Volume 48, Issue 2, March 2012

ISSN 0022-1031

ELSEVIER

Journal of the Society of Experimental Social Psychology

Journal of Experimental Social Psychology

Available online at www.sciencedirect.com

SciVerse ScienceDirect

Journal of Experimental Social Psychology 48 (2012) 486–491

Contents lists available at SciVerse ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Reports

Cyber-dehumanization: Violent video game play diminishes our humanity

Brock Bastian *, Jolanda Jetten, Helena R.M. Radke

School of Psychology, University of Queensland, Australia

ARTICLE INFO

Article history:
Received 27 May 2011
Revised 20 September 2011
Available online 18 October 2011

Keywords:
Dehumanization
Video game
Violence
Self-perception

ABSTRACT

Across two studies we show that engaging in violent video game play diminishes perceptions of our own human qualities. In addition, when other players are the targets of this violence it reduces our perceptions of their humanity also. In Study 1, we demonstrate that playing Mortal Kombat against another player reduces the perceived humanity of the self as well as the humanity of one's opponent (compared to playing a non-violent game). In Study 2 we replicate this effect on perceived humanity of the self when playing a violent game with a co-player. However, we find no dehumanization of co-players who are not the targets of violence. We demonstrate these effects cannot be reduced to mood, self-esteem, gender, or other characteristics of the game such as excitement and enjoyment. The findings provide a broader perspective from which to view previous work on the adverse effects of violent video games.

"FINISH HIM!"

— Mortal Kombat

This instruction from the popular video game "Mortal Kombat" encourages players to commit a final gory blow that ends the life of their opponent. Given such explicit instructions to engage in violent behavior, it is not surprising that many people are concerned about the effects of playing violent video games. There are good reasons to be concerned: the negative effects of violent video games have been well documented (Anderson & Bushman, 2001; Anderson et al., 2010) and appear to be more significant than those associated with other forms of violent media (Anderson, Gentile, & Buckley, 2007; Polman, Orobio de Castro, & Van Aken, 2008).

The focus of much research on video game violence links exposure to increased aggression (Anderson & Bushman, 2001; Anderson & Dill, 2000; Bartlett, Harris, & Bruey, 2008). However studies have also demonstrated a host of other negative outcomes. Players of violent video games are more likely to endorse violence in real-life (Dill, Brown, & Collins, 2008), to see others as more hostile (Bushman & Anderson, 2002), and are less likely to experience empathy (Funk, Buchman, Jenks, & Bechtoldt, 2003) or engage in pro-social behavior (Anderson et al., 2010). Moreover, playing violent video games appears to have a desensitizing effect on players, reducing their sensitivity to real-life violence (Carnagey, Anderson, & Bushman, 2007) and numbing them to the pain and suffering of others (Bushman & Anderson, 2009).

One reason that violence within video games is more powerful that other forms of violent media is that people identify with, and to some extent feel responsible for, the violence they perpetuate within virtual environments. Previous work has demonstrated that players become personally engaged with video game content (Anderson et al., 2010). Players often personally identify with video game avatars (Fischer, Kastenmuller, & Greitemeyer, 2010; Konijn, Bijvank, & Bushman, 2007), see themselves as more aggressive after playing violent games (Bluemke, Friedrich, & Zumbach, 2010; Uhlmann & Swanson, 2004) and use moral disengagement strategies to facilitate enjoyment of virtual violence (Hartmann & Vorderer, 2010). In short, perpetrating violence within virtual environments has personally relevant consequences, affecting how we see ourselves and respond to others.

Recent work has begun to establish links between video game violence and dehumanization. Specifically, Greitemeyer and McLatchie (2011) demonstrated that playing violent video games has the effect of reducing the perceived humanness of real-life antagonists, helping to explain how violent video games can lead to aggressive behavior. These findings are consistent with previous work showing that dehumanizing others allows people to behave violently towards them through processes of moral disengagement (Bandura, 1999; Kelman, 1976; Opotow, 1990), reducing empathy (Cehajic, Brown, & Gonzalez, 2009) and restoring psychological equanimity (Castano & Giner-Sorolla, 2006). In short, dehumanization oils the wheels of aggression and violence against others.

What is unclear, however, is whether playing violent video games has dehumanizing consequences for those involved in on-line interactions. People are increasingly spending large amounts of time engaging in on-line games (e.g., second life; world of warcraft; Ng & Wiemer-Hastings, 2005) and relatively little is known about how the experience of cyber-violence affects perceptions of the self as well as co-players. People who provoke us in real-life

* Corresponding author at: School of Psychology, University of Queensland, St Lucia, QLD, 4072, Australia. Fax: + 61 7 3365 4466.
E-mail address: b.bastian@uq.edu.au (B. Bastian).

0022-1031/$ – see front matter © 2011 Elsevier Inc. All rights reserved.
doi:10.1016/j.jesp.2011.10.009

may be viewed as less human (Bastian & Haslam, 2010; Greitemeyer & McLatchie, 2011), however whether co-players who harmlessly provoke us within the context of a video game are also perceived as less human is unclear. Perhaps more importantly, do these acts of aggression and violence have consequences for self-perception? As we note, previous work suggests a link between video game violence and self-perception, such that players see themselves as more aggressive (e.g., Bluemke et al., 2010). According to Self Perception Theory (Bem, 1972) people infer their internal attributes from observations of their own overt behavior. Importantly, observations of one's own aggressive behavior may have more pervasive effects on self-perception than increased aggressiveness alone: it may also lead to a perception of the self as less human. Indeed, theorists have often claimed that perpetrators of violence are dehumanized by their own brutality (Kelman, 1976). In line with self-perception theory we argue that engaging in inhumane behavior (e.g., acts of extreme violence and aggression) will affect our perceptions of our own humanity.

In the current studies we explore whether the experience of cyber-violence has dehumanizing consequences for the self and others. Specifically, we focus on self-perceptions of the perpetrators of cyber-violence (self) as well as perceptions of the victims of cyber-violence (others). We investigated these effects within a video game context where players were opponents engaged in violent behavior against each other (Mortal Kombat, Study 1). We also investigated whether engaging in cyber-violence against computer generated avatars, as opposed to other players, is sufficient to affect self-perceived humanity (Call of Duty 2, Study 2). In both studies we compared our findings against a similar but non-violent video game. In line with self-perception theory and observations that violent behavior is dehumanizing for perpetrators, we expected that engaging in the violent, compared to the non-violent video game would lead players to view *themselves* as less human (Hypothesis 1). We also expected that, in line with previous work on real-life violence, players would view their opponents as less human when they were the targets of violence compared to when they were opponents in a non-violent video game (Hypothesis 2). The design of Study 2 also provided the opportunity to explore another possible consequence of cyber-violence: perceptions of co-perpetrators. Co-players are often engaged in cooperative violent behavior rather than being the targets of violence (e.g., in two-player games) and no previous work has investigated perceptions of co-perpetrators, let alone whether co-perpetrators of violence are also dehumanized or not. As elaborated in Study 2, even though we made no specific predictions regarding the dehumanization of co-perpetrators, we were open to the finding that dehumanized perceptions would be less apparent when co-players were not the targets of violence.

Study 1

Our first study aimed to demonstrate that playing a violent video game against another player would lead to dehumanized perceptions of both the self and the other. We selected the highly popular game Mortal Kombat. In this game participants select a character and then enter into fighting bouts against another player. We predicted that, compared to playing an equally competitive non-violent interactive game, playing Mortal Kombat would reduce self-perceived humanity (H1) as well as humanness attributions of the opponent player (H2).

Our measure of humanness incorporated two dimensions identified in previous work (Haslam, 2006; Haslam, Bain, Douge, Lee, & Bastian, 2005). Human Nature refers to features that are seen as fundamental to our humanity and Human Uniqueness to attributes that distinguish people from animals. Perceiving a lack of Human Nature in a target is akin to likening them to objects or machines; cold, rigid, inert, and lacking emotion. On the other hand, perceiving a lack of Human Uniqueness is akin to likening them to animals; immature, coarse, irrational, or backward. This framework implies that people can be viewed as lacking humanness in two ways, and we argue that both may be implicated when playing violent video games.

Participants

Participants were 106 undergraduates (74 women, 32 men) who took part in the study for course credit. Their ages ranged from 17 to 34 years ($M = 19.28$, $SD = 2.39$). Participation was in groups of two with random assignment to conditions.

Materials

Participants were seated in front of a video screen with an X-box video game console. Each had a wireless X-box controller and separate head phones. Although both participants were looking at the same screen, a portable dividing wall obscured their view of each other and they were instructed not to interact throughout the course of the experiment. This was to ensure the interaction between participants was fully mediated by the video game environment. Participants then proceeded to play either two-player Mortal Kombat ($n = 52$) or Top Spin Tennis ($n = 54$) for 15 min. After playing the video game participants were given a questionnaire to complete. Before continuing onto the remainder of the questionnaire they were asked to indicate how much they enjoyed playing the video game on a scale from 1(*not at all enjoyable*) to 7 (*very enjoyable*), how exciting it was on a scale from 1(*not at all exciting*) to 7(*very exciting*) and how frustrating it was 1(*not at all frustrating*) to 7(*very frustrating*).

Humanness

Participants then rated themselves on 8-items adapted from Bastian and Haslam (2010) assessing the attribution of Human Nature (4-items; e.g., "I felt like I was open minded, like I could think clearly about things", "I felt that I was emotional, like I was responsive and warm", "I felt superficial like I had no depth" (*reversed*), "I felt like I was mechanical and cold, like a robot" (*reversed*)) and Human Uniqueness (4-items; e.g., "I felt like I was refined and cultured", "I felt like I was rational and logical, like I was intelligent", "I felt like I lacked self-restraint, like an animal" (*reversed*), "I felt like I was unsophisticated" (*reversed*)). Participants also rated the other person on the same items, with item stems changed to "I felt like the other person…" Responses were made from 1 (*not at all*) to 7 (*very much so*). Specifically they were asked to think about their "experience of playing the video game" and to answer each question in relation to how they saw themselves/the other person they played against as possessing each of the characteristics highlighted in the measure of dehumanization. Given high correlations between the dimensions of humanness for self: $r(106) = .63$, $p < .001$, and other, $r(106) = .64$, $p < .001$, we collapsed across both dimensions to form measures of Self ($\alpha = .71$) and Other Humanity ($\alpha = .75$). Participants were probed as to the purpose of the study. None indicated that they suspected any links between video game violence and dehumanization.

Results and discussion

Preliminary analysis revealed that participants found both games equally frustrating (violent: $M = 3.27$, $SD = 1.42$; non-violent: $M = 3.04$, $SD = 1.59$), $t(104) = 0.79$, $p = .430$. Mortal Kombat was marginally more enjoyable than Top Spin Tennis (violent: $M = 4.86$, $SD = 1.57$; non-violent: $M = 4.35$, $SD = 1.39$), $t(104) = 1.78$, $p = .077$, and was significantly more exciting (violent: $M = 4.52$, $SD = 1.51$; non-violent: $M = 3.46$, $SD = 1.25$), $t(104) = 3.92$, $p < .001$.

As we collected the data within dyads we investigated the possibility that assumptions that self and other humanity ratings are independent were violated (Kenny, Kashy, & Cook, 2006). To this end we

computed the intraclass correlations (controlling for experimental condition) for each rating type (self and other) at the level of the dyad to test for non-independence. This revealed that both self ($Z=0.87$, $p=.384$) and other ($Z=1.30$, $p=.194$) ratings were not significantly related (i.e., independent) and therefore we focused on the individual, rather than the dyad, as the unit of analysis. Ratings of Self and Other Humanity also varied by condition. Self Humanity ratings (violent: $M=3.74$, $SD=1.02$; non-violent: $M=4.35$, $SD=0.86$), $t(1,104)=3.33$, $p=.001$ (see Fig. 1), and Other Humanity ratings (violent: $M=4.43$, $SD=1.02$; non-violent: $M=4.93$, $SD=0.82$), $t(1,104)=2.81$, $p=.006$ (see Fig. 2), were lower after playing Mortal Kombat compared to Top Spin Tennis.

In order to determine whether the effects could be accounted for by characteristics of the game other than violence, or any effects potentially associated with gender, we entered ratings of frustration, enjoyableness, and excitement as well as participant gender as covariates in separate ANCOVAs testing the effects of Self and Other Humanity. After controlling for these variables, the effects of both Self Humanity, $F(1,98)=13.34$, $p<.001$, $\eta^2=.12$, and Other Humanity, $F(1,98)=6.39$, $p=.013$, $\eta^2=.06$, remained significant.

The findings of Study 1 confirmed predictions. We demonstrate that playing a violent game, compared to playing a non-violent game, against another player leads to reduced perceptions of one's own humanity (H1) as well as the humanity of their opponent (H2). Moreover, these effects cannot be accounted for by how enjoyable, exciting, or frustrating the game was and are not accounted for by any effects of gender.

Study 2

Study 1 provides evidence for a link between engaging in video game violence and dehumanized perceptions of the self and ones opponent. However, there are a number of questions that remain unanswered. First, it may be having a conflict with another person, even within a computer generated environment, that leads to reduced perceptions of one's own humanity. We would have stronger support for our hypotheses that effects are due to the nature of the game if players of violent games still see themselves as less human even if they are playing against computer-generated avatars, rather than avatars controlled by an opponent. Second, it is not clear from Study 1 whether our effects could simply be accounted for by feeling bad after playing a violent game. That is, playing violent games may not only arouse negative affect (or reduce positive affect) but may also lead to reductions in the positivity of global self-perception (i.e., self-esteem). As such, rather than being about a loss of humanity specifically, our effects may be driven by general reductions in global self-esteem or changes in mood. Third, although the findings of Study 1 are demonstrated using a highly popular violent video game, the characters in Mortal Kombat are characteristically non-human. As such participants may have been primed to see themselves

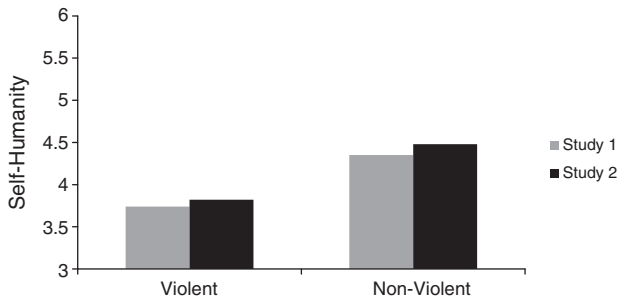

Fig. 1. Mean scores for ratings of Self Humanity across conditions, Studies 1 and 2.

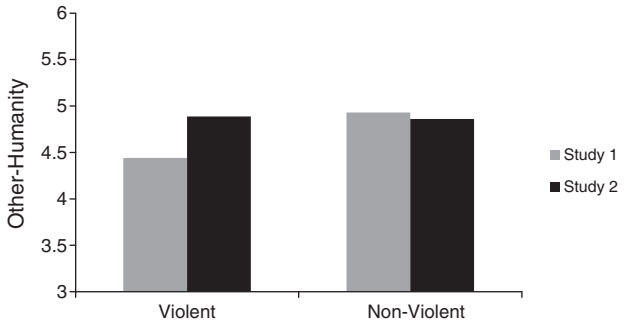

Fig. 2. Mean scores for ratings of Other Humanity across conditions, Studies 1 and 2.

and others as sub-human simply due to the qualities of the characters in the game rather than as a result of violence in the game.

In Study 2 we attempted to overcome these limitations. First we had participants play each game in collaboration with a co-player, such that both players were playing together against computer generated avatars. In line with previous work suggesting that participants are personally engaged and feel responsible for cyber-violence (e.g., Anderson et al., 2010; Hartmann & Vorderer, 2010) we expected to replicate our findings for self-perceived dehumanization, even when engaging in cyber-violence directed towards computer generated avatars (H1). Although we made no specific predictions about how participants would view co-perpetrators, we were open to the idea that their dehumanization would be less evident given they were not the targets of violence. Second, we included measures of state self-esteem and mood to ensure that these factors could not account for our findings. Third, participants played Call of Duty 2 instead of Mortal Kombat. In this game participants are part of a combat unit of soldiers whose role it is to fight and kill the enemy within the context of warfare. Critically, this game is a 'first person shooter' game. Although all characters in this game are clearly human, participants view is constructed as if they are the shooter, with only their gun visible at the bottom of the screen. Thus any dehumanization would not be due to priming effects from non-human characteristics of video game avatars. For this game the screen was split into two such that players could see their own and their co-players perspective.

Participants

Participants were 38 undergraduates (28 women, $M_{age}=20.13$) who took part in the study for course credit or $10 reimbursement. Participation was in groups of two with random assignment to conditions.

Materials

The same set-up from Study 1 was employed. Again participants were randomly assigned to either play a violent game (Call of Duty 2: $n=20$) or a non-violent game (Top Spin Tennis $n=18$). Call of Duty 2 is a first person shooter game that requires participants to enter a war-like scenario where they use various weapons to shoot at enemy soldiers. The violence is relatively graphic and the fighting is fast pace. The major difference compared to Study 1 was that in both games, rather than playing competitively against each other, players entered into a cooperative game play context where they both played as a team against computer programmed avatars (i.e., soldiers or other tennis players). Participants played for 20 min.

After playing the game, players were again asked how frustrating, enjoyable and exciting the game was. They then rated themselves and the other person on the same measures of humanness used in Study 1. Specifically they were asked to think about their "experience of playing the video game" and to answer each question in relation to

how they saw themselves/the other person they played with as possessing each of the characteristics highlighted in the measure of dehumanization.

In addition, we also provided participants with the 20-item PANAS (Watson, Clark, & Tellegen, 1988) and asked them to indicate their current mood (Positive mood: $\alpha = .77$; Negative mood: $\alpha = .70$). Participants also completed the State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991) to assess global self-evaluation. Participants are required to respond to a range of statements in relation to what they "feel is true of themselves at this moment" on a scale from 1 (*not at all*) to 5 (*extremely*). Three subscales tap a range of self aspects including performance (e.g., 'I feel confident about my abilities'), appearance (e.g., 'I feel that others respect and admire me') and social (e.g., 'I feel displeased with myself' *reversed*) ($\alpha = .85$). Participants were probed as to the purpose of the study. None indicated that they suspected any links between video game violence and dehumanization.

Results and discussion

We constructed measures of Self ($\alpha = .66$) and Other Humanity ($\alpha = .68$) as in Study 1.

Preliminary analysis revealed that participants found both games equally enjoyable (violent: $M = 2.70$, $SD = 1.94$; non-violent: $M = 3.56$, $SD = 1.58$), $t(36) = -1.48$, $p = .149$, and equally exciting (violent: $M = 3.05$, $SD = 1.64$; non-violent: $M = 3.44$, $SD = 1.50$), $t(36) = -0.77$, $p = .446$. Participants rated Call of Duty 2 as more frustrating than Top Spin Tennis (violent: $M = 5.00$, $SD = 1.69$; non-violent: $M = 3.83$, $SD = 1.76$), $t(36) = 2.09$, $p = .044$. Preliminary analysis also revealed no differences in state self-esteem (violent: $M = 3.37$, $SD = 0.54$; non-violent: $M = 3.48$, $SD = 0.43$), $t(36) = -0.70$, $p = .489$, positive mood (violent: $M = 2.30$, $SD = 0.74$; non-violent: $M = 2.50$, $SD = 0.58$), $t(36) = -0.92$, $p = .363$, or negative mood (violent: $M = 1.84$, $SD = 0.75$; non-violent: $M = 1.66$, $SD = 0.71$), $t(36) = 0.76$, $p = .451$.

As in Study 1 we tested for non-independence between self and other ratings at the level of the dyad, controlling for experimental condition. This revealed that both self ($Z = 0.79$, $p = .430$) and other ($Z = 0.74$, $p = .459$) ratings were not significantly related (independent) and therefore we focused on the individual, rather than the dyad, as the unit of analysis. Ratings of Self Humanity varied by condition (violent: $M = 3.82$, $SD = 0.89$; non-violent: $M = 4.48$, $SD = 0.56$), $t(1,36) = 2.69$, $p = .011$, such that people rated themselves as less human in the Call of Duty 2 condition than in the Top Spin Tennis condition (see Fig. 1). However there was no effect of condition on Other Humanity (violent: $M = 4.89$, $SD = 0.74$; non-violent: $M = 4.86$, $SD = 0.71$), $t(1,36) = 0.11$, $p = .910$ (see Fig. 2).

In order to determine whether these effects could be accounted for by characteristics of the game other than violence, in addition to any effects associated with reductions in self-esteem, changes in either positive or negative mood or gender, we entered all these variables as covariates into separate ANCOVAs testing the effects of Self and Other Humanity. This revealed that our findings for Self Humanity remained significant, $F(1,29) = 4.80$, $p = .037$, $\eta^2 = .14$, and the effects of Other Humanity remained non-significant, $F(1,29) = 0.008$, $p = .929$, $\eta^2 < .001$.

The findings of Study 2 support and extend on those of Study 1. Playing a violent video game reduces perceptions of one's own humanity even when participants play the game as a first person shooter and when playing in collaboration, rather than against, another co-player. In addition to controlling for characteristics of the game and gender, Study 2 demonstrates that the effects of self-dehumanization cannot be accounted for by reductions in global self-esteem or changes in mood. This suggests that engaging in violent media does not necessary make us feel bad, or see ourselves more negatively, but it does affect how human we feel. Importantly, the game employed in Study 2 was a first person shooter game, indicating that participant ratings were related to their experience of themselves as first person shooters, rather than any avatar that represented their character in the game.

The findings of Study 2 also indicate that simply playing a violent game with another person does not affect our perception of their humanity. Ratings of other people's humanity were only lowered when the other is the target of cyber-violence (Study 1), not when the other is a co-perpetrator of that violence (Study 2). This finding is interesting in the light of previous work on dehumanization. In particular, evidence suggests that dehumanization is apparent in perceptions of outgroup members (e.g., Leyens et al., 2001), occurs in response to provocation (e.g., Bastian & Haslam, 2010; Greitemeyer & McLatchie, 2011), or in order to justify violent and aggressive behavior (e.g., Bandura, 1999). Our findings suggest that this may not extend to co-perpetrators of violence, and when their violent behavior supports our own goals we may not see them as less human. Importantly, however, it may well be the specific context of Study 2 that led to this finding and it remains to be investigated whether findings can be generalized to different contexts.

General discussion

Across two studies we find evidence for our two hypotheses. First, people view themselves as less human when engaged in gratuitous video game violence compared to equally competitive non-violent games. Moreover, we find that this dehumanization extends to perceptions of opponents in violent compared to non-violent games, but that this does not occur in cooperative game play contexts. Players feel dehumanized when they engage in video game violence, even when this is directed towards computer-generated avatars, however it is only when another player is the target of this violence that they are also dehumanized. Moreover, we demonstrate that these affects are not reducible to mood, negative self-evaluation, gender, or qualities of the video games such as enjoyment and excitement.

Our work contributes to past research on dehumanization. It provides the first evidence that people may perceive themselves as less human when engaging in violent behavior. Self Perception Theory (Bem, 1972) helps to understand these findings. This theory states that people infer their internal attributes from observation of their own behavior. Our findings demonstrate that engaging in cyber-violence leads people to perceive themselves as less human and supports previous observations that perpetrators of violence are dehumanized by their own brutality (Kelman, 1976). We also demonstrate that when other players are opponents in a violent game, our perceptions of their humanity are also affected (more so compared to when they are opponents in an equally competitive, but non-violent game). That is, hitting, hurting or killing others is likely to affect how human we see them, and this is consistent with previous research showing that seeing others as dehumanized facilitates violence and aggression (Bandura, 1999). We demonstrate that this occurs even within a computer mediated environment where no actual harm is done.

Our findings also highlight the particularly insidious nature of video game violence. We demonstrate that engaging in violence against a co-player or simply being engaged in gratuitous violence against computer generated avatars is sufficient to affect our perceptions of our own humanity. These findings reflect those of past research, demonstrating links between video game violence and increased aggression (Anderson & Bushman, 2001; Bluemke et al., 2010; Uhlmann & Swanson, 2004), reduced empathy (Funk et al., 2003) and desensitization to the pain and suffering of others (Bushman & Anderson, 2009; Carnagey et al., 2007). Being empathic, emotional and sensitive to others, while also being refined and cultured as opposed to aggressive and uninhibited are all qualities commonly thought to be central to our humanity (Haslam, 2006; Leyens et al., 2001). Taken together, the effects of violent video game play appear to reflect changes in peoples' behavior, emotions, and cognitions in ways that are consistent with a loss of humanity. Importantly, recent research has also demonstrated that

playing prosocial games increases the accessibility of pro-social thoughts, increases empathy, and promotes helping behavior (Gentile et al., 2009; Greitemeyer & Osswald, 2010). A worthy avenue for future research would be to investigate whether playing pro-social games serves to increase perceptions of one's own humanity.

Although we interpret our findings from the perspective of perpetrators, in our research players were also the victims of violence. In Study 1 participants were the victims of another player's violence and in Study 2 of violence perpetrated by avatars. Importantly, past research has demonstrated that dehumanization is not limited to the minds of perpetrators, and that victims of interpersonal abuse view themselves as well as their perpetrators as less human (Bastian & Haslam, 2010). This offers an alternative interpretation for our findings, suggesting that players reduced perceptions of their humanity may be driven by being the victims as well as the perpetrators of violence. Little research has focused on these interpersonal elements of violent video games and future work might look to tease apart victim and perpetrator effects. However what is clear is that being involved in video game violence involves a dehumanizing experience.

Our work also extends on previous research examining the relationship between violent video games and dehumanization (Greitemeyer & McLatchie, 2011). Whereas that work focused on how violent video games affect the dehumanization of real-world protagonists, ours demonstrates these dehumanizing perceptions are evident within the context of violent video game play. That is, players dehumanize other players with whom they are engaged in violent interactions. Moreover, we demonstrate that these effects extend to self-perception indicating that engaging in video game violence affects self-perceived humanity. To this extent, our reported effects pertain to the actual experience of playing violent video games, rather than any subsequent or flow-on effects these perceptions may have in other interactions. This distinguishes our approach from that of previous studies which have sought to observe the effects of playing violent video games on real-world interactions. Our aim in the current research was to establish a relationship between the experience of engaging in cyber-violence and dehumanization. People spend long periods of time engaged in on-line gaming and the possibility that these experiences are dehumanizing represents an important insight into an increasingly prevalent domain of human interaction. Moreover, it provides an important foundation for understanding the kinds of cognitions and behaviors that might result from these experiences. Our findings also point to the potential long-term effects of violent video game play and suggest that repeated exposure to these dehumanizing experiences may result in chronic changes in self-perception.

We argue that the link between cyber-violence and self-dehumanization is a result of self-perception processes. That is, people infer a lack of self-humanity via observations of their own behavior. Another potential interpretation is that being primed with violence is dehumanizing for the self. On this account, changes in self-perception would be triggered due to priming effects on the active self-concept (e.g., Wheeler, DeMarree, & Petty, 2007) rather than attributions drawn from overt behavior. Although our findings provide more direct evidence for self-perception processes, we cannot rule out the role of priming effects. We find this possibility, however, particularly interesting, and if true it would highlight the broader implications of our findings: that simply being exposed to violence is a dehumanizing experience. This reasoning is consistent with recent evidence which suggests that mere exposure to generic violence leads to dehumanization of outgroups (Delgado, Rodríguez-Pérez, Vaes, Leyens, & Betancor, 2009). Whether this mere exposure effect would extend to self-perceived humanity is unclear.

Evidence for this mere exposure effect is mixed in the case of aggression. On the one hand, listening to songs with violent lyrics increases aggressive thoughts and feelings (Anderson, Carnagey, & Eubanks, 2003). On the other, simply observing others play violent video games does not increase aggressive behavior (Polman et al., 2008). Future research could explore the possibility that merely being exposed to violence is sufficient for self-dehumanization to occur.

It should also be noted that we used explicit measures of dehumanization (Bastian & Haslam, 2010). This allowed us to directly tap concepts associated with dehumanization however it also leaves open the possibility for demand effects. That is, participants may have felt compelled to rate themselves as less human, or more negatively, given the context. However, we believe that demand effects cannot account for our findings for two reasons. First, a demand explanation requires that people feel bad about themselves after playing violent video games. However, we did not find that participants felt worse or that they viewed themselves more negatively after playing a violent video game compared to playing tennis — probably reflecting the fact that playing violent video games is socially normative and a widely accepted practice. Second, although our measures were explicit, it is not clear that participants were aware of what construct we were measuring or how it should relate to playing violent video games. This is evidenced by the lack of any suspicion expressed in debriefing. In addition, most of the items referred to the possession of qualities such as intelligence, open-mindedness, self-restraint or superficiality, none of which are likely to be interpreted as measures of dehumanization, or even especially associated with violent behavior. Rather, our findings suggest that these qualities are especially sensitive to the perpetuation of violence, even when this occurs within the context of a video game.

The negative effects of violent video games have received a great deal of research attention. We add to this literature by demonstrating that engaging in the gratuitous violence of video games has implications for our own self-perceived humanity and that of our opponents. This work provides a broad perspective from which to view the effects of violent video games on behavior, affect and cognition. Moreover it provides for important reflections on the role of our own behaviors in perceptions of our own humanity. Engaging in violence against others is dehumanizing, and even engaging in harmless and gratuitous violence appears to be sufficient to make us feel we have lost elements of our own humanity.

References

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science*, *12*, 353–359.

Anderson, C. A., Carnagey, N. L., & Eubanks, J. (2003). Exposure to violent media: The effects of songs with violent lyrics on aggressive thoughts and feelings. *Journal of Personality and Social Psychology*, *84*, 960–971.

Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology*, *78*, 772–790.

Anderson, C. A., Gentile, D. A., & Buckley, K. E. (2007). *Violent video game effects on children and adolescents: Theory, research, and public policy*. New York, NY: Oxford University Press.

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., et al. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in Eastern and Western countries: A meta-analytic review. *Psychological Bulletin*, *136*, 151–173.

Bandura, A. (1999). Moral disengagement in the perpetuation of inhumanities. *Personality and Social Psychology Review*, *3*, 193–209.

Bartlett, C. P., Harris, R. J., & Bruey, C. (2008). The effect of the amount of blood in a violent video game on aggression, hostility, and arousal. *Journal of Experimental Social Psychology*, *44*, 539–546.

Bastian, B., & Haslam, N. (2010). Excluded from humanity: The dehumanizing effects of social ostracism. *Journal of Experimental Social Psychology*, *46*, 107–113.

Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*, 13 (pp. 1–62). New York: Academic Press.

Bluemke, M., Friedrich, M., & Zumbach, J. (2010). The influence of violent and nonviolent computer games on implicit measures of aggressiveness. *Aggressive Behavior*, *36*, 1–13.

Bushman, B. J., & Anderson, C. A. (2002). Violent video games and hostile expectations: A test of the general aggression model. *Personality and Social Psychology Bulletin*, *28*, 1679–1686.

Bushman, B. J., & Anderson, C. A. (2009). Comfortably numb: Desensitizing effects of violent media on helping others. *Psychological Science*, *20*, 273–277.

Carnagey, N. L., Anderson, C. A., & Bushman, B. J. (2007). The effect of video game violence on physiological desensitization to real-life violence. *Journal of Experimental Psychology*, *43*, 489–496.

Castano, E., & Giner-Sorolla, R. (2006). Not quite human: Infrahumanization in response to collective responsibility for intergroup killing. *Journal of Personality and Social Psychology*, *90*, 804–818.

Cehajic, S., Brown, R., & Gonzalez, R. (2009). What do I care? Perceived ingroup responsibility and dehumanization as predictors of empathy felt for the victim group. *Group Processes & Intergroup Relations*, *12*, 715–729.

Delgado, N., Rodríguez-Pérez, A., Vaes, J., Leyens, J. -P., & Betancor, V. (2009). Priming effects of violence on infrahumanization. *Group Processes & Intergroup Relations*, *12*, 699–714.

Dill, K. E., Brown, B. P., & Collins, M. A. (2008). Effects of exposure to sex-stereotyped video game characters on tolerance of sexual harassment. *Journal of Experimental Social Psychology*, *44*, 1402–1408.

Fischer, P., Kastenmuller, A., & Greitemeyer, T. (2010). Media violence and the self: The impact of personalized gaming characters in aggressive video games on aggressive behavior. *Journal of Experimental Social Psychology*, *46*, 192–195.

Funk, J. B., Buchman, D. D., Jenks, J., & Bechtoldt, H. (2003). Playing violent video games, desensitization, and moral evaluation in children. *Applied Developmental Psychology*, *24*, 413–436.

Gentile, D. A., Anderson, C. A., Yukawa, S., Ihori, N., Saleem, M., Ming, L. K., et al. (2009). The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies. *Personality and Social Psychology Bulletin*, *35*, 752–763.

Greitemeyer, T., & McLatchie, N. (2011). Denying humanness to others: A newly discovered mechanism by which violent video games increase aggressive behavior. *Psychological Science, published on-line*. doi:10.1177/0956797611403320.

Greitemeyer, T., & Osswald, S. (2010). Effects of prosocial video games on prosocial behavior. *Journal of Personality and Social Psychology*, *98*, 211–221.

Hartmann, T., & Vorderer, P. (2010). It's okay to shoot a character: Moral disengagement in violent video games. *Journal of Communication*, *60*, 94–119.

Haslam, N. (2006). Dehumanization: An integrative review. *Personality and Social Psychology Review*, *10*, 252–264.

Haslam, N., Bain, P., Douge, L., Lee, M., & Bastian, B. (2005). More human than you: Attributing humanness to self and others. *Journal of Personality and Social Psychology*, *89*, 937–950.

Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social Psychology*, *60*, 895–910.

Kelman, H. C. (1976). Violence without restraint: Reflections on the dehumanization of victims and victimizers. In G. M. Kren, & L. H. Rappoport (Eds.), *Varieties of psychohistory* (pp. 282–314). New York: Springer.

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis.* New York: Guilford Press.

Konijn, E. A., Bijvank, M. N., & Bushman, B. J. (2007). I wish I were a warrior: The role of wishful identification in the effects of violent video games on aggression in adolescent boys. *Developmental Psychology*, *43*, 1038–1044.

Leyens, J. -P., Rodriguez-Perez, A., Rodriguez-Torres, R., Gaunt, R., Paladino, M. -P., Vaes, J., et al. (2001). Psychological essentialism and the differential attribution of uniquely human emotions to ingroups and outgroups. *European Journal of Social Psychology*, *31*, 395–411.

Ng, B. D., & Wiemer-Hastings, P. (2005). Addiction to the internet and on-line gaming. *Cyberpsychology & Behavior*, *8*, 110–113.

Opotow, S. (1990). Moral exclusion and injustice: An introduction. *Journal of Social Issues*, *46*, 1–20.

Polman, H., Orobio de Castro, B., & Van Aken, M. A. G. (2008). Experimental study of the differential effects of playing versus watching violent video games on children's aggressive behavior. *Aggressive Behavior*, *34*, 256–264.

Uhlmann, E., & Swanson, J. (2004). Exposure to violent video games increases automatic aggressiveness. *Journal of Adolescence*, *27*, 41–52.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *45*, 1063–1070.

Wheeler, S. C., DeMarree, K. G., & Petty, R. E. (2007). Understanding the role of the self in prime-to-behavior effects: The active-self account. *Personality and Social Psychology Review*, *11*, 234–261.