Revival Actions in a Shooter Game

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ABSTRACT
In this paper we present an analysis of revival actions in a third person shooter video game. We observe that players who revived their teammates played significantly more sessions. They appear also to be more skilled and successful in the game in terms of kills, wins, and deaths. We then discuss how to extend our analysis methodology to other types of social play as well as other games.

Author Keywords
video games; social play; online multiplayer

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K.8.0 Personal Computing: General—*Games*

General Terms
Human Factors; Measurement.

INTRODUCTION

With the advent of computer games being increasing distributed and played online it is important to understand the social implications, relationships and behavior of players. In 2006, Ducheneaut et al. [1] studied Massively Multiplayer Online Games (MMOGs) and found that there was little empirical data to assess players' social experiences. Based on longitudinal gameplay data from the World of Warcraft (WoW) game, the authors analyzed various social factors such as player time and leveling, grouping patterns, social networks and their densities. The authors also observed that while MMOGs were clearly social environments, joint activities are not very prevalent, especially in the early stages of the game. The players instead of playing with others were playing for them as an "audience" or more specifically like being "alone together" — surrounded by others, but not necessarily actively interacting with them. More recently Nacke et al. [3] analyzed game websites to learn more about social behaviors. Using the website log files they explored three predominant themes: *permanence,* whether people formed a long-term association with the site; *social interaction,* in terms of shared activity and verbal communication; and *formation of ties,* whether people made contacts with others [3]. The authors discussed the nature of social interaction in terms of game structures, actions, and impersonal interaction. They also provided recommendations for site design and the benefits of impersonal and activity-based interaction in these sites.

All this research points to growing interest in social play in the games community. In this paper we present an analysis of social behavior in a third-person shooter game, more specifically focusing on in-game behavior like kills, assists, helping teammates in danger and sharing weapons with respect to the "revive" actions a player gives within the game. These results serve as a starting point for us to look at how people interact within a third-person shooter game. We also discuss how to generalize our analysis to other types of social behavior and other games.

More closely related to our research, Xu et al. [4] analyzed social relationships in Halo, a popular first-person shooter games. Using a mixed methods approach they observed relationships in terms of configuring social relationships to enjoy the game and configuring games for social bonding. They also quantified various types of player networks, for example star networks, where one or two players in the center sharing the same playmates as the participant forming a tightly knit player group.

THE GAME

For this paper, we analyze a popular third-person shooter game on Xbox 360. Third-person shooter games are closely related to first person shooter games [5] and players take on the role of a story character (avatar), armed with weapons to shoot down their foes. The game includes a *multiplayer* online component that is key aspect of the gameplay and provides players the ability to play with and against other human players online. Players can band together with friends to make a team composed of specific players or can join a team of other players who may be unknown. All multi-player sessions consist of two opposing teams trying to achieve some pre-specified goal based on the type of game being played. Players who do especially well can win trophies for specific accomplishments in the game.

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SOCIAL PLAY

We operationalize the term *"social"* as any behavior that involves coordinated action across teammates or is done for the benefit of another teammate. In the game, players have several opportunities to exhibit social behavior in multi-player game sessions.

- When players are knocked down, but not yet killed, their team members can *revive* them.
- Players can *assist* team members in targeted kills.
- Players can *give* teammates weapons or ammo.
- Players can *spot* enemies, where they mark their target for coordinated assault.

In this paper we will focus on revival actions by players.

ANALYSIS OF REVIVAL ACTIONS

We used gameplay data that was collected as part of public beta of the game from players with their consent. For purposes of scale, we randomly selected a sample of 26,000 players who played more than 928,000 sessions in total.

We categorized the players into two groups:

- Group A: The player never revived any team mates.
- Group B: The player revived team mates at least once.

Next we compared the groups across several dimensions (see Table 1 for a summary of the increase from Group A to Group B):

- *Engagement:* We found that players who revived their teammates played significantly more sessions than the players who never revived: 122.96 vs. 30.94 sessions, an increase of 297.44%.
- *Skill:* Players who revived also turned out to be more skilled. They had almost twice as many kills as the group with no revives and thrice as many kills when an enemy was executing a teammate. They were less likely to be in need of reviving and died fewer times.

Table 1: Characteristics of the group of players who revived other players relative to the players who never revived. When appropriate characteristics were normalized per session.

Dimension	Characteristic	Change
Engagement	Session count	+297.44%
Skill	Kills	+100.21%
	Killing an enemy that is executing a teammate	+194.85%
	Was revived	–54.55%
	Deaths	–12.44%
Success	Likelihood to win match	+18.88%
Social	Gave weapon	+486.14%

- *Success:* We observed that players who revived teammates are also 18.88% more likely to win a game.
- *Social:* Players who revived other were more likely to exhibit other social activities such as giving weapons (an increase of 486.14%).

These findings suggest that players who exhibit social behavior have a better experience in general in the game that we analyzed for this paper.

FUTURE WORK

In the previous section, we presented a preliminary study of social gameplay. In our future work, we plan to extend our study by investigating more characteristics than the ones listed in Table 1. In addition we plan to analyze the impact of social behavior at three levels: (1) impact of a player's own social behavior on his experience, (2) impact of his team's social behavior, and (3) impact of his enemy's social behavior within their own team.

While player experience is a broad term encompassing many variables, we plan to specifically focus on *retention*, which we define as *total session count*, similar to Weber et al. [6] Retention is perhaps one of the most descriptive and easily quantifiable measures of experience—players who enjoy a game can be expected to play it for longer, whereas players who do not enjoy a game can be expected to stop playing it quickly.

Thus, we have a single, continuous response variable (total session count) and several predictor variables (features describing social behavior). Though such a setup naturally lends itself to multivariate regression analysis [7], the presence of other variables in the gameplay data is potentially confounding (because of potential covariance). Further, regression analyses generally tend to account for only a certain percentage of the variance in the data. As such, we plan to first focus on isolating the social features and consider the presence of social variables in a broader context in a later analysis.

Our main analysis strategy will be a combination of cluster and contrasting techniques:

1. We first use *k-means clustering* to cluster players in our sample along the *social features*.
2. We then analyze the *cluster centroids* to understand the differences in social behavior across clusters.
3. Finally, we run a *survival analysis* to observe trends in *retention* across clusters.

This strategy is a generalization of the analysis that we exemplified with revival actions in the previous section. Rather than automated clustering we manually specified the clusters using the presence of revivals (Step 1+2) and then compared the clusters with respect to several characteristics such as session counts, kills, matches won, etc. (Step 3). We believe that this quantitative analysis approach can also be broadly applied to other games.

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