ORIGINAL ARTICLE

Causes of State Hostility and Enjoyment in Player Versus Player and Player Versus Environment Video Games

Daniel M. Shafer

Department of Communication Studies, Baylor University, TX 76798-7368, USA

Video games have been under scholarly study since the 1980s, but few studies have blended the research areas of video games and aggression and video game enjoyment. This article seeks to determine how certain game play factors affect hostility, enjoyment, and the relationship between the 2 variables. A total of 289 students played games in player-versus-player (PvP) and player-versus-environment (PvE) situations. Findings indicate that outcome, competitive situation, and genre interact in their influence on state hostility and enjoyment. Results suggest that in some cases, game players are able to enjoy games despite negative experiences, such as losing, but players in PvP situations experience enjoyment-reducing levels of hostility, contrary to P. Vorderer et al.'s (2004) complex entertainment model.

Recent statistics illustrate the strong popularity of video games as entertainment. They can now be found in over 72% of American households (ESA, 2011). The average gamer is 37 years of age, and 42% of game players are female (ESA, 2011). Furthermore, social gaming is common; the ESA reports that 65% of gamers play with others *in person*. With genres ranging from casual puzzle games such as *Angry Birds* (Rovio, 2009) to sophisticated immersive narratives such as *Fallout: New Vegas* (Obsidian Entertainment, 2010), appealing options abound. In 2009 and 2010, the video game industry accounted for nearly $32 billion in software sales (ESA, 2011). But what draws people to spend so much time and money on games? Some argue that games are satisfying and provide a sense of achievement in the face of the monotonous and often oppressive daily grind (McGonigal, 2011). But the simplest answer is that video games are fun; they are enjoyable. And this sense of fun or enjoyment forms the centerpiece of our understanding about why people play video games (Vorderer, Klimmt, & Ritterfeld, 2004; Williams, 2006).

However, scholars and the public have long been concerned about the possibility that violent games reinforce or trigger hostility and aggression. Violence in games

Corresponding author: Daniel M. Shafer; daniel_m_shafer@baylor.edu

is commonplace; 5 of the top 10 video games and 7 of the top 10 computer games of 2010 explicitly featured violent content (ESA, 2011). Playing violent video games has been linked to increased aggressive thoughts, feelings, and behavior, as well as decreased prosocial behavior (Anderson et al., 2010).

There exist, then, two divergent approaches to the study of video game effects. On one hand is a group of scholars who consider how violent video games may produce or exacerbate aggression and hostility (Anderson & Bushman, 2002). Studies from this perspective usually lean on the general aggression model, and argue that aggression is produced by a convergence of individual differences and situational variables such as gender, trait aggression, and previous exposure to such video games, and situation variables such as violent or nonviolent content.

On the other hand are scholars who consider the process of enjoyment of video games; focusing on the positive aspects of game play or how players negotiate the possible negative elements of games to produce enjoyment (e.g., Hartmann & Vorderer, 2010; Vorderer et al., 2004). What is needed is research that considers the effects of violent game play and enjoyment of video games within a single theoretic framework. This study attempts to offer such an approach.

The complex process of enjoyment of entertainment

The term enjoyment has typically been understood as pleasure derived from exposure to a mediated stimulus (Raney, 2003; Vorderer et al., 2004). Enjoyment was long assumed to be a purely affective reaction, but more recent conceptualizations point out that cognition and emotion are dependent on one another. This dependency means that enjoyment is both an affective reaction and a cognitive process (Vorderer et al., 2004).

Logic would dictate that enjoyment would be impossible if the media product consumed produces negative feelings. However, as Vorderer et al. (2004) point out, even media that produce sadness or thoughtfulness can be enjoyed or appreciated in some sense (Oliver, 1993). Vorderer et al. (2004) even mention video games in particular: ''Playing a computer game is usually challenging and rewarding but may also be frustrating and humbling'' (p. 391).The entertainment experience, then, may be more complex than some entertainment theories such as mood management (Zillmann, 1988) or affective disposition theory (Raney, 2003) suggest. With this complexity in mind, Vorderer et al. (2004) propose a broad theoretical approach to entertainment with enjoyment at its core, an approach I will term the *complex entertainment model* (CEM).

The complex entertainment model
Entertainment produces enjoyment, a pleasant experience that has components of physiology (i.e., arousal) cognition, and affect (Vorderer et al., 2004). The CEM suggests that enjoyment can be wrought not only from hedonically positive inputs but from negative as well. This phenomenon, the CEM contends, can be explained

by metamoods, a concept forwarded by Mayer and Gaschke (1988). Their argument is that mood is experienced not only directly but also as an evaluation of that direct experience. Higher order metamoods or metaemotions (Bartsch, Vorderer, Mangold, & Reinhold, 2008) can be experienced, wherein the individual has thoughts and feelings about the experience they are having and the mood that experience is creating (Mayer & Gaschke, 1988). It is theoretically possible, then, for an individual to experience negative emotions (e.g., hostility and frustration) induced by a media experience, while simultaneously enjoying the overall experience via metaemotions (Bartsch et al., 2008; Vorderer et al., 2004). Video games are designed to be challenging; putting players in situations that at times cannot end positively. In a player-versus-player (PvP) situation, one player or group must win, and one must lose. The experience of losing is not considered enjoyable; it is stressful and results in strong, unpleasant emotions (Wilson & Kerr, 1999). Winning, on the other hand, produces strong pleasant emotions and a reduction in stress (Wilson & Kerr, 1999).

This study examines the impact of specific important game play elements (game content, players' situation, outcome, and state hostility) on player enjoyment. My approach to investigate this issue involves three steps of analysis. First, the impact of the varying factors of competitive situation, game content, and outcome on both hostility and enjoyment will be analyzed separately. Second, a path model will be constructed to investigate the possible mediating relationship of hostility on enjoyment, given the independent variables in question. Third, the independent variables will be considered as moderators of the relationship between hostility and enjoyment via regression analysis.

Predictors of hostility
As noted above, winning and losing produce different hedonic experiences (Wilson & Kerr, 1999). Findings specific to violent media consumption indicate that situational variables such as frustration borne of failure can increase aggressive and hostile thoughts and feelings in media users (Anderson & Morrow, 1995). Therefore, it is predicted that

> H1: Losers will report a significantly greater increase in state hostility over winners.

Berkowitz (1989) argued that frustration can produce a higher likelihood to engage in aggression because people try to avoid frustrating situations. In a game play situation, frustration is produced by the opponent (whether it be a computer or a human), who hinders success. Several research studies indicate that the simple act of playing competitively with another human being may increase hostility (Anderson & Morrow, 1995; Berkowitz, 1990; Eastin, 2006; Eastin & Griffiths, 2009). Player-versus-environment (PvE) situations may be viewed as less competitive by some because there are no social stakes such as earning bragging rights and respect from friends (Sherry, Lucas, Greenberg, & Lachlan, 2006; Williams, 2006). Consequentially, it is predicted that

H2: Players in the PvP condition will report a significantly greater increase in state hostility over PvE players.

Violent media content has long been known to increase aggressive ideation and behavior in users (Anderson et al., 2010). More focused research on the differences in aggressive outcomes based on playing violent and nonviolent games suggests that playing violent games results in increased state hostility over playing nonviolent games (Anderson & Dill, 2000; Cicchirillo & Chory-Assad, 2005; Tamborini et al., 2004). Therefore, it is predicted that:

H3: Violent first person shooter games will produce significantly greater state hostility than nonviolent puzzle games.

Much extant literature considers factors such as playing situation (Ravaja et al., 2006), game content (Anderson & Dill, 2000; Arriaga, Esteves, Carneiro, & Monteiro, 2006), and outcome in isolation (Mazur, Susman & Edelbrock, 1997). A unique offering of this study, however, is the ability to analyze these factors in concert to consider possible moderation effects. It seems reasonable to assume that winning or losing, violent or nonviolent content, and/or PvP or PvE situation would all moderate each other's influence on hostility. However, this is (to this author's knowledge) the only study to combine all three factors in a single model. Therefore, the following research question is posed:

RQ1: What interaction/moderation effects (if any) will emerge from the combined impact of game situation, game content, and outcome on state hostility?

Predictors of enjoyment
Research suggests that competition and social interaction enhance enjoyment of video games (Sherry et al., 2006; Vorderer, Hartmann, & Klimmt, 2003). Among teens, 97% play some form of video games. Nearly two thirds (65%) of those report that they play games with other people who are physically present in the room (Lenhart et al., 2008). Past research indicates that playing games against human opponents can produce positively valenced emotions as compared with playing against a computer (Ravaja et al., 2006). Additional past research lends credence to the idea that playing in PvP situations should lead to increased enjoyment (Vorderer et al., 2003; Weibel, Wissmath, Habegger, Steiner, & Groner, 2008). Therefore, it is predicted that

H4: PvP players will enjoy the games more than PvE players.

Losing is not an enjoyable experience, and winning is typically associated with positive reactions (Wilson & Kerr, 1999). Additionally, "positive affect (liking, pleasure, dominance) increases with mastery of the game" (Holbrook, Chestnut, Oliva, & Greenleaf, 1984, p. 737). Therefore, it is predicted that

H5: Winners of the game will report significantly more enjoyment than losers.

As it is uncertain how enjoyment will operate in light of the combination of the three independent variables, the following research question is posed:

RQ2: What interaction/moderation effects (if any) will emerge from the combined impact of game situation, game content, and outcome on enjoyment?

Impact of hostility on enjoyment

As asserted in the introductory statements, the field of video game effects research has not yet fully investigated whether there is a link between state hostility and enjoyment of video games. Vorderer et al. (2004) argued that, even when a player experiences negative outcomes (e.g., losing) or negative emotions (e.g., frustration or hostility), the game play experience may still be evaluated as enjoyable (i.e., metamoods). Therefore, it is necessary to investigate the possible impact of state hostility on enjoyment under varying conditions such as PvE or PvP play, FPS or puzzle game content, and outcome. The following research questions are presented to better focus the investigation:

RQ3: Does state hostility mediate between situation, content, and outcome and enjoyment?

RQ4: Are there differences in the way hostility impacts enjoyment based on the moderating effects of situation, content, and/or outcome?

Method

Participants

Data were collected initially from 408 students recruited from various courses over two semesters at a midsized research university in the southern-central United States. They were offered course or extra credit for their participation. Given the use of path analysis, any case with missing data on key variables (e.g., enjoyment, perceived skill, gender, aggression, and pre- or postplay hostility measures) was eliminated from the sample. The final sample ($N = 289$) consisted of 70.8% of the original sample. The sample was 60% male, and participants ranged in age from 18 to 34 with an average age of 20.1 years ($SD = 1.97$).

Stimulus material

Four games were selected as stimulus material. *Call of Duty: Modern Warfare 2* (Activision, 2009) and *Halo 3: ODST* (Bungie Software, 2009) were selected as the FPS games. *Tetris: Evolution* (THQ, 2007) and *Lumines Live!* (Atari, 2009) were selected as the puzzle games.

In the FPS PvP condition, *Modern Warfare 2* players competed on the same map, an urban setting. The goal was to kill the opposing player's avatar as many times as possible in the time allotted. The time limit was set to a 10-min maximum, but total

time spent, taking load time and weapon selection into account, was about 15 min. For *Halo 3: ODST*, all PvP players played in an alien city map. The goal and time restrictions were the same as in *Modern Warfare 2*. For both games, number of kills was tracked and displayed on a statistics screen at the end of the round.

In the FPS PvE condition, all *Modern Warfare 2* players played the first mission following the training level. Research assistants using stopwatches ended each playing session after 10 min. For *Halo 3: ODST*, players played a survival mode minigame in which the player fights waves of enemies. The mini game allows a time limit (set to 10 min) and keeps a kill and death tally. In both games, a won/lost determination is not made by the game, but rather by how the player felt they performed based on feedback from the game (kills vs. deaths, progress in the level).

In the puzzle PvP condition, *Tetris* players competed by trying to clear more lines than their opponents. *Tetris* requires players to rotate geometric pieces as they fall on screen and organize them into lines, which disappear when complete. As one player eliminates large numbers of lines, the opposing player is penalized with incomplete lines, which make the game more difficult. *Lumines Live!* is similar in theme to Tetris, but instead of varying pieces, the player must shift colored blocks to create large blocks of color, which disappear. The goal is to eliminate as many blocks as possible. As one player succeeds, his or her play area increases, shrinking the opponent's play area and limiting brick placement options. Players of both games played three rounds at 3–4 min per round for a total of 10–12 min of play time per session.

In the puzzle PvE condition, players played in exactly the same way, except versus the CPU rather than versus a live opponent. Players played three rounds. In this way, all elements of the games were consistent between playing situations. In both playing situations, players won if they won 2–3 of the three rounds, and lost if they lost 2–3 rounds.

Procedure

Participants arrived in the video game lab and were seated in front of a multimedia station with a 32'' HD monitor displaying the online questionnaire beginning with the IRB-approved consent form. In the PvP condition, one participant completed the questionnaire online, while their opponent completed it on paper. Participants completed the individual difference measures portion of the questionnaire, then played the randomly assigned game and then completed the dependent variable measures. Each session lasted 40–50 min.

Measures

Individual difference variables assessed included gender and perceived skill at the game. *Gender* was determined by a single item: "What is your gender?" *Perceived skill* was also measured using a single item: "*How would you rate your skill at the game?*" Responses ranged from *expert* (1) to *I never played before* (4). Scores were reverse coded so that lower numbers represented lower perceived skill.

To determine competitive *situation* and game *content*, players were randomly assigned to play either a FPS or puzzle game in a PvP or PvE situation. *Outcome* was determined in the PvP condition by asking players: "Did you win or lose?" In the PvE condition, outcome was determined by a self-report of the player's subjective assessment of their performance: "If you evaluate your performance in the game, would you say you won or lost?"

State hostility was assessed both before ($\alpha = .92$) and after ($\alpha = .92$) game play using the measure for state hostility used by Anderson, Deuser, & DeNeve (1995). Scores were then subtracted to produce a single "change in hostility" score for each player. Scores ranged from -1.51 to 2.17 ($M = 0.15$, $SD = 0.58$).

Enjoyment was measured using a 12-item scale adapted from the measures used in other enjoyment studies (e.g., Raney, 2002). The enjoyment scale asks participants to evaluate their game play experience based on several items. Two sample items are "the game made me feel good" and "I enjoyed the game." Answers are given on a continuum from 0 (negative) to 10 (positive). Reliability was high for the enjoyment scale, Cronbach's $\alpha = .89$.

Results

Data were analyzed using a 2 (Competitive Situation: PvP/PvE) $\times$ 2 (Genre: FPS/Puzzle) $\times$ 2 (Outcome: Win/Loss) factorial multivariate analysis of covariance (MANCOVA) design with change in state hostility (postgame minus pregame) and enjoyment scores as dependent variables. Gender and perceived skill were included in the factorial model as covariates. A path model was also specified to investigate RQ3, and moderation analysis was conducted using regression procedures to analyze RQ4.

For the MANCOVA, omnibus tests indicated significant main effects for competitive situation, Wilk's $\lambda = .92$, $F(2, 278) = 11.48$, $p < .001$, $\eta_{part}^2 = .08$, game genre, Wilk's $\lambda = .96$, $F(2, 278) = 5.44$, $p = .005$, $\eta_{part}^2 = .04$, and outcome, Wilk's $\lambda = .90$, $F(2, 278) = 15.17$, $p < .001$, $\eta_{part}^2 = .10$. Significant covariate effects were found for perceived skill, Wilk's $\lambda = .86$, $F(2, 278) = 22.13$, $p < .001$, $\eta_{part}^2 = .14$, but not for gender. A significant two-way interaction was found between competitive situation and game genre, Wilk's $\lambda = .96$, $F(2, 278) = 5.65$, $p = .004$, $\eta_{part}^2 = .04$. No other two-way interactions were significant, and the overall three-way interaction between all predictors was not significant; however, the three-way interaction was significant for enjoyment scores (reported in the following sections).

Hostility

H1 predicted that losers would report a significantly greater increase in state hostility over winners. Between-subjects test results indicated that losers ($n = 153$, $M = 0.27$, $SD = 0.58$) experienced a significantly greater increase in state hostility over winners ($n = 136$, $M = 0.03$, $SD = 0.56$), $F(1, 279) = 13.69$, $p < .001$, $\eta_{part}^2 = .05$. Therefore, H1 is supported.

H2 predicted that PvP players would experience significantly more hostility than PvE players. Results indicated that PvP players ($n = 157$, $M = 0.29$, $SD = 0.48$) did experience a significantly greater increase in hostility than their PvE counterparts ($n = 132$, $M = 0.0002$, $SD = 0.65$), $F(1, 279) = 19.29$, $p < .001$, $\eta^2_{part} = .07$. Therefore, H2 is supported.

H3 predicted that FPS players would report significantly more hostility than puzzle players. However, players of FPSs ($n = 137$, $M = 0.22$, $SD = 0.66$) did not significantly differ in state hostility as compared with Puzzle players ($n = 152$, $M = 0.10$, $SD = 0.50$), $F(1, 279) = 2.47$, $p = .117$. Therefore, H3 is not supported.

RQ1 investigated the possibility of interaction effects between predictors on state hostility. Results indicated a marginally significant interaction between competitive situation and genre, $F(1, 279) = 3.32$, $p = .07$, $\eta^2_{part} = .01$. PvE players of FPS games reported a negative change in hostility, indicating that playing FPS games in a PvE situation actually slightly reduced state hostility. However, FPS players in a PvP situation had the greatest increase in state hostility, as Figure 1 shows. Results seem to indicate that playing in a PvP situation (as opposed to PvE) heightens state hostility in general, but the effect is pronounced when playing FPS games. Tests of simple effects indicate that PvP players of FPS games increased in hostility significantly more than PvP players of puzzle games, $p = .01$. On the other hand, no differences in change in hostility between game content in a PvE situation were found, $p = .899$.

Enjoyment

H4 predicted that PvP players would enjoy the games more than PvE players. Results indicated that PvE players ($n = 132$, $M = 6.80$, $SD = 1.79$) enjoyed the games significantly more than PvP players ($n = 157$, $M = 6.19$, $SD = 1.74$), $F(1, 279) = 4.90$, $p = .03$, $\eta^2_{part} = .02$, contrary to the hypothesized relationship. Therefore, H4 is not supported.
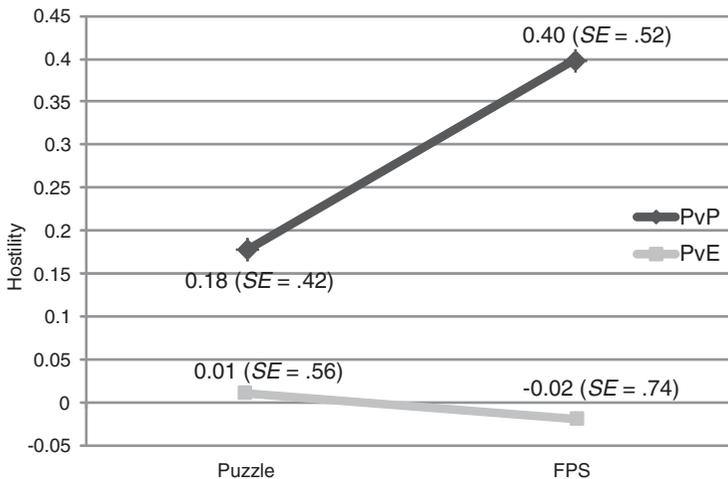

Figure 1 PvP/PvE and FPS/puzzle interaction effects on hostility.

H5 predicted that winners would enjoy the games more than losers. Winners ($n = 136$, $M = 7.28$, $SD = 1.62$) did report significantly more enjoyment than losers ($n = 153$, $M = 5.74$, $SD = 1.73$), $F(1, 279) = 18.67$, $p < .001$, $\eta^2_{part} = .06$. Therefore, H5 is supported.

RQ2 asked whether any interaction effects would emerge from the analysis of the independent variables on enjoyment. A significant two-way interaction was found between competitive situation and genre, and a significant three-way interaction was found between all three independent variables. For the two-way interaction, competitive situation and genre significantly interacted in their effect on enjoyment, $F(1, 279) = 7.35$, $p = .007$, $\eta^2_{part} = .03$. Figure 2 shows that playing puzzle games in a PvP situation drove enjoyment down significantly. Tests of simple effects indicated that, for FPS players, there were no significant differences in enjoyment between PvE and PvP groups, $p = .743$. However, for Puzzle players, a significant difference in enjoyment between PvE and PvP groups was found, $p < .001$. In a comparison of genres, enjoyment scores were significantly higher for FPS players in the PvP situation ($p < .001$), but scores did not significantly differ between genre for PvE players.

A significant three-way interaction was also observed, $F(1, 279) = 4.10$, $p = .044$, $\eta^2_{part} = .01$. An analysis of simple effects revealed a few significant differences in enjoyment between categories of the independent variables.

For outcome effects, winners enjoyed the game significantly more than losers for only the PvE puzzle situation ($p < .001$) and the PvP FPS situation ($p = .011$). No significant differences were found between winners and losers for the PvE FPS condition or the PvP puzzle condition (Figure 3).

For competitive situation effects, a significant difference in enjoyment was found for winners of puzzle games. Those in the PvE condition enjoyed winning the
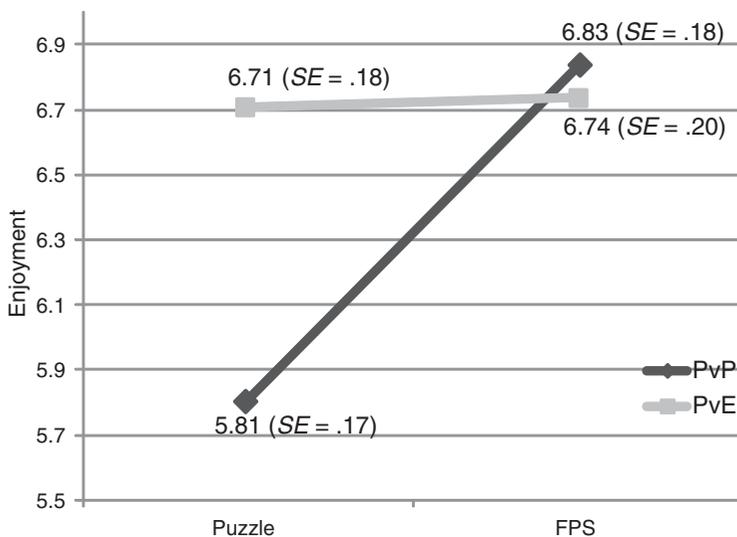

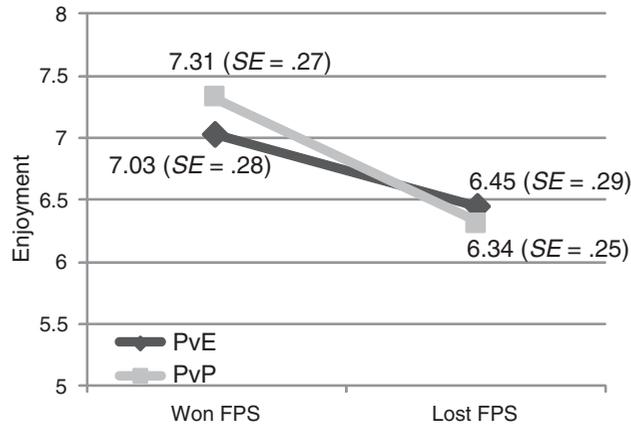**Figure 2** PvP/PvE and FPS/puzzle interaction effects on enjoyment.

Figure 3 Outcome and genre interaction effects on enjoyment, FPS games.
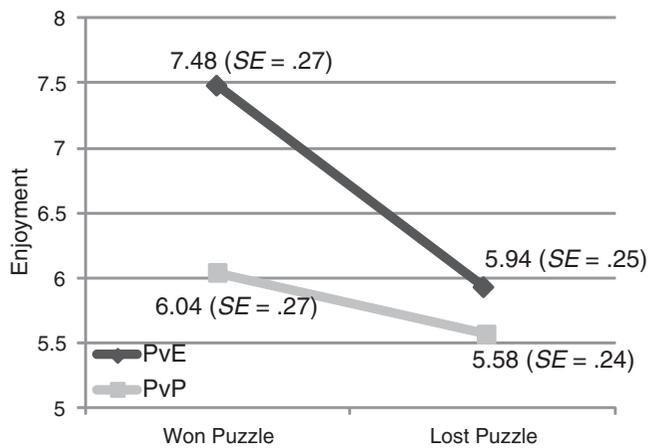

Figure 4 Outcome and genre interaction effects on enjoyment, puzzle games.

game significantly more than those in the PvP condition, contrary to predictions. Explanations for these findings are offered in the following section.

For genre effects, two significant differences were found. Both PvP winners and PvP losers enjoyed the FPS games significantly more than they enjoyed the puzzle games ($p = .001$ .021, respectively), a result that corresponds with the significant main effect of genre (see Figure 4).

Path analysis

RQ3 inquired as to the impact of hostility on enjoyment, given the presence of the predictors of competitive situation, game content, and outcome. Results of a path analysis using *Lisrel* 8.8 (Jöreskog & Sörbom, 2004) indicate that hostility did not significantly affect enjoyment. The original model with all paths specified returned a perfect fit, indicating the model was just identified. A just-identified model tells
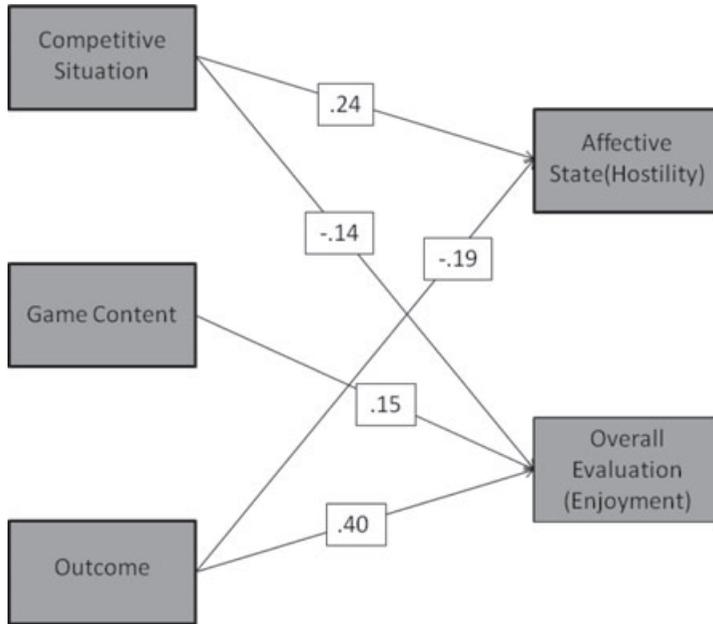
Figure 5 RQ3 path model; no mediating effect of hostility.

us very little about how the data fit the model; therefore, modifications were made. Specifically, because there were no effects found for game content on hostility, the path from game content to hostility was constrained to zero. The resulting model, which retained a nonsignificant path from hostility to enjoyment, demonstrated mediocre fit, $\chi^2_{1,N=289} = 3.24$, $p = .07$; RMSEA = 0.09; SRMR = 0.03; NNFI = 0.76. Removal of the nonsignificant path from hostility to enjoyment resulted in a good fitting final model, $\chi^2_{2,N=289} = 3.33$, $p = .19$; RMSEA = 0.05; SRMR = 0.03; NNFI = 0.93 (see Figure 5).

Enjoyment was significantly predicted by all three independent variables such that violent content and winning the game positively predicted enjoyment, and playing in a PvP situation had a negative impact on enjoyment. Outcome was the most powerful predictor in the model.

The path analysis tested the mediating effect of hostility between situation, content, outcome, and enjoyment. However, the path model cannot adequately answer RQ4, which investigated the moderating effect of situation, content, and outcome on the relationship between hostility and enjoyment. To probe this question, moderation analysis was conducted via a linear regression procedure as described by Holmbeck (1997). This procedure involves centering the independent variable and dummy-coding the dichotomous moderator variables to eliminate multicollinearity between the independent variable, the moderator, and the interaction term. Hierarchical regression was conducted. Significant main effects were found for each of the moderator variables (situation, $\beta = -.14$, $t = -2.60$, $p = .010$; content,

$\beta = .148$, $t = 2.81$, $p = .005$; and outcome, $\beta = .401$, $t = 7.45$, $p < .001$) on enjoyment. No significant main effect of hostility on enjoyment was found, $\beta = -.02$, $t = -0.26$, $p = .793$. These results are consistent with the analyses reported earlier. Interaction terms for hostility with each moderator were entered into the model in separate blocks.[1] Significant moderating effects of gaming situation (PvE/PvP) on the relationship between hostility and enjoyment were found. The F-test of the model was significant, $F(5, 283) = 17.49$, $p < .001$, $R^2_{adj.} = .22$. The interaction term was a significant negative predictor of enjoyment, $\beta = -.19$, $t = -2.69$, $p = .008$, controlling for the main effects of the moderator variables (situation, content, and outcome). These results, however, cannot fully describe the impact of gaming situation on the link between hostility and enjoyment. Follow-up post hoc analyses were conducted according to the procedures recommended by Holmbeck (2002). Regression coefficients describing the impact of hostility on enjoyment were generated for each value of gaming condition. Results indicated that hostility had no significant impact on the enjoyment felt by players in the PvE situation, $\beta = .04$, $t = 0.46$, $p = .646$. However, in the PvP situation, hostility significantly reduced enjoyment, $\beta = -.26$, $t = -2.77$, $p = .006$ (see Figure 6).
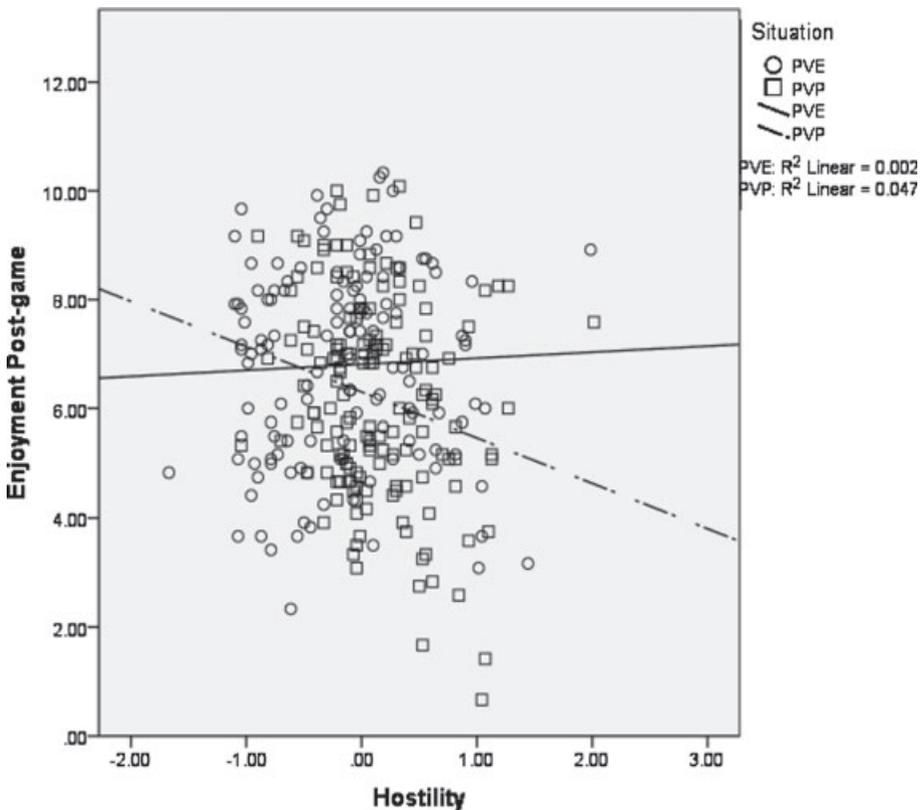

Figure 6 RQ4 regression plots, gaming situation moderates impact of hostility on enjoyment.

Discussion

This study used several statistical techniques to investigate the impact of three important game play factors on hostility and enjoyment and the possible impact of those factors on the relationship between the two outcome variables. A $2 \times 2 \times 2$ MANCOVA was used to investigate the impact of game content, competitive situation, and outcome on hostility and enjoyment. Path analysis was employed to investigate the possible mediating effect of hostility between the independent variables and enjoyment, and regression analysis was used to investigate moderating effects of situation, content, and outcome on the relationship between hostility and enjoyment. Results indicate that competitive situation (PvP or PvE), game content (FPS or puzzle), and outcome (win or lose) interact in their effects on hostility and enjoyment. Results also indicate that an increase in state hostility has no significant impact on enjoyment in a PvE situation but has a significant negative impact on enjoyment in a PvP situation.

Findings indicate that playing in a PvP situation sparked a greater increase in hostility than playing in a PvE situation. This effect on hostility is intensified when a FPS video game is introduced (Figure 4). FPS content and PvP situation interacted to produce significant increases in state hostility. This effect can perhaps be explained by the relationship between anonymity and hostility. As players were randomly assigned to condition in this experiment, it can be assumed that most players were unfamiliar with each other and were not friends. As pointed out by Eastin (2007) and also asserted by Thorne and Luria (1986), anonymity allows for a greater level of competitiveness with less offense given or taken. Greater anonymity allows players to pursue a personal goal (i.e., winning) without restraint, which may increase hostility (Eastin, 2007). In the two studies cited, however, anonymity was a function of playing with others in a large group. Arguably, less anonymity would be present in PvP play against a single opponent, but the principle may still apply. Note that hostility was lowest in the PvE situation, where there was no human opponent. In terms of anonymity, it might be expected that hostility would be greater. However, it may also be reasonable to suggest that because the competition is with the software-based AI driving the nonplayer characters, hostility would not increase. After all, in the PvE condition, there is no intentional aggression by a human agent as in the PvP condition. The presence of an intentional human agent of aggression could have served to increase hostility as players attribute the frustration they are experiencing to their opponent instead of a computer (see Berkowitz, 1989). Nonetheless, future research should incorporate a measure of perceived anonymity, which would give a better sense of what factors contribute to increased hostility within a PvP situation.

Considering enjoyment, PvP FPS games were enjoyed significantly more than puzzle games, but enjoyment was equal for PvE players regardless of genre played (Figure 3). Results showed a three-way interaction of competitive situation, game content, and outcome on enjoyment. For those who lost the puzzle game and those who lost the FPS game, there were no significant differences in enjoyment based on

competitive situation. Losers enjoy losing in equally small measure, no matter the genre. Although, it is important to note that these players still reported enjoying the game experience, on average. Where significant differences emerge is among winners. Winners of FPS games enjoyed the experience equally, regardless of competitive situation. But the enjoyment of winners of puzzle games was dependent on competitive situation. PvP players enjoyed the experience of beating their opponents significantly less than PvE players enjoyed beating the computer. In past research on player reactions to human versus computer opponents, scholars have found that playing against a human opponent results in significantly more positively valenced emotions than playing against a computer (Ravaja et al., 2006) and that playing in a PvP situation should lead to increased enjoyment both in person and online (Vorderer et al., 2003; Weibel et al., 2008). It might be suggested that the content of the puzzle game was simply not as enjoyable as the FPS game; however, the interaction effects reported do not bear out this conclusion. Winners of puzzle games in the PvE condition reported the most enjoyment of all players. The literature on excitation transfer theory and suspense may provide an explanation. Zillmann (1996) asserts that enjoyment of suspense is dependent on how much empathic distress is produced by the suspenseful media. The distress is transferred to euphoria when the suspenseful situation is resolved in the viewer's favor. In mediated sports contests, the number of suspenseful situations in the game has been found to affect enjoyment (Peterson & Raney, 2008). It is therefore possible that winners of PvP puzzle games did not feel enough suspense to push their enjoyment up to the level other winners experienced. The same difference in enjoyment did not emerge for FPS players, possibly because FPS games have more action; action has been found to be more suspenseful than media texts with low or no action (Vorderer, 1996). Puzzle game players in the PvE situation, however, may have felt higher levels of suspense. Such a suggestion is mere speculation; future research should incorporate measures of perceived suspense to judge its importance to the enjoyment of both PvP and PvE contests using various genres.

The results of the MANCOVA demonstrate the complexity of the enjoyment process. Outcome, competitive situation, and game content interact in their influence on both state hostility and enjoyment. Still, the results indicate that outcome is generally the most powerful determinant of enjoyment. Yet, as evidenced by the enjoyment scores of puzzle game winners, winning is not always more enjoyable than losing. In this study, game content, specifically violent content, was an important contributor to enjoyment such that even those who lost the FPS game tended to enjoy the games more than those who won the puzzle games (Figures 4 and 5). But it is important to note that winning is not a prerequisite to enjoyment. As already noted, one of the chief gratifications of playing video games is the challenge they present (Sherry et al., 2006). Indeed, for many gamers, winning is not the chief goal. Instead, it is the experience of playing that matters (McGonigal, 2011).

Path analysis was used to investigate the possible mediating effect of state hostility between the independent variables and enjoyment. Although competitive situation and outcome were significant predictors of both state hostility and enjoyment, results

showed no mediating effects. This finding suggests that state hostility does not affect enjoyment in the experience of playing video games under certain conditions. The analysis of RQ4 sheds further light on this finding. Results indicated that hostility significantly reduced enjoyment in the PvP situation. This finding stands in opposition to the arguments of the CEM (Vorderer et al., 2004), which asserts that enjoyment can be experienced because of negative emotions via metamoods. The results of this study indicate that the entertainment experience of playing video games may in fact be fairly straightforward. Players who play with human opponents experience greater hostility and enjoy the games less, while those who play against the computer experience less hostility and a minimal impact on enjoyment.

Limitations

This study is limited primarily by the range of games under study, and the results can only be applied to games of the shooter and puzzle genres. Sports games or role-playing games may return different results. Also, suspenseful, arousing, yet relatively nonviolent games (e.g., *Myst*; Cyan, 1993, *Portal*; Valve, 2007) may produce varying levels of state hostility.

An additional limitation of the study is the use of a student sample; a limitation that appears in much current research. However, other recent video game effects studies (Nowak, Krcmar, & Farrar, 2008; Skalski, Tamborini, Shelton, Buncher, & Lindmark, 2011; Skalski & Whitbred, 2010) have used student samples effectively. As Basil (1996) points out, student samples often introduce less error into research than a representative sample. Given the assumption of a robust methodological design, the risks associated with a student-only sample have been minimized in this study.

The way won/lost determinations were made is also a limitation. In both FPS and puzzle conditions, no distinction was made between fierce competition and blowout wins. A variable that could have been measured categorically was measured as a dichotomous variable, and so some nuanced information was lost. Drawing such distinctions in future research could provide valuable information in a future study.

Conclusion

This study makes a meaningful contribution to current knowledge on the process of enjoyment of video games. This study shows that enjoyment is not necessarily dependent on winning or losing (although winning certainly helps), playing with others or alone, or the genre of the game. The negative emotions potentially produced by losing the game did not increase or decrease enjoyment. It could be argued that metaevaluations of the game experience allowed players to enjoy the game despite losing. However, the CEM (Vorderer et al., 2004) argues that negative emotions can even positively affect enjoyment of entertainment. The results of this study suggest that, in at least some cases, this assertion is incorrect. PvP players experienced greater hostility, which significantly reduced their enjoyment. In all other situations, hostility did not affect enjoyment at all. This study does show that in some situations, negative emotions *detract* from enjoyment of playing video games, while in other situations,

negative emotions *do not hinder* the enjoyment of games to a great extent. This study does not support the argument that negative emotions *lead to* greater enjoyment (Vorderer et al., 2004). It is important to note, however, that there are a number of specific negative emotions that were not measured in this study, and further study is certainly needed.

This study joins the many others that seek to provide a deeper and more complete understanding of the entertainment process. Our knowledge base is growing, yet there is much still to do. As technology advances, and as more of the world's population become gamers, our need for understanding about how games affect and enrich our lives has never been greater.

Note

1 Three-way interaction terms and the four-way interaction term were calculated and entered into an earlier model but were found to be nonsignificant. Owing to space considerations, these results are not discussed.

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在玩家 vs.玩家和玩家 vs.环境情境下电子游戏对敌意和享受的成因

Daniel M. Shafer

Baylor 大学传播学系;

【摘要：】

人们从 20 世纪 80 年代就开始了对电子游戏的学术研究，但很少有研究结合电子游戏、侵略性和游戏享受这几个领域。本文旨在确定某些游戏因素如何影响敌意、享受和这两个变量之间的关系。289 位学生参与了玩家vs.玩家（PVP）和玩家vs.环境（PVE）的游戏。结果表明游戏结果、竞争形势以及游戏种类与当前敌意和享受状态相互作用。在某些情况下，游戏玩家尽管在如输局的负面经历下也能够享受游戏，但在PvP情况下，玩家会经历使愉悦下降的敌意。这个结果与Vorderer 等人（2004）的复杂娱乐模型预测相反。

Les causes de l'état d'hostilité et du plaisir dans les jeux vidéos joueur contre joueur et joueur contre environnement

Les jeux vidéos ont été étudiés depuis les années 1980, mais peu d'études ont combiné les domaines de l'agression liée aux jeux vidéo et du plaisir lié aux jeux vidéo. Cet article cherche à déterminer comment certains facteurs du jeu influencent l'hostilité, le plaisir et l'association entre les deux variables. 289 étudiants ont joué dans des situations joueur-contre-joueur (JcJ) et joueur-contre-environnement (JcE). Les résultats indiquent que le dénouement, la situation compétitive et le genre interagissent dans leur influence sur l'état d'hostilité et le plaisir. Ils suggèrent que dans certains cas, les joueurs sont capables d'aimer les jeux malgré des expériences négatives comme le fait de perdre, mais que les joueurs dans les situations JcJ ressentent des niveaux d'hostilité qui réduisent le plaisir, contrairement au modèle de divertissement complexe de Vorderer *et al.* (2004).

Gründe für Feindseligkeit und Enjoyment in Spieler-gegen-Spieler und Spieler-gegen-Umwelt-Videospielen

Videospiele werden seit den 1980er Jahren wissenschaftlich erforscht, aber wenige Studien verknüpfen die drei Forschungsfelder Videospiel, Aggression und Enjoyment beim Videospielen. Wir untersuchen deshalb, wie bestimmte Spielfaktoren Feindseligkeit, Enjoyment und die Beziehung zwischen den zwei Variablen beeinflussen. 289 Studierende spielten Videospiele mit Spieler-gegen-Spieler und Spieler-gegen-Umwelt-Situationen. Die Ergebnisse zeigen, dass Spielergebnis, kompetitive Situation und Genre Feindseligkeit und Enjoyment interagierend beeinflussen. Damit deuten die Ergebnisse darauf hin, dass Spieler manchmal in der Lage sind, trotz negativer Erfahrungen wie das Verlieren des Spiels. Allerdings erfahren Spieler in Spieler-gegen-Spieler-Situationen ein Maß an Feindseligkeit, dass enjoyment-verringernd ist und gegen das komplexe Unterhaltungsmodell von Vorderer et al. (2004) spricht.

Schlüsselbegriffe: Videospiele, Enjoyment, Feindseligkeit, kompetitives Spiel, First-Person-Shooter-Spiele, Puzzlespiele

선수대 선수 (PvP) 그리고 선수대 환경(PvE) 비디어 게임들에서 적대감과 오락감의 원인들

요약

비디오 게임들은 1980 년대 이후 학자들의 관심을 받아 왔으나 오로지 일부 연구들만이 비디오 게임과 적대감 그리고 비디오게임오락성의 영역을 혼합하여 왔다. 본 연구는 어떠한 게임요소들이 적대감, 오락감, 그리고 이러한 두가지 변수들 사이의 관계에 영향을 주는가를 결정하기 위한 것이다. 모두 289 학생들이 PvP 게임과 PvE 게임에 참여하였다. 발견들은 결과, 경쟁적 상황, 그리고 장르들이 적대감과 오락성에 대한 영향을 주는데 기여한 것으로 나타났다. 결과들은 게임머들은 일부의 경우, 상실등 부정적인 환경속에서도 게임을 즐길수 있는 것으로 나타났으나, PvP 상황에서의 게이머들은 Vorderer 등의 2004 년 논문에서 주장된 목잡한 오락 모델과 다르게, 적대성의 만족감소수순들을 경험하는 것으로 나타났다.

Las Causas del Estado de Hostilidad y de Placer en la Relación Jugador versus
Jugador y Jugador versus el Medio Ambiente de los Video Juegos

Daniel M. Shafer[a]

Resumen

Los video juegos han estado bajo el estudio de los eruditos desde los 80, pero pocos de esos estudios han fusionado las áreas de investigación de los video juegos y la agresión y el placer del juego de video. Este artículo busca determinar cómo algunos factores del juego impactan la hostilidad, el placer, y la relación entre las 2 variables. 289 estudiantes jugaron juegos en situaciones de jugador versus jugador (PvP) y jugador -versus-medioambiente (PvE). Los hallazgos indican que el resultado, en la situación competitiva, y de género interactúa con su influencia sobre el estado de hostilidad y placer. Los resultados sugieren que en algunos casos, los jugadores son capaces de disfrutar los juegos a pesar de las experiencias negativas tales como perder, pero que los jugadores en situaciones de PvP experimentan placer y niveles reducidos de hostilidad, contrario al modelo complejo de entretenimiento de Vorderer y asociados (2004).

Palabras claves: juegos de video, placer, hostilidad, juegos competitivos, juegos FPS, juegos enigmáticos