Collocated Multiplayer Games and Social Interaction

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ABSTRACT

Collocated multiplayer games are computer games in which multiple players can play competitively or collaboratively together in the same room, and their ability to facilitate social engagement has contributed to an increase in popularity in recent years. Games researchers may learn much about the strength of collocated game designs through observing group behaviour, however social groups have complex infrastructures and situational variables can make analyses challenging. Studies have attempted to understand group behaviour around games (Voida, Carpendale & Greenburg, 2010), but no one has systematically identified the relationship between behaviour, type of game being played, and personality. This study reports two sets of findings on an experiment in which 12 groups of friends were observed playing both competitive and collaborative game modes of a First Person Shooter game. Firstly, it investigated the affect that competitive and collaborative game modes had on social interactions within groups. Secondly, it investigated the reliability of a gaming personality questionnaire (Andreasen & Downey, 1999) for predicting social interactions of individuals. Results showed that competitive and collaborative game modes had a polarised affect on the group’s social interactions, and that the questionnaire was not a strong predictor for social interaction in general - although competitive participants demonstrated a significant negative correlation with interactions supporting group cohesion. Taken together, the findings provide a systematic validation of Voida’s findings (2010), and foundations towards a general
guide on group behaviour around games for researchers to use as an observational referencing tool.
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CHAPTER 1. INTRODUCTION

Collocated multiplayer games are computer games that multiple players can play together in the same room. This type of game has rapidly grown more popular in recent years, with both competitive and collaborative games showing potential to facilitate social engagement and enhance group cohesiveness and interdependence between group members (Voida, Carpendale & Greenburg, 2010; De Kort, IJsselsteijn & Poels, 2007). The social interactions facilitated by the game may also simultaneously enhance game-related experiences, creating a snowball effect where group-gaming activity and social engagement intrinsically link to create an enhanced ‘party’ experience (Isbister, 2010). The links between game engagement and socialising mean that it is therefore necessary for game designers and research practitioners to acknowledge and understand group behaviour that surround the games they develop.

The practice of observing group’s behaviour, while its members play computer games, can be an invaluable way for researchers to evaluate the design of game prototypes. However, social groups have complex infrastructures (Baron & Kerr, 2003) and therefore pose considerable challenge to those attempting to determine which behaviours are indicative of the type of game being played and which are the result of existing group dynamics or individual personalities. Unfortunately, much of the previous research on group dynamics has centred on work or sports contexts (Carron, Bray & Eys, 2002) rather than gaming. One of the few attempts made to understand group gaming behaviour across different game modes was an
ethnographic study led by Voida, Carpendale, and Greenburg (2010), who observed groups playing competitive, cooperative and collaborative games. Using different game modes made it possible to identify distinct group behaviours, and the analysis resulted in the identification of six main types of social interaction. Among the few attempts made to understand the personalities of different players was a study by Bartle (1996), who observed the various behaviours of players in an online Multi-User Domain (MUD) game, and identified four main personality archetypes. This resulted in a Bartle personality test questionnaire, which could be used to quickly ascertain the motivations of players and define their broad gaming personality for MUDs.

Voida’s ethnographic study (2010) provided valuable insight into collocated gaming behaviour as all groups were observed in their natural gaming environments (their homes). However, this approach may have encountered various uncontrollable variables, making it difficult to reliably associate typical behaviours with certain game types. Despite the traditional view, that competitive and collaborative contexts have polarised affects on group behaviour (Hansell, Tackaberry & Slavin, 1981; Vorderer, 2003), Voida proposed there was no such distinction across competitive and cooperative game modes (Voida et al., 2010). Such claims are difficult to validate as no single group was observed playing both competitive and cooperative game modes. Since social groups have their own unique social norms and group dynamics (Baron & Kerr, 2003) any comparison of behaviour across game modes should ideally be contained within groups. In addition, the personalities of participants were not defined from the outset of the study, therefore making it
difficult to ascertain whether certain behaviours were a result of the game, or personality type.

The purpose of this study is to investigate the affect that different game modes and personality have on group behaviour. The study sets out to systematically validate Voida’s social interaction taxonomy under controlled conditions, and quantitatively compare the frequency of social interactions across competitive and collaborative game modes. It also attempts to use a Bartle test to generate a personality score for each participant and then identify correlations between participants’ Bartle scores and the types of social interactions they engaged in the most. To summarise, by identifying typical behaviours relating to game mode and personality type, this study aims to contribute towards a group behavioural guide for games researchers, one that may be used to help explicate the complexities of group play-tests.
CHAPTER 2. LITERATURE REVIEW

Overview

This chapter presents a review of the relevant literature which pertains to previous research conducted within the field of collocated gaming and group behaviour in general. It provides an overview of the social elements of at work in collocated games and the challenges of involved in observing groups. It also provides an introduction to different types of game modes and traditional views on how they affect behaviour. Finally, it provides a comprehensive review of the studies directly relevant to this paper, such as the social interactions identified by Voidsa (2010) and the gaming personality test inspired by Bartle (1996), and concludes by outlining the relevance of First Person Shooter games to the study.

Social games

The social engagement that collocated multiplayer games facilitate is a positive thing, and should be supported in future game designs as much as possible. Collocated games have been shown to enhance group cohesion and strengthen interdependent bonds between individuals within groups (Isbister, 2010). Collaborative games may unite the group in a common goal, helping the group bond through tactical communication and teamwork. Whether the teams win or lose they share in the success and failure together, therefore bonding common experience. Competitive games may initiate playful banter and trash talk. Game designers and user researchers recognise the social engagement around such games to be an
intrinsic part of their success, and as such it is in their interests to build on their
knowledge of what makes a good “social” game.

The social activity facilitated by the game may also simultaneously enhance the
group’s in-game engagement (Isbister, 2010). Players may assist each other by
giving advice on how to play the game (such as how to use the controls, game
mechanics, and tactical tips) - a social phenomenon known outside of gaming
contexts as “social learning” (Bandura, 1977). Similarly, players may also share
general awareness with each other by communicating information on what is
happening in the game (such as pointing out certain game elements that other
players may have missed). Such social activity can help to enrich the gaming
experience, but playing in groups may have additional benefits. Playing computer
games in the presence of others has been shown to enhance emotional arousal in the
player due to the fact that they might feel extra pressure and want to perform well in
front of others (Zajonc, 1965). This heightened arousal may further increase
excitement levels in individuals, which may in turn have a positive effect on the rest
of the group. Social scientists have identified a phenomenon known as “emotional
contagion”, in which one person’s mood has been shown to directly influence the
mood of the others (Hatfield, Cacioppo & Rapson, 1994; Iacoboni et al. 1999). This
however, may have a positive or negative effect on the group, depending on the
person’s mood.
Problems evaluating group behaviour

Game designers and user researchers recognise the value in social games. They also recognise that in order to improve the game’s design, they require an understanding of the group behaviours that surround the game - a group’s immediate reaction to a prototype may provide key data on good and bad game features that may not emerge in post-session interviews. Despite this, there is still very little existing research available in the field of collocated games (Isbister, 2010), and this is perhaps due to the complexities involved with group behaviour.

Social groups have complex infrastructures, therefore one must accept that there may be many potential variables influencing behaviour at any one time. The personality of an individual may have significant impact on behaviour of the group to which they belong, and likewise the group can have an impact on an individual. For example a group composed of highly dominant individuals will behave differently than a group composed of varying dominance (Hare, Blumberg, Davies, & Kent, 1994). In addition, one group may have various characteristics that set it apart from others, including group norms (Baron & Kerr, 2003), the level of group cohesion (Dion, 2000) or the length of time that members in the group have known each other (Tuckman & Jenson, 1997). Situational forces may also influence group behaviour, such as change of environment (Baron & Kerr, 2003), or in the case of social gaming, the type of game being played.

The topics above provide a very brief summary of potential variables that may impact behaviour in groups, and as such illustrate some of the challenges that face
games researchers. A potential scenario for a games researcher may involve observing a group playing a game prototype, and noting that the group appear to be enjoying themselves therefore inferring that the game prototype is good. However, when the group are interviewed at the end of the session they might say that they did not like the game, therefore creating confusion. During observations it may be difficult for the researcher to infer whether the group’s behaviour is indicative of good game design, or indeed because they are just enjoying each other’s company, or both. If thorough research was conducted into how different types of games affect group behaviour in general, it may be possible to use the findings to help researchers connect the dots in what can be described as the ‘chaos’ of group analysis. A behavioural guide for different types of games may allow researchers to ascertain which behaviours are a result of the game, and which are not, through a process of deduction.

**Types of games: competitive, cooperative and collaborative games**

The type of game being played in a play-test may impact group behaviour, although there is no systematic research available on exactly how behaviour is impacted. Traditionally, all games have fallen into either one of two main categories: cooperative or competitive. However, collaborative games have more recently been recognised as a third category (Zagal, Rick & Hsi, 2006). Communication is of particular importance in a collaborative game, as players are required to coordinate their actions and strategise together in order to succeed. However, because of this, collaborative games can also be complex and difficult for game designers to extract design principles from (Zagal et al., 2006). In
collaborative games all players are on the same team, and they all share one goal together. As a result, they also share in each other’s successes and failures, if one player fails then it is as if the whole team has failed. Competitive games, on the other hand, require players in the game to oppose each other. Players in cooperative games do not oppose each other or share the same goal, but may still help each other in order to succeed. Competitive and collaborative games have traditionally been viewed to be at opposite ends of the spectrum (Zagal et al., 2006), in that collaborative games require players to work together in order to succeed, whereas competitive games they require individuals to oppose each other. As a result it could be hypothesised that the types of behaviour they facilitate should also be opposing. Despite this, there are still those that believe that cooperative games do not share the same relationship with competitive games, and the types of interactions they facilitate are neither completely competitive nor collaborative in nature.

Traditionally, competitive contexts have been seen as less social than collaborative (Hansell et al., 1981), as they reward individual performances that are driven out of self-interests (Voida et al., 2010). As such, collaborative games may naturally lend themselves to constructive socialising through the pursuit of a common goal within the group (Ducheneaut & Moore, 2004). A player’s desire to beat an opponent may heighten their arousal and performance (Hatfield et al., 1994), but as a result they may concentrate more on the screen and less on socialising with their peer. Instead of discussing shared strategies and cooperative support, players may also be more motivated to engage in strategic social interactions such as trash talk (insults and put-downs) in order to gain competitive advantage. Furthermore,
when a player wins they may experience euphoria and increased arousal, while the loser may experience anger and frustration (Vorderer, 2003). In a group context, this may potentially alienate the players emotionally, and impact negatively on group cohesiveness. Despite the potentially negative impact that competition may have on groups, competitive games have still shown to facilitate social behaviour. In a study of a competitive online First Person Shooter (FPS) game (in which players shoot their opponents through a first-person perspective), rich communications and social interactions have been observed between players (Manninen, 2003). Considering the variance of opinion over competitive, cooperative and collaborative games, and the types of behaviour that they facilitate, the field of collocated gaming may benefit from further close inspection.

**Voida and social interaction**

One of the most comprehensive attempts made at identifying typical group behaviours across different game modes was an ethnographic study led by Voida and her colleagues (2010). 12 groups of friends and family members (who regularly gathered to play video console games) were recruited and observed while playing different competitive, cooperative and collaborative games. Participants were allowed to choose the types of games that they would normally play and were given the option to play them for various amounts of time in their respective homes. Gaming sessions were recorded and most of the utterances and conversations were transcribed — when sounds from the video game drowned out conversation, field notes were used as a substitute. Grounded theory was to identify the following six main types of social interactions:
Constructing shared awareness

Participants in groups often used conversation as a way of making each other aware of certain aspects of game play, such as game state — e.g. one participant telling the other how much time was left during a challenge. At other times, participants communicated specific activities within the game, such as their spatial location and what they were doing. Conversation was also used as a way for participants to communicate their level of engagement with the game, such as telling or asking each other how much they were enjoying the game.

Reinforcing shared history

Participants reinforced their shared history with each other at various points by reminiscing about previous times they had played the game. These conversations often took the form of stories initiated by one participant, in which rest of the group shared enjoyment. At other times, groups used shared history in the form of tactical reference points, which helped them to overcome difficult challenges within the game as the players remembered how they had met the challenges in previous games.

Sharing in success and failure

This either took the form of celebration, in which participants encouraged and congratulated each other as a group, or sharing responsibility when they failed. In such cases it served to unite the group and sometimes make them feel better about the failure.
Engaging in interdependence and self-sacrifice

This form of interaction involved individual participants who sacrificed their own interests for the benefit of the group. Some of the collaborative games in the study had game mechanisms that made it possible for participants who were performing poorly (and so jeopardising the success of the team) to drop out of the game temporarily, thus allowing the team to continue playing. Such sacrificial actions appeared to be second nature to participants and often occurred without much discussion.

Trash talk

Trash talk was a pre-existing term before the study. Voida observed it in the form of general insults and put-downs that were mostly related to scenarios in which players competed for the most desirable input device on the console. Generally speaking, trash talk has been shown to foster hierarchical distinctions between individuals in sports contexts (Eveslage & Delaney, 1998).

Falling prey to the computer’s holding power

This was also a pre-existing term before Voida’s study, defined by Turkle (1995) and reported in another study by Ito (2005). Voida observed a number of instances in which participants became temporarily absorbed by mechanical loopholes or visual effects in the game, which (as described by Ito (2005)) involved a tight interactional coupling between human and machine. As a result, the engagement generated was with the computer rather than the group, and so this type of interaction was perceived to have a somewhat antisocial effect.
Voida Summary

Voida’s taxonomy of social interaction provides broad insight into collocated group behaviour. However, the study does not set out to clearly define the interactions from the perspective of game type. Voida separated the various types of interactions into two main groups, those that emphasised the group and those that emphasised the individual. Apart from Trash Talk and Falling Prey to the Computer’s Holding Power, all the interactions fell into the category that supported group orientated activities. As Trash Talk emphasised the individual, it could be argued that it lent itself naturally to competitive games, in which players are driven by self-interests. Similarly, it could be argued that Constructing Shared Awareness lent itself naturally to collaborative games, in which groups were required to communicate frequently in order to succeed. Finally, as Sharing in Success and Failure emphasised the group, it could be said to support group activities too. Similarly, group celebration or communal commiseration may be a direct result of the group sharing in a common goal.

As groups were observed playing games in their natural gaming environments (their homes), and were permitted to select the games that they wanted to play, the study can claim to contain ecological validity — something that Isbister recommends to be of utmost importance when evaluating social games (2010). However, ecological validity inevitably breeds more uncontrollable variables. Voida claimed that, unlike the traditional view that competitive and collaborative games facilitate polarised behaviour in groups, cooperative games facilitated a mixture of interactions relating to competition and collaboration (2010). Such claims are
difficult to validate based on Voida’s study approach, as no one group was observed playing the same competitive and cooperative game. As each group would have had their own social norms and group dynamics, it would be unfair to compare behaviour between groups. In order to make such solid inferences over how the type of game affects behaviour, a within-group study would need to be adopted.

In addition, there were numerous other variables that may have affected behaviour, e.g. all groups played different games, various consoles were used with different input devices, all groups were observed in different environments, groups played the games for different periods of time, and the personalities and motivations of the participants were not clearly defined. While offering a broad sample of the genuine group behaviours associated with collocated games, the area of research may benefit from a systematic validation of Voida’s interaction taxonomy under more controlled conditions — while still maintaining as much ecological validity as possible.

**Bartle and types of gamers**

Voida & Greenburg (2009) revealed that players’ primary motivation for collocated gaming was to engage in social interaction. However, the types of interaction may vary greatly depending on the types of games being played and the personalities of the players.

As previously mentioned, having some understanding of the motivations and personalities of participants within a collocated gaming group is important in order to help explain behaviour. Traditionally, studies outside of gaming contexts have
struggled to find clear correlations between personality traits and behaviour, due to situational variables. However, the parameters of a computer game are finite, and therefore measuring behaviour may be easier. Research outside of computer games has shown that groups composed of highly dominant individuals behave differently from groups composed of varying dominance (Hare et al., 1994). One could argue that this is similar for different types of personalities within a gaming context, e.g. a group composed of competitive players may behave differently to a group composed of non-competitive players. In gaming research there have been various attempts to identify different personality types and motivations of players. Lazarro (2004) indicated four motivations for people to play games in general:

- Hard fun — players want to win, seek a challenge, develop strategies and solve puzzles. They like to test themselves to see how good they are.

- Easy fun — players like to explore story-driven games and become immersed in an open fantasy world in which curiosity is greater than the desire to win.

- Altered states — players want to alter their emotional state, e.g. avoid boredom by becoming excited or relieve stress by becoming relaxed.

- The people factor — players care more about social interaction than the game itself and will be prepared to play a game that they don’t like as long as it facilitates social engagement.
These categories provide broad motivations for why people play games, but it may also be the case that some people fall into more than one category, e.g. players who seek hard fun in a collocated multiplayer game, who wish to socialise as well.

In a gaming context, there have been various attempts to understand the motivations of players in Massive Multiplayer Online games (MMOs) — which are huge online virtual environments where thousands of players can meet and play together in an open-ended fantasy world on a PC. Each player has the freedom to play the game and interact with other players in a multitude of different ways. Players may be driven by personal achievement and progress through the game alone, or alternatively, they may choose to communicate with other players and form clans and guilds in which they may become part of a collaborative pursuit. Because of the rich possibilities within such gaming environments, there have been various studies aimed at understanding the motivations behind peoples’ desire to play them.

One of the most well known attempts at understanding the different types of players in an online multiplayer game was carried out by Bartle (1996), who conducted a study on the motivations of players on a Multi-User Dungeon (MUD) game. Bartle and his colleagues observed the most common types of social interaction to occur in the chat window during the game, and aligned the findings with a comprehensive self-report bulletin-board for the players, which consisted of several hundred postings updated by players over the space of seven months. The study resulted in the creation of four main archetypes: Achievers, Explorers, Socialisers, and Killers. Each archetype represented the main defining motivations
of players. The process of analysis allowed for the creation of a Bartle test of gamer psychology (citation): an online questionnaire designed to identify a player’s highest motivation. After completing the questionnaire, participants would be provided with a Bartle score, in which they would receive a percentage for each archetype. The archetype with the highest score would be their dominant motivation, although Bartle stresses that the archetypes are not exclusive to one player, and that they may overlap often. As a result, a player’s gaming personality should be viewed with respect to their score for all four archetypes.

The following section presents detailed descriptions of all four archetypes (Bartle, 1996):

Achievers

Achievers are mostly motivated by improving their status in the game and largely take reward from overcoming challenges. This may take the form of gathering points, levelling-up, or collecting riches. They may subsequently engage in some of the practices associated with the other archetypes, but only as a way of achieving more in the game, e.g. they may explore, only to find new treasure or new ways of levelling up. In addition, they may socialise with other players, but only to find out new ways of achieving points. And finally, they may kill other players, but only if they stand in the way of their achieving points or if there are vast amounts of points available as a reward through killing the other player. Achievers say things like:

"I'm busy."

"Sure, I'll help you. What do I get?"
"So how do YOU kill the dragon, then?"

"Only 4211 points to go!"

**Explorers**

Explorers are mostly motivated by discovery, such as exploring new places on the map, and learning about the game’s internal mechanisms, e.g. bugs and loopholes. They enjoy looking for interesting features and figuring out how things work, and may need to score points, but only as a way for them to enter the next phase of exploration. Explorers say things like:

"Hmm..."

"You mean you don't know the shortest route from <obscure room 1> to <obscure room 2>?"

"I haven't tried that one, what's it do?"

"Why is it that if you carry the uranium you get radiation sickness, and if you put it in a bag you still get it, but if you put it in a bag and drop it then wait 20 seconds and pick it up again, you don't?"

**Socialisers**

Socialisers are mostly motivated by interacting with the other people in the game, and developing and maintaining inter-player relationships. As a result, they take enjoyment from empathising, sympathising, joking, entertaining, and listening. They may also take enjoyment from mentoring other players and helping them develop and progress over time. The game acts as a backdrop to facilitate social interactions, although socialisers may explore a bit in order to understand what other
players are talking about, or score points in order to gain a higher social status. Killing is only used if it takes the form of an impulsive act of revenge, or to avenge the misfortunes of a dear friend. Socialisers say things like:

"Hi!"

"Yeah, well, I'm having trouble with my boyfriend."

"What happened? I missed it, I was talking."

"Really? Oh no! Gee, that's terrible! Are you sure? Awful, just awful!"

Killers

Killers are mostly motivated by imposing themselves on others, and take reward from attacking other players with the intention of killing off their personas. The more distress that they cause the other player, the more satisfaction they take. Killers often need to score points in order to become powerful enough to kill other players, or explore new places so as to discover new ways to kill people. Any socialising may take the form of taunting a recent victim or discussing tactics with other Killers, but generally, Killers are people of few words. Since Killers and Socialisers have opposite motives, their relationship is perhaps the most dynamic and tense. When they do speak Killers say things like:

"Ha!"

"Coward!"

"Die!"

"Die! Die! Die!"
Bartle Summary

These defining player archetypes are all interlinked within the success of the game, and it is important that the virtual environment maintains a relatively even balance of all player types, e.g. Killers like to prey on Achievers since they provide the most reward, but if there are too many Killers they may drive out the Achievers, therefore eventually driving out the Killers since they have fewer players to prey on. Such is the case for other online multiplayer games, and from this perspective, the online Bartle test served the online gaming community well, providing an applicable tool for measuring the current distribution of players in a game. However, through understanding the motivations of players, the archetypes simultaneously served as key indicators for the types of social interaction that players engaged in the most. Therefore, if archetypes could be successfully adapted to suit collocated games, they may serve as a useful tool for identifying causality in social behaviour, therefore helping to aid analysis for evaluators.

First Person Shooter games

FPS games can support single player and multiplayer. Multiplayer involves players in the same gaming environment shooting each other (or AI avatars) with guns from a first person perspective. They traditionally support competitive, cooperative and collaborative game modes (although these are frequently just referred to as versus and co-op mode) and as well as being played online, they may also be played within a collocated setting. FPS games are played by many people and comprised 18.4% of the gaming market in 2011, with Call of Duty games topping the sales charts in 2010 and 2011 (ESA, 2011; ESA, 2012). In light of this,
FPS games would make an appealing area of focus for collocated gaming research, if Bartle’s archetypes could be applied successfully.

FPS games are not as diverse and open-ended as MMOs — often the sole objective is to just kill other players or AI. As such, it could be argued that if Bartle’s archetypes were applied, the majority of players would fall into the category of Killer. However, studies have shown that FPS games can support players motivated by both killing and socialising, with players engaging in rich communication and social interaction during game sessions (Xu et al., 2010). They also traditionally contain a wide array of different maps, which players can explore and exploit to their own advantage, therefore supporting players motivated by exploration. Finally, since FPS games often make use of leader boards and provide players with the ability to level-up and collect points, there is also scope to support players motivated by achievement.

However, compared to online games, little research has been directed into identifying specific types of gamers and their social interactions within a collocated context. Large online multiplayer games are complex social ecosystems which can give rise to a set of distinct types of social interactions and gaming personae. The social interactions initiated by players essentially reveal which type of gamer they are, their motivations for playing games, and to some extent, elements of their real character. From this it would seem logical that these motivations should carry relevance within a collocated gaming context too.
CHAPTER 3. STUDY

1.1. Rationale and Hypothesis

This literature review has presented a case for carrying out further research on collocated games. It highlights the potential that collocated games have to facilitate social engagement and the gaming experience, while also outlining the challenges that face games researchers as they evaluate them. In particular, it suggests a direction for research aimed at understanding typical group behaviours across certain types of games, and also understanding the personality of the players. The outcome of such research may be applied to analysis of play-tests by helping researchers to better identify the causality in behaviour. This knowledge may also provide evaluators with a guide in what to expect from certain groups playing certain games, helping them to assign more focus to analysis, and therefore make stronger inferences over good and bad game design features. The work of Voida (2010) and Bartle (1996) respectively provided tools to aid research, however Voida’s study contained too many variables for solid inferences to be made over behaviour relating to different types of games, and Bartle’s study was initially intended for a specific MUD game.

The focus of this study is to utilise elements of Voida and Bartle and combine them in an experiment focusing solely on one FPS games. By using one game, the study aims to trade scope for granularity and provide a more comprehensive analysis
of one area of gaming. After validating Voida’s taxonomy of social interactions, this
study aims to focus on two main areas:-

1) Game mode

Aim: investigate the affect that competitive and collaborative game modes have
on social interactions within groups.

Hypothesis: competitive games will facilitate more Trash Talk, and conversely,
collaborative games will facilitate more Constructed Shared Awareness and Sharing
in Success and Failure.

2) Gamer type

Aim: investigate the reliability of the Bartle test to predict social interactions in
individuals.

Hypothesis: Killers will engage in more Trash Talk and Socialisers in more
Constructed Shared Awareness and Shared Success and Failure.
1.2. Method

Participants

Eight groups of four friends were recruited for the purposes of the collocated gaming console study. The specifications of the screening process required that participants were between the ages of 18-35, owned an Xbox 360 and/or PS3, and owned and regularly played one or more game from the Call of Duty franchise. For ecological validity it was important that each group were friends or knew each other and regularly played in multiplayer mode together in a collocated setting, such as one of their homes. Out of 32 participants, one participant did not show for the study.

During screening, each participant’s gamer type was identified using an adapted Bartle test questionnaire for FPS games (see appendix A) which is to be discussed in detail in the Materials section. Upon completion of the questionnaire four separate scores were generated for each participant, indicating their motivations in line with Bartle’s gaming archetypes: Achiever, Explorer, Socialisers, and Killer. These scores were used to create a general gamer type code for each participant, which served to aid analysis after the game session. Participants were not informed of their Bartle scores in case it would affect their behaviour during the session. Table 1 shows the gamer type codes for each participant, e.g. participant A1 (group A, participant 1) has a gaming type of ‘KESA’, signifying they scored highest on Killer, second on Explorer, third on Socialiser, and fourth on Achiever. To ensure an
even mix of gamer personalities were present in the study all 31 participants completed the questionnaire during screening and before being recruited.

<table>
<thead>
<tr>
<th>Gaming Group</th>
<th>Participant 1</th>
<th>Participant 2</th>
<th>Participant 3</th>
<th>Participant 4</th>
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<tr>
<td>A</td>
<td>KESA</td>
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<td>AKSE</td>
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<td>KEAS</td>
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</tbody>
</table>

Table 1. All participants recruited for the study with their gamer type code.

Of 31 participants, there were 17 Killers, 7 Achievers, 7 Explorers, and no dominant Socialisers. Across all participants the average score for each gaming archetype was 26% Achiever, 26.2% Explorer, 12.9% Socialiser, and 34.8% Killer. The lack of dominant Socialisers may have been as a result of the nature of the game used for the study, in that FPS games are inherently about killing, and do not offer the same social parameters as MMOs.

Design

One independent variable was used, the FPS game *Call of Duty: Black Ops*, which was manipulated across two conditions, versus (competitive) and co-op (collaborative) mode. A within subjects design was adopted in which all groups played both game modes. The order of conditions was alternated so as to counterbalance the groups. The same room was used for all game sessions so as to reduce
potential confounds created through different gaming environments. In co-op mode all four participants were on the same team, and had to fight against the computer. If one participant died in the game then the whole team would fail, so participants were required to collaborate with each other in order to stay alive and progress. In versus mode there was no opposition from the computer, but all four participants had to try to kill each other instead. Players gained points each time they got a kill, which were displayed on a leader board at the end of each game. The player with the most points at the end of each round was the winner. Unlike co-op mode, if one player died in versus mode, they would quickly re-spawn and continue playing until the session ran out of time.

During data analysis, grounded theory was used to initially identify a broad set of social interaction types made by all groups during sessions. The dependent variables were the difference in frequency of social interactions across conditions, and the difference in frequency of social interactions across gamer types (based on the Bartle personality test). A social interaction was defined as a verbal utterance, conversation or gesture.

**Materials**

*Call of Duty: Black Ops*

This game was a viable choice for the study as it supported joint game play for four collocated players in both versus and co-op mode. That it supported both game modes was important as it meant that participants were equally competent playing under both conditions. It was also ideal as (unlike many FPS games) it had zombie
co-op mode which was wholly collaborative in nature, i.e. if one player died the whole team failed as a consequence. When a player became injured they were incapacitated, and had only a short amount of time to be rescued by one of their teammates before they perished. This meant that all four players had to take an interest in the wellbeing of their teammates in order to succeed. Figure 1 shows a screenshot from *The Call of the Dead* map, which was one of two maps that groups played in co-op mode. On this map, players started together in the same room of a large dilapidated building in the Siberian Coast. The team would be equipped with standard handguns, and together had to face an onslaught of zombies and “hellhounds” (zombie killer dogs). Throughout the game, enemies would constantly try to break into the building through the windows and doors, and would be the team’s job to defend various positions around the house in order to prevent breaches.
Figure 1. Zombie co-op mode on Call of Duty: Black Ops, showing the Call of the Dead map with split screen for two players.

As players progressed through the game, the number of zombies would increase until teams became overrun and are inevitably forced to adapt strategies and tactics in order to survive. As players killed enemies they gathered points, which could be used collectively within the team to unlock different parts of the house, buy new weapons and ammo, or other performance enhancing features. The game is designed to be impossible to complete, as eventually the number of the zombies becomes overwhelming. Each wave of zombies was marked by a new level within the game, therefore the challenge for a team would be to reach the highest level possible. The only other map available to participants in zombie mode was The Pentagon, which
worked the same as the *The Call of the Dead* map, except it was in a different environment.

Versus mode was standard for any other FPS game in that players had the choice of various different maps and game modes to choose from. Figure 2 shows an example of one of the maps that participants played in “Free For All” mode - where all players would start in different places in the map and have to find and kill each other repeatedly until the timer ran out. Players gained points for each kill, and when they died they automatically re-spawned in a new place on the map. At the end of each round the points for each player were shown on a leader board.

![Figure 2. Versus mode on *Call of Duty: Black Ops*, showing split screen for two players.](image-url)
Technical Setup

Groups played gaming sessions in four player mode, however as *Call of Duty: Black Ops* didn’t support four player split screen on co-op mode, a system link between two PS3s and television sets was required. Two 47 inch HD LCD television sets were used, with two participants from each group sharing one television set each. The games room contained four comfortable chairs and a coffee table with soft drinks and snacks for participants. There were also two other chairs for the moderator: one placed at the side of the television for the purposes of interviewing gamers, and one at the back of the room for note-taking, so that the moderator was able sit out away from the game and minimise any intrusion or impact on the group’s social interactions. During game sessions the practitioner sat at the back of the room and coded social interactions in real-time with a data capturing tool programmed in Visual Basic. Sessions were recorded on two HD video cameras – one at the front recording the participants, and one at the back recording the television screens. An audio recorder was also placed below the coffee table with a cardboard funnel on top of it so as to capture higher quality voice interactions without unwanted noise from the televisions.

Real-time data gathering

During test sessions all the utterances and conversations of participants were coded and captured in real-time using the custom-built social interaction tool shown in Figure 3. The output of this tool created a CSV file with separate rows for each social interaction. Each row contained data on the type of interaction made, the time the interaction was made, the participant who initiated the interaction, and the
participant(s) who were recipients of the interaction. If recipients responded to the interaction the details were noted in the text field. This tool not only made it possible to document important observations quickly, but the data in the CSV file served as a useful reference during post-session video analysis.

![Screenshot of real-time data capture tool created in Visual Basic.](image)

**Figure 3. Screenshot of real-time data capture tool created in Visual Basic.**

VOIDA’s social interaction taxonomy was used as a basis for coding all interactions made by the participants, each of which were implemented as options in the coding tool to act as a guide for post-session analysis. In addition, a final “Other” option was implemented, allowing the researcher to capture interactions which were not immediately relevant to VOIDA’s descriptions.
In order to identify the gaming preferences and motivations of each participant, the adapted Bartle test questionnaire for FPS games was given to participants (see appendix A). The questionnaire was adapted from Andreasen and Downey’s original online questionnaire (1999), which had 30 questions, each with a binary answer structure designed to elicit gaming preferences across four archetypes: Achievers, Explorers, Socialisers, and Killers. Below are two questions taken from the original questionnaire (1999):

1) Which is more enjoyable to you?
   - Killing a big monster? (+K)
   - Bragging about it to your friends? (+S)

2) Which would you enjoy more as a MUD player?
   - Running your own tavern? (+S)
   - Making your own maps of the world, then selling them? (+E)

If answer ‘a’ was selected in question 1 then a point would be added to the Killer score, and if answer ‘b’ was selected in question 2, a point would be added for Socialiser. Among the 30 questions, each compared type X vs. type Y for each of the six combinations of X vs. Y. For example:

1) Killers vs. Explorers
2) Killers vs. Achievers
3) Killers vs. Socialisers
4) Explorers vs. Achievers
5) Explorers vs. Socialisers
6) Socialisers vs. Achievers

There were five different examples of each of these combinations to make up 30 questions. After completing the questionnaire, each participant ended up with a separate score for the four different Bartle gaming archetypes. For the purposes of this study the original structure, scoring mechanics and personality archetypes of the questionnaire were retained. However, since the original Bartle test was designed for a specific MMO, the content of some questions had to be suitably adapted for First Person Shooters. Below are two questions taken from the adapted Bartle questionnaire for FPS games, so as to demonstrate how they were adapted from the two original questions 1 and 2:-

1) Which is more enjoyable to you?
   - Getting a kill-streak (+K)
   - Bragging about it to your friends? (+S)

2) Which would you enjoy more in a First Person Shooter?
   - Socialising with other players? (+S)
   - Finding new places on the map? (+E)

*End-session group interview*

Gaming sessions ended with all four individuals contributing to a semi-structured group interview that was guided by the practitioner (see appendix B for interview script). Questions focused on validating which type of game mode was preferred by each participant during the session, and the reasons for their choice. Each participant was also asked to describe one high and one low point during the
whole session regarding game engagement and enjoyment. It also allowed for any additional points of interest to be followed up with further questions.

**Procedure**

All 32 participants, recruited via a recruitment agency, were informed that the purpose of the study was to look at the differences between different game modes on First Person Shooters. They were told that they would play two 45 minute sessions on each game mode: Free For All on versus mode, and zombie co-op mode and that there would be a break in between each session, and that for the duration of each session they should play continuously until the moderator told them to stop. They were also told that they could play any maps that they liked, as long as they stayed on the specified game modes. They were then given an information sheet and asked to sign a participant consent form (see appendix C). Before the first gaming session, participants were also asked to complete the adapted Bartle test questionnaire for FPS games (see appendix A) without talking to each other. When all participants had completed the questionnaire, the first gaming session could begin (either in co-op or versus mode first, depending on which group it was). For the whole session the moderator sat at the back of the room and did not initiate discussion with the participants. Social interactions were coded in real-time using the coding tool in Visual Basic.

After the break, participants were led back into the games room, and reminded that they must continue playing on the specified mode until the moderator asked them to stop. Again, social interactions were coded in real-time using the coding
tool in Visual Basic. At the end of the second session participants took part in a semi-structured group interview, lasting approximately 15 minutes was conducted.
1.3. Analysis

This section presents the process used to analyse the data gathered from gaming sessions.

Identifying types of social interactions

Analysis of video recordings ensured no social interactions were missed during real-time observations, and also helped validate the data with more rigorous analysis. During data gathering, Voida’s social interactions were used as a guide, however grounded theory was applied in analysis to ensure any unforeseen themes were given the opportunity to come to light without bias from pre-defined taxonomy.

Comparing interactions across game modes

For each identified interaction, the frequency that each group engaged in them was counted and then normalising by being turned into a percentage of the group’s overall interactions. This made it possible to compare the distribution of each interaction across game modes for each group. Finally, averages were calculated across all groups to gain an overall distribution split for each type of interaction. For statistical analysis an independent two-sample t-test was used, and effects were judged significant if they reached a .05 significance level.
Correlation analysis: Bartle score against interaction frequency

For each identified interaction, the frequency that each participant engaged in them was counted and then normalised by being turned into a percentage of their overall interactions (co-op and versus mode combined). This made it possible to compare the frequency of interactions across all 31 participants. Using all participants, a correlation analysis was done to see if Bartle scores predicted interaction. Effects were judged significant if they reached a .05 significance level.

1.4. Results

The results of the grounded theory analysis showed that Voida’s (2010) set of interaction categories did not sufficiently represent all of the observed interactions facilitated by Call of Duty: Black Ops, and as a result two new categories were created: Indulgence in Individual Success and Failure, and Etiquette Complaint. In addition “Engaging in Interdependence and Self-Sacrifice” - one of Voida’s identified interactions - was not observed at all in this study and so is not included in the results. Voida observed the interaction during Rock Band and Lego Star Wars, in which participants who were performed poorly could choose to drop-out of the game temporarily for the benefit of the team. Call of Duty: Black Ops did not support this type of functionality, and as a result the interaction was not observed.

The dependent variables of interest were frequency of interactions across game modes, and the frequency of interaction in relation to Bartle score. The game-mode hypothesis proposed that there would be differences in interaction across co-op and versus mode, with more Trash Talk in versus mode, and more Constructed Shared
Awareness and Sharing in Success and Failure in co-op mode. Similarly, the gamer type hypothesis proposed that Bartle score would predict interaction, with Killers engaging in more Trash Talk and Socialisers engaging in more Constructed Shared Awareness.

The remainder of this chapter presents the results of the quantitative and qualitative analysis. A total of seven main social interaction types were indentified through grounded theory, of which all groups engaged in to varying degrees during the game sessions. Each of the seven social interactions will now be introduced consecutively with qualitative descriptions based on observations of the sessions, and sample quotes from participants. For each social interaction the respective quantitative results will also be presented, showing the average frequency that all groups engaged in the interaction across game modes and the correlation analyses for Bartle score against interaction frequency. Participants are referenced by their code (group letter and participant number), alongside their gamer type code.

**Constructing Shared Awareness**

Definition: “the use of conversation to construct shared awareness of game state, others’ activities within the game, and others’ engagement within the game.” (Voida et al., 2010)

Constructing Shared Awareness was the most common form of interaction across all groups, making up 63.29% (SD=10.94%) of all interactions observed in the study (versus and co-op mode combined). The reason it was so common was because the interaction category was broad, encompassing various different forms of
information sharing such as location awareness, tactics, and advice about game mechanics. In-line with the game-mode hypothesis, the results in Figure 4 show that groups engaged in significantly more Constructing Shared Awareness during co-op mode (M=47.96%, SD=6.75%) than they did during versus mode (M=15.33%, SD=4.19%), t(7)= 9.83, p < .001.

Figure 3. Box plot showing the average difference in frequency of interactions across conditions for Constructing Shared Awareness. (Each box represents the lower and upper quartiles, with a line running through them to indicate the median. The minimum and maximum data points are represented either side of the boxes.)
Groups had a shared goal in co-op mode, and as a result were more inclined to communicate important information more frequently. Such sharing of information between participants included location whereabouts (of participants or zombies), whichever action being carried out at the time, general status in terms of health or ammo, or whether or not they required being revived. At times, when groups were being overrun by zombies, the level of interaction became more intense — sometimes with all four group members shouting forms of Constructed Shared Awareness at each other, e.g.:-

“[curse] We’ve got a breach! I’m down! Revive me!” – F4 – KEAS – co-op

“OK, OK. I’m coming” – F3 – KESA – co-op

“[curse]“ – F2 – KAES – co-op

“Just stab them.” F3 – KESA – co-op

“Everyone to the top!” – F1 – ESKA – co-op

Constructing Shared Awareness took on various different forms during co-op mode, of which are presented in sub-categories below.

*Tactics:* – The nature of the game required all players to work together, because one player dying would cause the whole team to fail. This common goal amongst players encouraged constant communication throughout the team, where one (or sometimes two) players would adopt a leadership role and attempt to organise and delegate roles to other players. Often tactics discussions naturally occurred in-between sessions or when there was a lull in the game action.
“Ok, so everyone get one window each, that’s where they come in.” – F3 – KESA – co-op

“Wise words.” – F4 – KEAS – co-op

Game state: Players constantly communicated changes in the game state to each other, such as checking on the wellbeing of their team mates or telling their team mates if they needed help –, at which point quick-fire exchanges on the spatial location of the player who was down ensued. Other common topics of game state included location of Zombies and running out of ammo.

“If a zombie gets through just say.” – F3 – KESA – co-op

“You want me to come down and help you guys?” – F1 – ESKA - co-op

Game mechanics: – Players often took advantage of short breaks in the waves of Zombies to discuss and share knowledge on the mechanics of the game, including which are the best guns, how to unlock ammo, the purpose of money and how to unlock different parts of the map. More experienced players consistently adopted a mentor role; they frequently gave advice on game mechanics in order to help the survival of other team mates.

“Where do you get ammo?” – B3 – KAES - co-op

“You need to save up points before you can unlock ammo.” – B4 – EASK – co-op

“If you stab you can kill them straight away.” – C4 – EKAS - co-op

Mechanics also took the form of discussion about different maps in the game and level structure.
Group cohesion: – Players offered reassurance and encouragement to others, particularly in a mentor context. In between games players would give pep-talks or attempt to unify the rest of the team.

“Come on guys, we’re a team now. We can do this.” – G1 – KAES – co-op

“That’s it boys, we’re all together now yeah?” – E4 – KASE - co-op

“Guys come on! We need to get some team work.” – D2 – KASE – co-op

“We need to come together as a tea guys.” – B4 – EASK - co-op

The Constructing Shared Awareness that was observed during versus mode took on a different form to any observed in coop. In versus mode it was often intended as a way of aiding the competitive atmosphere, or leading into Trash Talk behaviour. For example, when a player had been killed it was not always obvious who actually killed them (participants were not able to enter their personal names into the user accounts and as result their names did not show up on the screen). As a result it was common for participants to share information on who killed who in the form of kill acknowledgements, which were often intended as boasts or taunts that would lead into Trash Talk.

[player just been killed] “Ah, who was that?” – H3 – AKES - versus

“Me, that’s what you get.” – H1 – AEKS – versus

A correlation analysis was done to see if Bartle scores predicted interaction, but it was found that they provided a weak predictor, in particular percentage of
Socialiser score against Constructing Shared Awareness ($R^2 = 0.02$), $F(1,29) = 1.70$, $p = 0.2$.

**Trash Talk**

Definition: insults, put-downs, and boasts designed to intimidate the opposition, often in a humorous spirit.

Overall, Trash Talk was the second most frequent interaction, making up an average of 17.42% (SD=6.06%) of total interactions throughout the study (versus and co-op mode combined). In-line with the game-mode hypothesis, the results in Figure 5 show that groups engaged in significantly more Trash Talk during versus mode (M=16.48%, SD=5.22%) than they did during co-op mode (M=0.94%, SD=0.84%), $t(7)= 8.45$, $p < .001$. 
Figure 5: Box plot showing the average difference in frequency of interactions across conditions for Trash Talk.

The competitive nature of versus mode created a stark contrast in observed behaviour when compared to co-op mode. The atmosphere in versus mode was generally more tense, with participants leaning forward in their chairs and remaining silent for longer periods of time; as they snuck up on their opponents, they did not want to give their position away with Constructing Shared Awareness. This silence commonly continued up to the point of a kill, at which point the two involved participants often made eye contact (perhaps one expressing frustration and the other smiling) or engaged in some quick-fire exchanges of Trash Talk and/or laughing before the cycle repeated itself. After such events, rivalries would tend to emerge (or become apparent if they had not already been established), therefore
resulting in further Trash Talk as the game session progressed. Overall, the Trash Talk observed in the study was light-hearted, and often initiated further exchanges of joking between rivals. It mainly took the form of insults, put-downs, boasts, or playful revenge threats.

“Jammy.” – H1 – AEKS - Versus

“How do you feel?” – H3 – AKES - Versus

“Whoever just killed me is gonna regret it, no lie.” – H3 - AKES - Versus

“You’re gonna die there in that corner boy.” – H3 - AKES - Versus

“Ooh, you got lucky.” – H1 - AEKS – Versus

Where co-op mode encouraged constant communication of game-state, mechanics and tactics to ensure all players benefitted, the competitive nature of versus mode meant that such communication would result in an advantage to the opponent, and therefore was generally curbed. For example, players would often sneak up on each other, and would not wish to reveal their location so would remain silent until a kill had happened. It was only at this point when a quick release of exchanges between the two players would follow, often commentating on the recent event whilst simultaneously trash talking. More often than not, at this stage, one player would express frustration (either playfully or not) and the other would laugh (either maliciously or not).

A correlation analysis was done to see if Bartle scores predicted interaction, but it was found that they provided a weak predictor, in particular percentage of Killer score against Trash Talk ($R^2 = 0.09$), $F(1,29) = 3.97$, $p = 0.06$. 

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Sharing in Success and Failure

Definition: Celebrating, complimenting, commiserating, or criticising as a group.

In comparison to Constructing Shared Awareness and Trash Talk this form of interaction was notably scarce, comprising an average of only 2.68% (SD=1.61%) of overall interactions throughout the study (versus and co-op mode combined). However, despite being infrequent, Sharing in Success and Failure was observed to have significant impact on the groups in terms of group cohesion. The interaction either took the form of joint celebrations when teams successfully fought off large waves of zombies (which helped spur the team on), or in-between games after the team had died. In such cases players collectively criticised the team performance or took leadership and offered collective reassurance, pep talks and encouragement.

“That’s bad.” A3 – AKSE – co-op

“That’s horrific.” A4 – KSEA – co-op

“We weren’t good enough to last. [laughing]” A2 – KAES – co-op

“We need to come together as a team guys.” A3 – AKSE – co-op

These pep talks often united the group and helped prepare them for the next round, which ultimately impacted on participants’ engagement with the game, e.g. participant G4 (AESK) mentioned in post-session interviews that they were more engaged in co-op mode as they didn’t want to let their team down.

The results in Figure 6 show that groups in co-op mode engaged in significantly more Sharing in Success and Failure (M=2.42%, SD=1.15%) than they did in versus
mode (M=0.26%, SD=0.46%), t(7)= 4.53, p < .01. This is indicative of the collaborative nature of co-op mode. During co-op mode Sharing in Success and Failure was interspersed with Constructed Shared Awareness. As teams progressed past each wave of zombies, they often basked in collective relief (albeit briefly) and gave each other encouragement whilst talking tactics and reorganising themselves for the next wave of attack.

![Box plot showing the average difference in frequency of interactions across conditions for Sharing in Success and Failure. (The circle represents outliers.)](image)

**Figure 6:** Box plot showing the average difference in frequency of interactions across conditions for Sharing in Success and Failure. (The circle represents outliers.)

Very occasionally this type of interaction occurred in versus mode, e.g. rare scenarios where two players teamed up against the most experienced player and

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offered each other support and condolences; even apologising for killing each other. This was found to be the case with one pair of participants who seemed to be closer friends (e.g. G2 – EKAS and G3 – AESK) and appeared to have an affinity with each other in the game – this may perhaps have also related to them being the only females in the group (unfortunately there is insufficient data on gender difference from this study to be able to confirm this).

A correlation analysis was done to see if Bartle scores predicted interaction. As the results show in Figure 7, there was a significant negative correlation between Sharing in Success and Failure and Killers ($R^2 = 0.12$), $F(1,29) = 5.25$, $p = 0.03$. This suggests that Killers were less motivated by group success, and less inclined to share responsibility of failures across the group.

![Killer score vs Sharing in Success and Failure](image)

**Figure 7:** Scatter chart with line of best fit, showing significant negative correlation between Killer score and Sharing in Success and Failure.
Indulgence in Individual Success and Failure

Definition: individual celebrations and boasts, or self put-downs and expressions of annoyance at failure.

Indulgence in Individual Success and Failure was a newly created interaction category for this study, and contrasts with Sharing in Success and Failure in the sense that it involves the individual rather than the group. It was the third most frequent interaction overall, comprising 10.17% (SD=4.64%) of interactions throughout the study (versus and co-op mode combined). The results in Figure 8 show that groups engaged in Indulgence in Individual Success and Failure more in versus mode (M=8.39%, SD=2.94%) than they did in co-op mode (M=1.78%, SD=1.70%), t(7)= 5.65, p < .001. In contrast to Sharing in Success and Failure, this is indicative of the individualistic nature of versus mode.
Figure 8: Box plot showing the average difference in frequency of interactions across conditions for Indulgence in Individual Success and Failure.

Indulgence in individual *success* took the form of individual vitriolic celebrations or boasts about kill streaks or points achieved.

“Yes! I killed someone, I’m so happy.” H4 – KEAS – versus

“Ah, I still got the most kills.” H4 – AKES - versus

Indulgence in individual *failure* often took the form of verbal or non-verbal expressions of frustration or complaints; usually criticising themselves for poor performance. The more experienced players generally chose to vent their frustration non-verbally, whilst the least experienced players often had fewer inhibitions about communicating their failures, and would occasionally turn it into an exhibition by
making jokes about their poor performance or lack of ability; one player even sang an impromptu song about their lack of ability.

“Oh, I got the lowest.”

“I’m so bad.”

A correlation analysis was done to see if Bartle scores predicted interaction, but it was found that they provided a weak predictor, in particular percentage of Killer score against Indulgence in Individual Success and Failure ($R^2 = 0.1$), $F(1,29) = 0.6$, $p = 0.45$.

**Etiquette Complaint**

Definition: a complaint initiated to a player who has breached a group norm relating to fair play.

Etiquette Complaint was created as a new interaction category for this study and was observed exclusively in versus mode, comprising 1.21% (SD=1.61%) of interactions throughout the study. It occurred when any one player behaved in such a way to gain an advantage, and another participant (or indeed the rest of the group) deemed it unsportsmanlike and decided to vocalise the protest. It is therefore competitive by its nature, which explains why the interaction was exclusive to versus mode. Players often looked at another players screen in versus mode so as to see what the other player was doing or to see where they were on the map. During
the study this kind of behaviour was often referred to as “screen watching” and considered cheating.

“Stop screen cheating!” B3 – KAES - versus

“Come down, don’t look at the screen, it’s boring.” C1 – KASE - versus

Another form of etiquette complaint occurred as a result of “camping”, which was when a player hid in an obscure area of the map and waited for unsuspecting players to run into their line of sight. Such play was also often considered to be “boring” as it was not felt to be in the spirit of the game, where all players should keep running around looking for each other.

“Oi, camping!” H2 – AKSE - versus

“No!” H3 – AKES – versus

A correlation analysis was done to see if Bartle scores predicted interaction, but it was found that they provided a weak predictor, in particular percentage of Explorer score against Etiquette Complaint ($R^2 = 0.03$), $F(1,29) = 0.01$, $p = 0.9$.

**Reinforcing Shared History**

Definition: Voida’s study observed several groups reminiscing about previous times they had played together, in which players would tell stories, “reinforcing the shared history of the gaming group” (Voida, 2010).

Reinforcing Shared History comprised 1.23% (SD=1.38%) of total interactions in the study (versus and co-op mode combined). Results showed that there was not a significant difference between interactions in versus mode ($M=0.94\%, \ SD=1.05\%$) and co-op ($M=0.28\%, \ SD=0.33\%$), $t(7)= 1.49$, $p 0.18$. It was mostly observed when
players were selecting new maps in between games, e.g. discussions about whether or not the group had played a certain map before, or what the benefits of certain size map was over others.

A correlation analysis was done to see if Bartle scores predicted interaction, but it was found that they provided a weak predictor, e.g. percentage of Explorer score against Reinforced Shared History ($R^2 = 0.02$), $F(1,29) = 3.73$, $p = 0.06$.

**Falling Prey to the Computer’s Holding Power**

Definition: a phenomenon that occurs when particular sensorial elements of the game - such as graphics or sound – engage a player to such an extent that it has an antisocial affect (Voida et al., 2010; Turkle, 1995; Ito, 2005).

Falling Prey to the Computer’s Holding Power comprised 2.20% (SD=1.76%) of total interactions throughout the study (versus and co-op mode combined). Results showed that there was not a significant difference in interaction between groups in co-op mode ($M=1.42\%, \ SD=1.1\%$) and versus mode ($M=0.78\%, \ SD=0.67\%$), $t(7)= 1.64$, $p = 0.15$.

Voida (2010) observed Falling Prey to the Computer’s Holding Power during instances when certain players in the group became fixed on an element of the game at the expense of shared social awareness. During this study there were various instances where social interactions of players were directly influenced by the game content, e.g. voices of avatars, and the clothes they were wearing often triggered vocal reactions from participants. Similarly to Voida’s observations, some of these
cases appeared to involve just one player at a time, either engaging in mimicry, or pointing out a game feature. However, unlike Voida’s findings, the majority of such instances actually served as a trigger for further social discussion or joking with the rest of the group members, e.g. participant B2 – EKAS, sparked a long conversation about Fidel Castro with the rest of the group after commenting on the image in the loading screen. Similarly, participant B4 – EASK, frequently mimicked the sound of a zombie screech, which often led to more joking amongst other group members.

A correlation analysis was done to see if Bartle scores predicted interaction. As can be seen in Figure 9, the results showed that there was a significant correlation between Falling Prey to the Computer's Holding Power and Explorers ($R^2 = 0.20$), $F(1,29) = 8.91, p = 0.005$. In addition, Figure 10 shows a significant negative correlation for Killers ($R^2 = 0.1$), $F(1,29) = 4.49, p = 0.04$. By Bartle’s definition (1996), Explorers are interested in game mechanics and exploring the map, however these findings suggest that in a FPS context, they are also motivated by broad concepts relating to the design of the game as well, e.g. graphics, sounds, storyline and characters. Killers on the other hand showed the opposite relationship to Explorers, suggesting that they were less intrigued by in-game elements, and more driven by the competitive dynamics between their friends (or outside of the screen).
Figure 9: Scatter chart with line of best fit, showing significant correlation between Explorer score and Falling Prey to the Computer’s Holding Power.

Figure 10: Scatter chart with line of best fit, showing significant negative correlation between Killer score and Falling Prey to the Computer’s Holding Power.
CHAPTER 4. DISCUSSION

Game mode

The results of the game mode investigation showed that competitive and collaborative game modes had a polarised affect on the social interactions of groups, with five out of seven interaction types (in total comprising 94.8% of all interactions made) demonstrating a significant swing to one game mode or the other. The game mode hypothesis was therefore supported, with versus mode facilitating significantly more Trash Talk than co-op mode, and conversely co-op mode facilitating significantly more Constructing Shared Awareness, and Sharing in Success and Failure than versus mode. In addition, groups engaged in Individual Success and Failure, and Etiquette Complaint significantly more in versus mode than they did in co-op mode. Finally, the results of the grounded theory analysis showed that Voida’s (2010) set of interaction categories did not sufficiently represent all of the observed interactions facilitated by a FPS game. Taken together, this extends past Voida’s (2010) study by providing a systematic validation of group behaviour across competitive and collaborative game modes in a FPS context.

Gamer type

The findings of the gamer type investigation showed that the higher the participant’s Killer score, the less they engaged in Sharing in Success and Failure. This implies that Killers are less motivated by group success, collaboration and group cohesion, which is consistent with Bartle’s archetypal definition that Killers are the least social (1996). In addition, the higher the Explorer score the more
participants engaged in Falling Prey to the Computer’s Holding Power, which implies that Explorers were more affected by in-game stimuli. Conversely, the higher the Killer score the less participants engaged in Falling Prey to the Computer’s Holding Power, suggesting that Killers are less affected by the in-game content, perhaps because they are more concerned about the competitive group hierarchy outside of the game. However, whilst revealing three significant correlations, in general the Bartle score of participants was not a reliable predictor for interaction, and as such, the gamer type hypothesis was rejected, with results showing no significant correlations between Killer score and Trash Talk, or for Socialiser score and Constructing Shared Awareness. However, that Killers showed two significant correlations with Bartle score and interactions does indicate that of all gamer types, they are least likely to be swayed by game mode.

The lack of correlation between Bartle score and interaction type may either suggest that the Bartle test did not accurately define the motivations of players in a FPS context (in which case further research is required into refining the archetypes), or that FPS games lack the complexity to support four diverse archetypes, or simply that gamer types had less impact on behaviour than game mode. In addition, the lack of correlation between Bartle score and interaction type may also be evidence to suggest that group conformity was occurring, and that individuals changed their attitudes and social interactions to adhere to the perceived social norms of the group (Baron & Kerr, 2003). In any case, the collocated gaming community would benefit from further research into this area, since it is largely untapped in comparison to online multiplayer games.
Practical Implications

That certain types of interactions became polarised over competitive and collaborative game modes could be used as a benchmark to form part of a behavioural guide for evaluators, or a referencing tool which, in turn, might be used to help predict or understand the types of group behaviour in FPS games. It may also be used as a starting point for further research aimed at validating group behaviour in other gaming genres.

Whilst the Bartle score was generally not a reliable predictor for interaction, it did show that within a FPS context, some gamer types exhibited typical traits, e.g. Killers were less supportive of group cohesion, Explorers were more affected by in-game elements, and Killers were less affected by in-game design elements. That the Bartle questionnaire might help to identify these traits before gaming sessions could be seen as a valuable tool for industry evaluators and researchers, firstly by aiding analysis and helping to identify causes of behaviour, and secondly by helping to provide richer information on participants during the recruitment process for playtests. This information may be used to construct personas on participants to identify different types of groups, e.g. less cohesive groups, or more cohesive groups.

Further Research

The gaming archetypes that Bartle created were specifically for MUD or MMO games, and were the result of extensive analysis of self-report data from players and behavioural observations. It was outside the scope of this study to conduct the same amount of research into FPS games and therefore the original gaming archetypes
(Achiever, Explorer, Socialiser and Killer) were used, supported by the rationale that FPS games contained similar game design feature and mechanics, e.g. players could kill each other, they had the ability to explore maps and mechanical loopholes in the game, there was incentive to accumulate points on the leader board, and within a collocated context players could socialise. However, the results of the Bartle test showed that a large number of participants scored highest on Killer and none scored highest on Socialiser. In light of this, there may be value in conducting further research into the motivations of players specifically for FPS games, so as to ensure all four archetypes are distributed more evenly.

It would also be interesting to see how the Bartle archetypes may be adapted to suit party games, in which the sole purpose of playing the game may often be to act as an ice-breaker at a social gathering. Due to the social aspects of such games, the demographic of players may tend to fall into the category that Lazarro (2006) defined as “The People Factor”, in which players care more about social interaction than the game itself. In contrast, it could be argued that players who like to play FPS games are less motivated by social reasons and more by the challenge of the game itself, including competition with others. As a result they may tend to fall into the category that Lazarro (2006) defined as “Hard fun”, in which players want to win and to test themselves in order to see how good they are at playing the game. In light of this, it could be argued that party games will attract a higher population of Socialisers than FPS games, and therefore provide a more balanced distribution of gamer types. In addition, it would also be interesting to see how many players
emerge as Killers when they play party games, and to observe the different types of social interaction that they engaged in compared to FPS games.

**Limitations**

One aspect that may have influenced group behaviour was the skill level of each participant. Participants were screened with the requirement that they played FPS games frequently, and were therefore all familiar with the game. However, as is inevitably the case in groups, some participants were more expert than others, a fact which appeared to impact on their behaviour. For example, as expert players tended to lose less than novices, they displayed less expression of frustration. Similarly, as a result of experts winning more often, they may have been more complacent, engaging less in verbal celebrations when they did win. However, these are suppositions because there was no quantitative data that could be used to identify each participant’s skill level in relation to the group, so it was not possible to effectively measure the impact of skill level on interaction. Nonetheless, this is an aspect that might be considered for future research within the field.
CHAPTER 5. CONCLUSION

In conclusion, competitive and collaborative game modes were shown to have a polarised affect on the social interactions of groups, with five out of seven interaction types (in total comprising 94.8% of all interactions made) swinging significantly to one game mode or the other. Results showed the game mode hypothesis was supported, as groups in versus mode engaged in more Trash Talk, and in addition, more Individual Indulgence in Success and Failure and Etiquette Complaint, whilst groups in co-op mode engaged in more Constructing Shared Awareness and Sharing in Success and Failure. Results showed the gamer type hypothesis was not supported and the Bartle score of participants was not shown to be a strong predictor of interaction overall. However, the results did reveal that the higher the participant’s Killer score the less they engaged in Sharing in Success and Failure, and Falling Prey to the Computer’s Holding Power, whilst the higher the participant’s Explorer score, the more they engaged in Falling Prey to the Computer’s Holding Power. The findings of this study suggest that type of game is generally more influential on group behaviour than gamer type, although strong personalities such as Killers are less likely to adjust behaviour towards group cohesion. The systematic approach of the study means it can be reproduced for other types of games, and that the results can be compared and used to form part of a larger behavioural guide for user researchers. The findings on Killers and Explorers may be directly applied to aid participant screening or analysis of playtests.
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1) In Call of Duty, do you prefer:
+S playing split-screen multiplayer mode?
+A playing single campaign?

2) Which is more enjoyable to you?
+A Getting a kill-streak?
+S Bragging about it to your friends?

3) In Call of Duty, which do you enjoy more:
+S Getting involved in the storyline
+A Getting the rewards at the end?

4) Which would you rather be noticed for?:
+A Your character’s class/rank
+S Your own personality

5) Would you rather be:
+S Popular with other players
+A Powerful with a high rank

6) Which do you enjoy more on Call of Duty?:
+S Chatting to other players
+A Getting a new equipment/guns

7) Which would you rather have when playing Call of Duty?:
+S Playing with your friends
+A Having the highest ranking and best weapons

8) Which would you enjoy more on Call of Duty?
+S Socialising with other players?
+E Finding new places on the map?

9) What's more important in Call of Duty online?
+S More people in a match to chat to
+E Having a bigger map to explore

10) You are being pinned down by gunfire.
Do you:
+S Ask a team mate for support
+E Try to get somewhere safe in the map

11) You want to penetrate a well defended area.
How would you approach this problem?
+S Develop a strategy with your team mates
+E Seek a better position of attack on the map

12) Is it better to be:
+K Feared by other players
+S Liked by other players

13) Someone has killed you several times. Do you want to:
+S Chat to the player to seek advice
+K Plot your revenge

14) Which is more exciting?
+S Working as part of a team
+K Killing the enemy

15) Which would you enjoy more?
+K Getting a kill streak
+S Joining a clan with your friends

16) Would you rather
+K Kill other players
+S Make new online friends

17) What's worse:
+K To have a low kill score
+S To not socialise with anyone

18) When playing online, would you rather:
+S Chat to other players
+K Kill them in the game

19) A new map is available for download. 
Which do you look forward to more?
+E Exploring the new area
+A Increasing your rank against un-familiar players

20) Would you rather:
+E Know all the maps inside out
+A Have the highest rank

21) Would you rather:
+A Increase your rank faster than your friends
+E Know the maps better than your friends

22) Would you rather:
+E Know where the good vantage points are on a map
+A Unlock better weapons

23) Which would you rather:
+E Know how to exploit the mechanics of the game to your advantage
+A Get to a higher rank faster than other players

24) Would you prefer to:
+E Know places on the map that not many other players know
+A Have a weapon that not many other players have
25) Would you rather have:
+E Good body armour
+K Powerful weapons

26) Would you rather play:
+E Capture the flag
+K Death match

27) If you're alone in an area, would you prioritise:
+E Searching around for items
+K Searching around for enemies

28) Would you rather have:
+E Knowledge about the game
+K Better weapons

29) Would you rather:
+K Defeat an enemy
+E Explore a new areas

30) On Call of Duty, would you rather:
+A Have a weapon twice as powerful as any other in the game
+K Be the most feared person in the game
APPENDIX B – INTERVIEW SCRIPT

Interview

Group:

Pre-Test

1) How long have you known each other?

2) How often do you play FPS together in a room?

3) Why do you like to play this game together?

Post-Test

4) What was the high point/most enjoyable moment in playing the game today? Why?

5) What was the low point/least enjoyable moment? Why?

6) Do you usually talk much when you play FPSs as a group?

7) Do you think you talk more when playing versus or co-op?

8) Is that good or bad thing? Which do you prefer?

9) As a group, do you think you talk about different things when you play versus and coop?

10) Is that good or bad thing? Which do you prefer?
Participant Informed Consent Form

Title of Project: Co-located multiplayer games and social interaction

This study has been approved by the UCL Research Ethics Committee as Project ID Number: MSc/1112/008

Participant’s Statement

I ……………………………………………………………………………………………………………………………

agree that I have

- read the information sheet and/or the project has been explained to me orally;
- had the opportunity to ask questions and discuss the study; and
- received satisfactory answers to all my questions or have been advised of an individual to contact for answers to pertinent questions about the research and my rights as a participant and whom to contact in the event of a research-related injury.

I understand that I am free to withdraw from the study without penalty if I so wish, and I consent to the processing of my personal information for the purposes of this study only and that it will not be used for any other purpose. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998. I understand that my participation will be taped/video recorded, and I am aware of, and consent to, any use you intend to make of the recordings after the end of the project. I understand that any data published from this study will be treated with confidentiality and anonymity.

Please tick the box to show you consent to the following:

☐ I agree to give permission for my image to be used for presentations and external conferences.
Investigator’s Statement

I ……………………………………………………………………..
confirm that I have carefully explained the purpose of the study to the participant and outlined any
reasonably foreseeable risks or benefits (where applicable).

Signed:    Date:
## APPENDIX D – DATA SAMPLE

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<th>A4</th>
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<th>Group Total %</th>
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