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RESEARCH ARTICLE

A STUDY TO EXAMINE THE RELATIONSHIP BETWEEN VIDEO GAME VIOLENCE, MORAL DISENGAGEMENT, TRAIT COMPETITIVENESS, AND TRAIT AGGRESSION IN YOUNG ADULTS IN THE UK

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ABSTRACT

Introduction: Within context societal moral indignation and panic expressed in response to recent increases in urban violence and death amongst young adults in the UK, some researchers are asking whether exposure to video game violence (EVGV) might be a contributing factor. Methods: Using a correlational design, and web-based survey methods to collect data, the author examined the relationship between violent video games, moral disengagement, competitiveness, and trait aggression. **Results:** Commensurate with other studies, a small significant positive correlation was found between exposure to video game violence (EVGV) and reported trait aggression. Multiple regression revealed that EVGV explained an additional 4.5% of the reported trait aggression after controlling for age, sex, average violent video game difficulty, average violent video game pace of action, moral disengagement, and trait competitiveness. **Conclusion:** Moral disengagement might better explain trait aggression in young people exposed to video game violence in the UK, but violent video games along with other risk factors can act as potential primers for aggressive behaviours and cognition. Implications for public and mental health are discussed.

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INTRODUCTION

Within the context of societal moral indignation and panic prevalent within many inner city communities (Ferguson, 2008), the alarming increases in serious violence, (i.e., the intention to seriously harm someone or something), and death amongst young adults (aged between 18-24 years old) in the UK, has become a public health issue (Home Office, 2018a). The incidence of the knife and other violent crime in Greater London, UK has reached epidemic proportions with the police recording 17 offences per 10,000 people compared to approximately ten offences per 10,000 people in other major conurbations in the UK (Home Office, 2018a). These figures reflect a year-on-year rise in knife or sharp instrument offence of 12% since 2011 reaching 38,332 offences in 2017-18. Most of these knives were used in the commission of robberies (16,801) or assaults (18,402), but 285 of these cases in 2018 resulted in death. Twenty-five per cent of all deaths were men aged 18 – 24 years, but most violent attacks involve no weapons (Home Office, 2018a).

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The reasons 'why' there has been a steady rise in serious violent crime among young adults remain complicated and multi-faceted (Ferguson, 2009). Some authors point to immigration and poverty as reasons for an increase in serious violence in the UK (Banks, 2011), but many of deaths amongst adolescent and adult men appear to be drug-related, and the perpetrators are often not in education, training or legal employment (Sarrica, 2008). Consequently, the UK government and criminal justice system are focusing on the illegal drugs trade; implying that, inherent competition for market share amongst those not in education, training or employment leads to ever-increasing levels of violence being perpetrated by increasingly younger individuals (Home Office, 2018b). Prison sentences for carrying a concealed weapon like a knife have gone up sharply since 2008, but this has not deterred those individuals intent on committing a violent crime or from putting themselves and others at risk of harm. To combat this rise in violent crime, the UK government have invested heavily in prevention and detection of serious crime led by the 'National Crime Agency' as part of it is 'Serious Crime Strategy' (Home Office, 2019b). A £200 million 'Youth Endowment Fund' has been set up to 'steer young people away from violence' (Home Office, 2018b). 'Violent Crime Task

Force' has increased its 'stop and search' practices to pre-empt the commission of a violent crime, however, only 10% of one million 'stop and searches' have resulted in arrests (Ministry of Justice, 2014; Home Office, 2014). The vast majority of those from socially disadvantaged backgrounds and deprivation, however, do not engage in violent crime. The commission of ever more serious violent crime by increasingly higherproportion of young individuals not in education training or employment has led some researchers to wonder whether regular exposure to violence within adventure/action and "survival against all odds" video games might be a significant contributing factor to observed (Anderson, 2004; Anderson, Shibuya, Ihori, Swing, Bushman, Sakmot, Rothstein & Saleem, 2010; Greitemeyer & Mügge, 2014; Prescott, Sargent, & Hull, 2017).However, other researchers question whether exposure to video games increases the risk of resultant violence citing small fixed and random effects of short duration and questionable methodology (Adachi & Willoughby, 2011; Elson & Ferguson, 2014; Ferguson, 2008; 2009; Hilgard, Engelhardt & Rouder, 2017; Kühn, Kugler, Schmalen, Weichenberger, Witt, & Gallinat, 2018). Other risk factors such as a genetic predisposition to aggression and violence, normative views about aggression and violence and poor self-control, abusive parents, peer victimisation, peer delinquency,grooming and neighbourhood crime may be more critical in predicting subsequent aggression and violent behaviourin young people (Anderson, Suzuki, Swing, Groves, Gentile et al., 2017).

Young people are spending inordinate amounts of time engaged in playing these violent video games either alone or with others (Przybylski & Weinstein, 2019). Violent video games have become even more popular than music or video. Activision's (2019) end of quarter sales report indicates that 53 million Monthly Active Users (MAUs) played the mature-rated 'Call of Duty®' video game series, and 35 million MAUs paying 'Blizzard®' releases 'Overwatch®' and 'Hearthstone®' and 'World of Warcraft®' worldwide. The vast majority of MAUs, however, do not feel the need to express any latent tendency towards physical & verbal aggression, hostility and anger, (i.e., trait aggression), that might underpin expressed violence outside of the virtual world of gaming. In a longitudinal study, Ybarra, Huesmann, Korchmaros, and Reisner (2014) found that that the population-average odds of 9 – 18-year-olds carrying a knife to school in the last month of the study were found to increase fourfold in 1.4% of those exposed to violent video game for a year after controlling for potential confounders. No matter how small the numbers of knife carriers, those who are carrying a knife are more likely to use them with devastating effect or be a victim of knife crime than those who do not. Some researchers argue that violent video game players who are predisposed or susceptible to trait aggression are not more likely to "try out" their newly acquired violence-related knowledge and skills on an unsuspecting public than anyone else, (e.g., Ferguson, 2009). Other researchers, however, argue that all young impressionable minds are at risk of acquiring and exercising violence-related knowledge and skills in virtual world situations and applying them in real-world situations to devasting effect, (e.g., Anderson et al. 2010). The 'General Aggression Model (GAM)' (Anderson & Bushman, 2002; Bushman, 1998) and the 'General Learning Model' (Buckley & Anderson, 2006) are main theoretical frameworks within which the link between exposure to video game violence and aggression might be explained.

Proponents of these models argue that violent video games reward trait aggression to the point where aggressive thought, aggressive affect, and behaviour occur without the stimulus of the violent video game. The GAM depicts an interaction between an individual's personality and situational factors in his or her lived environment such as violent video games which when encoded as aggressive schemas and scripts may be used to interpret and make sense of new/different experiences in both ambiguous and unambiguous situations. Through the process of operant learning, individual and group aggressive thoughts, feelings, and actions in the virtual worlds of violent video games may be readily generalised to real-world contexts leading to increases in observed aggressive cognitions, affect, and behaviour in the real world (Anderson & Dill, 2000). Identifying with fictitious antiheroic characters or avatars in video games enables the player to become someone else; to take on the attributes of the fictitious person or creature, and to do things that internally accommodated societal sanctions would ordinarily prohibit in the real world (Hull, Brunelle, Prescott & Sargent, 2014).

In addition to increases in observed aggressive behaviour indicative of trait aggression, there also appears to be a concomitant "dampening" of empathy and other prosocial thoughts feelings and behaviours, and an expectation of hostile reactions from others in ambiguoussituations (Bartholow, Sestir & Davis, 2005). Some authors argue that this apparent reduced capacity to register the emotional responses of others is due to the difficulty some people exposed to video game violence over time might have recognising the emotional responses of others and understanding the consequences of their aggressive behaviour in the real world (Carnagey, Anderson & Bushman, 2007;Sebastian, McCrory, Cecil, Lockwood, De Britoet al., 2012). However, Szycik, Mohammadi, Hake, Kneer, Samii, Münte, and Te Wildt (2016), Ballard, Visser and Jocoy (2012) and Read, Emery, Ballard and Bazzin (2016) found no differences in physiological response that might be indicative of desensitisation such as heart rate and skin conductance. The reason 'why' some people do not respond as expected to violent stimuli remains unclear, butemotional dysregulation and the suspension of moral agency could result in reduced attention to distress-inducing stimuli enabling the individual to become as aggressively competitive as necessary to achieve a high score or the next level on the violent video game, and to receive his or reward in released endorphins at least in the short to medium term(Foulks et al., 2014). The process of becoming desensitised to violence may start with traumatic experiences in early childhood culminating with an apparent loss of prosocial emotional responses such as guilt and empathy to what would ordinarily be noxious stimuli in adolescence or early adulthood (Cecil, McCroy, Barker, Guiney & Viding, 2018). Individuals so unrestrained may "model" their subsequent aggressive cognitions, affect (anger and frustration), physiological arousal (increased heart rate, hypertension and sweating), and violent behaviour, (i.e., expressed trait aggression), on observed interactions in violent video games and come to view violence as a solution to all their problems in all contexts (Anderson et al., 2010; Anderson & Bushman, 2002). The amygdala oblongata is central to the regulation of emotion and the formation of connections between conditioned stimuli such as exposure to video game violence and reinforcement contingencies such as the stimulation of the brain's rewards centres and dopamine release for destroying virtual objects and people (Blair, 2013;

Fikkers, Piotrowski, Weeda, Vossen, & Valkenburg, 2013; Foulks, McCrory, Neumann &Viding, 2014). Reduced amygdala responsiveness to aversive stimuli inherent within violent video games seems to coincide with an impaired emotional response to any distress cues virtual or otherwise and the cessation of the aggressive behaviour causing the distress (Frick & White, 2008). Within the context of social learning theory, however, Bandura (1986; 2001) argued that people are not passive automatons whose observed violence-related behaviour is passively governed by the violent video games they have been playing. People are active participants in the com-construction of violence-related knowledge and behaviour, which when mentally represented and activated as violence-related schema and scripts determine how an individual or group is likely to respond in new and different situations. Even when coerced on pain of serious injury or death, however, the individual remains free to choose how to exercise moral agency according to the extent to which the moral standards he or she has acquired from meaningful others throughout his or her life to date (Bandura, Barbaranelli, Caprara & Pastorelli, 1996). Individuals intent on transgressing societal rules, however, appear to morally justify or "disengage" from the moral standards that would ordinarily prevent aggressive behaviour, and pursue of course of action that he or he believes is most advantageous and satisfy his or her reward centres in the brain better (Foulkeset al., 2014; Bandura, 2002).

Arguing from a 'gene-environment' perspective, however, proponents of the 'Catalyst Model' (Elson & Ferguson, 2014), suggest that violent video games cannot "cause" aggressive behaviour in someone who is not already genetically predisposed to behave violently. Factors such as perceived threat within or outside of the context of violent video games, (i.e., in the environment), act as 'catalysts' to violence which activate a genetic predisposition for violence resulting in aggressive and violent behaviour (Ferguson, Rueda, Cruz, Ferguson, Fritz & Smith, 2008). From this perspective, external factors such as exposure to video game violence, peer pressure, and family violence interact with aggressive personality traits, beliefs, and feelings resulting in the observed aggressive behaviour, but these external factors would not have their effect if the individual were not already predisposed to violence (Ferguson, Rueda, Cruz, Ferguson, Fritz & Smith, 2009). Ultimately, those individuals who are best able to exercise personal "choice" are those who are best able to morally disengage or 'justify' and temper their aggressive impulses with morality schema and scripts acquired to date when deciding whether to act on his or her aggressive impulses or not.

The process whereby individuals might exert some control over their latent trait aggression, and aggressive urges appears to be related to the development and maturation of the prefrontal cortices and a sense of moral agency (Stenberg, 2010). Playing violent video games, however, seems to require a suspension of moral agency to achieve the desired goal or reward, (i.e., to win, or achieve the level of game complexity and the release of endorphins from the pleasure centres of the brain) (Sauer, Drummond & Nova, 2015). Moral disengagement seems to involve the modulation of normative beliefs about aggression and violence such that the individual no longer responds with sadness, disgust, or empathy to aversive stimuli inherent in violent video games (Huesmann & Guerra, 1997; Jones, Laurens, Herba, Barker, Viding, 2009). Perhaps in this way, some people become better at "hiding" their murderous intentions than others.Whether individual interaction with violent game content activates trait aggression scripts or schemata when primed or creates new aggression scripts when primed remains unclear, but studies looking at the role of moral disengagement in the modulation of normative beliefs about aggression would suggest that overtime individuals exposed to video game violence may be able to carry out co-constructed set plays of violence without the associated physiological arousal when primed. Most studies looking at the relationship between violent video games and aggression to date have been carried out in children, adolescents, and university students (Anderson et al., 2010). Very few studies have looked at the relationship between violent video games and trait aggression in a sample of young adults aged 18 to 24 yearswho may or may not be in education, training or employment in the UK. Individual interaction with video game characteristics such as video game difficulty and video game pace of action may confound the relationship between exposure to video game violence and trait aggression through the process of physiological arousal (Barlett, Branch, Rodeheffer & Harris, 2009). Some authors have found that biological sex and age differences in reported video game characteristics, moral disengagement, and competitiveness may confound the relationship between exposure to video game violence and trait aggression (Adachi & Willoughby, 2011; 2016; Archer, 2004; Hay, 2007; Ferguson et al. 2008; Teng et al., 2019). While others have found no significant effect of biological age or sex on the relationship between exposure to video game violence, moral disengagement, and trait aggression in children and adolescents overall (Kühn et al., 2018; Przybylski & Weinstein, 2019). Therefore, the aim of this study was:

- To determine whether age, sex, violent video game characteristics of difficulty and pace of action, exposure to video game violence, moral disengagement, and competitiveness are significantly associated with trait aggression in young adults who may or may not be in education, employment or training in the UK; and,
- To determine whether exposure to video game violence predicts trait aggression after controlling for the effects of age, sex, violent video game difficulty, violent video game pace of action, moral disengagement, and competitiveness in a random sample of young adults who may or may not be in education, employment or training in the UK.

MATERIALS AND METHODS

Participants: Seven-seven (77.0%) male and 23 (23.0%) female participants, aged between 18 and 24 years (M = 20.3 years, SD = 2.12), responded to the web-based questionnaire. The data for age was measured at an interval level. Although the categorical data for biological sex was measured on three levels, no participants ticked 'Other' box. The variable 'sex' was treated as both a grouping variable and a continuous variable with two levels. The reason why approximately 3.35 times as many men (77) participated than women (23) did may be due to more men playing violent video games than women. Though largely uniform, a graph displaying the frequency distribution of participants age indicated that 3.4 times more 18-year-olds participated in the study than the number of 20 (9), and 24-year-olds (9) did. The reason why, however, is also unclear.

Materials

- Demographic component: was comprised of age (in years), and sex (male, female or other).
- Outcome component: Brief Aggression Scale, Moral Disengagement Scale, and Competitiveness Scale.

Brief Aggression Scale (Webster, Dewall, Pond, Deckman, Jonason, Le, B.M., ... Bator, R.J., 2014) is a 12-item scale used to measure trait aggression across four dimensions: a) Physical aggression, b) Verbal Aggression, c) Anger and d) Hostility that shows both convergent and discriminant validity with other measures of aggressive behaviour and affect such as Bryant and Smith's (2001) Buss-Perry Aggression Questionnaire-SF and Buss and Perry's (1992) Aggression Questionnaire. Items are scored using a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree, and the total is then averaged, with higher scores indicating higher levels of aggression. Item 7 is reverse-scored by the authors to help reduce social desirability effects. The scale is reliable, Cronbach's (1951) alpha, α = .79 (Webster et al., 2014), α = .71 (Teng, Nie, Guo, Zhang, Liu & Bushman, 2019). In this study, Cronbach's (1951) alpha, α = .80 (N = 88).

ExposuretoVideo Game Violence (EVGV): The latent variable 'exposure to video game violence' was estimated in average exposure to video game violence hours per week based on the composite mean product of ratings for video game violence and frequency of play for all three favourite Mature-rated action/adventure video games listed (Teng et al., 2019). Participants listed their three favourite Mature-rated, '18'-only action/adventure video games, and then rated each game in terms of difficulty using a seven-point Likert scale where 1 (not very difficult to 7 (very difficult), pace of action where 1 (extremely slow to 7 (extremely fast), and violence where (1= not very violence (much fighting and killing, destroying) to 7 = extremely violent (loads of fighting and killing, destroying), and then indicated how frequently they played each game (1 = 1 hour per week to 7 = more than seven hours per week). Violence was defined as "all violence, (e.g., fighting and killing, destroying), that vehicles, machines, humans, animals or monsters do to each other". Fifty-seven different M-rated video games were listed (see Appendix A). The T-rated games listed were retained as their ESRB rating (16) indicated they contained substantial violence that was not much different to those video games receiving an 'M' rating.

Reported video game difficulty, the pace of action, and violence ratings for the same game were summed and averaged to obtain more reliable standardised ratings overall. For instance, all participants who listed 'Grand Theft Auto' as their favourites, for example, their scores difficulty, the pace of action, and violence were summed and averaged and then all participants listing that game was awarded the average score for that game. The rating for violence was then multiplied by the frequency with which each participant reported playing the video game per week to give a composite score in average exposure to video game violence per week for each of the three favourite video games listed. The three composite exposure to video game violence scores were then summed and averaged to give an overall estimate of 'exposure to violent video games' per week rating for each participant with higher scores indicating higher levels of exposure to video game violence. Pearson's product-moment correlations between user-ratings and violent content agency ratings for the same game is good, r = .79 to r = .91 (Busching, Gentile, Krajé, Möller, Khoo, Walsh & Anderson, 2015), and r = .84 (Fikkers, Piotrowski & Valkenburg, 2017). Suggestive reliability using this kind of method to measure the latent variable exposure to video game violence is good, Cronbach's (1951) alpha, α = .72 (Teng et al., 2019). In this study, Cronbach's (1951) alpha, α = .72, (N = 75).

Moral Disengagement Scale (Bandura et al., 1996) is a 32-item scale used to measure moral disengagement across eight dimensions: a) moral justification, (e.g., "It is all right to fight when your group's honour is threatened'), b) Euphemistic language, (e.g., "To hit obnoxious classmates is just giving them "a lesson")", c) advantageous comparison, (e.g., "It is okay to insult a classmate because beating him or her is worse"), d) displacement of responsibility, (e.g., "If kids are not disciplined they should not be blamed for misbehaving"), e) diffusion of responsibility, (e.g., "A kid in a gang should not be blamed for the trouble the gang causes"), f) distorting consequences, (e.g., "Children do not mind being teased because it shows interest in them"), g) attribution of blame, (e.g., "Kids who get mistreated usually do things that deserve it"), and h) dehumanisation, (e.g., "Someone who is obnoxious does not deserve to be treated like a human being"). Each item is measured on a 5-point Likert scale with 1 = strongly disagree to 5 = strongly agree and the items summed to give an overall score for moral disengagement with higher scores indicating high levels of moral disengagement. The scale is reliable, Cronbach's (1951) alpha, α = .92 (Tang et al., 2019), α = .82 (Bandura et al., 1996). In this study, Cronbach's (1951) alpha, α = .88, (N= 79).

Competitiveness Scale: Archer & Webb's (2006) modified version of Tang's (1999) 11-item Competitiveness Scale was used to assess the central tendency of competitiveness or trait competitiveness. Participants are asked to indicate to what extent they agree or disagree with statements like "It is important for me to do better than others", and "To succeed, one must compete against others" using a 5-point Likert scale ranging from 1) strongly disagree to 5) strongly agree. Item 10 is reverse scored. The items were summed to give an overall score of competitiveness with higher scores indicating high levels of competitiveness. The scale is reliable, Cronbach's (1951) alpha, α = .74 (Archer & Webb, 2006). In this study, Cronbach's (1951) alpha, α = .74, (N = 79).

Procedure: A questionnaire comprised of an Information Sheet, GDPR guidelines for participants, consent form, demographic component, an outcome component and debrief component was then constructed using 'Qualtrics'. Ethics approval was then sought and granted a University Ethics Committee before publishing the questionnaire on the World Wide Web (WWW) (See Appendix F). An advertisement was produced and published on 'Facebook' for one calendar month. Facebook algorithms determined how often, and how random, impressions of the advertisement would be shown to 18-24-year-olds living in the UK within six weeks. As an incentive, all participants were offered the opportunity to be entered into a prize draw where they could win one of five 'Google Play' gift cards worth £20 each. Following data screening and cleaning; removing all cases where participants had consented to participate but then decided not to complete the questionnaire (N = 72), associated IP addresses were

checked to ensure all participants were UK residents. The favourite video games the remaining 100 participants listed were reviewed using the 'Video Standards Council Rating Board (VSC)' and 'Pan European Game Information (PEGI)' (2019) rating systems to determine whether they fitted the inclusion criteria of '18'-rated, M (Mature)-rated, adult only action/adventure games. 'T'–rated video games were also included if they contained violence. 'VSC' is a statutory organisation responsible for rating video games and apps and ensuring that the 'PEGI' system is legally enforced in the UK. Video games are rated '18' where 'the level of violence reaches a stage where it becomes a depiction of gross violence, apparently motiveless killing, or violence towards defenceless characters, and the use of illegal drugs and explicit sexual activity appears glamorised' (PEGI, 2019). The 'Entertainment Software Rating Board (ESRB)' is a non-profit, self-regulatory organisation based in the USA that assigns a rating for video games and applications (apps), but it also enforces industry-adopted advertising guidelines as to the age-appropriateness of entertainment software. The rating system is similar in many ways to the PEGI system, but the M (Mature)-rated video games content descriptors usually contained words such as 'blood, gore, and intense violence' (see Appendix A).

Violence appears to be present in some form in all the video games reported, but it may be the subjective value apportioned to the violence and the context within which the violence occurs that is important in determining whether exposure to video game violence predicts subsequent aggressive cognition, affect, and physiological arousal (Sauer, Drummond & Nova, 2015). Therefore, an estimate of the participants' subjective evaluation of video game was calculated based on the ratings given for video game violence and frequency of play given for each game listed. All games listed were M-rated or T-rated, these games were deemed "matched" for violent content. Exposure to video game violence was based on the average cross product of reported video game violence ratings and reported frequency of violent video game play across all three favourite games listed.

Video game characteristics such as video game difficulty and pace of action can influence physical and verbal aggression, anger, and hostility, (i.e., trait aggression), through the mechanism of physiological arousal. An estimate of participants subjective evaluation of video game difficulty and pace of action was calculated based on the mean value for video game difficulty, and the pace of action given for each game listed. Pearson product-moment correlation analyses determined the bivariate associations between the demographic measures, (i.e., participant biological sex and age), and outcome measures, (i.e., video game characteristics of reported video game difficulty and pace of action, and individual differences in reported moral disengagement and competitiveness). Multiple regression analysis determined whether (log. of) exposure to video game violence predicted (log. of) trait aggression after controlling for the effects of biological sex, age, violent video game difficulty and pace of action, moral disengagement, and competitiveness.

Sample Size: For an a priori analysis using seven predictors, G* Power 3.1.2 suggests a total sample size of 153 respondents would be sufficient to stand a 95% chance of detecting a small effect size (.15) on the primary outcome measure – trait aggression in multiple regression analysis.

RESULTS

Using SPSS v23, the frequency distributions of the data were checked for normalcy, linearity, homogeneity of variance and covariance, and interval and independence of values. An exploration of the data revealed no outside of the range values and values were at least at the interval level and independent of each other. Most missing variables occurred towards the end of the questionnaire possibly due to questionnaire fatigue. The frequency distribution for biological sex (skewness = 1.30, SE = .24, *z*-score = 5.42, $p < .01$), age (skewness = .38, SE = .24, *z*-score = 1.58, $p > .05$), exposure to video game violence (skewness = .44, SE = .24, *z*-score = 1.83, $p > .05$), trait aggression (skewness = .70, SE = .25, *z*-score = 2.80, $p < .01$), moral disengagement (skewness = .35, SE = .26, *z*-score = 1.35, $p > .05$) were positively skewed. Average violent video game difficulty (skewness = -.10, SE = .24, *z*-score = -.42, $p > .05$), average violent video game pace of action (skewness = -.06, SE = .24, *z*-score = -.25, $p > .05$), and competitiveness, (skewness = -.14, SE = .27, *z*-score = -.52, $p > .05$), however, were negatively skewed.

The negative kurtosis for sex was due to more male respondents completing the questionnaire than female respondents did. The *z*-score of kurtosis for age (kurtosis = -1.29, SE = 0.48) was -2.69, $p < .01$, but this value was below the upper threshold of 3.29 indicating that extreme outliers did not have a significant undue effect on the mean for age. Transforming the date for biological sex and age made no significant difference as kurtosis observed was due to more men participating rather due to extreme values of biological sex and age. However, transforming the data for trait aggression and exposure to video game violence using Log10 significantly improved their skewness and kurtosis. Therefore, the (log. of) of exposure to video game violence and (log. of) trait aggression was used for all parametric tests. Kolmogorov-Smirnov tests for normality after transforming indicated that, violent video game difficulty D (100) = 0.07, $p = .20$, violent video game pace of action, D (100) = 0.08, $p = .13$, Exposure to video game violence, D (100) = 0.06, $p = .20$, and moral disengagement, D (89) = 0.08, $p = .20$, and competitiveness, D (81) = 0.09, $p = .20$, and (Log of) trait Aggression, D (91) = 0.06, $p = .20$, did not deviate significantly from normalcy, and were therefore used for all parametric analyses. Pearson product-moment correlation analysis was conducted to determine whether age, sex, violent video game difficulty, violent video game pace of action, moral disengagement, exposure to video game violence, and competitiveness were significantly correlated with reported trait aggression. A small significant positive correlation between exposure to video game violence and trait aggression, $r = .21$, n = 87, $p = .03$ (one-tailed). However, a small significant positive correlation were also observed between violent video game pace of action and trait aggression, $r = .23$, n = 91, $p = .02$ (one-tailed), and a moderately significant positive correlation between moral disengagement and trait aggression, $r = .41$, n = 89, $p = .0005$ (one-tailed). The small significant correlation between male sex and moral disengagement, $r = -.20$, n = 89, $p = .03$ (one-tailed), and between violent video game difficulty and competitiveness, $r = .23$, n = 81, $p = .02$(one-tailed), were not expected.

Table 1. Bivariate Correlations between sex, age, violent video game difficulty and pace of action, exposure to video game violence, moral disengagement, competitiveness, and trait aggression in the sample of young adults in the UK

	Sex	Age	Average video game difficulty	Average pace of action	Exposure to video game violence	Moral Disengagement	Competitiveness	Trait aggression
Sex	1	.21*	-.13	.08	.08	-.20*	-.18	-.04
Age		1	.12	-.08	.08	-.13	.02	-.02
Average video game difficulty			1	.09	-.14	-.02	.23*	-.03
Average pace of action				1	.14	.12	.05	.23*
Exposure to video game violence					1	-.09	-.08	.21*
Moral Disengagement						1	.14	.41**
Competitiveness							1	.16
Trait aggression						.		1
Means	0.23	20.31	3.87	4.91	1.31	60.10	36.02	2.43
SD	0.42	2.12	1.03	0.99	0.21	16.55	6.73	0.70

Notes: **p < .01, * p < .05 (1-tailed)

Table 2. Multiple Regression Model predicts the reported trait aggression overall

		B	Std. Error	Beta	Confidence Interval for B	
					Lower Bound	Upper Bound
	(Constant)	-0.01	0.16		- 0.33	0.31
	Sex	-0.01	0.03	.02	-0.06	0.07
	Age	0.00	0.01	.05	-0.01	0.02
	Average video game difficulty	-0.01	0.01	-.08	-0.03	0.02
	Average pace of action	0.00	0.00	.18	0.00	0.05
	Moral Disengagement	0.00	0.00	.38**	0.00	0.01
	Competitiveness	0.00	0.00	.12	0.00	0.01
Model 2	(Constant)	-0.16	0.17		-0.53	0.18
	Sex	-0.01	0.03	-.02	-0.06	0.07
	Age	0.00	0.01	.03	-0.01	0.01
	Average video game difficulty	-0.01	0.01	-.05	-0.03	0.02
	Average pace of action	0.02	0.01	.15	-0.01	0.04
	Moral Disengagement	0.00	0.00	.41**	0 .00	0.00
	Competitiveness	0.00	0.00	.12	-0.00	0.01
	Exposure to video game violence	0.13	0.06	.22*	0.01	0.25

As exposure to video game violence, violent video game pace of action, and moral disengagement increased or decreased, so did the reported trait aggression. Table 1 below shows the univariate correlations between the outcome measures.

DISCUSSION

This study examined the relationship between biological sex, age, violent video games characteristics such as difficulty and pace of action, exposure to video game violent, moral disengagement, competitiveness, and trait aggression) in young adults who may or may not be in education, employment or training in the UK. Other researchers have found these factors to relate and contribute significantly to the variance in reported trait aggression in children, adolescents, and university students (see Anderson et al., 2010; 2017) for review), but very few studies have examined the relationship between these factors in sample of young adults who may or may not be in education, employment or training in the UK. To collect data, an advertisement linking potential participants to a web-based questionnaire was published on a social media website inviting self-selecting potential young adults to participate in the study. One hundred and seventy-twopeople engaged with the questionnaire, but only 100 cases had useable data.

The disproportionate number of 18-year-olds participating in the study relative to all the other ages, however, was not expected. The frequency distribution for all other ages was practically uniform, implying that perhaps some of those claiming to 18 years old may not have been 18 years old at all. Consistent with other studies (Archer, 2004; Hay, 2007; Shoa & Wang, 2019; Teng et al., 2019), more male participants responded to the study than female participants did. However, neither male sex or age was significantly associated with average violent video game difficulty, average violent video game pace of action, exposure to video game violence, competitiveness, and trait aggression in this study (Adachi & Willoughby, 2011; Anderson, 2004).

To all intents and purposes, the sample group of young adults were "matched" with respect to their ratings of video game characteristics such as perceived video game difficulty, the pace of action, and violence. Any observed effect exposure to video game violence on trait aggression was, therefore, not due to significant biological sex or age differences in reported in video game difficulty, the pace of action, violence, or frequency of play. In asking participants to rate their three favourite M-rated or '18'-only video game before proceeding complete the rest of the questionnaire, however, may have primed participants ready for the ensuing moral disengagement, and competitiveness components of the questionnaire. As such, participants might be expected to report video game characteristics in relation to aggressive thoughts and feelings, and arousal activated when recalling the playing of their favourite violent video games (Anderson et al., 2010). Considering participants had not been asked to physically "play" their favourite violent video games before completing the questionnaire, it would appear that the mere thought of violent content is sufficient to elicit trait aggression in a sample of young adults in the UK. The significant association between exposure to video game violence and trait aggression, no matter how short-lived, should be a cause for public concern if we consider how popular violent video games are into the broader society and how much time on their hands young adults not in education, employment or training might have (Anderson et al., 2010; Hollingdale & Greitemeyer, 2014; Prescott et al., 2017). Adachi & Willoughby (2011) suggested video games characteristics such as violent video game difficulty, the pace of action, and competitiveness might better explain the variance in trait aggression than exposure to video game violence did because these factors induce a state of physiological arousal in heart rate and blood pressure associated with aggression. However, the finding that trait competitiveness was significantly associated with violent video game difficulty rather than trait aggression, and that neither variable was associated with nor elevated trait aggression in the short-term irrespective of the level of video game violent content, contradicts Adachi and Willoughby (2011; 2016) previous research. The significant association between average violent video game pace of action and trait aggression suggests that the rate of killing and wanton destruction demanded in M-rated violent video games may be a more important factor in the subsequent aggression than average video game difficulty, moral disengagement, or trait competitiveness.

In this study, exposure to video game violence, average violent video game pace of action, and moral disengagement varied directly with trait aggression thus corroborating the findings of other studies, (e.g., Greitemeyer & Mügge, 2014; Teng et al., 2019). However, inconsistent with other studies, exposure to video game violence, average violent video game pace of action, and moral disengagement did not correlate significantly with each other in this study. The relationship between exposure to video game violence and trait aggression, therefore, may not exert its effect through their association with moral disengagement contrary to other studies. In setting aside societal sanctions, young adults seem better able to express any latent trait aggression within the context of violent video games when primed if violent video games are easy and fast-paced.

Despite spending on average 20.92 (SD= 9.95) violent video game hours per week, multiple regression analysis revealed thatexposure to video game violence could only account for 4.5% of reported trait aggression when primed (Anderson, Suzuki, Swing, Groves, Gentile et al., 2017; Prescott et al., 2017; Shoa & Wang, 2019; Teng et al., 2019). Some authors argue that the fact that exposure to video games containing 'blood, gore, and intense violence' has a significant effect on trait aggression; no matter how small, should be sufficient to cause public concern (Anderson et al., 2010; Prescott et al., 2017). However, other authors argue that the effect is either none existent; or so small, short-lived, and difficult to reproduce in different samples not to pose a problem in any given society (Elson & Ferguson, 2014; Kühn et al., 2018; Przybylski & Weinstein, 2019). This study shows that the relationship between exposure to video game violence and trait aggression observed in children, adolescents and university students when primed persists into early adulthood in young adults who may or may not be in education, employment or training where the potential for realising learnt aggressive scripts in those susceptible to violence poses far higher potential risk to society at large. In the absence of a moral injunction and under pressure, who is to say at what someone susceptible to trait aggression might do when primed with merely the thought of playing his or her favourite violent video games?

Limitations and further research: Despite 'Facebook' randomly delivering over 48,000 impressions to the Facebook pages of potential participants throughout the UK over six weeks using search terms such as 'gamers' and 'first-person shooter', only 172 people consented to take part. A Google Play Gift Card was offered as an incentive was offered to encourage participation, but it was very difficult to purchase more than one gift card from retailers at the same time. Rather than incentivise all participants, only entrance into a prize draw could be offered which meat there were far fewer benefactors than initially anticipated. In future studies, a different method of rewarding participation should be found. Having consented to take part, however, 72 people chose not to complete the questionnaire after having read the information sheet and the data protection statement. It was not clear 'why' these participants decided not to continue after consenting to participate. Perhaps confronted with the prospect of completing the questionnaire, potential participants decided that playing video games was simply much more fun. One of the components of the questionnaire did have 32 items, and perhaps this component needs to be shorter.

The study did not set out show causality between exposure to violent video games and trait aggression, but to examine the strength of the relationship between violent video game and trait aggression in young adults at a time when regulatory control of aggressive impulses via the prefrontal cortex is presumed to be reaching maturity (Steinberg, 2010). This study relied on the respondent giving his or her realistic age, but it was unclear whether a disproportional number of 18-year-olds engaged with the study than all other age groups occurred by chance skewed the results slightly. Trait competitiveness was not found to correlate significantly with or predict trait aggression; hence, the relationship between violent video game difficulty and competitiveness as a possible mediator of violent video game pace action should be explored further.

Preliminary explorative investigations suggest that moral disengagement was significantly associated with physical and verbal aggression of trait aggression, but only verbal aggression and anger components of the Brief Aggression Scale were significantly associated with exposure to video game violence. Whether exposure to video game violence activates, creates, or both activates and creates aggressive scripts or schemata when primed during, remains unclear. Determining which aspects of moral disengagement predict the relationship between video game characteristics, exposure to video game violence, and anger and verbal aggression might help elucidate this conundrum.

Conclusion

Rationalising aggressive thought, feeling, and behaviour quickly might be a prerequisite to 'achieve the next level' or 'beat your opponent' when gaming in the virtual world, and there is no reason to suggest that the violence-related knowledge and skills acquired there might not be readily transferrable to the real world and real-life situations. However, it is unclear whether the intention to win or to achieve a higher level in the virtual world of gaming "should" be equated with the intention to do harm in the real world. Perhaps exposure to violent video games provides escape for some people whose lives in the real world are particularly stressful. For others, video gaming might act as a displacement activity: somewhere to put all his or her hurt feelings without causing any serious harm to anyone in real life. Whatever the reasons for young adults continued indulgence in gore, blood, and intense violence in the virtual world, society should not lose sight of the possibility that exposure to video game violence in the virtual world could be "practice" for thoseintent on doing violence and terror in the real world.

Ethical statement: The author obtained ethical approval from Goldsmith College Londonethics Board for the conduct of this study.

Informed consent: The author obtained informed consent for the use of information to produce and publish this paper only.

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