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Competitively versus cooperatively? An analysis of the effect of game play on levels of stress



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ABSTRACT

Many gamers report that playing video games, including those with violent content, helps them to reduce stress. However, few studies have examined competitive and cooperative video game play as they relate to stress reduction. The current study employed a design to acutely stress 100 participants before assigning them randomly to play a mildly violent game either competitively or cooperatively with a female confederate. Results indicated stress levels declined over time at equal levels during both competitive and cooperative game play. Participants in the competitive condition held a slightly less positive impression of the confederate following game play, although players held a generally positive impression of the confederate overall.

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Few studies have considered the role of competitive and cooperative play in the context of recovering from stressful events. Many gamers report that playing video games, including those with violent content, is a positive force in their lives, reducing stress and increasing socialization. However, much of the research on gaming comes from a perspective of presuming that games are harmful, despite the perspective of gamers themselves. Understanding the phenomenology of user experiences can be valuable in understanding the game experience from the perspective of player, rather than the remote and often artificial perspective of the laboratory (Oswald, Prorock, & Murphy, 2014). Nonetheless, scholars have too often taken the perspective that the perspective of scholarship is sacrosanct, whereas that of players in inherently biased (e.g. Nauroth, Gollwitzer, Bender, & Rothmund, 2014). Although opinions will undoubtedly differ in this regard, we take the perspective that this approach is naturally self-limiting and remote.

At present, over 100 studies have been conducted to look at the potential harmful effects of “violent” video games and whether these are associated with aggressive or anti-social behavior (Ferguson, 2015). Research evidence has not provided clear evidence for a clear link between such games and societally relevant

aggression (Ferguson, 2015). Fewer studies have considered the role of competition and cooperative play regarding behavioral outcomes, although data in this area is slowly emerging (Adachi & Willoughby, 2011). Most of the research on competitive and cooperative game play has looked at interactions between these play styles with video game violence. Even fewer studies have examined how style of play might influence stress coping among players, nor whether reactions to games differ between male and female players. This study sought to address this gap in the literature by examining play style, as well as the effects of gender on cooperative and competitive game play in regards to participant stress levels and heart rates.

1. The impact of competition and cooperation in games

In a series of studies by Adachi and Willoughby (2011), the research team looked at differences in aggression potentially caused by violent content or competitiveness in the games. The researchers were concerned that past experiments of video game violence often conflated violent content with competitiveness. These differences were examined through two experiments. In both experiments, using the Hot Sauce paradigm for aggression (in which participants believe they are assigned to give more or less hot sauce to a person who wishes to avoid eating this sauce), the researchers confirmed that competitiveness, not violent content, was a source for aggressive behavior in players. This

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groundbreaking study provided evidence that much of the data on violent games may need to be reconsidered with a need for better matching between violent and non-violent game conditions. Przybylski, Deci, Rigby, and Ryan (2014) found similar results for frustration, rather than violent content, increasing aggression in players.

Dolgov, Graves, Nearents, Schwark, and Volkman (2014) defined cooperation as a form of “reciprocal altruism in which parties exchange goods or services to further their mutual goal(s)” (p. 50). In their study, the authors manipulated whether participants played a neutral video game (*Wii Sports Tennis* or *Canoeing*) either cooperatively or competitively with a confederate. In the competitive mode (in which players work against each other toward mutually exclusive goals), human players played against each other whereas the cooperative mode put the two human players on the same team and they competed together against a computerized opponent. Players in the cooperative condition subsequently picked up more pencils spilled by a confederate after gameplay. Overall, the study found cooperative gameplay in a formal context led to an increase in spontaneous helping behaviors.

Ewoldsen et al. (2012) found that playing violent video games cooperatively decreased arousal and violent cognitions. The study examined how playing a violent video game (*Halo II*) cooperatively would influence future cooperative behaviors. Results showed that participants in the cooperation condition showed significantly more generous behavior in a coin exchange social task than participants in competition or control conditions.

Using experimental data, Schmierbach (2010) found evidence supporting the idea that cooperative play results in less aggressive cognitions. The study utilized *Halo* on the Xbox console in three distinct modes. Before the study commenced, the participants all completed a ten minute training session, during which they were shown the game and the controller, and were allowed to play against an investigator for practice. This “training” allowed the study to place its participants in experienced and inexperienced categories. The participants were then matched and assigned to time slots based on their respective categories. These pairs of participants were randomly assigned to play one of the three modes: solo, cooperative, or competitive. In solo mode, each participant played the second level of the single player game, in which the player fights a series of battles against a small variety of alien opponents. In the cooperative mode, two players worked together to get through the same level that those did in solo mode. In both cases, no participants successfully made it to the end of the level in the allotted time. In the competitive mode, participants attempted to kill their opponent in a death match in the games longest level played in its default setting. Competitive players showed the highest level of subsequent aggressive cognitions, whereas cooperative players scored much lower. Game mode had no significant effect on arousal, but it did show a marginal effect on affect. The data also showed that solo players, both male and female, were most likely to report feeling angry, whereas competitive players, particularly men, actually felt less angry. Frustration was marginally affected by game mode, such that solo players were actually the most frustrated.

Lim and Lee (2009) concluded from their research that the social aspects of game play are as important, if not more, than the content of the game itself, violent or not. This study used *World of Warcraft* (WoW), a massive multiplayer online role playing game where participants engaged in violent or non-violent tasks, either cooperatively or solo. The violent tasks had participants fighting hostile nonplayer characters. The nonviolent tasks had participants navigating the game to find a destination (mailbox) and send an item. The collaborative condition had participants perform the game tasks with a same-gendered co-player character (the confederate)

who played from behind a partition in the lab, unknown to the participant. In the solo condition, participants completed all game tasks alone. Physiological arousal was measured by skin conductance (SC), a measure of activation in the sympathetic nervous systems that indicates how the body prepares itself to become ready for action and deal with external threats. For both non-violent and violent tasks, collaborative play led to significantly lower levels of arousal than in solo play although this was greater in magnitude for the violent tasks. The research team inferred from this that collaborative play may have decreased arousal for violent tasks by reducing the physical and mental load caused by the tasks, with the co-player serving as a source of support. However, for the nonviolent tasks, having a co-player requires extra care and attention; in most multiplayer games, co-players are required to stick together in order to get around the game world. Accounting for the collaborative context, these otherwise nonchallenging tasks can become psychologically demanding, thereby increasing the intensity of sympathetic activation. Jerabeck and Ferguson (2013) also found that when participants played cooperatively, aggressive behavior decreased regardless of game content. It is possible that the social context of cooperative play is more crucial than the content of the game itself in regards to determining emotional state. Players may be drawn to action games as a means of cooperative bonding, which may actually reduce stress.

2. Influences on stress

From previous research, it is clear that style of game play, whether competitive or cooperative can influence behavioral outcomes. Relatively little research has examined differential effects on stress, however. As one example, however, Reinecke (2009) looked at the correlation between video games as a means of recovery and stress relief. He believed that the content and narratives of games provide an opportunity to take a break from everyday life and to escape stress, problems, and negative affect. He believed that the characteristics of games significantly contributed to the recovery process in humans by eliciting psychological detachment. Video games also offer a unique sense of control and provide a feeling of autonomy (Ryan, Rigby, & Przybylski, 2006) and can alleviate stress by providing and fostering feelings of control during leisure. Reinecke (2009) also looked at how daily hassles impacted levels of stress. He believed that the daily hassles were a significant contributor to individual stress levels, especially psychological distress. The study asked participants to indicate how often they played video games on a 5-point scale, ranging from daily to less than once per month. In most games, players are confronted with opponents or challenges that they need to beat in order to move on from one level to another. The majority of the participants played video games daily, or at least several times a week. It was also found that most of the participants played games after stressful situations for the purpose of recovery.

By contrast Hasan, Bègue, and Bushman (2012) believed that violent video games increase stress, regardless of game play. The study measured cardiac coherence (heart rate) as a means to measure the elevated levels of stress through the autonomic nervous system. In the study, participants were randomly assigned to play either a violent or a nonviolent video game. After game play, the participant participated in a partnered task with a confederate, where the participant and the confederate competed against each other, and the winner had the opportunity to blast the loser with noise through headphones. It was hypothesized that those who played the violent video games would have lower cardiac coherence, and that the lower levels of cardiac coherence would be negatively related to aggression. The results showed that cardiac coherence values were lower when the individuals were assigned

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