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# The Effects of Cooperative Gameplay on Aggression and Prosocial Behavior

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## Abstract

Over a quarter of the world's population spends an average of 5.96 hours a week gaming. The top ten most played games are either exclusively multiplayer or have a multiplayer option, with 70% containing violent content. Despite the prevalence of multiplayer gaming, most video game research has been focused on single player modes. Video game aversion is based on this single player research. There is a lesser awareness of the effects of cooperative video game play. The majority of the literature on the effects of cooperative game play on aggression and prosocial behavior reviewed shows that, when played cooperatively, video games, regardless of content, have little or no effect on aggression or prosocial behavior. It is indicated that, playing video games cooperatively may reduce aggressive behavior and increase prosocial behavior. Given that there is relatively little research into cooperative video games as compared to violent video game research, more research is necessary.

*Keywords:* video games, aggression, prosocial behavior, cooperative gameplay

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*Effects of Cooperative Gameplay*

Video games are a prevalent source of entertainment. In 2017, there were 2.21 billion video gamers worldwide who spent an average of 5.96 hours a week playing video games (Limelight, 2018). The number of gamers is projected to reach 2.73 billion by 2021. Many gamers engage in multiplayer games or cooperative play. Cooperative play may include two or more players either in the same room or thousands of miles away. For the purposes of this paper, cooperative games include any video game where players work together to achieve some goal (e.g., *Overwatch*, *League of Legends*, and *Rocket League*). These multiplayer games can include anywhere from two to thousands of players. Of the top ten most popular games of 2018, five are exclusively online multiplayer and the remaining five have multiplayer modes (Ranker, 2018). Given the large number of gamers, the long amount of time spent gaming, and the near dominance of multiplayer games, it is important to consider the effects of cooperative games. It is also important to determine how the effects may differ from single player games.

There are two main areas of video game research today: effect on aggression and effect on prosocial behavior. Prosocial behavior is social behavior that benefits other people or society including empathy, helping, and cooperating (Jerabeck & Ferguson, 2013). The effects of videogaming on prosocial behavior has been studied with all genres of video games and is relevant considering that over a quarter of the world's population is actively gaming.

Aggression is the most studied parameter in violent video games (VVGs). The Entertainment Software Rating Board (ESRB) is an organization that assigns one of six ratings to video games that have been submitted for review: Early Childhood, Everyone, Everyone 10+, Teen, Mature, and Adults Only ("ESRB Ratings Guide," n.d.). In 2017, 1,948 ratings were assigned by the ESRB ("Rating," n.d.). Of these, 31% were rated Teen and 13% were rated Mature. Of the 17,331 ratings done by the ESRB since 2006, 32% of video games were rated Teen and Mature and less than 1% were rated Adults Only. Both Everyone and Everyone 10+ ratings can contain mild violence. Teen rated games can contain violence, but nothing more than minimal blood. Mature and Adults Only rated



games can contain intense violence. Forty-four percent of games released in 2017 and 32% of games released since 2006 had a rating of Teen or above, classifying them as VVGs. Of the top 10 games of 2018, three were rated Mature, four Teen, two Everyone 10+, and one Everyone by the ESRB (“ESRB Ratings,” n.d.). As discussed in Ferguson’s (2018) review, many studies have found that playing VVGs increases player aggression and decreases prosocial behavior. Ferguson concluded that publication bias played a major role in this research and that no clear conclusion about the effects of VVGs could be made since different studies found no correlation between VVGs, increased player aggression, and decreased prosocial behavior. However, Kepes, Bushman, and Anderson’s (2017) meta-analysis did not come to the same conclusion as Ferguson’s. They found the majority of research to have sound methods and to have drawn appropriate conclusions. Despite the difference between the two studies in reasoning and results, both studies agreed on the need for continued research. Furthermore, many video game studies use single-player modes in their research, neglecting the massive multiplayer market.

Over a quarter of the world’s population is spending an average of 5.96 hours a week gaming. All the top ten games being played by those gamers are either exclusively multiplayer or have a multiplayer option, and 70% contain violent content (Ranker, 2018). Despite the prevalence of multiplayer gaming, most video game research has been done with single player modes. When this research shows a positive correlation with aggression and a negative correlation with prosocial behavior, it is frequently highly publicized and is treated as if it applies to all video games. This negative publicity may lead to consumer aversion to video games. Although there is an abundance of research on the effects of single-player VVGs, there needs to be more research into and greater awareness of the effects of cooperative video game play on aggression and prosocial behavior and how these effects may differ from single player video games because of the greater popularity of cooperative video games.



## Effects of Cooperative Gameplay on Aggression

### Positive Effects

Eastin (2007) studied state hostility which was defined as level of hostility at a given point. Participants were split into groups of two, four, and six. They were allowed to practice using the controls for 10 minutes before 20 minutes of competitive or cooperative VVG play during which verbal aggression was measured through audio recording. After gameplay, the patient's state hostility was measured using a questionnaire. It was found that, as group size increased, verbal aggression increased significantly for both competitive and cooperative groups. The state hostility of cooperative groups was marginally less than that of competitive groups in all group sizes. The method of allowing participants to practice using the controls before actual gameplay is also employed by Velez, Mahood, and Moyer-Guse (2014). This method minimizes the potential for frustration with the controls, which often results in higher aggression scores. Ewoldsen et al. (2012) required participants to have experience playing the VVG used, in addition to allowing time to practice. These requirements further minimized the potential effect of frustration. It is difficult to know the true effects of gameplay as there was no control group to compare state hostility to. Greitemeyer (2013) had a control group and used a comparable questionnaire for aggression measurement. A significant difference between aggression of participants in the cooperative and non-cooperative conditions was found. Those that played cooperatively were less aggressive. The effect of group size on aggression warrants consideration and further research as exclusively online multiplayer games involve larger groups and no other studies examined the effects of different group sizes on aggression.

### Neutral Effect

Greitemeyer (2013) studied the effect of cooperative VVG play on both aggression and prosocial behavior. Participants were grouped into one of three conditions: cooperative VVG play, single player VVG play, and single player non-violent



video game play. After, 15 minutes of game play, participants wrote down everything they thought about during the game. This list was reviewed for aggressive ideas by a researcher with no knowledge of the objectives of the study. This is similar to Eastin's (2017) use of audio recording to measure verbal aggression, however, as it is self-reported, it may suffer from participant error. It is possible that participants over or under dramatized the words used in order to fake being good or bad, or perhaps to appear more interesting. The researchers found no significant difference between the cooperative and non-violent groups' aggressive thoughts. However, the participants that played VVGs as a single player had significantly more aggressive thoughts than the participants in both the cooperative and non-violent groups, supporting that the results of single-player VVG studies would be different than those of other video games.

### **Negative Effect**

Jerabeck and Ferguson (2013) also studied the effect of independent and cooperative VVG play on aggression and prosocial behavior. Specifically, the researchers were concerned with how content and context interact: the content being violence and the context being cooperative. They also hypothesized that longer exposure would reduce the positive effect of gameplay on aggression and the negative effect on prosocial behavior. Pairs of participants were assigned to play one of three games (violent cooperative, violent non-cooperative, and cooperative non-violent) for 45 minutes under one of two conditions: split screen or separate screens. After gameplay, aggressive behavior was measured using Lieberman et al.'s (1999) *Hot Sauce Paradigm*. Participants were given four hot sauces of varying degrees of heat. They then had to assign one sauce to the other participant. It was found that participants who played alone tended to administer spicier sauces than participants that played cooperatively. Overall, it was found that cooperative gameplay resulted in less aggressive behavior, regardless of game content (violent or non-violent). Additionally, violent content in video games did not affect aggressive behavior.



*Effects of Cooperative Gameplay*

Velez, Greitmeyer, Whitaker, Ewoldsen, and Bushman (2016) studied the effect of cooperative video game play on aggression toward video game partners and non-game partners. Their study was based on bounded generalized reciprocity. According to Yamagishi, Jin, and Kiyonari (1999), bounded generalized reciprocity explains people's behaviors in intergroup social situations. When interacting with outgroups, people behave to serve their self-interests. When interacting with their ingroup, people expect ingroup members to behave positively. This involves reciprocating positive behaviors. Participants were paired and assigned to one of three conditions: cooperative, competitive, and control. The cooperative and competitive groups played a VVG for 15 minutes and then participated in a competitive reaction time task to measure aggression. Participants chose a noise level and, if they won the task, blasted their opponent with the unpleasant noise. The control group filled out a questionnaire that was used to measure aggression before gameplay. The researchers found that participants in the cooperative condition were less aggressive to their partners after game play than those in the competitive condition. Similar to Greitmeyer (2013), there was no significant difference between the cooperative and the control group.

Velez, Mahood, and Moyer-Guse (2014) studied the effect of cooperative violent video game play on aggression and helping behavior in ingroups and outgroups. Participants played a VVG cooperatively or competitively. Their partner was a confederate who posed as a member of the participant's ingroup or the outgroup. The participant and the confederate took turns watching each other practice playing the VVG for five minutes each. They were then placed in separate rooms and given headsets, so they could communicate with each other. They played the VVG for 15 minutes. After gameplay, the participant and the confederate participated in a modified prisoner's dilemma. A prisoner's dilemma involves two people who choose to either cooperate or defect. Participants are separated and told the result after each round. If one participant defects and the other cooperates, the defector receives all the coins. If both cooperate, both participants receive a lower number of coins.

Mutual defection results in neither participant receiving coins. The confederate would give two dimes the first round and would follow tit-for-tat expectations for the remaining rounds; meaning that if the participant cooperated one round, the confederate would cooperate the next. Or, if the participant defected one round, the confederate would defect the next round. Afterwards, participants were given a self-reporting questionnaire. This study found that participants gave more dimes after having played cooperatively and that cooperating with an outgroup member resulted in reduced aggression. A major limitation of the research on aggression is the use of different methods of measure. Although it does eliminate the limitations involved with using the same measure, it does make it more difficult to compare results.

### **Effects of Cooperative Gameplay on Prosocial Behavior**

#### **Positive Effects**

Ewoldsen et al. (2012) studied the effect of cooperative VVG play on tit-for-tat behavior. Tit-for-tat or retaliation-in-kind behavior typically precedes cooperative behavior, which is a form of prosocial behavior. Participants had to have experience playing Halo, a VVG with single-player and multiplayer options, and were split into pairs and put into one of four conditions: direct competition, indirect competition, cooperation, and control. Participants played in separate rooms with no means of communication and had five minutes of practice and 15 minutes of gameplay. After game play, the participants engaged in a modified prisoner's dilemma to assess tit-for-tat behaviors. Those who played cooperatively engaged in more tit-for-tat behaviors, meaning that they reciprocated their partner's actions, than those that played in either competitive condition.

Greitemeyer (2013) studied the effect of cooperative VVG play on both aggression and prosocial behavior as well as the effect of cooperative non-violent game play on prosocial behavior in a two-part study. In the first part of the study, participants gamed in one of three conditions: cooperative VVG play, single player VVG

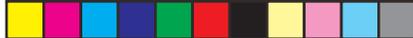
*Effects of Cooperative Gameplay*

play, and single player non-violent video game play. It was found that those in the single player VVG group felt less empathy than the cooperative VVG group. There was no statistically significant difference in empathy between the cooperative VVG group and the non-violent group. However, the cooperative group in the second part of the study reported more cooperative thoughts and showed more consideration for others as compared to the single player group, which resulted in increased empathy.

Greitmeyer and Cox (2013) performed a study on the effect of cooperative video games on cooperative behavior. The pairs that played cooperatively showed increased cooperative behavior as a result of increased cohesion which activated trust norms. Velez, Mahood, and Moyer-Guse (2014) also found that helping behavior increased in participants that played cooperatively. Velez (2015) studied the effect of cooperative game play on prosocial behavior based on bounded generalized reciprocity. The confederate was either helpful or not helpful. When the confederate was helpful, the participant showed an increase in prosocial behavior. When the confederate was not helpful, prosocial behavior between teammates decreased. Controlling for helpfulness is unique to this study. Ewoldsen et al. (2012), Greitemeyer (2013), Greitmeyer and Cox (2013), and Velez, Mahood, and Moyer-Guse (2014) made no mention of how helpful teammates were, which makes some sense as there is not always control over the helpfulness of players teammates in online settings. However, further research into the helpfulness of teammates could suggest a need for functionality that allows teammates to report and remove unhelpful players.

**Neutral Effect**

Jerabeck and Ferguson (2013) studied the effect of independent and cooperative VVG play on aggression and prosocial behavior. After gameplay, the paired participants participated in a prisoner's dilemma. After the conclusion of the prisoner's dilemma, participants were then given a manila envelope with a questionnaire to measure self-perceptions of empathy. The information gathered from the prisoner's dilemma and questionnaire did not show statistically significant differences



between the games and conditions. Overall, it was found that cooperative gameplay resulted in less aggressive behavior, regardless of game content (violent or non-violent). Additionally, violent content in video games did not affect prosocial behavior, aggressive behavior, or self-perceptions of empathy.

### Conclusion

There is compelling evidence that cooperative gameplay could nullify the potential aggression increasing and prosocial behavior reducing effects of VVGs, however, these studies lack external validity. Only one study had a play time over 20 minutes. The average gaming session lasts 80 minutes (Limelight, 2018). Only two of the reviewed studies used groups of participants larger than two. Typically, only local split screen game play would consist of two players. Research into typical gameplay behavior and statistics on gamer demographics could be used to create more externally valid experiments. Given the popularity video games, it is important for consumers to be aware of potential risks and benefits. As such, research into cooperative video games should be publicized just as much as single-player VVG studies, literature and policy regarding the effects of video gameplay on aggression and prosocial behavior should be revised to include information regarding cooperative game study results. It would also be of interest to see measures of aggression and prosocial behavior after gaming compared to those same measures after similar real-life activity (eg., NBA 2K18 and a game of basketball). Finally, further research should be done into the effects of cooperative game play with greater external validity.

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