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Toxic Teammates or Obscene Opponents? Influences of Cooperation and Competition on Hostility between Teammates and Opponents in an Online Game

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Abstract

Hostility among players is an ongoing problem for many types of online games, where the competitive, "high stakes" nature of ranked competitiveness may foster anti-social behavior among game players. Not all games are created equal, however, as more online games now afford players with the opportunity to either play as characters with cooperative goals or choose less competitive game environments. Does the mere presence of a competitive environment or a cooperative teammate affect hostile responses in violent online games? An online field experiment was conducted to answer these questions using a 2 (game mode competitiveness: casual vs. ranked) x 2 (cooperative behavior: present vs. absent) x 2 (player allegiance: teammate vs. opponent) between-subjects design. Results suggest that teammates are typically more hostile to each other than to opponents, particularly in the absence of cooperative behavior. Previous work has postulated that opponents would be more likely to exhibit negative behaviors, but the results of this study indicate that players experience more negative behaviors from teammates, especially when the team is not working together. The theoretical implications of these findings are discussed.

1.   Introduction

Online games are often plagued by antisocial and hostile behaviors like derogatory language, cheating, and other actions intended to disparage, frustrate, or offend other players. In gaming communities, such negative behaviors are often grouped under the label of "toxic behavior" (Kwak, Blackburn, & Han, 2015). Toxic behavior in online games can be common across genres, and most players experience these behaviors as they spend more time playing online (Rubin & Camm, 2013; Warner & Raiter, 2005). Discouraging anti-social behavior is an increasing goal among game producers, with major companies like Blizzard actively monitoring players' in-game interactions for signs of "trolling" intentionally playing poorly or in a way that elicits a negative response from others, (Morrisey, 2010). *Riot* Games has created a 30-person team within their studio to combat toxic behavior (McWhertor, 2012) while *Blizzard* designs their games in ways to limit toxic behavior (Bridges, 2016).

Perhaps it is not surprising that violent online video games like *Overwatch* (Blizzard Entertainment, 2016) or *League of Legends* (Riot Games, 2009) are offensive places given that video game violence has been associated with increased levels of self-reported hostility (e.g., Anderson, Shibuya, Ihori, Swing, Bushman, Sakamoto et al., 2010). However, there has been some debate regarding the relationship between violent video games and aggression (Elson & Ferguson, 2014). Studies by Ferguson and Rueda (2010), as well as Markey and Markey (2010), have failed to find a relationship between in-game violence and aggression. While violence in video games has been studied, it is not the only factor that promotes hostility between players (Adachi & Willoughby, 2011). Violent video games also tend to be competitive, which previous research has found decreases prosocial behavior and increases aggression following gameplay (e.g., Ewoldsen, Eno, Velez, Guadagno, & DeCoster, 2012). Indeed, several scholars have highlighted that the effects of violent video games may be caused by their competitiveness rather than their violent content (Breuer, Scharkow, & Quandt, 2015; Schmierbach, 2010; Velez, 2015).

While past research has tested the effects of competition against opponents as well as cooperation among teammates, one area still deserving of further research is whether the mere presence of competition or cooperation elicits similar effects on player hostility. The features of digital games (e.g., player ranking, online matchmaking) increasingly introduce cooperative and competitive elements that may affect hostility, above and beyond cooperation or competition by the players themselves. In terms of cooperation, many online games now include a variety of characters with roles that are cooperative and supportive in nature, such as healing and scouting for teammates ("warding"). The context of online games can also affect the competitiveness of the game environment, as features like "rewards" and "ranking" potentially heighten the competitive pressure of the game setting. Two questions thus arise: (1) Does the mere presence of these cooperative and competitive elements have the same effects on hostility as those observed in past work on cooperation and competition among players? (Greitemeyer, Traut-Mattausch, & Osswald, 2012; Kivikangas, Kätsyri, Järvelä, & Ravaja, 2014), and (2) If so, do the effects of cooperative and competitive "triggers" lead to hostility against teammates as well as opponents? The purpose of the study reported here was to address these two questions empirically through an experimental research design.

To answer these questions, an online field experiment was conducted. It examined the effect of three common contextual features of games on player hostility: (1) cooperation (cooperative behavior vs. no cooperative behavior control), (2) environment competitiveness (low stakes casual mode vs. high stakes ranked mode), and team affiliation (opponent vs. teammate). The following sections review past research on the effects of competitiveness and cooperation in violent video games, identify the study's research questions and hypotheses, then present an outline of the field experiment's methodology, a report of results, and a discussion of the study's theoretical and practical implications.

2.   Video Game Violence and Competition: Literature, Research Questions, and Hypotheses

More than 30 years of research have been conducted on the effects of violence in video games (Bushman & Huesmann, 2015; Elson & Ferguson, 2014). Some studies suggest that violent video games heighten hostility following competitiveness (Bushman, Rothstein, & Anderson, 2010), while others have failed to find evidence that violent competitiveness and hostility are related (Ferguson & Kilburn, 2010). In either case, most experimental studies of violent games compare the effects of a violent game to those elicited by a non-violent game, with hostility typically assessed after a brief period of gameplay in an artificial experimental setting using self-reported measures of aggression.

2.1.   Video Game Violence and Competition

One issue in past research on video games is a confounding of violence and competition. Although this past work has provided some evidence that violent games can heighten certain outcomes related to hostility, several scholars have noted that video game violence is often confounded with competition (Adachi & Willoughby, 2011). Specifically, past game studies have tended to use manipulations that compound the presence of violence and the experience of competition, raising the possibility that both violence and competition play a role in eliciting hostile outcomes. Consistent with this prediction, a number of studies have shown that competition increases hostility and decreases prosocial behavior following gameplay, even in the absence of violent content (Jerabeck & Ferguson, 2013; Velez, Greitemeyer, Whitaker, Ewoldsen, & Bushman, 2016). The evidence suggests that competition in games is at least partially accountable for the effects that violent video games elicit.

A second issue is the measurement of hostility arising from gaming. Past studies on the effects of violent video games have mostly relied upon data from experimental studies measuring hostility in one of two possible ways: (1) via self-report measures of hostility or (2) via experimental tasks that serve as a proxy for hostility. Although these laboratory-based measures have generated much discussion within the field (Quandt, Van Looy, Vogelgesang, Elson, Ivory, Consalvo, & Mäyrä, 2015), self-report hostility measures can be limited by social desirability bias, while experimental tasks related to hostility tend to have lower concurrent validity with clinical measures of aggression (Elson, Mohseni, Breuer, Scharkow, & Quandt, 2014; Ferguson, Smith, Miller-Stratton, Fritz, & Heinrich, 2008). Given these concerns regarding the external validity of lab-based aggression studies, scholars have recently embraced the use of online games to study human behavior in a naturalistic setting (Bainbridge, 2007). User behavior in online games tends to follow the same norms and social rules that guide offline interactions (Williams, 2010), making virtual worlds the ideal "petri dish" for studying the effects of games (Castronova, 2006). To that end, a number of studies have found that a range of psychological phenomena such as economic behaviors (Castronova et al., 2009), gender stereotypes (Kuznekoff & Rose, 2012), and social norms (Yee, Bailenson, Urbanek, Chang, & Merget, 2007) are replicable in online games.

Building on this emerging research paradigm, the current study employed an online field experiment to test the effects of environment competitiveness on player hostility. Unlike past work that has focused on the effects associated with competing against others, the present work asks whether the mere presence of a competitive environment is adequate to heighten hostility. To that end, the present work examined the effect of "competition cues" on hostility by comparing the hostility that players experience between ranked and casual gameplay modes. *Ranked gameplay* is an option available in many online games that rewards gameplay success and penalizes gameplay failure. In *League of Legends (LoL)* (Riot Games, 2009), the ranked mode puts players into one of seven ranked tiers based on their skill level, with each tier having five divisions within it. This rank is determined

by a player's *League Points* (LP). Players gain and lose these points as they win and lose matches climbing up or falling down the ranked tiers in the process. At the end of every year, players receive rewards based on the highest rank they achieved that year. Players at higher ranks receive better rewards than those in lower ranks. Achieving a higher rank confers both in-game rewards and bragging rights to players. The incentives and stakes of ranked mode are likely to promote greater competition among players than *casual game modes*, increasing player investment in the game, thus leading to differences in hostility between players during gameplay. Players enjoy the competitive environment of online games and often play them for the feeling of accomplishment that comes with winning (Sherry et al., 2006). Players also feel more competitiveness depending on whom they are playing with and against, meaning that the game environment can change how competitive they feel (Sepehr & Head, 2018). However, it is less clear whether the pressure of ranked gameplay leads to hostility against opponents, or if the effect also spills over to affect hostility expressed towards teammates as well. In sum, while it is generally expected that a ranked gameplay environment will elicit greater hostility than a casual gameplay environment, it is unclear whether such effects will vary between teammates and opponents. More formally, to examine these issues, the following research questions and hypothesis are proposed:

> H1: Hostility will be more common during ranked gameplay than casual gameplay

> RQ1: Does the effect of competitiveness on hostility vary between teammates and opponents?

2.2.   Video Game Violence and Cooperation

A second common trend in online video games is the inclusion of characters and functions that promote cooperation among teammates. For example, the popular game *League of Legends (LoL)* (Riot Games, 2009) allows players to identify points of interests via "warding" for other players, while the team-based game *Overwatch* (Blizzard Entertainment, 2016) designates classes of players to "heal" other teammates during battles. In either case, these cooperative functions and character roles are significant for several reasons. Firstly, this cooperation between players is essential to winning matches. Games like *LoL* and *Overwatch* (Blizzard Entertainment, 2016) are designed to facilitate cooperation between teammates. A team that works well together will usually beat a team of better individual players that do not have a cohesive strategy or good teamwork. Teamwork is at the core of these games, and a certain level of teamwork is often expected from players. Teamwork in games like *LoL* and *Overwatch* (Blizzard Entertainment, 2016) is expected among players and vital for team success (Pobiedina, Neidhardt, Calatrava Moreno, & Werthner, 2013). Previous research on teamwork in online games has focused on the characteristics of teams (Kou & Gui, 2014), the formation of teams (Alhazmi, Horawalavithana, Skvoretz, Blackburn, & Iamnitchi, 2017), and how team composition can influence performance (Kim et al., 2017). The ways that teamwork influences toxic behavior has gone understudied by researchers, which is why the present study is aimed at understanding how teamwork affects player hostility. Secondly, cooperation among players in games has been linked to increased prosocial behavior. For example, one study (Jerabeck & Ferguson, 2013) found that between-player cooperation decreased post- gameplay aggression relative to playing alone, regardless of whether the game was violent. Along similar lines, cooperation in games has also been linked to greater prosocial behavior, again occurring even when the game in question featured violent content (Breuer et al., 2015; Roy & Ferguson, 2016; Velez et al., 2016).

Extending this work to the domain of online field work, the present study asks whether similar effects are elicited by the inclusion of cooperative behavior. While past work has found that players who cooperate with others are less likely to experience aggression, the effects of playing with others who are facilitating team success through a cooperative role are a novel manipulation. More broadly, the extension of the effects of cooperation to the field experiment setting is an area that has received

limited attention in past research. Finally, it is unclear whether the presence of cooperative behavior reduces hostility among teammates, or if such effects are observed across game players overall. As a result, given the limited past work on the context for the study and the novelty of the manipulation, the following research questions and hypotheses are proposed:

RQ2: Does the mere presence of cooperation affect player hostility?

RQ3: Does the effect of cooperativeness on hostility vary between teammates and opponents?

3.   Method

The present study was an online field experiment that tested a 2 (game mode competitiveness: casual vs. ranked) x 2 (cooperative behavior: present vs. absent) x 2 (player allegiance: teammates vs. opponents) between-subjects design.

3.1.   Design and Virtual Field Setting

A field experiment was chosen as the method to answer the above questions to ensure ecological validity. Previous studies on video game hostility have primarily been conducted in a lab setting (Castronova, 2006). Lab experiments are essential to the social sciences, but they are not perfect. Because lab experiments are heavily controlled, participants may not respond in the same way that they would outside of the lab. In the lab, participants know they are being watched and may change their behavior as a result (McCambridge, Witton, & Elbourne, 2014). A field experiment, by comparison, allows for the collection of natural data as subjects are unaware of being observed. However, as the researcher was interacting with the participants being observed, there could be issues of reliability because of the researcher's involvement (Oswald, Sherratt, and Smith, 2014). By participating with the subjects, the researcher may compromise his or her objectivity, but this participation by the researcher is needed to understand the environment and participants (Johnson, Rogers, Van der linden, & Bianchi-Berthouze, 2012). Field experiments have proven to be an effective method to study social interactions in online games and have allowed researchers to observe behavior that they would not be able to in a lab setting (Holz Ivory, Fox, Waddell, & Ivory 2014; Kuznekoff & Rose, 2012; Waddell & Ivory 2015).

The game chosen for the present study was *League of Legends* (*LoL*) (Riot Games, 2009). *League of Legends* is a *Multiplayer Online Battle Arena* (MOBA), which are large-scale online multiplayer games that feature teams of players working together to complete objectives and defeat opposing teams. Matches in *LoL* feature two teams of five players competing against each other to conquer the other team's base using a variety of different characters and strategies. In *LoL,* players start the game by picking a character that fills one of several in-game roles. Players then use the special abilities of their chosen character to defeat their opponents and destroy the defenses of their base. Once the defenses are destroyed, players work together to destroy the enemy base and claim victory. *LoL* was chosen as the game to be used in the present study because it is one of the most popular and most played *MOBAs* in the world, with as many as 100 million monthly players (Kollar, 2016).

3.2.   Participants

Except for one player who was encountered twice, all participants ($N = 501$) for this study were unique users of the online game *League of Legends* (Riot Games, 2009) encountered during field experiment sessions. No identifying information was collected from the participants during the field experiment. The Electronic Entertainment Design and Research (EEDAR) (2015) reported that 74%

of MOBA players are male. Fifty-seven total games were played with a total of 513 participants. Three participants were excluded for leaving the game. One match with an additional nine participants was excluded because the researcher was not able to play with one of the characters chosen for this study, leaving a total of 56 games with 501 participants (exclusion of participants did not affect the statistical significance of subsequent tests). Participants were not aware of their participation in this study and were not debriefed regarding the objectives of the experiment to maintain the naturalistic quality of the field experiment. The omission of informed consent for participants was approved by the Institutional Review Board because the experimental manipulations were unobtrusive and were a minimal risk to participants.

3.3. Independent Variables

Game mode competitiveness. The level of competition was manipulated by playing matches in one of two game modes, ranked or casual. A random number generator was used to determine which mode would be played. In the ranked mode, players are placed into a tier based on their skill level, which serves as their ranking. As players win or lose matches, their rank goes up or down within their tier based on whether they won or lost. At the end of the year, players receive rewards based on their rank. These rewards range from simple profile badges for lower ranks to exclusive "skins," or outfits that are used for customizing the appearance of one's in-game character, and items for higher-ranked players. If players reached the top 200, they could even receive a special collector's jacket as a reward. These rewards serve as bragging rights amongst players, and for the highest ranks, players can receive material rewards. These rewards are what separate the ranked and casual modes, and the motivation to try and achieve higher ranks to get these rewards makes the ranked mode more competitive. This ranked mode served as the highly competitive environment while the normal mode, which does not have a ranking system, was used as a less competitive environment. The primary difference between the two game modes is the stakes involved. Playing in the ranked mode rewards players for winning and punishes players for losing. The extra incentives provided by the ranked rewards increase the stakes of each match by putting more on the line than just the desire to win. Winning and losing in the ranked mode should mean more to players than doing the same in the casual game mode. The two game modes were identical except for the rewards associated with gameplay success that were intended to manipulate environment competitiveness.

Cooperative behavior. In order to win matches in *LoL,* players must work together as a team to complete objectives and defeat their opponent. Cooperation was manipulated through the act of "warding" by the researcher. Wards are items that allow both the player and their teammates to view hidden areas of the map and to see the enemy team. While warding is seen as good teamwork, it is not a mandatory part of the game. Cooperation was manipulated by the researcher's character either warding multiple times in the teamwork condition or not warding at all in the no teamwork condition. The character roles of "top laner" and "mid laner" (two roles in *LoL*) were used for this study because warding is not typically required of their role during gameplay, thus allowing the researcher to abstain from warding without eliciting negative responses from other players. If the researcher played in a role expected to ward but did not, the response would be much more severe than if they played a role not expected to ward. A random number generator was used to determine whether the researcher would ward or not.

Player allegiance. The researcher and participants were randomly assigned to one of two teams by the game itself, so no additional manipulation was required. Data were collected from both teammates and opponents by using screen recording software to record the game's chat function, which allows players to type messages to their team or to all players in the match.

3.4. Dependent Variable

Hostility. Hostility was measured using the Rude, Chrisman, Denmark, and Maesta (2012) *Hostility Individual-Level Scale*. Five dimensions of hostility were measured: sarcastic comments (I love nothing more than playing with a Sh** mid like you.); judgmental or critical comments (This riven is garbage); patronizing or condescending comments (If you can't win your lane let me know and I will take care of it); shaming (Why did you not ult? Are you autistic?), and mocking (you sound like a f**). These outcomes were chosen because they could be measured as verbal behaviors through chat logs provided by the game interface. The language that indicated that players were "trolling" (e.g., when players intentionally play poorly) was measured as hostility as well. For example, a player could say "mid or feed," which means that he or she will intentionally play poorly if the player does not get the position they want. Both allies and opponents were coded as being either hostile or not hostile to any player in the game. A single act of hostility written in the chat would label a player as hostile.

3.5. Supplementary Measures

Performance. Because the researcher was an active player in the matches, it is possible that their performance could impact the ways that participants behaved during the match. For example, if the researcher played poorly, it could anger teammates and make them more hostile than if the researcher was playing well. To determine whether researcher performance potentially varied between conditions, the number of kills, deaths, and assists the researcher had during each match, as well as the result of the match, were recorded to ensure consistency.

3.6. Procedure

The researcher randomly chose the match type (casual vs. ranked) and the presence of cooperative behavior (absent vs. present). Once the condition was randomly chosen, the researcher played and recorded each match using screen recording software. During each match, the researcher varied the extent to which they warded depending on experimental condition while holding other player behavior constant. In the cooperation condition, the researcher warded a minimum of five times, while the researcher did not ward during the match in the no cooperation condition. The researcher played a total of 57 matches, which averaged 31 minutes each. Data collection took approximately 31 hours to complete. Of the 57 matches, one was excluded because the researcher could not play as one of the chosen characters leaving a total of 56 matches (see Table 1). The chat logs for each match were coded by one primary and one secondary coder. Reliability was measured using Cohen's kappa. After the initial round of coding ($\kappa = .725$, agreement % = 90.0), the coder was retrained and coded a new sample, leading to higher and more reliable agreement ($\kappa = .93$, agreement % = 98.41).

Table 1: Table 1. Game and Condition count.

	Ranked	Normal	Total
Cooperative	14	15	29
Non-cooperative	12	15	27
Total	26	30	56

4. Results

4.1. Descriptive Statistics

Total hostility. Twenty-nine of the fifty-six games (51.79%) from the sample included hostility, which was generated by 69 of the 501 participants (13.77%). In other words, while nearly half of all games featured hostility, only a minority of players were hostile during gameplay.

4.2.   Manipulation Checks

Cooperation. To ensure that the cooperation manipulation was effective, the number of times the player warded in each game was recorded. There was a significant difference in the number of times warded, $\chi^2 (N = 56) = 79.00$, $p < .001$, $w = 1.19$, with the confederate warding significantly more in the cooperation condition than in the no cooperation condition. In sum, the cooperation manipulation was successful.

In order to ensure consistency between conditions, the confederate's performance was measured. The performance was gauged using three different measures: number of kills, number of deaths, and number of assists. There was no significant difference in the number of kills, $\chi^2 (1, N = 56) = 3.06$, $p = .08$, $w = .24$, and deaths, $\chi^2 (1, N = 56) = 2.61$, $p = .11$, $w = .22$. There was a significant difference in the number of assists, $\chi^2 (1, N = 56) = 11.16$, $p < .001$, $w = .45$, with the confederate getting more assists in the low cooperation condition. Because the confederate was not as cooperative, it is possible that other players came to the confederate's lane more often to attempt to pick up his slack. If a teammate saw the researcher not warding, they might visit the researcher's lane more often to make up for the lack of vision. When visiting the researcher's lane, the teammate could initiate fights and get kills, which the researcher would assist on. This could have led to an increase in assists in the no cooperation condition.

To ensure consistency between the characters and positions played, the amount of hostility exhibited when playing each was recorded. There was no significant difference in the amount of hostility when playing the two different positions mid lane, ($M = 1.40$, $SD = 1.40$) and top lane, ($M = 1.17$, $SD = 1.63$); $t(29) = -.50$, $p = .62$. Additionally, there was no significant difference in the amount of hostility exhibited when the researcher played as the four different characters, $F(3,52) = 1.02$, $p = .39$.

To ensure that game length was not correlated with the amount of hostility exhibited, the length of each game was recorded. There was no significant correlation between game length and hostility $r(54) = .04$, $p = .77$.

To ensure that game result was not correlated with hostility, the result of each game was recorded. There was no significant difference in the amount of hostility exhibited when the researcher won ($M = .84$, and lost ($SD = 1.55$); $t(54) = -1.76$, $p = .08$.

4.3.   Competition

H1 predicted that players in competitive environments would exhibit more hostility than those in less competitive environments, while RQ1 asked whether the effect of competitiveness would vary between teammates and opponents. The main effect of competition on hostility was not significant, $\chi^2 (1, N = 501) = 3.08$, $p = .08$, $w = .09$, nor did the effect vary between teammates and opponents, $\chi^2 (1, N = 501) = .09$, $p = .76$, $w = .01$. H1 was not supported.

4.4.   Cooperation

RQ2 asked whether the presence of cooperative behavior would affect hostility, while RQ2 asked whether the effects of cooperation would be moderated by team allegiance (teammate vs. opponent). A chi-square analysis with cooperation as the independent variable and hostility as the

dependent variable was not significant χ^2 (1, $N = 501$) $= 2.51$, $p = .11$ $w = .07$. However, this relationship should be contextualized according to a significant relationship between cooperation and team affiliation, χ^2 (1, $N = 501$) $= 5.59$, $p = .02$, $w = .11$. As shown in Figure 1, while teammates were typically more hostile than opponents, this effect was particularly pronounced when cooperative behavior was absent rather than present. Specifically, while teammates (18.97%) were typically more hostile than opponents (11.72%) when cooperating, the difference between teammates (23.36%) and opponents (3.76%) was even greater in the absence of cooperative behavior.

5.   Discussion

The present study was an online field experiment that examined whether the mere presence of competition and cooperation affect the hostility exhibited by teammates and opponents in an online game. Unlike many studies that have examined the relationship between competition in video games and anti-social behaviors in laboratory settings (Ewoldsen, et al., 2012; Schmierbach, 2010), the current experiment examined how naturally occurring cues related to cooperation and competition affected anti-social behavior during players' everyday behaviors in an online, game-based environment. Study findings provide an increased understanding of the environments and contexts of online competitive video games and how these environments affect players in a field-based setting measuring player behavior during naturally occurring gameplay, as discussed below.

There is no relationship between the level of competition and hostility in this study. This may seem to go against previous research that has found increases in antisocial behavior due to competition in video games (Adachi & Willoughby, 2011; Schmierbach, 2010). It appears that the mere presence of competition does not increase hostility in players, at least in the present study. In a lab setting, hostility is measured using either self-report measures or experimental tasks. Both self-report and experimental measures of hostility have been critiqued for having relatively low levels of external validity (Elson et al., 2015; Ferguson et al., 2008). The problems related to traditional measures of hostility could change participants' responses to seem more aggressive. Differences in the measurements used may explain why the present study contradicts previous research on the effects of competition and hostility. However, it is also possible that the effects of competition are not additive. That is to say, there may be a difference when competitive and non-competitive environments are compared, but this difference in effects does not persist for differing levels of competition.

This study did also find that players experience more hostility from teammates than from opponents. Teammates' being more hostile than opponents was contrary to expectations. However, it is not entirely surprising, given that previous research shows that individuals prefer teammates to opponents in face-to-face interactions but, when team interactions are anonymous, group members are more negative towards their teammates (Eberlein & Walkowitz, 2008). Anonymity in online games could make it difficult for teams to develop a group identity (Han & Harms, 2010). Additionally, the short length of online games also limits the ability of players to develop a group identity and cohesion (Chidambaram, Bostrom, & Wynne, 1990; Lind, 2007). The lack of group identity is likely to lead to conflict within the team, which could explain the increased hostility from teammates (Han & Harms, 2010).

Another potential reason for teammates being more hostile is that teammates have more opportunity and reason to be hostile to their teammates than their opponents. During competitiveness, players talk much more frequently to their teammates than their opponents because team communication is important to victory. In *LoL* it is important for teammates to communicate with each other to discuss things like strategy and the actions of opposing players. Because communication is mostly confined to interactions with one's own team, players have more opportunity to be hostile towards their teammates. Additionally, players may not feel the need to be hostile towards the other team because there is not much communication between them. Players may also be more invested in

the play of their teammates than their opponents. It is possible that players may be more negatively affected by their teammates who play poorly than their opponents that play well, and this could increase hostility towards teammates. That is to say that a player may respond negatively towards a teammate's poor performance and react with hostility while this may not be true for opponents who are playing well.

Previous research has found that cooperation in video games can both increase prosocial behaviors and decrease antisocial behaviors in players (Velez, 2015). While this study found that teammates were generally more hostile than opponents, this difference in hostility was moderated by the presence of cooperative behavior. Specifically, the presence of cooperative behavior appeared to decrease hostility expressed towards teammates, while hostility expressed by opponents slightly increased, likely due to the frustration of competing against a well-organized and cooperative opposing team. This finding contributes to existing research on the effects of cooperation by showing that the mere presence of cooperative behavior can also decrease hostility expressed towards teammates, like the effects of cooperating with others observed in past work. This indicates that the prosocial benefits of cooperation are not limited to actively cooperating with others, as players may benefit from being in a cooperative environment.

As for theory development and modification, research on cooperation in games has used the theory of bounded generalized reciprocity (BGR) to predict and explain social interactions (Breuer et al., 2017). This theory proposes that people choose how to act based on the expected behaviors of others (Yamagishi, Jin, & Kyonari, 1999). According to BGR, ingroup members are expected to reciprocate positive behaviors, whereas outgroup members are not expected to reciprocate. The difference in expectation leads to more prosocial behaviors shown to ingroup members as prosocial behaviors are expected in return. The present study expands on this theory by demonstrating that prosocial behaviors may depend on more than just group membership. BGR would predict less hostility between teammates because players would exhibit more prosocial behaviors to teammates who are the ingroup. However, this was not the case for the present study, which found teammates to be more hostile than opponents. This suggests that players may not expect teammates to reciprocate prosocial behaviors and would, therefore, be hesitant to perform prosocial behaviors themselves. The difference in hostility between teammates was moderated by cooperation, with greater cooperation decreasing hostility between teammates. This could mean that once a player sees a teammate behaving in a prosocial way, they begin to expect the reciprocation of prosocial behaviors, making them cooperate more and decreasing hostility between teammates. This would mean that in online settings with weak group identity, being a part of an ingroup isn't enough to create the expectation of reciprocity, and players need more information to determine if their teammates will cooperate. The findings of the present study thus identify the strength of group identity in online settings as a possible boundary condition for the effects predicted by BGR.

5.1. Limitations

There are several important limitations to highlight when discussing the results of this study. First, the difference in the amount of hostility from teammates and opponents could be due to differences in the amount of communication between groups. While players have the ability to speak to both opponents and teammates while playing, players of team-based online games tend to communicate more frequently with their teammates in general, thus leading to more opportunities for hostility overall. Textual interactions were the only measure of hostility employed, so the difference in hostility may be due, in part, to the difference in communication frequency between groups.

Secondly, it is possible that no effect of our competition manipulation was observed because the ranked and "normal" environments did not differ strongly enough in competitiveness. While the increased stakes of winning in the ranked mode were expected to make the mode more competitive,

players may view winning in both modes as equally important regardless of rewards, thus leading to the same level of competitiveness.

Finally, this study may not be generalizable due to the nature of the game played. *League of Legends* (Riot Games, 2009) and most other MOBAs cater to a very specific audience of serious and dedicated gamers. As a result, the findings of this study may not generalize to more casual gamers or hardcore gamers who play games outside the MOBA genre. Put another way, games like *LoL* have unique environments and user-bases that may not necessarily be the same as other games, thus leading to lower levels of generalizability to games overall.

5.2. Future Research

Future research on the effects of competition and cooperation in online video games can take several potential directions. For example, future studies can look more closely at how cooperation in online video games may affect prosocial behaviors in players. Researchers should investigate how varying teamwork in online situations affects helping behaviors in offline situations. The present study only looked at how playing online-games with uncooperative players affected antisocial behaviors but not at how this affected other behaviors. Since previous research has found that cooperation in video games increases prosocial behaviors, this seems like a promising avenue of research (Velez, 2015).

Further research on this topic should address different types of online multiplayer games. The present study was conducted using a single game featuring one type of gameplay. While many online multiplayer video games have similar player interactions and gameplay, each game has unique gameplay elements and player interactions. For this reason, it is important to expand research on antisocial behavior in online videogames to focus on many different types of games and the interactions in them in order to develop theory and a better understanding of this phenomenon.

Finally, researchers should further investigate how players interact with opponents. Much of the current research focuses on how people play together, but not as much as looked at the ways that players interact with their opponents in online-games. While the present study did examine the relationship between players and their opponents, more research should be done on this dynamic. There is the possibility that inter-team interactions and intra-team interactions could be very different depending on the nature of the environment they are in. Future research should examine how opposed groups interact with each other in online games and how these interactions may affect players.

5.3. Conclusion

Despite several limitations and the potential for additional refinement, the results of the present study suggest that players are more hostile to their teammates than to opponents. Additionally, how cooperative a player is can also affect hostility from others. However, it seems that the level of competition in an online game may not affect antisocial behaviors. The results of this study show that while the level of competition may not affect hostility in online games, interactions with other players and not just opponents may.

References

Adachi, P. J. C., & Willoughby, T. (2011). The effect of video game competition and violence on aggressive behavior: Which characteristics has the greatest influence? *Psychology of Violence, 1*, 259-274. https://doi.org/10.1037/a0024908

Alhazmi, E., Horawalavithana, S., Skvoretz, J., Blackburn, J., & Iamnitchi, A. (2017). An empirical study on team formation in online games. *Proceedings of the 2017 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining 2017*, 431–438. https://doi.org/10.1145/3110025.3110094

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., Rothstein, H.R., Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in Eastern and Western countries: A meta-analytic review. *Psychological Bulletin, 136*(2), 151-173. doi: 10.1037/a0018251

Bainbridge, W. S. (2007). The scientific research potential of virtual worlds. *Science, 317*, 472-476. doi: 10.1126/science.1146930

Bridges, C. (2016). Pro-social behavior in overwatch. Retrieved from http://www.zam.com/article/766/pro-social-behavior-in-overwatch

Breuer, J., Scharkow, M., & Quandt, T. (2015). Sore losers? A reexamination of the frustration-aggression hypothesis for collocated video game play. *Psychology of Popular Media Culture, 4*, 126-137. https://doi.org/10.1037/ppm0000020

Breuer, J., Velez, J., Bowman, N., Wulf, T., & Bente, G. (2017). "Drive the lane; Together, hard!" *Journal of Media Psychology*, 29(1), 31–41. https://doi.org/10.1027/1864-1105/a000209

Bushman, B. J., & Huesmann, L. R. (2015). Twenty-five years of research on violent in digital games and aggression revisited: A reply to Elson and Ferguson (2013). *European Psychologist, 19*, 47-55. https://doi.org/10.1027/1016-9040/a000164

Bushman, B. J., Rothstein, H. R., & Anderson, C. A. (2010). Much ado about something: Violent video game effects and a school of red herring: Reply to Ferguson and Kilburn (2010). *Psychological Bulletin, 136*, 182-187. https://doi.org/10.1037/a0018718

Castronova, E. (2006). On the research value of large games: Natural experiments in Norrath and Camelot. *Games and Culture, 1*, 163-186. https://doi.org/10.1177/1555412006286686

Castronova, E., Williams, D., Shen, C., Ratan, R., Xiong, L., Huang, Y., & Keegan, B. (2009). As real as real? Macroeconomic behavior in a large-scale virtual world. *New Media & Society, 11*, 685-707. https://doi.org/10.1177/1461444809105346

Chidambaram, L., Bostrom, R. P., & Wynne, B. E. (1990). A longitudinal study of the impact of group decision support systems on group development. *Journal of Management Information Systems*, 7(3), 7–25. https://doi.org/10.1080/07421222.1990.11517894

Eberlein, M., & Walkowitz, G. (2008). *Positive and negative team identity in a promotion game* (No. 13/2008). Bonn Econ Discussion Papers.

Electronic Entertainment Design and Research. (2015). *Deconstructing the PC free-to-play market* [Press release]. Retrieved from http://denintelligenteinvestor.dk/wp-content/uploads/2015/05/EEDAR_-_Deconstructing_the_PC_Free-To-Play_Market_2015.pdf

Elson, M., Breuer, J., Ivory, J. D., & Quandt, T. (2014). More than stories with buttons: Narrative, mechanics, and context as determinants of player experience in digital games. *Journal of Communication, 64*, 521-542. https://doi.org/10.1111/jcom.12096

Elson, M., & Ferguson, C. J. (2015). Twenty five years of research on violence in digital games and aggression. *European Psychologist, 19*, 33-46. https://doi.org/10.1027/1016-9040/a000147

Elson, M., Mohseni, M. R., Breuer, J., Scharkow, M., & Quandt, T. (2014). Press CRTT to measure aggressive behavior: The unstandardized use of the competitive reaction time task in aggression research. *Psychological Assessment, 26*, 419-432. https://doi.org/10.1037/a0035569

Ewoldsen, D. R., Eno, C. A., Okdie, B. M., Velez, J. A., Guadagno, R. E., & DeCoster, J. (2012). Effect of playing violent video games cooperatively or competitively on subsequent cooperative behavior. *Cyberpsychology, Behavior and Social Networking, 15*, 277-280. https://doi.org/10.1089/cyber.2011.0308

Ferguson, C. J., & Kilburn, J. (2010). Much ado about nothing: The misestimation and overinterpretation of violent video game effects in Eastern and Western nations: Comment on Anderson et al. (2010). *Psychological Bulletin, 136*, 174-178. https://doi.org/10.1037/a0018566

Ferguson, C. J., & Rueda, S. M. (2010). The hitman study: Violent video game exposure effects on aggressive behavior, hostile feelings, and depression. European Psychologist, *15*(2), 99-108. https://doi.org/10.1027/1016-9040/a000010

Ferguson, C. J., Smith, S., Miller-Stratton, H., Fritz, S., & Heinrich, E. (2008). Aggression in the laboratory: Problems with the validity of the modified Taylor Competitive Reaction Time Test as a measure of aggression in media violence studies. *Journal of Aggression, Maltreatment, and Trauma, 17*, 118-132. https://doi.org/10.1080/10926770802250678

Greitemeyer, T., Traut-Mattausch, E., & Osswald, S. (2012). How to ameliorate negative effects of violent video games on cooperation: Play it cooperatively in a team. *Computers in Human Behavior, 28*, 1465-1470. https://doi.org/10.1016/j.chb.2012.03.009

Han, G. (Helen), & Harms, P. D. (2010). Team identification, trust and conflict: a mediation model. *International Journal of Conflict Management*, 21(1), 20–43. https://doi.org/10.1108/10444061011016614

Holz Ivory, A. H., Fox, j., Waddell, T. F., & Ivory, J.D., (2014). Sex role stereotyping is hard to kill: A field experiment measuring social responses to user characteristics and behavior in an online multiplayer first-person shooter game. *Computers in Human behavior 35*, 148-156. https://doi.org/10.1016/j.chb.2014.02.026

Jerabeck, J. M., & Ferguson, C. J. (2013). The influence of solitary and cooperative violent video game play on aggressive and prosocial behavior. *Computers in Human Behavior, 29*, 2573-2578. https://doi.org/10.1016/j.chb.2013.06.034

Johnson, R., Rogers, Y., van der Linden, J., & Bianchi-Berthouze, N. (2012). Being in the thick of in-the-wild studies: The challenges and insights of researcher participation. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 1135–1144. https://doi.org/10.1145/2207676.2208561

Kivikangas, J. M., Kätsyri, J., Järvelä, S., & Ravaja, N. (2014). Gender differences in emotional responses to cooperative and competitive game play. *PLoS One, 9*(7). doi: 10.1371/journal.pone.0100318

Kollar, P. (2016). The past, present and future of league of legends studio RIOT games. Retrieved from https://www.polygon.com/2016/9/13/12891656/the-past-present-and-future-of-league-of-legends-studio-riot-games

Kou, Y., & Gui, X. (2014). Playing with strangers: understanding temporary teams in league of legends. *First ACM SIGCHI Annual Symposium on Computer-Human Interaction in Play,* 161–169. https://doi.org/10.1145/2658537.2658538

Kuznekoff, J. H., & Rose, L. M. (2012). Communication in multiplayer gaming: Examining player responses to gender cues. *New Media & Society*, *15*, 541–556. https://doi.org/10.1177/1461444812458271

Kwak, H., Blackburn, J., & Han, S. (2015). Exploring cyberbullying and other toxic behavior in team competition online games. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems - CHI '15*. doi:10.1145/2702123.2702529

Lind, M. (2007). Collective team identification in temporary teams. *2007 40th Annual Hawaii International Conference on System Sciences (HICSS'07)*. https://doi.org/10.1109/HICSS.2007.132

Markey, P. M., & Markey, C. N. (2010). Vulnerability to violent video games: A review and integration of personality research. *Review of General Psychology,* 14(2), 82-91. https://doi.org/10.1037/a0019000

McCambridge, J., Witton, J., & Elbourne, D. R. (2014). Systematic review of the Hawthorne effect: New concepts are needed to study research participation effects. *Journal of Clinical Epidemiology*, 67(3), 267–277. doi:10.1016/j.jclinepi.2013.08.015

McWhertor, M. (2012). The League of Legends team of scientists trying to cure "toxic behavior" online. Retrieved from http://www.polygon.com/2012/10/17/3515178/the-league-of-legends-team-of-scientists-trying-to-cure-toxic

Morrisey, L. (2010). Trolling is a art: Towards a schematic classification of intention in internet trolling. *Griffith Working Papers in Pragmatics and Intercultural Communications*, *3*(2), 75–82.

Oswald, D., Sherratt, F., & Smith, S. (2014). Handling the Hawthorne effect: The challenges surrounding a participant observer. *Review of Social Studies*, 1(1), 53–74. doi:10.21586/ross0000004

Blizzard Entertainment. (2016). Overwatch [Computer software]. Available from https://us.shop.battle.net/en-us/product/overwatch?p=37693

Pobiedina, N., Neidhardt, J., Calatrava Moreno, M. del C., & Werthner, H. (2013). Ranking factors of team success. *Proceedings of the 22nd International Conference on World Wide Web - WWW '13 Companion*. https://doi.org/10.1145/2487788.2488147

Quandt, T., Van Looy, J., Vogelgesang, J., Elson, M., Ivory, J. D., Consalvo, M., & Mäyrä, F. (2015). Digital games research: A survey study on an emerging field and its prevalent debates. *Journal of Communication, 65*, 975-996. https://doi.org/10.1111/jcom.12182

Riot games Inc. (2009) League of Legends [Computer software]. Available from https://na.leagueoflegends.com/en/

Roy, A., & Ferguson, C. J. (2016). Competitively versus cooperatively? An analysis of the effect of game play on levels of stress. *Computers in Human Behavior, 56*, 14-20. https://doi.org/10.1016/j.chb.2015.11.020

Rubin, V. L., & Camm, S. C. (2013). Deception in video games: examining varieties of griefing. Online Information Review, 37, 369–387. https://doi.org/10.1108/OIR-10-2011-0181

Rude, S. S., Chrisman, J. G., Denmark, A. B., & Maestas, K. L. (2012). Expression of direct anger and hostility predict depression symptoms in formerly depressed women. Canadian Journal of Behavioral Science, 44(3), 200-209. https://doi.org/10.1037/a0027496

Schmierbach, M. (2010). "Killing spree": Exploring the connection between competitive game play and aggressive cognition. *Communication Research*, *37*, 256-274. https://doi.org/10.1177/0093650209356394

Sepehr, S., & Head, M. (2018). Understanding the role of competition in video gameplay satisfaction. Information & Management, 55(4), 407–421. doi:10.1016/j.im.2017.09.007

Sherry, J. L., Lucas, K., Greenberg, B. S., & Lachlan, K. (2006). Video game uses and gratifications as predicators of use and game preference. In P. Vorderer & J. Bryant (Eds.), Playing video games: Motives, responses, and consequence (pp. 213–224). Mahwah, NJ: Erlbaum Retrieved from https://www.researchgate.net/publication/259583577_Video_game_uses_and_gratifications_as_predictors_of_use_and_game_preference

Velez, J. A. (2015). Extending the theory of bounded generalized reciprocity: An explanation of the social benefits of cooperative video game play. *Computers in Human Behavior*, 48, 481-191 https://doi.org/10.1016/j.chb.2015.02.015

Velez, J. A., Greitemeyer, T., Whitaker, J. L., Ewoldsen, D. R., & Bushman, B. J. (2016). Violent video games and reciprocity: The attenuating effects of cooperative game play on subsequent aggression. *Communication Research, 43*, 447-467. https://doi.org/10.1177/0093650214552519

Waddell, T. F., & Ivory, J. D. (2015). It's not easy trying to be one of the guys: The effect of avatar attractiveness, avatar sex, and user sex on the success of help-seeking requests in an online game. *Journal of Broadcasting & Electronic Media*, *59*(1), 112-129. https://doi.org/10.1080/08838151.2014.998221

Warner, D. E., & Raiter, M. (2005). Social context in massively-multiplayer online games (MMOGs): ethical questions in shared space. *International Review of Information Ethics, 4*, 46–52.

Williams, D. (201). The mapping principle, and a research framework for virtual worlds. *Communication Theory, 20*, 451-470. https://doi.org/10.1111/j.1468-2885.2010.01371.x

Yamagishi, T., Jin, N. & Kiyonari, T. (1999). Bounded generalized reciprocity: Ingroup boasting and ingroup favoritism. *Advances in Group Processes*, 16(1), 161–197

Yee, N., Bailenson, J. N., Urbanek, M., Chang, F., & Merget, D. (2007). The unbearable likeness of being digital: The persistence of nonverbal social norms in online virtual environments. *Cyberpsychology, Behavior, and Social Networking, 10*, 115-121. https://doi.org/10.1089/cpb.2006.9984