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# The Motivating Role of Violence in Video Games

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*Six studies, two survey based and four experimental, explored the relations between violent content and people's motivation and enjoyment of video game play. Based on self-determination theory, the authors hypothesized that violence adds little to enjoyment or motivation for typical players once autonomy and competence need satisfactions are considered. As predicted, results from all studies showed that enjoyment, value, and desire for future play were robustly associated with the experience of autonomy and competence in gameplay. Violent content added little unique variance in accounting for these outcomes and was also largely unrelated to need satisfactions. The studies also showed that players high in trait aggression were more likely to prefer or value games with violent contents, even though violent contents did not reliably enhance their game enjoyment or immersion. Discussion focuses on the significance of the current findings for individuals and the understanding of motivation in virtual environments.*

**Keywords:** *motivation; autonomy; video games; violence; aggression*

Few can contest the popular appeal of video games. With annual revenues rivaling Hollywood box office sales (Yi, 2004), this relatively new medium has become a dominant form of electronic entertainment. Concurrently, video games have generated a great deal of controversy in the popular press and culture. Primarily, these controversies focus on the mature and violent themes of many popular video games. Parents, politicians, and researchers alike have expressed concerns that such contents might foster antisocial behavior and maladjustment (Kirsch, 2006). These apprehensions are exacerbated by rapid technological progress that enables video

game developers to graphically represent violent material in ever-greater variety and detail. Accordingly, much of the empirical work on video games has focused on possible negative consequences of violent games. For example, research suggests that violent games may desensitize players to real-world violence, decrease empathy, and increase players' tendencies toward aggression (e.g., Anderson, 2004; Bartholow, Bushman, & Sestir, 2006).

At the same time, little research has examined the role of violent game content in player motivation and immersion. Given the prevalence of violent content in popular game titles, one might assume that violent material itself is attractive and enjoyable to players and thus plays a substantial role in immersing players in game worlds and motivating game purchases and play. In fact, some have argued that violent media can enhance feelings of excitement, empowerment, and status, among other satisfactions (Johnston, 1995; Jones, 2002; Zillman, 1998).

Yet it remains unclear how much it is violent content per se that motivates play behavior or enjoyment, versus other satisfactions that the games involving violence can provide. Many popular games that have violent content are also appealing for the challenges they offer or the freedom to act in a different world. For example, McCarthy, Curran, and Byron (2005) commented,

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In all the tabloid-inspired furor over *Grand Theft Auto's* questionable content, it is easy to lose sight of why it's such a successful game in the first place. People don't play it for the violence; they play it because it affords the opportunity to do whatever they please. (p. 14)

Indeed, games involving war, combat, or adventures may provide opportunities for psychological satisfactions that are irrespective of the violent elements within the games. These include opportunities for mastery, achievement, heroism, and self-directed action. As Walkerdine (2007) reported, players often "like" the act of killing in games primarily because it represents feedback of progress or advancement through the game. When focused on the violence per se they often, in contrast, express ambivalence or anxiety. Similarly, Schneider, Lang, Shin, and Bradley (2004) found that video game play was immersive for players when violent acts were framed in compelling narrative. Yet to date there is virtually no research on the role of violence in motivating gameplay or enhancing player immersion.

In the present research we investigate the hypothesis that violent content plays a much less significant role in predicting enjoyment and persistence than many commentators, consumers, and game developers may assume. Instead, based on self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000b) we suggest that both violent and nonviolent games are motivating mainly to the extent that they provide opportunities to satisfy basic psychological needs for competence, autonomy, and relatedness and that for the average player, violent content per se plays a very minor role above and beyond these satisfactions. At the same time we explore an "opt in" hypothesis, namely, whether individual predispositions toward aggression or hostility may lead to a preference for the violent content even if it does not account for enjoyment. We test these hypotheses through a series of experimental and survey studies. Before proceeding to these studies we briefly elaborate on the basis for these hypotheses.

### *Motivation for Gameplay*

As noted, little empirical research has focused on the motivational underpinnings or attractions of video games. Yet, as game developer Bartle (2004) pointed out, "Players must expect to get something out of their experience" (p. 128). This assumption is also reflected in uses-and-gratifications theory (Blumler & Katz, 1974; Sherry, Lucas, Greenberg, & Lachlan, 2006), which suggests that media use, including video games, is actively motivated and goal oriented. People, that is, are searching for specific satisfactions when they engage in games.

Based on SDT we suggest that video game play is typically intrinsically motivated, or energized by the inherent

satisfactions derived from an activity. According to SDT, intrinsic motivation is the core type of motivation underlying most play and sport (Frederick & Ryan, 1995; Ryan & Deci, 2007). Intrinsic motivation would seem very relevant to computer gaming, as most players do not derive extragame rewards or approval or playing (indeed, most players pay to play and/or face disapproval). Rather, most players play because they find the activity itself to be interesting and enjoyable.

One minitheory of SDT, cognitive evaluation theory (CET; Deci & Ryan, 1980, 1985; Ryan & Deci, 2000a), focuses on the psychological satisfactions underlying intrinsic motivation. CET proposes that conditions that enhance a person's sense of autonomy and competence support intrinsic motivation, whereas factors that diminish perceived autonomy or competence undermine intrinsic motivation. *Autonomy* concerns a sense of volition when doing a task. When activities allow one to engage interests and experience choice or freedom in acting, a sense of autonomy is high. Provisions for choice, use of rewards as feedback (rather than to control behavior), and minimal external pressures have thus all been shown to enhance autonomy and in turn, intrinsic motivation (Deci, Koestner, & Ryan, 1999). Conversely, conditions that diminish a sense of choice or volition for actions interfere with perceived autonomy and undermine intrinsic motivation. In addition, CET suggests that activities will be more intrinsically motivating to the extent they provide opportunities for experiencing *competence* (Deci & Ryan, 1985). CET proposes that the experience of competence is enhanced by opportunities to exercise skills or abilities, be optimally challenged, or receive positive feedback and that these factors in turn enhance intrinsic motivation.

Recently, Ryan, Rigby, and Przybylski (2006) applied CET to better understand motivation for video games. Ryan et al. developed an assessment of players' experience of psychological need satisfaction. Using this framework they demonstrated that game designs differ in the autonomy they afford, such as the flexibility over movement and strategies, choice over tasks and goals, and how rewards are structured. Games also differ in competence supports, such as the degree to which controls are intuitive and readily mastered and tasks within the game provide graded challenges and clear positive feedback. Moreover, Ryan et al. showed at both between- and within-person levels of analysis that experiences of competence and autonomy predict game preferences, enjoyment, and persistence.

### *Violence as a Motivator*

Our current question asks to what extent are the factors postulated within SDT sufficient to account for game motivation and more specifically to what extent

does violent content add additional variance in explaining players' motivation. Clearly games involving armed fighting matches (e.g., *Mortal Kombat*), war (e.g., *Call of Duty*), or organized crime (e.g., *Grand Theft Auto*) offer a storyline or conceit within which feelings of autonomy and competence, as well as relatedness, can be engendered. For example, combat settings provide opportunities to select goals, experience challenges, create strategies, and exert personal control over actions, thus satisfying autonomy and competence needs. In multiplayer environments (e.g., *World of Warcraft*), games can also offer opportunities to experience relatedness and camaraderie as players pursue cooperative missions, share goals and rewards, and come to each other's aid.

But there may be additional satisfactions offered by violence itself. Some theorists have posited, for example, that humans are innately aggressive and derive satisfaction from it (e.g., Freud, 1915). More recently, Zillman (1998) and Jones (2002) argued that violent media offers opportunities for modern youths to feel brave and heroic. Johnston (1995) suggested that violent media could enhance mood and feelings of empowerment. Thus, there is some reason to think that violence itself has motivational features. It remains unclear however if these "benefits" are afforded by violent game content proper or the same psychological need satisfactions provided by games with little or no violence.

*Individual differences.* Although it may be the case for most players that violence per se does not enhance motivation except through the intrinsic satisfactions involved in challenging, self-directed play, there nonetheless may be a subgroup of individuals who specifically seek out violent or aggressive contents. Clearly, there are individual differences in propensities to be hostile or aggressive (e.g., Buss & Perry, 1992), which may impact upon preferences for violent media (Bushman & Geen, 1990; Huesmann, Moise, Podolski, & Eron, 2003). If this were the case, the converse would also be possible. People low in aggression or hostility may "opt out" of potentially interesting games because they find violent or gore-filled content unattractive. Thus, traits of aggression may interact with game contents in predicting preferences and motivation. In our view, the variables specified within CET that account for intrinsic motivation should sufficiently account for game enjoyment and motivation, however, hostile or aggressive individuals may prefer violent material independent of enjoyment as such content matches their trait-level propensities or tastes.

### *Overview of the Present Research*

In the current studies we test our postulate that virtual contexts can engender feelings competence, autonomy,

and in some formats, relatedness to other players (Ryan et al., 2006). The degree to which a video game affords these specific need satisfactions will determine players' enjoyment and immersion within a virtual world, and violence will not provide additional variance once these factors are considered. No studies to date have tested whether violent content enhances immersion and enjoyment of play in video games. In addition, we examine the role of trait aggression in predicting preferences for violent contents independent of enjoyment or intrinsic motivation per se. We specifically predict that violent contents will be preferred by those high in this trait and dispreferred by those low in it.

Six studies explore these hypotheses. Study 1 examines relations between game enjoyment, popularity, immersion, and violent content in a survey of avid video game players. In Study 2, participants are exposed to a highly violent video game to examine the role of trait aggression in predicting game play motivation independent of in-game need satisfaction. Study 3 utilizes two video games, one violent and one nonviolent, to again test the sufficiency of needs to account for enjoyment and motivation and the moderating impact of trait aggression. Study 4 experimentally manipulates the conceit and depiction of violent content within the same game to provide a more stringent test of these main effects. Study 5 manipulates gore and blood displays in a controlled comparison using a sample of male gamers. Study 6 returns to an online survey design to test the role of dispositional aggression in moderating the relation between violent content and value for play.

## STUDY 1

To gain a broad idea of the motivating role of violent game content, we surveyed video game players. We hypothesized that a player's experience of competence and autonomy is the primary determinant of motivation and enjoyment and that violent content would account for little incremental variance. Specifically, we predicted that players will be intrinsically motivated for play, experience immersion, and be likely to recommend a game only insofar as they perceive a video game as satisfying basic psychological needs, and we did not expect violent content per se to contribute additional unique variance in accounting for these outcomes.

### Method

#### *Participants and Procedure*

The initial sample consisted of 1,028 members (99 female, 929 male) of a popular online community, selected because it is a forum for discussions about

video games and Internet culture. Participants ranged from 18 to 39 years ( $M = 24.14$ ), with 38.4% being married or in a committed relationship.

Participants were asked to respond with respect to a game that was self-selected as their current favorite. As incentive, those completing the survey were entered into a raffle for \$100. The survey was linked to the community's online forum for a 2-week period. To control for duplicate responses we crosschecked IP addresses. No duplicates were found.

### Measures

Survey measures were delivered in HTML format. All items, aside from demographics, were rated on 7-point scales, with anchors appropriate to each item.

*Player Experience of Need Satisfaction (PENS).* The PENS subscales were created for research by Ryan et al. (2006) and further validated in two rounds of confirmatory factor analysis using survey data from 2,000 regular video game players. The PENS subscale for in-game competence ( $\alpha = .70$ ) consisted of three items focused on experiences of competence and mastery (e.g., "I felt competent at the game" and "I felt capable and effective while playing"). In-game autonomy ( $\alpha = .69$ ) was assessed with a four-item subscale measuring perceptions that the game offered meaningful choices and options during play (e.g., "I experienced a lot of freedom in the game" and "The game provides me with interesting options and choices"). Subscale items were averaged to create separate autonomy and competence scores. In-game relatedness, a subscale of the PENS primarily relevant to multiplayer contexts, was not assessed.

*Presence.* This nine-item scale, also from the PENS, assessed immersion in the gaming environment. Three items each assessed emotional, physical, and narrative presence. Sample items, respectively, were: "When playing the game I feel as if I am an important participant in the story," "I experience feelings as deeply in the game as I have in real life," and "When moving through the game world I feel as if I am actually there." A total score was created by averaging across the nine items ( $\alpha = .88$ ).

*Game enjoyment.* This was assessed with four items adapted from the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen, 1989; Ryan, 1982). Sample items included: "I thought the game was boring" (reversed) and "I enjoyed playing the game very much." Items were averaged to create a total score ( $\alpha = .82$ ).

*Sequel interest.* We assessed future game preference with one item: "I would buy a sequel to this game."

*Word of mouth.* We also used a single item to assess how much participants have shared their liking of the game with their friends: "I have recommended this game to others."

*Violence ratings.* We both coded the violence content of each game using our own coding system and applied ratings assigned by the Entertainment Software Rating Board (ESRB).

*ESRB rating.* The ESRB is a nonprofit group largely funded through the game industry that assigns games one of five ratings: E (everyone), E10+ (everyone 10 or older), T (teen), M (mature), or AO (adults only), which we coded from 1 to 5, respectively. The ESRB categories have been modified slightly over time; we used the most up-to-date ratings for each game. In this sample no AO games were selected, so effectively this created a 1 to 4 scale. From the initial sample, 923 participants selected games that had ESRB ratings and 105 selected games that did not. There were three reasons for this: Some titles were published before 1994, the year the ESRB began reviewing games; some titles were heavily player-modified versions of retail games; and some titles were independently developed and therefore not reviewed by the ESRB. Thus, 105 participants were dropped from analyses, leaving a sample of 85 females and 838 males ( $M$  age = 24.17).

*Violence coding.* Three raters coded target games for violent contents. A rating of 1 was assigned to games with no violent content whatsoever (e.g., puzzle games like *Tetris*), a 2 was assigned to games with abstract violence (e.g., *Pokemon* or *Super Mario*), a 3 was assigned to games with impersonal violence (e.g., strategy games like *Starcraft* or *Civilization*), a 4 was assigned to games with fantasy violence (e.g., *World of Warcraft* or *Starfox*), and a 5 was assigned to games with realistic violence (e.g., *God of War 2* or *Grand Theft Auto 3*). To verify reliability, 50 game titles were selected at random and an interrater reliability of .95 was found based on the three raters. Given this high reliability, two of the three raters coded all remaining titles that also had an ESRB rating. Violence content was calculated by averaging rater scores.

## Results

### Preliminary Analyses

Of the 923 games included in the analyses, 99 received a rating of everyone, 32 a rating of everyone 10+, 506 a rating of teen, and 286 a rating of mature. No titles received an adults only rating. The mean violence rating was 3.90 ( $SD = 0.99$ ).

**TABLE 1:** Correlations Between Variables of Interest (Study 1;  $n = 923$ )

	1	2	3	4	5	6	7	8	9
1. Age	—								
2. Sex	-.10**	—							
3. Entertainment Software Rating Board (ESRB) rating	-.03	-.15***	—						
4. Violent content	.01	-.19***	.75***	—					
5. In-game autonomy	.07*	.06	.03	.03	—				
6. In-game competence	-.04	.01	-.01	-.01	.33***	—			
7. Game enjoyment	.04	.01	.04	.04	.48***	.33***	—		
8. Presence	-.03	.07*	.08*	.08*	.49***	.28***	.31***	—	
9. Word of mouth	.01	.04	-.01	-.03	.37***	.33***	.49***	.25***	—
10. Sequel interest	.05	.06	.01	.01	.31***	.22***	.47***	.24***	.45***

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

We assessed sex differences on all study variables and game ratings and found three effects. Men selected titles with higher ESRB ratings,  $F(1, 921) = 21.24$ ,  $p < .001$ ,  $\eta^2 = .02$  (males  $M = 3.10$ , females  $M = 2.65$ ); and more violent content,  $F(1, 921) = 34.85$ ,  $p < .001$ ,  $\eta^2 = .04$  (males  $M = 3.97$ , females  $M = 3.31$ ). Women reported greater presence for their games,  $F(1, 921) = 5.00$ ,  $p < .05$ ,  $\eta^2 = .01$  (males  $M = 3.93$ , females  $M = 4.28$ ). There were no differences on any of the need satisfaction variables, enjoyment, word of mouth, or sequel interest.

### Primary Analyses

To test the central hypotheses we ran correlations (Table 1) followed by two sets of simultaneous multiple regressions. First, we regressed enjoyment, presence, sequel interest, and word of mouth on in-game competence, in-game autonomy, and mature content (ESRB rating), respectively. Second, we ran a parallel analysis using our own violence coding. These results are presented in Table 2. The regression with the ESRB rating shows significant relations of both autonomy and competence with all four outcomes, whereas the content rating predicted unique variance only for presence. Because the ESRB rating is based on sexual contents, mature language, and violence, the second regression using our violence rating tests more exclusively the role of violent content. In this regression, both autonomy and competence showed significant associations with outcomes, whereas violent content related only to presence.

### Brief Discussion

Results from Study 1 supported our primary hypotheses. We found that the psychological need satisfactions of autonomy and competence were associated with enjoyment, presence, sequel interest, and word of

mouth, over and above both game maturity rating and violence content. Furthermore, the negative relations between violent content and gameplay outcomes suggest that violent content proper might not be a motivating factor across players.

## STUDY 2

Many popular video games frame gameplay challenges within a violent conceit. For example, by participating in the role of the story's hero, a player might exercise force or commit violent acts against "bad guys" to save the day. Such scenarios offer opportunities for competence feedback and autonomous action, and the actual violent content may be secondary. Yet given that games can vary in the violence depicted, it is reasonable to assume that aggressive persons might differentially prefer or opt in to games offering more violent content.

In Study 2 we engaged players with a violent game in a laboratory setting. As in the Study 1 survey, we predicted players' experience of competence and autonomy during play will significantly account for their enjoyment, immersion, and preference for future engagement. Yet, insofar as dispositional factors impact opt-in behavior, we predicted that differences in trait aggression would account for unique variance in preference for future play for this violent game, over and above variance accounted for by need satisfaction.

### Method

#### Participants

In Study 2, 68 undergraduates (21 male, 47 female) with a mean age of 19.5 years ( $SD = 1.2$ ) reported to a video lab for extra course credit.

**TABLE 2:** Simultaneous Regressions of Relations Between Game Content and In-Game Need Satisfaction on Outcomes of Interest (Study 1;  $n = 923$ )

Dependent Variables			Entertainment Software Rating Board (ESRB) $\beta$	Violence $\beta$
Enjoyment	Step 1	Sex	-.01	-.01
	Step 2	Game content	.03	.01
		In-game competence	.19***	.19***
$R^2_a = .00, .26$		In-game autonomy	.41***	.42***
$R^2_b = .00, .26$				
Presence	Step 1	Sex	-.07*	-.07*
	Step 2	Game content	.07*	.09***
		In-game competence	.14***	.14***
$R^2_a = .01, .26$		In-game autonomy	.44***	.45***
$R^2_b = .01, .27$				
Word of mouth	Step 1	Sex	-.04	-.04
	Step 2	Game content	-.02	-.02
		In-game competence	.23***	.23***
$R^2_a = .00, .18$		In-game autonomy	.29***	.29***
$R^2_b = .00, .18$				
Sequel interest	Step 1	Sex	-.06	-.06
	Step 2	Game content	.01	-.06
		In-game competence	.14***	.14***
$R^2_a = .00, .25$		In-game autonomy	.26***	.26***
$R^2_b = .00, .26$				

NOTE:  $R^2_a$  is variance estimate for each step of regression for violence content as ESRB.  $R^2_b$  is variance estimate for each step of regression for violence content as coded by raters.

\* $p < .05$ . \*\*\* $p < .001$ .

### Target Game

We selected the XBOX version of *House of the Dead III* (HOTD3) because it offered both simple controls and graphically violent gameplay. To progress, participants faced a series of bloody linear reflex-based challenges. Arcade games like HOTD3 are designed for short periods of play, typically 5 to 30 minutes. A 15-minute play period was thus selected to reflect play as it occurs in typical gaming sessions.

### Measures

Measures were delivered in HTML format both pre- and postplay. Preplay assessments included an index of trait aggression and filler questions. Postplay assessments included measures of competence, autonomy, presence, enjoyment, and preference for future play. In-game autonomy, competence, enjoyment, and presence were assessed as in Study 1, with alphas = .71, .73, .87, and .90, respectively.

Trait aggression was assessed with a 29-item trait aggression scale (Buss & Perry, 1992). Participants rated each statement on 7-point scales. The 29 items form four subscales: physical aggression (e.g., "Given enough provocation, I may hit another person"), verbal aggression (e.g., "I can't help getting into arguments with people who disagree with me"), anger (e.g., "I sometimes feel like a powder keg ready to explode"), and hostility (e.g., "I sometimes feel that people are laughing at

me behind my back"). We collapsed across subscales to compute a total trait aggression score ( $\alpha = .94$ ).

*Preference for future play.* Preference for future play was assessed with five items, including "Given the chance I would play this game in my free time" and "I would be interested in having my own personal copy of this game." Reliability ( $\alpha$ ) was .92.

### Results

#### Preliminary Analyses

There were no age effects and no sex differences for enjoyment, presence, future preference, or trait hostility. Males reported higher competence,  $F(1, 65) = 14.14$ ,  $p < .001$ ,  $\eta^2 = .018$  (males  $M = 4.59$ , females  $M = 3.26$ ); and autonomy,  $F(1, 65) = 4.54$ ,  $p < .05$ ,  $\eta^2 = .09$  (males  $M = 2.95$ , females  $M = 2.39$ ).

#### Primary Analyses

We expected autonomy and competence to account for unique variance in enjoyment, presence, and preference for future play. Additionally we hypothesized that trait-level aggression might influence opting-in behavior as indexed by preference for future play. Correlations revealed that enjoyment, preference, and presence were each correlated with autonomy ( $r_s = .59, .61, .54$ ;  $p_s < .001$ ) and competence ( $r_s = .63, .50, .53$ ;  $p_s < .001$ ).

**TABLE 3:** Simultaneous Regressions of Relations Between Trait Aggression and In-Game Need Satisfaction on Outcomes of Interest (Study 2;  $n = 68$ )

Dependent Variables			$\beta$	
Enjoyment	Step 1	Sex	-.16	
		Step 2	Trait aggression	.12
	$R^2 = .03, .55$		In-game competence	.54***
			In-game autonomy	.37***
Future preference	Step 1	Sex	-.19	
		Step 2	Trait aggression	.37***
	$R^2 = .04, .57$		In-game competence	.36***
			In-game autonomy	.41***
Presence	Step 1	Sex	-.08	
		Step 2	Trait aggression	-.06
	$R^2 = .01, .52$		In-game competence	.43***
			In-game autonomy	.43***

\*\*\* $p < .001$ .

Trait aggression was significantly correlated with future preference ( $r = .46, p < .001$ ) but not enjoyment ( $r = .21, ns$ ) or presence ( $r = .03, ns$ ). Finally, trait aggression was unrelated to competence ( $r = .07, ns$ ), but it was associated with autonomy ( $r = .25, p < .05$ ) within this violent game context.

To test our primary hypotheses, we simultaneously regressed enjoyment, preference for future play, and presence onto trait aggression, competence, and autonomy, controlling for sex (see Table 3). Autonomy and competence were related to all outcomes, but trait aggression remained significant only with regards to future preference. Secondary analyses placing sex and trait aggression in the first step of the regressions do not alter the direction, magnitude, or significance of effects in this or any of the other present studies.

### Brief Discussion

Study 2 results replicated the relations between in-game need satisfaction and enjoyment, preference, and presence within a violent game context. Furthermore, trait aggression contributed to opting-in behavior: Although those high in aggression did not report greater enjoyment or presence, they did report a stronger preference for playing this violent game in the future.

## STUDY 3

In Study 3 we utilized two games that differ in violent content to further explore the role of trait aggression in predicting preferences. We hypothesized that player experience of autonomy and competence need satisfaction would predict unique variance in outcomes across violent and nonviolent contents. Yet, in line with

Study 2, we expected trait aggression to moderate the relation between condition (violent, nonviolent) and preference for future play.

### Method

#### Participants

For Study 3, 99 students (41 males, 58 females), with a mean age of 20.1 years ( $SD = 1.4$ ), reported to a media lab for extra course credit.

#### Target Games

Participants were randomly assigned to play either a nonviolent or a violent game. We chose the two games to parallel a classic study by Anderson et al. (2004), who used these same titles to contrast violent and nonviolent gameplay. Neither game is currently commercially available, but the respective developers offer each for free download. The nonviolent game, *Glider Pro 4*, belongs to the arcade genre and entails navigating a paper airplane through an obstacle-ridden home. Reflex-based challenges included capitalizing on updrafts to stay aloft and avoiding collisions with furniture and nefarious paper shredders. The violent game, *Marathon 2*, belongs to the first-person shooter (FPS) genre, and much like the target game in Study 2, involves reflex-based challenges framed within a violent conceit.

Questionnaires were administered through hypertext markup language form presented before and after a 20-minute gameplay session.

#### Measures

We assessed variables of interest exactly as in Study 2. Reliabilities ( $\alpha$ ) in Study 3 were .87 for competence, .85 for autonomy, .89 for enjoyment, .87 for presence, .95 for preference for future play, and .93 for trait aggression.

### Results

#### Preliminary Results

We tested for main effects and interactions of age, sex, and condition across variables of interest. Only one effect found was found: Males ( $M = 3.38$ ) reported higher in-game competence than females ( $M = 2.49$ ),  $F(1, 98) = 9.99, p < .01, \eta^2 = .09$ . It is noteworthy that there was no effect of condition on either autonomy or competence.

#### Primary Results

We expected that psychological need satisfaction would account for unique variance in enjoyment, preference for

**TABLE 4:** Simultaneous Regressions of Relations Between Trait Aggression and In-Game Need Satisfaction on Outcomes of Interest Within High (HVG) and Low (LVG) Violence Conditions (Study 3)

Dependent Variables			LVG (n = 51) β	HVG (n = 48) β	
Enjoyment	Step 1	Sex	-.05	-.13	
		Step 2	Trait aggression	-.08	.03
	R <sup>2</sup> = .00, .75, .02, .62		In-game competence	.39**	.30***
			In-game autonomy	.53***	.55***
Future preference	Step 1	Sex	.04	-.01	
		Step 2	Trait aggression	-.08	.13
	R <sup>2</sup> = .00, .75, .00, .51		In-game competence	.39**	.27
			In-game autonomy	.53***	.46***
Presence	Step 1	Sex	.06	.01	
		Step 2	Trait aggression	.14	.18
	R <sup>2</sup> = .00, .43, .00, .62		In-game competence	.04	.18
			In-game autonomy	.63***	.59***

\*\*p < .01. \*\*\*p < .001.

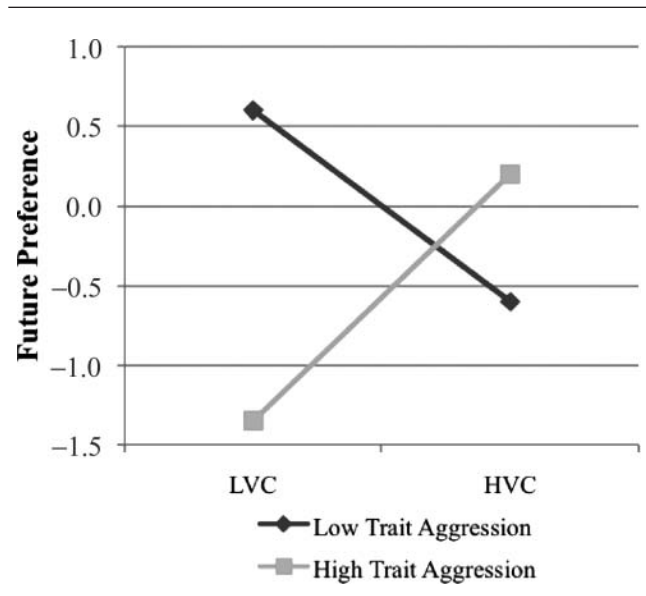
**TABLE 5:** The Effects of Condition on Outcomes as Moderated by Trait Aggression (Study 3; n = 99)

Dependent Variables			β	
Enjoyment	Step 1	Sex	-.03	
		Step 2	Trait aggression	.01
	R <sup>2</sup> = .00, .02, .09		Condition	-.12
		Step 3	Interaction	1.29**
Future preference	Step 1	Sex	-.02	
		Step 2	Trait aggression	.13
	R <sup>2</sup> = .00, .03, .07		Condition	-.10
		Step 3	Interaction	.87*
Presence	Step 1	Sex	-.03	
		Step 2	Trait aggression	.24*
	R <sup>2</sup> = .00, .06, .10		Condition	.05
		Step 3	Interaction	.89*

\*p < .05. \*\*p < .01.

future play, and presence. We further hypothesized that condition (violent, nonviolent) would interact with individual differences in aggression in predicting preference for future play. To test these hypotheses we simultaneously regressed enjoyment, preference for future play, and presence onto trait aggression, autonomy, and competence separately for players of each game. Table 4 presents these results. To test the interaction between violent/nonviolent condition and trait aggression we also conducted a series of hierarchical regressions, presented in Table 5.

Results supported our first hypotheses that in-game autonomy and competence would be associated with enjoyment, preference for future play, and presence. Besides a modest relation between trait aggression and presence across condition, we did not find any significant main effects for individual differences in aggression on gameplay variables. Trait aggression did, however, interact with game type (violent, nonviolent) in predicting enjoyment, preference for future play, and presence (accounting for 7%, 4%, and 4% unique predictive



**Figure 1** The effect of condition (low violence/high violence) on future preference as moderated by trait aggression (low/high): Study 3.

NOTE: LVC = low violence condition; HVC = high violence condition.

variance, respectively). Figure 1 depicts this interaction for preference for future play, indicating that players low in trait aggression showed a preference for the non-violent game, whereas high aggression participants did not show differential ratings across level of violence. The form of all three interactions was similar. Supplementary analysis revealed that when controlling for autonomy and competence satisfactions, these interactions were no longer significant.

**Brief Discussion**

Findings largely supported our hypotheses. First, players, on average, did not find the violent game to be more



enjoyable than the nonviolent one, nor did it foster greater autonomy or competence feelings. In contrast, players' experience of need satisfaction was associated with enjoyment, presence, and preference for future play for both games. A condition by trait aggression interaction revealed that participants low in aggression were less likely to prefer, enjoy, or become immersed in the violent game relative to the nonviolent one.

In Study 3 we followed Anderson et al. (2004), who used these same two games to contrast nonviolent and violent play. Although violent content may have accounted for these observed effects, these two games also differed in a number of other ways. The nonviolent game was an easily mastered arcade game, while the violent game was a more complex and challenging first-person shooter. The structure of the challenges, the control complexity, and other features of these games also varied. A more compelling experiment might control for these potential confounds. Accordingly, in Study 4 we modify a single computer game to manipulate the presentation and narrative framing so as to have both violent and nonviolent versions of the same play format, offering all players the same game challenges.

## STUDY 4

In Study 4 we again examine the effects of violent contents on enjoyment and the role of dispositional aggression on opting-in behavior for violent games. To this end we modified a commercially available video game so that it offered participants functionally identical challenges and either high or low level of violent content. Unlike Study 3, the structure of gameplay was invariant across the violent and nonviolent conditions, so we did not expect main effects of condition on competence, autonomy, enjoyment, presence, or preference for future play. We did expect condition to interact with trait aggression in predicting preference for future play, but not enjoyment, because in this case, the opportunities for autonomy and competence in play would be the same. Persons high in trait aggression were expected to prefer the high violence version.

## Method

### *Participants and Procedure*

In Study 4, 101 students (36 males, 65 females) with a mean age of 19.6 ( $SD = 1.3$ ) reported to a media lab for extra credit. They were provided with instructions and a 20-minute training period to become familiar with the control interface. After the training period, surveys were administered through hypertext markup language. Upon completion of this first set of questionnaires,

participants were randomly assigned to either the low or high violence conditions. Following a 20-minute play period, postquestionnaires were administered.

### *Target Game*

For this study we extensively modified a commercially available game, *Half-Life 2* (HL2). By means of a programming toolkit we created three virtual environments; the first was a training ground sequence, designed with the aim of teaching participants the prerequisite skills for successful play. There was no violent content in this environment. Following this, participants were shown a short video appropriate for condition. This 30-second clip provided a short narrative and visuals that framed the upcoming gameplay. Two versions were developed. In both, participants were told that the environment was populated by computer-controlled adversaries. Those assigned to the high violence condition (HVC) were told that these adversaries were intent on doing them harm with firearms and physical attacks, and the player was equipped with a weapon to dispatch these adversaries in a thoroughly bloody manner. Participants in the low violence condition (LVC) were told that adversaries were programmed only to tag them with nonweapon marker. LVC participants were equipped with a marker that teleported their adversaries to "base," first floating them into the air serenely before they appeared to evaporate. Gameplay then ensued, with participants in the HVC playing the bloody version of HL2 and those in the LVC playing the same game as "tag," with gore removed.

### *Measures*

We assessed variables in the same manner as Studies 1, 2, and 3. Reliabilities (alpha) in Study 4 were .79 for competence, .75 for autonomy, .80 for enjoyment, .85 for presence, .95 for preference for future play, and .91 for trait aggression.

## Results

### *Preliminary Analyses*

As expected, MANOVA revealed no differences between low and high violence conditions on competence, autonomy, enjoyment, preference for future play, or presence. Sex differences were in evidence for autonomy,  $F(1, 99) = 34.57, p < .001, \eta^2 = .26$  (males  $M = 5.01$ , females  $M = 3.50$ ); competence,  $F(1, 99) = 19.79, p < .001, \eta^2 = .16$  (males  $M = 3.79$ , females  $M = 2.66$ ); enjoyment,  $F(1, 99) = 4.64, p < .05, \eta^2 = .04$  (males  $M = 3.66$ , females  $M = 3.04$ ); and preference for future play,  $F(1, 99) = 11.94, p < .001, \eta^2 = .12$  (males  $M = 3.90$ , females  $M = 2.78$ ); but not for presence or trait aggression.

**TABLE 6:** Simultaneous Regressions of Relations Between Trait Aggression and In-Game Need Satisfaction on Outcomes Within High (HVC), Low (LVC) Violence Conditions, and Experienced Video Game Players (Studies 4 and 5)

Dependent Variables			Study 4 LVC (n = 52) β	Study 4 HVC (n = 49) β	Study 5 (n = 39) β
Enjoyment	Step 1	Sex	-.02	-.38**	N/A
Study 4: R <sup>2</sup> <sub>a</sub> = .00, .31 R <sup>2</sup> <sub>b</sub> = .14, .63 Study 5: R <sup>2</sup> <sub>c</sub> = .58	Step 2	Trait aggression	.07	.07	-.11
		In-game competence	.34*	.60***	.37***
		In-game autonomy	.39*	.29*	.57***
Future preference	Step 1	Sex	-.23	-.47**	N/A
Study 4: R <sup>2</sup> <sub>a</sub> = .05, .27 R <sup>2</sup> <sub>b</sub> = .22, .55 Study 5: R <sup>2</sup> <sub>c</sub> = .66	Step 2	Trait aggression	.01	.32**	.04
		In-game competence	.38*	.36**	.46***
		In-game autonomy	.22	.21	.47***
Presence	Step 1	Sex	-.05	-.22	N/A
Study 4: R <sup>2</sup> <sub>a</sub> = .00, .29 R <sup>2</sup> <sub>b</sub> = .05, .27 Study 5: R <sup>2</sup> <sub>c</sub> = .37	Step 2	Trait aggression	-.01	.28*	-.05
		In-game competence	.59***	.39*	.01
		In-game autonomy	-.04	-.03	.63***

NOTE: R<sup>2</sup><sub>a</sub> are the variance estimates for each step of regression for participants playing low violence game in Study 4. R<sup>2</sup><sub>b</sub> are the variance estimates for each step of regression for participants playing high violence game in Study 4. R<sup>2</sup><sub>c</sub> are the variance estimates for each regression for participants in Study 5.

\*p < .05. \*\*p < .01. \*\*\*p < .001.

**TABLE 7:** The Effects of Condition on Outcomes as Moderated by Trait Aggression (Studies 4 and 5)

Dependent Variables			Study 4 (n = 101) β	Study 5 (n = 39) β
Enjoyment	Step 1	Sex	-.21***	N/A
	Step 2	Trait aggression	.14	.34*
		Condition	.01	-.12
Study 4: R <sup>2</sup> <sub>a</sub> = .04, .06, .07 Study 5: R <sup>2</sup> <sub>b</sub> = .09, .20	Step 3	Interaction	.34	.36*
	Future preference	Step 1	Sex	-.35***
Study 4: R <sup>2</sup> <sub>a</sub> = .12, .18, .23 Study 5: R <sup>2</sup> <sub>b</sub> = .16, .29	Step 2	Trait aggression	.23**	.39*
		Condition	.11	-.14
	Step 3	Interaction	.72**	.37*
Presence	Step 1	Sex	-.13	N/A
Study 4: R <sup>2</sup> <sub>a</sub> = .02, .06, .08 Study 5: R <sup>2</sup> <sub>b</sub> = .10, .15	Step 2	Trait aggression	.20	.32
		Condition	.02	-.04
	Step 3	Interaction	.58	.23

NOTE: R<sup>2</sup><sub>a</sub> are the variance estimates for each step regression for participants in Study 4. R<sup>2</sup><sub>b</sub> are the variance estimates for each step regression for participants in Study 5.

\*p < .05. \*\*p < .01. \*\*\*p < .001.

**Primary Analyses**

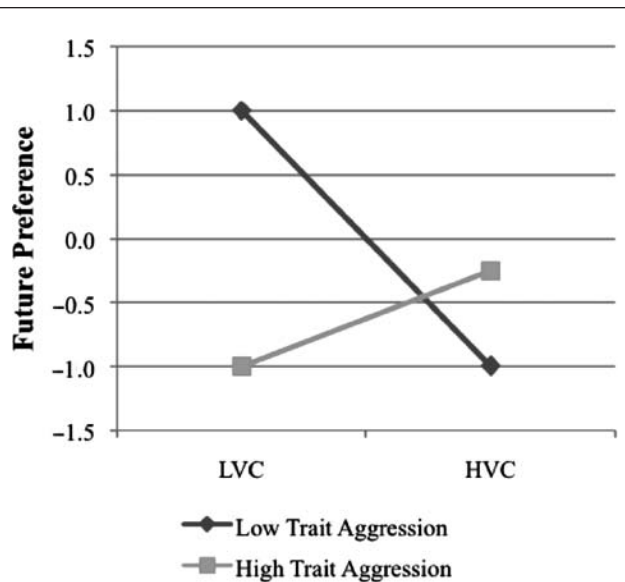
We anticipated replicating our findings from Studies 2 and 3 that competence and autonomy would account for unique variance in enjoyment and presence. Additionally, we anticipated that both trait aggression and need satisfaction would account for unique variance in preference for future play. Results in Table 6 support these hypotheses.

We further postulated that the relation between trait aggression and preference for future play would be moderated by condition. To test this interaction we utilized a hierarchical regression model. Controlling for sex we placed trait aggression and condition in the second step of the regression and their product term in the third step. This yielded a significant moderation accounting for nearly 5% variance in preference for future play over and above the combined contributions

of sex, condition, and trait aggression. These results appear in Table 7.

**Brief Discussion**

Study 4 results generally supported our hypotheses. Across condition, player need satisfaction predicted enjoyment, preference for future play, and presence. Furthermore, we found a unique contribution of trait aggression to preference for future play, but not enjoyment, as in Study 2. When players were presented with functionally identical gameplay, persons high in aggression preferred the high violence condition, whereas persons low in trait aggression preferred the low violence condition. This interaction (Figure 2) lends support to the idea that more aggressive persons may select themselves into games with a violent conceit. Yet when



**Figure 2** The effect of condition (low violence/high violence) on future preference as moderated by trait aggression (low/high): Study 4.

NOTE: LVC = low violence condition; HVC = high violence condition.

player need satisfaction was controlled for across condition, trait aggression did not interact with violent content level in predicting enjoyment or presence, again suggesting that the violent content per se is not critical to enjoyment, even for those high in aggression.

## STUDY 5

In Study 5 we extend the external validity of our previous findings by examining the effects of violent content and dispositional aggression on enjoyment and opting-in behavior in a population of avid video game players. Specifically, we recruited young males who spend a significant amount of time playing video games.

As in Study 4, the structure of gameplay was invariant across low and high violence conditions. What was manipulated was the level of gore and blood. In line with SDT we predicted main effects for competence and autonomy on enjoyment, preference, and presence. We did not, however, expect condition to account for variance in need satisfactions or in players' enjoyment, preference, or presence. Finally, we expected that trait aggression would interact with the level of violent content in predicting opting-in behavior.

### Method

#### *Participants and Procedure*

For Study 5, 39 students, mean age of 19.54 ( $SD = 0.97$ ), reported to a media lab for extra credit. Enrollment was

limited to males who regularly spent more than 5 hours per week in video game play. Participants reported an average of 7.47 ( $SD = 5.60$ ) hours a week of play and 11.23 ( $SD = 2.77$ ) years of past video game play. The procedure and measures of Study 5 followed those of Study 2 exactly except that the game's settings were modified to present either low or high levels of graphic violence.

#### *Target Game and Violence Conditions*

As in Study 2 we used the *HOTD3* arcade game. Participants were randomly assigned to play the game with a low level of graphic violence (no blood, neon green wounds on enemies) or a high level of graphic violence (gratuitous blood, realistic red wounds on enemies).

#### *Measures*

We assessed variables exactly as in Study 2. Reliabilities (alphas) ranged from .86 to .94.

### Results

As expected, MANOVA revealed no significant differences of condition on assessments of competence, autonomy, enjoyment, preference for future play, or presence. This suggests that the added violence did not enhance player experiences.

We further predicted that gameplay competence and autonomy would be associated with enjoyment, preference, and presence and that trait-level aggression would account for variance in preference. To test these hypotheses we simultaneously regressed each dependent variable onto competence, autonomy, and trait aggression. As shown in Table 6, need satisfaction was a consistent predictor of outcomes. Although trait aggression and future preference were correlated ( $r = .38, p < .05$ ) in the way expected, trait aggression did not account for unique variance in preference. We also expected that the relation between trait aggression and preference for future play would be moderated by condition. To test this we followed the same procedure outlined in Study 4. Results from these moderation analyses (see Table 7) reveal that trait aggression and condition did interact to account for 11% more variance in enjoyment and 13% more variance in preference as expected. The interaction plots follow the pattern of Figures 1 and 2. As in Study 3 these interactions were no longer significant when controlling for need satisfactions.

### Brief Discussion

The results mirrored findings from Study 4 and expanded their applicability to avid male video game players. In these players, psychological need satisfaction

remained a robust predictor of enjoyment, preference, and immersion, and level of violence did not by itself enhance enjoyment. Instead, as was the case for more novice players, violent content interacted with individual differences in aggression in predicting the attractiveness of the game.

## STUDY 6

Informed by experimental results, we returned to a survey design to test the role dispositional aggression might play in accounting for game outcomes and value for play in a diverse sample of regular video game players. As in the previous studies we anticipated that need satisfaction would predict substantial variance in game enjoyment, presence, word of mouth, and sequel interest. Second, mirroring experimental findings, we expected that ESRB rating (reflecting sexual and violent material) and our separate rating of violent content would both interact with trait aggression in predicting participants' appraisal of a game's value but, as in Study 4, not enjoyment or presence.

### Method

#### *Participants and Procedure*

Participants were 1,642 (195 female, 1,447 male) persons ranging in age from 18 to 43 ( $M = 23.9$ ;  $SD = 4.09$ ), recruited from the same online community sampled in Study 1. Participants were asked to respond to the survey with respect to their current favorite game. As incentive, they were entered into a raffle to win a cash prize, as in Study 1.

#### *Target Game Ratings*

Of the 1,642 titles endorsed by participants, 1,548 had an ESRB rating. Of these, 269 titles received a rating of everyone, 38 a rating of everyone 10+, 775 a rating of teen, and 466 a rating of mature. No titles received a rating of adults only. Two trained coders also rated each game for violent content using the 1 to 5 scale described in Study 1; the mean violence rating was 3.49 ( $SD = 1.30$ ). For the same reasons specified in Study 1, 94 titles did not have ratings. This left 187 females and 1,361 males ( $M$  age = 24.02,  $SD = 4.15$ ) in this sample.

#### *Measures*

We assessed variables in the same manner as Study 1. Reliabilities (alpha) for Study 6 were .68 for competence, .73 for autonomy, .80 for enjoyment, .78 for presence, and .95 for trait aggression. As in Study 1,

sequel interest and word of mouth were each assessed with one item.

*Game value.* To assess perceptions of their target game's value, participants rated the statement "The game was worth its price" on a 7-point scale.

### Results

#### *Preliminary Analyses*

Similar to Study 1, female participants were older,  $F(1, 1546) = 8.92$ ,  $p < .01$ ,  $\eta^2 = .01$  (males  $M = 24.87$ , females  $M = 23.91$ ); reported higher levels of in-game autonomy,  $F(1, 1546) = 7.52$ ,  $p < .01$ ,  $\eta^2 = .01$  (males  $M = 4.86$ , females  $M = 5.11$ ); enjoyment,  $F(1, 1546) = 9.59$ ,  $p < .01$ ,  $\eta^2 = .01$  (males  $M = 6.05$ , females  $M = 6.26$ ); presence,  $F(1, 1546) = 23.80$ ,  $p < .001$ ,  $\eta^2 = .02$  (males  $M = 2.78$ , females  $M = 3.22$ ); and sequel interest,  $F(1, 1546) = 8.34$ ,  $p < .01$ ,  $\eta^2 = .01$  (males  $M = 5.74$ , females  $M = 6.09$ ). Females also reported lower trait aggression,  $F(1, 1546) = 9.43$ ,  $p < .01$ ,  $\eta^2 = .01$  (males  $M = 3.40$ , females  $M = 3.10$ ); and they selected games with lower ESRB ratings,  $F(1, 1546) = 16.16$ ,  $p < .001$ ,  $\eta^2 = .01$  (males  $M = 2.13$ , females  $M = 1.89$ ); and less violent content,  $F(1, 1546) = 14.46$ ,  $p < .001$ ,  $\eta^2 = .01$  (males  $M = 3.53$ , females  $M = 3.21$ ).

#### *Primary Analyses*

To test the relations between motivation, aggression, and outcomes we obtained both correlations (Table 8), and we performed hierarchical simultaneous regressions (Tables 9 and 10). First, correlations show positive relations of in-game need satisfaction with all outcomes of note and also, unlike Study 1, positive relations of violent content with autonomy, presence, and value. Next, controlling for sex, we regressed enjoyment, presence, word of mouth, and game value onto rating, ESRB, competence, and autonomy. Second, we regressed enjoyment, presence, word of mouth, and sequel interest onto presence/absence of violence, competence, and autonomy (see Table 9). Competence and autonomy experiences related strongly and positively to outcomes. ESRB and violent content ratings were positively related only to presence, and violent content showed weak but significant negative relations to enjoyment, word of mouth, and sequel interest.

Tests for interactions between dispositional aggression and violent content on outcomes are reported in Table 10. Only the interaction involving game value was significant (Figures 3 and 4), showing that those higher in aggression reported more value for games that were violent.

**TABLE 8:** Correlations Between Variables of Interest (Study 6;  $n = 1,548$ )

	1	2	3	4	5	6	7	8	9	10
1. Sex	—									
2. Trait aggression	-.08**	—								
3. Entertainment Software Rating Board rating	-.11***	.05	—							
4. Violent content	-.11***	.04	.72***	—						
5. In-game autonomy	-.01	.05	.10***	.15***	—					
6. In-game competence	.07*	.03	.00	.03	.39***	—				
7. Game enjoyment	.08**	-.01	.04	-.04	.40***	.35***	—			
8. Presence	.12**	.06	.11***	.10***	.42***	.25***	.15***	—		
9. Sequel interest	.08**	.05	.05	-.01	.36***	.34***	.50***	.21***	—	
10. Word of mouth	.03*	.04	.03	-.02	.29***	.30***	.46***	.20***	.47***	—
11. Game value	-.02	.05	.09**	.10**	.34***	.23***	.29***	.29***	.34***	.35***

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**TABLE 9:** Simultaneous Regressions of Relations Between Game Content (Entertainment Software Rating Board [ESRB] and Violence Ratings) and In-Game Need Satisfaction on Outcomes (Study 6;  $n = 1,548$ )

Dependent Variables			ESRB $\beta$	Violence $\beta$
Enjoyment $R^2_a = .01, .21$ $R^2_b = .01, .23$	Step 1	Sex	.08**	.08**
		Game content	.02	-.10***
	Step 2	In-game competence	.27***	.27***
		In-game autonomy	.30***	.30***
Presence $R^2_a = .02, .20$ $R^2_b = .02, .21$	Step 1	Sex	.12***	.11***
		Game content	.09***	.05*
	Step 2	In-game competence	.16***	.12***
		In-game autonomy	.36***	.37***
Word of mouth $R^2_a = .00, .18$ $R^2_b = .00, .18$	Step 1	Sex	.03	.03
		Game content	.02	-.05*
	Step 2	In-game competence	.24***	.26***
		In-game autonomy	.26***	.26***
Sequel interest $R^2_a = .02, .17$ $R^2_b = .02, .20$	Step 1	Sex	.08**	.08**
		Game content	.02	-.04
	Step 2	In-game competence	.22***	.23***
		In-game autonomy	.20***	.21***
Game value $R^2_a = .00, .18$ $R^2_b = .01, .15$	Step 1	Sex	-.02	-.02
		Game content	.00	.02
	Step 2	In-game competence	.26***	.11***
		In-game autonomy	.25***	.33***

NOTE:  $R^2_a$  is variance estimate for each step of regression for violence content as ESRB.  $R^2_b$  is variance estimate for each step of regression for violence content as coded by expert raters.  
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Brief Discussion**

Results largely followed the pattern from previous studies. Violent content added little, and in some cases detracted from, motivation and enjoyment once accounting for gameplay autonomy and competence. In addition, although accounting for only a small portion of variance, interactions suggested that trait aggression enhances the preference for and valuation of more violent games, but not enjoyment or presence.

**GENERAL DISCUSSION**

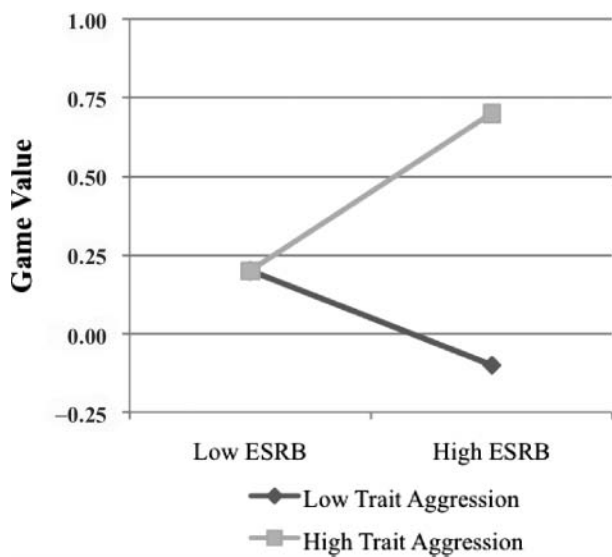
Violence in video games is a controversial topic and a subject of strong debate among researchers. Most of the controversy surrounds the benefits versus hazards of gameplay and especially whether exposure to violent games causes aggressive behavior (e.g., Anderson, 2004; Funk, Baldacci, Pasold, & Baumgardner, 2003). In this series of studies we asked a different question, namely, whether the inclusion of violence and gore in video games adds to enjoyment or preference and if so, for whom. Six studies utilized

**TABLE 10:** The Effects of Game Content on Outcomes as Moderated by Trait Aggression (Study 6;  $n = 1,548$ )

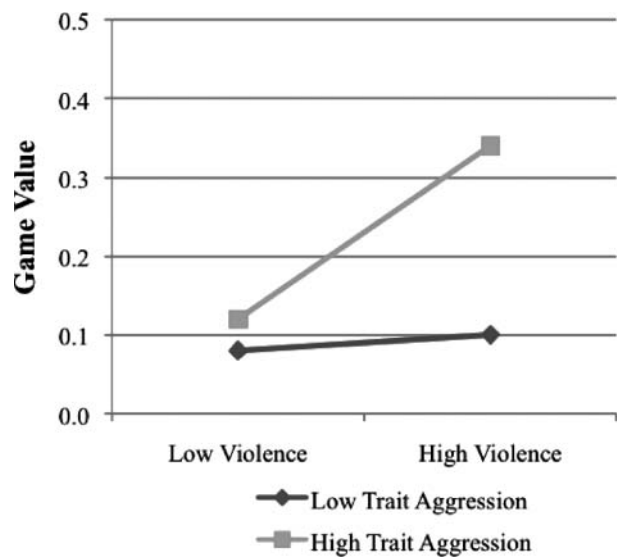
Dependent Variables			Entertainment Software Rating Board (ESRB) $\beta$	Violence $\beta$
Enjoyment	Step 1	Sex	.08**	.08**
	Step 2	Trait aggression	.00	-.09
		Game content	.05	-.05
$R^2_a = .01, .01, .01$	Step 3	Interaction	.01	.08
$R^2_b = .01, .01, .01$				
Presence	Step 1	Sex	.12***	.12***
	Step 2	Trait aggression	.07**	.09***
		Game content	.12***	.06*
$R^2_a = .02, .04, .04$	Step 3	Interaction	-.06	-.07
$R^2_b = .02, .04, .04$				
Word of mouth	Step 1	Sex	.03	.03
	Step 2	Trait aggression	.05*	-.02
		Game content	.05*	-.01
$R^2_a = .00, .01, .01$	Step 3	Interaction	-.11	-.06
$R^2_b = .00, .00, .00$				
Sequel interest	Step 1	Sex	.08**	.08**
	Step 2	Trait aggression	.05	.01
		Game content	.04	.08
$R^2_a = .01, .01, .01$	Step 3	Interaction	-.18	-.07
$R^2_b = .01, .01, .01$				
Game value	Step 1	Sex	-.02	-.02
	Step 2	Trait aggression	.02	.07
		Game content	.03	.06
$R^2_a = .00, .00, .01$	Step 3	Interaction	.33**	.20*
$R^2_b = .00, .00, .01$				

NOTE:  $R^2_a$  is variance estimate for each step of regression for violence content as ESRB.  $R^2_b$  is variance estimate for each step of regression for violence content as coded by expert raters.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



**Figure 3** The effect of game rating (Entertainment Software Rating Board) on game value as moderated by trait aggression (low/high): Study 6.



**Figure 4** The effect of game violence level on game value as moderated by trait aggression (low/high): Study 6.

the framework of self-determination theory to examine the contribution that violent game content makes to motivation, independent of the contributions of in-game psychological need satisfactions for competence and autonomy.

Results of the studies revealed consistently robust relations between players' experience of psychological need satisfaction and enjoyment, presence, preference for future play, word of mouth, and game value, supporting the general tenets of cognitive evaluation theory (Deci

& Ryan, 1985). The findings also suggested that violent video game content adds little or no unique predictive variance to player enjoyment or preferences. Violent game content interacted, however, with individual differences in aggression to account for opting-in behaviors, as indicated by future preference and game value ratings. Persons high in aggression did not consistently enjoy violent games more than nonviolent ones, but they did have a stronger preference and value for them.

More specifically, in Study 1 we assessed an online sample of persons who are regularly engaged in video games to look for a connection between violent content and player enjoyment. Overall, we did not find any relation between game enjoyability and violent contents. In fact, when controlling for psychological need satisfaction, violent content was weakly negatively related to game enjoyment, presence, word of mouth, and sequel interest. Study 2 introduced dispositional aggression as a factor that might be related to interest in violent video games. When participants were exposed to a violent video game, psychological need satisfaction accounted for a large share of game enjoyment, presence, and preference for future play. In this study, trait aggression accounted for unique predictive variance in preference for future play but not enjoyment or presence, suggesting that individual differences in aggression might influence opting-in behavior. Studies 3 and 4 further examined the role of individual differences in aggression in relation to violent game content. In Study 3, trait aggression moderated the effects of violent versus nonviolent conditions on future preference, enjoyment, and immersion. However, in Study 3 we used two different games that had been used in a classic study by Anderson et al. (2004) to represent these violent and nonviolent conditions, which may have introduced potential confounds. Thus, in Study 4 we addressed these potential confounds by presenting participants with structurally equivalent gameplay within which we experimentally manipulated the level of violence. In this better controlled study we found a crossover interaction, with participants high in trait aggression showing more preference for future play with the violent version but not more enjoyment or presence, results that were more consistent with findings from Studies 1 and 2. In Study 5, we expanded the generalizability of our findings by sampling young males who were frequent players, again showing main effects for need satisfaction, no main effects for violent content, and interactions suggesting higher violent game preference and enjoyment for those high in aggression. In Study 6 we returned to an online sample and again found evidence of an association between aggressive traits and value for violent games but no effect on enjoyment. In sum, violence in games did not generally add to enjoyment or presence, and on average, violent

contents were not more preferred by players, either in the lab or in field studies of regular gamers. Persons high in trait aggression did, however, report a greater preference for violent games in future play, but they did not reliably enjoy violent games more than nonviolent ones or find them more immersive. Moreover, this interaction between trait aggression and preferences or enjoyment disappeared when we controlled for autonomy and competence, suggesting that trait aggressive persons may simply experience more choice/freedom or effectiveness in a more violent game scenario.

We were also interested in whether violent content was correlated with greater feelings of competence or autonomy, which would suggest the special potential of such contents to fulfill these psychological needs. Those relations were not significant in Studies 1, 3, 4, and 5 where it was relevant to test them. In Study 6, however, violence ratings were mildly but significantly associated with more autonomy, both for our rating and that from ESRB. Further inspection of this relation suggested it was due largely to the popular massively multiplayer online (MMO) *World of Warcraft*, which received both a high violence rating and was perceived as allowing a lot of autonomy. Like *Grand Theft Auto* mentioned earlier, *World of Warcraft* affords a wide range of in-game choices, areas to explore, and different ways to play. Yet because it entails combat with animated human characters it rates as high violence on both ESRB and our coding systems. When this title was removed, the correlation of violence and autonomy was no longer in evidence.

It thus appears that although violent or gory games can offer challenges and options that foster autonomy and competence, so can equally option-laden and competence-challenging nonviolent games. At the same time, we did detect a weak effect for more mature or violent games to engender feelings of presence, suggesting that such contents can at times pull players into somewhat greater immersion in the game experience.

In these studies we also identified a subgroup of high trait aggressive players that were more likely to prefer violent contents. This finding suggests that there may be individual differences associated with consumption of violent games. Yet as Huesmann et al. (2003) suggested, it is also likely that early exposure to violent media can lead to greater propensities for aggression, both virtual and real world. Thus, both traits and environments are relevant, and one limitation in our studies is we did not collect histories of media consumption or exposure. Future studies might explore this and other potential moderators of responses to violent contents, such as cultural norms, mindfulness, sensation seeking, past exposure to interpersonal or family violence, and other constructs of interest.

There were other limitations to the present studies. First, participants in all six studies were from North America and Europe, and thus results may not generalize to game consumers around the globe. Given the popularity of video games in East Asian cultures, and the fact they are often played in public arcade or club contexts, inclusion of such samples would be timely. Second, we relied on self-report measures of need satisfaction, enjoyment, game value, and other variables. Behavioral measures (e.g., tracking purchases and choices over time) would supplement these findings. Third, in some studies we used ratings provided by the ESRB to quantify violent contents, alongside our own rating scheme. Parental groups and researchers have expressed reservations about the validity of the ESRB categories (Thompson, Tepichin, & Haninger, 2006). Future studies might want to examine more exactly how violence is depicted in games as an influence on a variety of outcomes. Researchers might also assess players' violent feelings while playing and their associations with outcomes.

The present studies explored the role of violent content in motivating video game play. Although many people, including many game developers and popular commentators, assume that violence motivates players or adds to video game enjoyment, our findings do not support that intuition. Instead, they suggest that video games are enjoyable, immersive, and motivating insofar as they offer opportunities for psychological need satisfaction, specifically experiences of competence and autonomy, to which violent content per se is largely unrelated. Although violent game contents did little to add to or detract from outcomes when other need satisfactions were considered, violent contents were more preferred by persons high in trait aggression. This suggests that even if violence may not be important to game enjoyment or popularity for most people, and may even turn off those low in aggression, there may be a subgroup of high aggressive persons particularly prone to their consumption. There are important implications of these findings for game developers and consumers, especially as they point toward wider opportunities to satisfy needs in less violent-oriented contexts. These results also suggest that aggression per se is not intrinsically motivating or associated with the satisfaction of basic psychological needs, findings that should be further examined both within and outside the domain of virtual activities.

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