

# A Study into the Experience and Effect of Social Presence When Playing Digital Games

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Group 20; Experiment 3

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## Introduction

It is interesting that two thirds of gamers actively play with other people for at least an hour per week, with 60% of those sampled stating their main motivation being to play with friends<sup>[3, p3]</sup>, contradicting the strong image of the lone gamer. It is argued that higher levels of enjoyment caused whilst playing games occur when people play together and interact<sup>[4]</sup>; something that technology is increasingly facilitating even over distances.

However, different games offer different scope for interaction, and so players could benefit differently from the presence of another person. Game designers could therefore establish what the minimum threshold of interaction opportunities are for a game to be considered fun, even for someone watching who is a potential customer; most people are introduced by playing with or watching others play<sup>[7]</sup>.

Knowing that social presence is a big factor in the enjoyment of games, we hypothesised about how levels of interaction generate different levels of social presence as felt by the gamer and measured by the Social Presence in Gaming Questionnaire (SPGQ). This generates metrics for psychological involvement, measuring both empathy and negative feelings, and behavioural involvement with the other person(s)<sup>[5]</sup>.

## Aims and Hypotheses

As measured by the SPGQ, Psychological Involvement - Empathy, Behavioural Involvement and Negative Involvement will each increase between the groups when under supervision.

## Experimental Method

In this section we will talk about the method we used to conduct our experiment, as well as demographic information of participants.

## Participants

We initially aimed to conduct the experiment with students from Computer Science. Unfortunately, not many of the targeted participants turned up. Participants were also recruited from flats and friends. A lower proportion of Computer Science students turned up, but the total number of participants made the experiment viable.

## Demographic Information from Participants

13 students from the University of York agreed to take part on the day (9 male). All were first year undergraduate students, with age ranging from 18-25. All students were accommodated on Heslington East campus. The subject's studied by participants were slightly skewed towards Computer Science, however there was a mix of other subjects (Fig. 1).

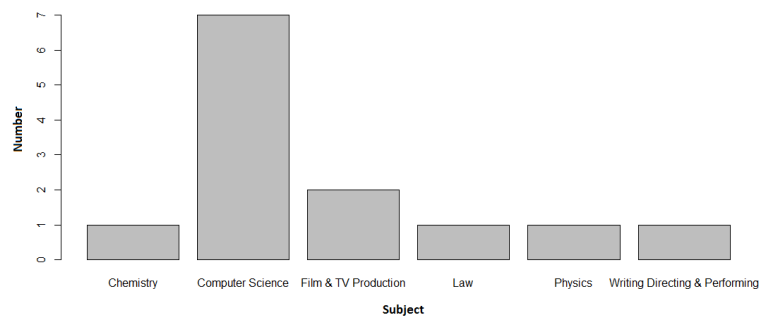


Fig. 1

Students were recruited with the offer of various sweet rewards such as chocolate biscuits on completion.

## Design & Tasks

This was a between subjects design with two conditions. The independent variable was whether the participant was helped to play the game or not. The dependant variables are the three measures of social involvement in the SPGQ.

## Effects of Experience

As some players may have had more experience than others, they may pay less attention to people with them, or not require as much help, limiting the opportunities for social interaction. In order to minimize this effect we used a game which was modified specifically to be used in this experiment. The game will include no time pressures and has a linear difficulty progression.

## Social Gaming

We recorded how often the players played digital games and how often they played team based games which require good communication. Those who played these games, possibly with people locally to communicate with or using VoIP programs, may produce exaggerated results as they are either desensitised or else unable to tune the presence of the other out.

## Materials

The game was of the match three genre, of which the most familiar is perhaps Bejeweled. The version used was developed by Dale Green and modified by us to be more suitable for a controlled conditions experiment. The aim is to match sets of exactly three, at which point they vanish and the blocks above fall into place (with a small time delay). This is achieved by clicking two horizontally or vertically adjacent blocks which are then swapped, but only if this would result in a match. The first block clicked is enlarged to highlight it, and if an invalid second choice is made then it is reset.

There was no time limit on the game, so that the score could be controlled and so that the game did not get harder as time progressed (although more skilled users can pick moves that change the grid so as to allow more possible future moves). This helps prevent any effects of existing experience as the player cannot be familiar with the rules of this unreleased game, while allowing less experienced players to relax due to the lack of a time

limit. The lack of a time limit is shown to reduce immersion<sup>[1]</sup>, which we hope allowed any social presence to better manifest itself. Although removing sound completely should have the same effect<sup>[2]</sup>, it was felt best to reward the player slightly to make them care by playing a sound whenever a match was made. The custom game also enabled us to make the game fullscreen and with a limited interface to remove distractions

The experiment was run in two small rooms next to a lake at the university. Both rooms were configured identically. The blinds were shut and the participants faced them so there was no distractions were caused by the lake. In both rooms, we used Dell XPS laptops with identical cases and 15.6 inch displays (LCD, 1366x768 and LED, 1920x1080). The game was resized to appear at the same physical size on both screens, and the players and confederates positioned such that the different viewing angles offered by LCD and LED screens did not affect what was seen by the pairs. It should be noted that LCD and LED offer different brightness and contrast levels, but the eight coloured blocks used in-game had sufficient contrast and brightness was controlled such that the two screens appeared very similar. Different types of mouse were used for the rooms but were selected from a small range such that their shapes were as similar as possible. One then had weights added internally to bring their masses as close as possible.

## Procedure

### In experiment zone

The participants were assigned sequentially to one of the rooms, under the assumption that without any prompting their order would be random. The confederate in each room was the same throughout the experiment, and sequentially either interacted with the participant (talking, pointing out moves etc.) or sat silently until they told them that the participant that they should stop playing. The confederate was one of the experimenters so that their behaviour could be controlled, but they were not introduced to the participants as such but simply as someone who had agreed to watch them. The confederates did not know the participants in the sample we achieved.

Once the participants had entered the experiment zone they were asked to read through the instruction sheet. This contained the basics of how to play the game and what they should be doing throughout the experiment. The instruction sheet was specifically designed to lack details in order to not give any details of the experiment away before the participant answered the questionnaire. This helped to prevent distortion of the results from the participant giving answers they expect for the experiment rather than what actually happened.

The participants played the game for five minutes before being asked to stop and fill in the questionnaire. If at any point there were no more moves left, they were asked to restart the game. Once they had filled in the questionnaire they were allowed to ask questions about the experiment and how the data would be used. The answers to the questionnaires were then collated with the confederate's notes.

## Results

Thirteen participants were recruited for the experiment, which were split between the confederates and conditions as seen in Table 1.

	N	Y	
Jonathan	3	3	Table 1
James	4	3	

To control the overall chance of Type I errors, the Bonferroni correction was used and the significance level was  $p = 0.01$ .

To analyse the effects of a potential confound, Mann-Whitney U tests were carried out to test for significant differences between the two confederates in each metric. There was no significant result in the control group (no interaction) ( $p > 0.25$  all) and no significant result in the experimental group ( $p \geq 0.70$  all).

A Mann-Whitney U test was carried out on each of the three metrics of the SPGQ, to determine whether the hypotheses were correct.

## Empathy

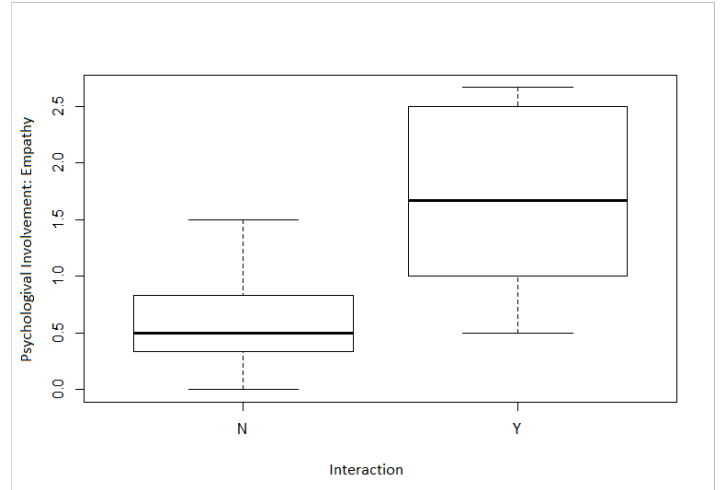


Fig. 2

The empathy component of psychological involvement with the confederate was not significantly different when they interacted with the participant ( $W = 6$ ,  $p = 0.04$ ). This does not support our hypothesis.

## Negative Feelings

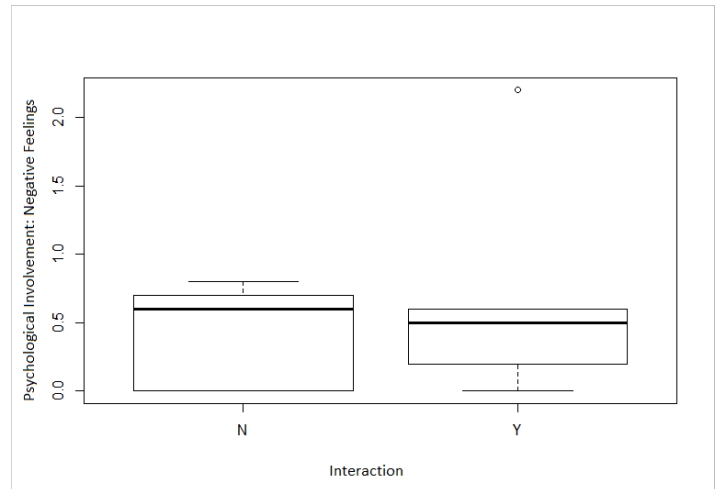


Fig. 3

The negative feelings component of psychological involvement did not differ significantly across the conditions ( $W = 19.5$ ,  $p = 0.883$ ). However, the s.d. more than halves when interaction occurs (0.79, 0.38).

## Behavioural Involvement

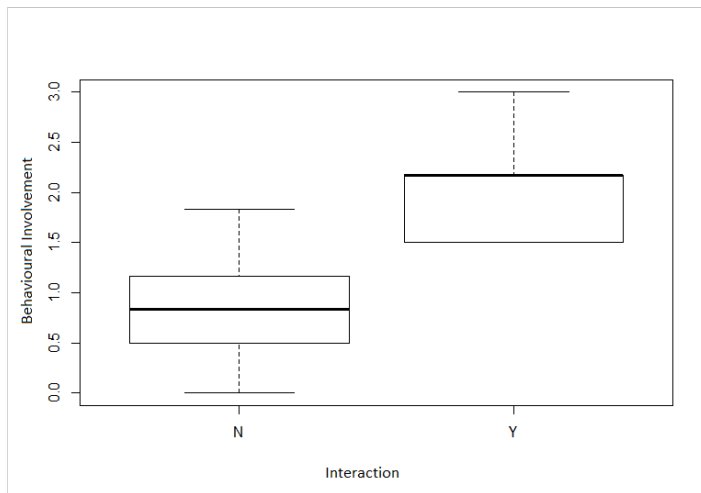


Fig. 4

Behavioural involvement was found to vary significantly ( $W = 2$ ,  $p < 0.01$ ) between groups.

## Discussion and Conclusion

The experiment tried to determine whether the components of social presence changed significantly when the player was helped in the game. The results show that only the behavioural involvement component changed significantly, although the empathy component was very close to being significant. The sensitivity of this measure seemed very good for the experiment, and with more participants may well have yielded a significant result. This is likely due to the good matchup with the experimental setup, which encouraged the confederate to work with the participant to suggest actions in the experimental group.

Unlike previous experiments<sup>[6]</sup>, there was no difference between conditions for the negative feelings component. This experimental setup seemed to be very bad at either causing any amount of or else picking up any negative feelings, and allows no real conclusions to be drawn. This may have been caused by the player being intentionally less immersed in the game and so not feeling as many bad feelings about the other player “interfering” with them. It is also possible that a ‘bad move’ in the game was not obvious, and there was no obvious blame when the only negative outcome occurred: the game ended. A game with more highs and lows may have elicited a better response here.

There were also unwanted interactions necessary because of how the experiment was run: when there were no more moves possible available for the player to make the game would stop and the confederate would have to tell the player to press to reset button to start a new game and continue playing. This could make the player feel like they aren’t doing well and cause them to slow down or become less immersed in the game. This might cause them to have increased social experience as they are not focused on the game as much; all of this is unwanted interaction which may have unwanted social effects in the groups in which the confederate didn’t interact with the participant. This could be removed by automatically restarting, and if more experimenters were available they could also call in to stop the experiment. Additionally, if the participant had questions during the experiment, this may require communication from the confederate. The response in the control group was that they were not allowed to talk, but this was not properly logged and would have impacted how they felt about the confederate.

The results may be affected if the confederate knew the test subject outside of the experimental conditions; this could cause adverse positive or negative effects but did not occur. The experiment was run with two confederates to allow us to process enough people, which may have caused some effects on the results as they may have interacted different amounts with the participants during the experiment. Any skew here should be countered by the even division of participants and conditions, but the added noise may mask any true results.

Any future experiments should use either one confederate, or different people acting as the extra person but a much larger sample size. This would also allow testing of the confederates, to see if different conditions affect their enjoyment or feeling of social presence. In this scenario, it may also be interesting to see how the two interpretations differ between them affecting each other’s behaviour and feelings, as tested by the SPGQ.

The experiment could be run using a game designed to have two players working together in order to increase the social interaction between them. A longer playing time may also have given results which better reflect the social effects as there would be more opportunities for interaction between the participant and confederate. However the player may become uninterested after a long period of time, causing them to pay less attention to the game and more to the confederate, increasing the effects of interaction even in the group with limited social interaction.

For this reason, it should be considered that other conditions might be added. If instead of physically placing people in the same room, they are allowed to play a more engaging game but placed together in the game world, interaction can be required without reducing immersion. This may yield larger differences in the scores all around, and allows comparison of different interaction methods, e.g. long distance communication using headsets compared to adjacent desks.

This would ideally allow it to be determined what is required for different degrees of social presence, and how it may enrich the experiences of all parties involved. Surely this would be useful not just to allow games more fun for all who may ever become involved, but also wherever two or more people may have to meet to convey ideas or feel valued.

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