to 34 years of age (M = 27.3; SD = 4.3), participated in the experiment. Participants played in pairs against each other; all couples were acquainted with each other.

Apparatus

In the experiments the game *WoodPong* by Radu Resinari (released in 2005) was used, which was displayed on a 17 inch monitor display. The game is derived from tennis with doubles, where a team has to prevent the ball going in the black space behind them by trying to touch the approaching ball and hitting it towards the other player (see Figure 1). The music and side effects within the game were played via a headphone which players wore in all conditions.

[1] This is work in progress. The full experiment will include a larger number of participants.

Procedure

Participants were asked to fill in a consent form and were led to believe that the purpose of the study concerned latency in online games. Both participants played three sets of *WoodPong* in three sessions where the social setting in each session alternated: in the 'virtual' play configuration participants played against the computer (in separate rooms), in the 'mediated' setting they played online against each other (in separate rooms), and in the 'co-located' setting they played against each other in the same room, on the same console. The order of conditions was randomly assigned per couple. After each session both participants were asked to fill in a survey individually. Lastly, the subjects were debriefed, paid and thanked for participation. The experiment lasted 30 minutes; each participant received a standard compensation of €5,- for their participation.

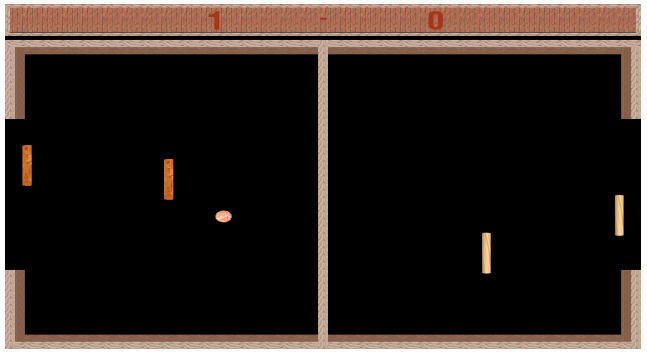

figure 1. Interface of WoodPong where both slices of the same color are simultaneously controlled by the keyboard; the game stops when one of the players has 6 points.

Measures

A questionnaire was constructed which consisted of three scales: player experience, aggression, and social presence. Player experience was measured with the Game Experience Questionnaire (GEQ), which was recently developed and validated [4]. It consists of seven subscales: Positive Affect, Negative Affect, Flow, Sensory Immersion, Tension, Challenge and Competence. For the second scale, measuring state aggression, the Trait Aggression Scale by Buss & Perry [2], was modified by changing items into state questions (e.g. *"I sometimes feel that people are laughing at me behind my back",* became *"I sometimes thought the other was laughing at me behind my back"*). It consists of four subscales: Anger, Hostility, Verbal Aggression and Physical Aggression. The third scale, the Social Presence in Gaming Questionnaire (SPGQ) [7] was administered to verify the manipulation of social presence in the three play configurations under study. It was partly derived from a more general scale of social presence [1] and consists of three subscales: Psychological Involvement-Empathy, Psychological Involvement-Negative Feelings and Behavioral Engagement.

The combined questionnaire included 65 items. Participants could respond on 5-point Likert scales, ranging from 1 (not at all) to 5 (extremely).

Results

We report here the preliminary analyses on the data currently collected.

To check the manipulation of setting, we performed Repeated Measures ANOVAs (REMANOVAs) on the self-reported Social Presence. Reliability of the SPGQ scales varied considerably: Cronbach's alpha ranged between 0.86 and 0.93 for Behavioral Involvement, 0.29 and 0.67 for PI-Empathy, and between 0.39 and 0.77 for PI-Negative Feelings. The Psychological Involvement-Empathy scale showed significant effects ($F(2,14) = 49.0$, $p < .01$, $R^2 = 0.8$). Contrast analyses demonstrated differences between each of the experimental groups. Psychological Involvement-Negative Feelings also differed between conditions ($F(2,14) = 7.2$, $p < .01$, $R^2 = 0.3$). Contrast analysis showed higher scores for co-located and mediated play compared to virtual play.

To test the hypotheses we performed REMANOVAs on the participants' self-reported Player Experience with Co-player presence as the within groups factor. All GEQ subscales had satisfactory Cronbach's alphas (between 0.62 and 0.91), except for Negative Affect (between -0.30 and 0.33). A significant effect for Tension ($F(2,14) = 6.3$, $p = .01$, $R^2 = 0.5$) appeared which is explained by higher scores for virtual and mediated play compared to co-located play ($F(1,15) = 7.6$, $p = .01$, $R^2 = 0.3$; $F(1,15) = 5.3$, $p = .04$, $R^2 = 0.3$), as is shown in Figure 2. In addition, a significant effect for Positive Affect emerged ($F(2,14) = 3.7$, $p = .04$, $R^2 = 0.2$). More Positive Affect is experienced in the co-located than in the virtual condition ($F(1,15) = 6.5$, $p = .02$, $R^2 = 0.3$), as also is shown in Figure 2. Although marginal, a significant effect is also found for Competence ($F(2,14) = 2.7$, $p = .08$, $R^2 = 0.2$) due to higher scores for co-located and mediated play compared to virtual play ($F(1,15) = 3.9$, $p = .07$, $R^2 = 0.2$; $F(1,15) = 3.7$, $p = .07$, $R^2 = 0.2$).

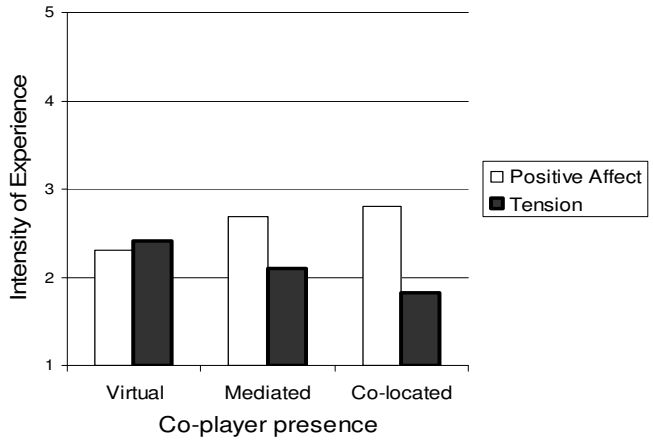

figure 2. Positive Affect and Tension as a function of Co-player presence (1 = not at all, 5 = extremely).

We also performed REMANOVAs on the participants' self-reported state aggression. Cronbach's alpha for the subscales ranged between 0.16 and 0.52 for Anger, 0.54 and 0.85 for Hostility, between 0.60 and 0.70 for Physical Aggression and between 0.64 and 0.90 for Verbal Aggression. A marginally significant effect for Hostility ($F(2,14) = 2.8$, $p = .09$, $R^2 = 0.3$) emerged which is explained by a higher score for mediated compared to co-located play ($F(1,15) = 4.1$, $p = .06$, $R^2 = 0.2$). In addition, although there was no significant effect on Verbal Aggression in the overall test, a marginally significant contrast indicated a higher score for mediated compared to co-located play ($F(1,15) = 3.7$, $p = .07$, $R^2 = 0.2$).

Discussion

In spite of the small data set, preliminary analyses already showed significant effects. First of all, results demonstrated that social presence progressively increased from playing against a computer, a mediated co-player and a co-located co-player. Hence, social setting has been successfully manipulated. Second, participants involved in co-located play against a human co-player reported significantly more positive affect, less tension and more competence than playing against the computer. Differences between playing against a computer and mediated play did not yet reach significance. This indicates that the limited social richness of mediated play may influence game experience. Furthermore, state aggression in co-located play was lower than in mediated play, as was suggested in [9]. Co-located situations allow for more elaborate impression management, both verbal and non-verbal, disambiguating potential aggressive signals as friendly banter.

Our results are in line with the results found by [11] and [13]; that is, playing against humans brings more enjoyment than playing against a non-human. In addition, however, we have also provided evidence that perceived human agency is in itself not a sufficient explanation for the enhanced player experience in co-located settings. If this were the case then the pattern of results of co-located and mediated settings should have been more similar. We believe that the opportunity for social interaction and sharing experiences with others in co-located play is the main cause for these differences in player experience. To elaborate further, we expect that less tension and aggression, and more competence and positive affect indicate that social presence of a co-player enhances game enjoyment. This holds clear implications for the design of games, consoles and interfaces.

The first results presented in this paper show that social setting significantly influences player experience, as argued in [6]. Yet three important concerns surfaced during the execution of the experiment. First, although the mode was set to "easy" almost all participants lost their game against the computer, which could produce a confound. This needs to be controlled for. Second, differences between the mediated co-playing and playing against a computer are as yet modest. Effects that do emerge can be attributed to one of two reasons: the fact that the player is aware of playing against a human and the psychological relevance of this fact, or the different playing styles of computers vs. people. We need to further refine our experimental design in order to disentangle these effects. Third, we observed that pairs that were more familiar with each other were more enthusiastic during play, in line with [13]. These considerations inspired a few changes in the design of the final experiment, the data of which will be available at the time of the conference.

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