Investigating causal factors of aggression: Frustration, personality, and the vicarious learning of video game violence

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ABSTRACT

In April 1999, the Columbine High School shootings stimulated research into the effects of video game violence on behaviour. Subsequently, violent video games have been associated to increases in aggression, emphasising the role of observational learning. An important factor often acknowledged in research is frustration, however it is generally controlled for as a confound, or tested without adhering to the theoretical guidelines stipulated by the frustration-aggression hypothesis. Following these guidelines, a 2x2 experimental design is used to assess the contributions of frustration (high and low game difficulty), and violent content levels (violent; Counter Strike / non-violent content; FIFA10) to automatic aggressive self-concept and explicit self-reported aggressive state, as measured by an implicit attitudes test and the state hostility scale, respectively. Given the considerable support for the influence of aggressive personality traits in aggressive behaviour, personality was assessed as a covariate, using the Buss and Perry Scale. It was hypothesised participants in the high frustration arousal conditions would be associated with increased aggressive states and self concepts, regardless of the video game content group they were assigned, and that a correlation would be present between aggressive personality level and aggressive automatic self concepts and states results. The results provide significant support for the hypotheses that frustration influences aggressive states and automatic self concepts, video game content had no significant influence on the results. The results also support the contribution of aggressive personality to aggression. The author discusses the limitations of the research and considers applications of the findings, such as investing in social programmes to identify and assist troubled adolescents.

KEY WORDS:	VIDEO GAME VIOLENCE	AGGRESSION	SOCIAL LEARNING	GENERAL AGGRESSION MODEL	FRUSTRATION-AGGRESSION HYPOTHESIS

Investigating Causal Factors of Aggression: Frustration, Personality, and the Vicarious Learning of Video Game Violence

On 20th April 1999, two students walked through the halls and classrooms of their school. Armed with weapons, Eric Harris and Dylan Klebold fired upon their teachers and peers, killing 13 and wounding 23, after which the two adolescent boys took their own lives. This brutal expression of aggression attracted the attention of psychologists, in an attempt to provide theoretical insight into why two young teenagers would commit such an unexplainable act of hostility. A prominent suggestion is that the Columbine High School killers were influenced by violent video games (Anderson, 2004; Anderson & Dill, 2000; Bartholow & Anderson, 2002; Bushman & Anderson, 2002; Kirsch, 2003), as both were reportedly obsessed with the violent video game "Doom", and engaged in a comparable act of violence.

It appears in fact that many of the papers considered in this study tend to apportion significant responsibility to the influence of violent video games on aggressive behaviour (as shall be discussed), and as previously stated there has been conjecture that violent video games influenced the Columbine shooters. However, few authors note that Dylan Klebold and Eric Harris were considered to be "loners", "outsiders", somehow "undesirable" (Aronson, 2000), and were subsequently bullied and teased by their peers (Kimmel & Mahler, 2003). Furthermore, the suggestion that video game violence influenced their behaviour on that ill-fated afternoon does not explain why the killers turned the guns on themselves, a behaviour which is not represented in the video game Doom.

At the time of "The Columbine High School Massacre", as to which it is now referred, video games had received a relatively small amount of attention in psychological research, given that video games consoles were a contemporary media (Anderson, 2004). However, comparable empirical evidence existed suggesting that television violence could influence aggressive behaviour cognitions and states, primarily through social learning processes, (Bandura, Ross, & Ross, 1963a; Bandura, Ross, & Ross, 1963b; Josephson, 1987; Liebert & Baron, 1972), providing the basis for a strong argument that violent video games could influence aggressive behaviour in a similar way given the similarity of the screen based media formats (Funk, Baldacci, Pasold, & Baumgardner, 2004).

Subsequently, in recent years, the growing popularity of video games, and increasingly realistic portrayals of violence in video games (Weber, Ritterfield, & Mathiak, 2006), have resulted in further research into the field, with findings typically associating violent video game use with increases in; aggressive behaviour (Anderson & Dill, 2000; Bartholow & Anderson, 2002), aggressive cognitions (Anderson, 2004; Anderson, Berkowitz, Donnerstein, Huesmann, Johnson, Linz, et al., 2003; Anderson & Bushman, 2001), self concepts (Uhlmann & Swanson, 2004), as well as reductions in pro-social behaviour (Anderson & Bushman, 2001). Conversely, research has also found that games with a pro-social theme encourage and increase pro-social behaviour (Greitemeyer & Osswald, 2010).

The most widely approved theoretical perspective put forward to explain the aforementioned increases in aggression proposes that frequent exposure to violent

video games results in the formation of aggressive scripts and schemata, subsequently priming aggressive cognitions, states and behaviours (Anderson & Dill, 2000; Bartholow & Anderson, 2002; Berkowitz, 1990; Dill & Dill 1998) as per social learning processes, primarily observational learning (Bandura, Ross, & Ross, 1963*a*). Furthermore, research suggests that frequency of exposure to violent video game content increases automatic accessibility to aggressive scripts (Ulhmann & Swanson, 2004).

Social learning theory, as established and developed predominantly by the works of Albert Bandura, states that aggressive behaviour may be learned vicariously and through direct experience (the latter of which does not require further elaboration for the purposes of this study). Vicarious learning is the cognitive process in which the individual observes the behaviour and actions of a "model" and deduces the positive or negative reinforcements associated to the aforesaid behaviour (Bandura, Ross, & Ross, 1963*b***;** Bandura, 1989; Bordens & Horowitz, 2001), providing the individual with a social schema, or adding to an existing schema (Bushman & Huesmann, 2006; Huesmann, Moise-Titus, Podolski, & Eron, 2003).

Although the current research does not disagree with the processes defined within social learning theory, the author does think that the influence of observational learning of violent video games on aggressive behaviour, states and cognitions has been overstated. When considering social observations, which have been provided statistically, as documented in relevant literature, against the central theoretical perspective provided, this overstatement becomes increasingly apparent.

To illustrate this point, consider that ninety per cent of 2-17 year old Americans play video games, for seven hours a week on average (Gentile & Walsh, 2002). Of these video games, approximately eighty-nine per cent contain violent content (Gentile, Lynch, Linder, & Walsh, 2004) and forty-eight percent portray extreme violent actions against other characters (Dietz, 1998). At age 12, the average American child will have observed 100,000 representations of aggressive behaviour on television alone (Signorielli, Gerbner, & Morgan, 1995). Also it should be noted that video games are becoming more popular with middle aged adults as revealed by the "Nielsen Active Gamer study" (Greitemeyer & Osswald, 2010). Given this information it seems plausible that the majority of individuals will have frequently observed similar acts of aggression and subsequently primed similar aggressive scripts and schemata via the abovementioned processes. Therefore, if social learning processes significantly contribute to aggressive states, cognitions and behaviours, acts of aggression comparable to those witnessed during the Columbine High School Massacre would be expected to be more frequent. It is fortunate that this is not the case and that acts of such malice are relatively rare, and furthermore, suggests that video game content may provide the schemata necessary to carry out such a behaviour, but may not influence the actualisation of an aggressive behaviour in the majority of cases, suggesting that other factors contribute more significantly to aggression.

Indeed, research has considered many other causal factors of aggression, such as: physiological arousal, as per Zilliman's excitation-transfer model (1983), provocation (Kirsch, 1998), competitive aspects of game play (Anderson & Carnagey, 2009) personality traits (Anderson & Dill, 2000; Uhlmann & Swanson, 2004) and frustration (Carnagey & Anderson, 2005). The General Aggression Model (Bushman &

Anderson, 2002), considers all of the aforementioned causal factors of aggression by integrating past research, theory and models, with particular hierarchal importance attributed to social learning theory (Anderson & Dill, 2000; Ferguson, 2007). Although the GAM currently provides the most prominent guidelines for researching causal factors of aggression, the fact that other important aspects described within the model are considered subsidiary to social learning processes is a potential oversight and one that requires investigation given the aforementioned rationale.

One factor of particular importance is that of frustration, which is often referred to within relevant literature and deemed necessary if an aggressive behaviour is to be performed (Anderson & Dill, 2000). However, despite the implied importance of frustration, it is generally mentioned in passing (Weber, Ritterfield, & Mathiak, 2006), viewed as a confounding variable which should be controlled for (Anderson, 2004), and is controlled for in experimental conditions to minimise the effects it has on the results (Anderson & Dill, 2000). Additionally, experiments repeatedly test competitive violent video games against less competitive non-violent video games, increasing aggressive responses as a result of the competitive nature of the games, increasing frustration and physiological arousal (Anderson & Carnagey, 2009) and thus frustration may indeed confound the results of such investigations. Furthermore, when frustration is considered as a variable, researchers fail to apply the most significantly relevant theoretical guidelines as detailed within the Frustration-Aggression Hypothesis (Carnagey & Anderson, 2005).

The frustration-aggression hypothesis was proposed by the Yale Group in 1939 (Dollard, Doob, Miller, Mowrer, & Sears, as cited in Berkowitz, 1989) and it stipulates that aggression will only occur when frustration is present, and that when frustration is present some form of aggression must occur (Berkowitz, 1989; Miller, 1941). A central tenet of FAH states that if the primary drive of an individual is blocked, frustration arousal will occur (Berkowitz & Harmon-Jones, 2004). However, it is essential to note that frustration will only occur if the individual is implicitly or explicitly trying to obtain the goal which is being blocked. Furthermore, that the level of frustration which will occur is dependent on the expectations of achieving the primary drive. The higher the expectation of obtaining a goal or the more proximal the goal is, the greater the level of frustration will be if the goal is blocked (Berkowitz, 1989), as demonstrated by prior research (Harris, 1974).

Soon after the formulation of the frustration-aggression, researchers were critical of the theories inability to explain how aggressive responses are required, as frustration only creates affective arousal (Berkowitz, 1989; Sears, 1941, as cited in Grusec, 1992). The point was extremely valid and subsequent research resulted in the early theoretical framework which would later become Bandura's widely accepted social learning theory. However, the same criticism of the FAH should in turn be applied to the use of the theory in the GAM. Social learning theory explains the acquisition of aggressive schemas and social scripts, however given that the majority of individuals do not generally engage in extremely violent acts of hostility, despite having similarly primed schemas as previously highlighted by statistical information, it does not appear to explain the reason for the behaviour being carried out.

Hanratty, O'Neal, and Sulzer (1972) conducted a study which exemplifies this rationale. Participants were placed in three groups, half of which were exposed to

an aggressive model. Two of the groups received a frustration arousal cue and given the chance to either aggress against their frustrator in one group, to aggress against another person in the other. The third group were not frustrated. The results show that aggression was only acted out when a frustration arousal cue was present, regardless of whether or not the participants had been exposed to an aggressive model and emphasises the importance of frustration arousal as a causal factor of aggressive behaviour, as well as highlighting that social learning will not instigate an aggressive act without some form of arousal.

Aggressive personalities are also frequently explored and reported as a contributing factor to aggressive behaviours (Anderson & Dill, 2000), states and self concepts (Uhlmann & Swanson, 2004), as influenced by violent video game content. Given the significant results yielded in prior research, which associate aggressive personalities with an increase in aggressive responses, aggressive personalities will be investigated as a covariate, as without doing so, it may be an unmeasured variable which confounds the results (Field, 2005).

Although some authors consider a scientific debate of this nature to be over (Anderson et al., 2003; Anderson, Gentile, & Buckley, 2009), in some cases stating that it should have been over thirty-five years ago, before the popular emergence of the video games console (Anderson, 2004; Bushman & Anderson, 2001), this author believes, given the information presented thus far, that it seems justified to re-examine the influence of observationally learning aggressive behaviour from violent video games. In particular it is important to investigate the significance of vicarious learning as an interactive causal factor, using influences stated within the GAM and applying their respective and appropriate theoretical guidelines, a need which has been observed in prior research (Kirsch, 2003).

The author considers this research to be necessary in order to provide a valid answer to questions raised by societal concerns, such as those surrounding the tragic events which transpired at Columbine High School, as discussed earlier in this paper. By considering multiple causal factors and including a frustration condition the paper aims to provide improved ecological validity, as causal factors interact in an ecological setting. Furthermore, findings supporting the hypotheses of this study will be beneficial to the understanding of behavioural processes and license an investigative reallocation of emphasis attributed to respective causal factors.

The current study investigates three contributing factors to aggressive states and cognitions: vicariously learning violent video game content, frustration arousal and aggressive personality. Frustration arousal was controlled for by following the guidelines of the frustration-aggression hypothesis.

Participant's automatic aggressive self concepts were measured using an implicit attitudes test (IAT) as formulated by (Greenwald, McGhee, & Schwartz, 1998). A version adapted to measure automatic aggressive self concepts by Uhlmann and Swanson (2004), was partially replicated in this study. It was hypothesised that higher levels of automatic aggressive self concept would be associated with participants assigned to the high frustration level conditions, regardless of video game content and observational learning influences. Details of the implicit attitudes test are provided in the method section, as it is necessary to understand the

complicated procedure of the test to understand how the test measures implicit attitudes, in this case, an automatic self concept. A full review is provided within Greenwald, McGhee, and Schwartz's (1998) paper.

Secondly it was postulated that participants in the high frustration level conditions would provide higher explicit self-reported results on the state hostility scale (Anderson, Deuser, & DeNeve, 1995), regardless of video game content. The SHS provides an explicit measure of participant's aggressive state.

Thirdly, and in keeping with prior research, a correlation was expected to be present between high scores of automatic aggressive self concept / aggressive state, and high aggressive personalities, as measured by the Buss and Perry Questionnaire (1992), a scale measuring aggressive personality.

Method

Design

A 2x2 experimental design was utilized, the independent variables were video game content (violent: Counter Strike Source / non-violent: FIFA10), and frustration level (high frustration level / low frustration level). Three of the four cells consisted of 11 participants, while one consisted of 10 participants. The frustration level was manipulated by altering the difficulty of the video games. Thusly, high frustration levels was a consequence of the primary drive (to win a cash prize based on gaming performance) being perceived to be blocked due to the difficulty of achieving the respective objective of the violent and non-violent video games. Personality was assessed as a covariate.

Participants

43 participants (male = 38 / female = 5), between the ages of 18 and 26 (M = 22.07, SD = 2.1), were opportunistically sampled from the Southampton Solent University area (Appendix A). Participants were restricted from taking part in the study if they had no prior experience of the video games being used. In cases where participants had experience of only one of the two video games, participants were assigned to that condition, otherwise participants were randomly assigned.

Materials / Apparatus

Materials used to carry out this study included a participant recruitment poster (Appendix B), which highlighted the investigative nature associated with participation, the duration of the experiment, competition prize information, researcher contact details and the video games being used for the study and associated participant restrictions.

An information sheet (Appendix C), was used to describe details pertinent to the nature of the experiment, the duration and basic procedural description of the study, as well assuring participants that all data provided will be treated confidentially. Participants were also required to provide signed consent on the information sheet and contact information to be used to inform them of the results of the competition. The details provided on the nature of the study were misleading as it was necessary to guise the true purpose of the study to minimise demand characteristics.

Each participant received a participation pack front sheet (Appendix D) detailing the age and gender of the participants, as well as a unique participant reference number and score (as achieved whilst playing the video game). It was essential to record the score to reinforce the deceptive approach used in this study, as participants believe the prize to be awarded based on performance.

An implicit attitude test (IAT), was also provided to measure the automatic aggressive self concept of participants (Appendix E). The IAT consisted of seven separate testing blocks, each of which require participants to categorise randomised words from four categories: two contrasted target categories ("self" and "other"), and two contrasted attribute categories ("peaceful" and "aggressive"). The participants sorted the words by placing a mark in the appropriate box alongside the word (the words to be sorted appear in a list in the centre of the page and were accompanied by a box either side, headed by the categories in which the words are to be sorted). Participants were instructed to go as quickly as possible, whilst making as few mistakes as possible. A stopwatch was used to time the participants. The IAT results are derived from the latency between the two critical blocks.

The theoretical assumption of the IAT is that it is easier to sort words from different semantic fields in to the same group if the different categories are well associated. Conversely, it should be more difficult to group words from different categories if they not easily associable (Greenwald et al., 1998). Previous research has provided support for the reliability and predictive validity of the IAT (Fazio & Olson, 2003; Uhlmann & Swanson, 2004). Participants were provided with an IAT instructions sheet also to clarify the procedure (Appendix F). The IAT and accompanying instruction sheet were labelled as an "attention test" to guise the true nature of the experiment and minimise demand characteristics, which may confound the results.

Of the seven IAT blocks, only the fourth and seventh are critically analysed and the others are considered practise blocks. The first block of the IAT requires the participant to sort words selected from the contrasted target categories, with "self" words sorted into the left column and "other" words sorted into the right. In the second block, participants were to sort words from the contrasted attribute categories. "Peaceful" words were sorted into the left column and "aggressive" words into the right. In the third block, participants were asked to sort all four categories of words into two columns, words associated to "self" and "peaceful" were sorted into the left column and words associated to "other" and "aggressive" were sorted into the right. The fourth block was the same design as the third block, however data from this block was analysed. The fifth block is a repeat of the second block, however participants were now asked to sort "aggressive" words into the left column, and "peaceful" words into the right column. The sixth block and seventh blocks were comparable to the third and fourth blocks. Both required the participant to sort all four categories of words into two columns, however on this occasion, words associated to "self" and "aggressive" were sorted into the left column, and words associated with "other" and "peaceful" were sorted into the right. The first, second and fifth block consisted of 38 trials, whereas the third, fourth, sixth and seventh blocks consisted of 48 trials. A schematic diagram is provided in order to highlight the words selected for each category and clarify which response should be sorted into which category (Appendix G).

Participants information was not be analysed if they provided too many incorrect responses, an acceptable level of accuracy has been noted to be seventy percent in previous studies (Uhlmann & Swanson, 2004).

The SHS (SHS) is a 35 item likert scale style questionnaire was employed in order to explicitly assess the current aggressive or peaceful state of the participant (Appendix H). Participants rated statements such as, “I feel furious” or “I feel good-natured” between 1 (strongly disagree) and 5 (strongly agree). A second copy of the SHS (Appendix I) is provided to highlight items which need to be reverse scored, as well as subscales which have been assessed, as established by Anderson and Carnagey (2009).

The item “I feel frustrated”, from the SHS, was used to assess whether or not the frustration control had been successful. Participants in the low frustration condition, who rated this item above ‘3’, were not used during analysis. Similarly, participants in the high frustration condition who rated the item below ‘3’, were also not excluded from analyses.

Participants also completed the Bus and Perry Questionnaire, which is a 29 item likert scale providing a self-report measure of trait aggression (Appendix J), as required to test the third hypothesis. Statements such as, “If a person hits me, I hit back”, were rated by participants between 1 (strongly disagree) and 7 (strongly agree). Items 7 and 18 should be reversed scored during analyses (Appendix K).

The non-violent video game used for this study was FIFA 10, which is a popular football game. The aim of the game is to score as many goals as possible, whilst conceding as few as possible. Each game lasts a duration of approximately fifteen minutes, and the difficulty is manipulated prior to the commencement of each session (difficulties include beginner, amateur, semi-professional, professional and world class). For the high frustration condition the game difficulty is set to world class, and the participant must select a team which is rated a full star below the opposition (teams ratings range between half a star and five stars). For the low frustration condition the game difficulty is set to beginner and the participant must use a team which is one full star more than the opposing team.

A potential flaw with using a football video game in the non-violent condition is that football is a contact sport and subsequently there are aspects of violence expressed within the game. The researcher justifies the inclusion of FIFA 10, as the content is significantly less violent than the violent video game. Furthermore, participants were informed that acts of in game violence would be punishable; a technique which has showed marked reductions for in-game violent behaviour in violent video games (Carnagey & Anderson, 2005).

In order to run FIFA 10, an appropriate, working games console and television / monitor are required. A Playstation 3 was used in this study due to ease of access to the researcher.

Counter Strike Source (CSS), a popular first person shooting game, was used in the violent video game condition. The aim of the game differs dependent on which team

the player is assigned (terrorist / counter-terrorist). The terrorist's objective is to patrol a map and either eliminate the opposition, to detonate a bomb, or to prevent the counter-terrorist's from rescuing hostages (dependent on the map). The counter-terrorists aim is to either eliminate the opposing team, to rescue the hostages, or to prevent the terrorists from detonating a bomb. If any of the aforementioned objectives are completed, the round is over and the winning team receive a point. Participants were instructed that the team score was used to assess performance, in case of a tie, the individual score would be used as a decider. The participants were given 15 minutes to win as many rounds as possible.

For the purposes of this study, participants were assigned to the terrorist team and played on the map "Dust 2". The reason for this selection is that on the map Dust 2, the terrorist's objective is to detonate the bomb, which is the most violent objective available. Also, the map is one of the most commonly used maps on online servers, thus minimising any frustration associated to learning a new map as participants should have a prior knowledge of the map.

The gaming difficulty is manipulated by increasing / decreasing the difficulty level (easy for the low frustration conditions, and expert for the high frustration condition). Participants in the low frustration conditions will also have two computer robot teammates ("bots"), and will face two opposing bots (these team settings were selected as they provide the most Terrorist assisted settings possible on the game). In the high frustration condition, the participant will have no team members or bots, and will be opposed by three bots (again this is the most disadvantageous game setting available, thus blocking the primary goal to perform well and win the competition).

In order to run CSS, a fully operational PC or laptop with suitable specifications is required. A mouse is necessary to control movement and a monitor is required for PC's. Headphones were also used in this study to reduce any unwanted distractive noise. Two removable walls were used for all conditions to minimise distractions, however the space behind the participants was left open to allow the researcher to observe the participant.

A mood repairer was used for all participants to remove any effects caused by the study. The mood repairer is a stand up comedy clip, as performed by Rhod Gilbert and available at http://www.youtube.com/watch?v=Vt8aAy_8Ub4.

Procedure

Participants were recruited under the assumption that they were taking part in a study of the effects of video games on attention. They were given an information sheet and asked to provide signed consent, as well as reminded they may stop at any time and for any reason. Participants were invited to sit in front of the appropriate console, as sectioned off by removable walls. Participants were verbally reminded of the £25 cash prize at stake, and in the non-violent video game condition, instructed of the team selection rules, and punishable criteria. Participants played the assigned game, against a computer opponent, as computer opponents have been reported to generate higher levels of aggressive feelings (Williams & Clippinger, 2002). The game lasts for 15 minutes in the violent video game condition (as timed by a stopwatch), and as determined by the final whistle in the non-violent

video game condition (approximately 15 minutes). Participants who demonstrated aggressive behaviours during the study were reminded they may take a short break or cease their participation altogether.

After participants completed the respective 15 minutes video game session, they were given the participation pack front sheet and asked to fill in the "age" and "gender" section. The researcher then filled in the participants score, to maintain the deception that the competition was based on score, and personal reference number. Participants were then given an IAT instruction sheet, aspects of which were clarified by the researcher if so required. Each block of the IAT was handed to the participant in order, and the stopwatch was started on the first mark made by the participant's pen, and stopped on the last mark of made by the participant. The time was recorded on the respective IAT page. Participants were then asked to complete the SHS in their own time, followed by the Bus and Perry Questionnaire.

Upon completion, participants were debriefed using a debriefing form (Appendix L) to the true nature of the experiment and made aware that the £25 prize would be awarded pending a "lottery style draw" (given that it would not be fair to award a prize based on performance as the difficulty ratings were different between conditions, as was the game content / aims). Participants were informed that the draw would take place on the 1st May 2010, and the winner announced by the contact provided on the same day. A mood repair clip was then shown to all participants, after which participants were thanked for participating.

Results

Of the 43 participants who participated in the study, only 2 were excluded from analyses as the frustration control was not effective, as tested for by observing the participant's response to item 10 on the SHS "I feel frustrated". The mean scores for this item was 1.31 in both of the low frustration conditions (1.70 in the respective non-violent video game and 1.2 in the violent video game conditions) and 3.9 in the high frustration conditions (4.00 and 3.90 respectively), after excluding the results of participants whose data was not used for analysis.

All participants provided an acceptable level of accuracy on the IAT (M = 98.51%, SD = 2.30), descriptive statistics are made available in Appendix M. The results of the IAT were derived by subtracting the time it took to complete the 4th test block, where "peaceful" and "self" words were categorised together, from the 7th critical test block, where "aggressive" and "self" words were categorised together. Negative scores, or scores approaching 0, are indicative of an automatic aggressive self concept being presented by participants. All participants, in all conditions, provided results which indicated that they associated the self easier with peaceful words, as opposed to aggressive words.

It was expected that participants in the high frustration conditions would be associated with a higher automatic aggressive self concept, regardless of the video game content condition. In order to test for this, a two-way ANOVA was carried out (Appendix N). Figure 1 highlights the mean difference between the times taken to complete the two critical IAT blocks. As expected participants in the high frustration

condition were more likely to automatically associate themselves with aggression (*M* = 10.89, *SD* = 5.37), than participants in the low frustration groups (*M* = 14.98, *SD* = 6.60) (Appendix O). The ANOVA provided statistical significance that frustration influenced the IAT results, $F(1, 35) = 5.54$, $p < .05$. There was no main effect of violence on IAT scores $F(1, 35) = 0.77$, $p > .05$, and there was no interaction between violent content and frustration level $F(1, 35) = 1.26$, $p > .05$. Thusly, the hypothesis is supported by the results that high frustration level would be related to high automatic aggressive self concept scores as measured by the IAT.

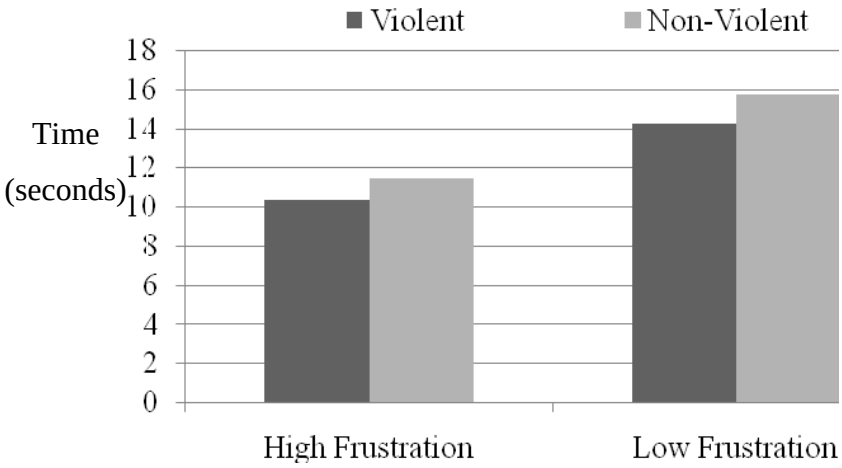

Figure 1: Mean difference between completion time for IAT blocks 4 and 7

The second hypothesis, that participants in the high frustration conditions would provide higher self-reported levels of aggressive states as measured by the SHS, was also tested for by means of a two–way ANOVA. The scales reliability was extremely high (α = .93, *M* = 86.17, *SD* = 28.89), further details are provided in Appendix P. Higher scores on the SHS are associated with an increased aggressive state, and as illustrated in figure 2, scores were consistently higher in the high frustration condition. The ANOVA yielded significant results for the main effect of frustration $F(1, 37) = 63.95$, $p < .001$. There were no significant results for the effect of violent content $F(1, 37) = .01$, $p > 0.05$, or an interaction of frustration and violent content factors $F(1, 37) = 1.48$, $p > 0.05$ (for further statistical data, refer to Appendix Q).

Participants assigned to the low frustration group, despite the video game content, provided scores substantially lower than the scale midpoint of 87 (*M* = 63.10), whereas participants in the high frustration condition scored substantially higher (*M* = 108.14). As anticipated, participant's in the high frustration condition typically rated items on the SHS higher (*M* = 3.10, *SD* = .65), than those in the low frustration condition (*M* = 1.80, *SD* = .32).

To interpret these results further, multivariate analysis was carried out (Appendix R) in order to establish which of the subscales of the SHS were affected by high frustration arousal condition. The four subscales of the SHS include: 'feeling unsociable' which consists of 3 items (α = .29, *M* = 6.51, *SD* = 1.94), 'feeling mean'

which consists of 14 items (α = .97, *M* = 31.00, *SD* = 15.86), 'lack of positive feelings' which consists of 11 items (α = .84, *M* = 31.44, *SD* = 6.27), and 'aggravation' which consists of 7 items (α = .95, *M* = 17.22, *SD* = 8.05). Descriptive statistics for the subscales of the SHS are provided in Appendix P. Although the feeling unsociable subscale was not considered given the scales poor validity, results highlight that frustration had a main effect on all subscales of the SHS. 'Feeling mean': $F(1, 36) = 63.75$, $p < .001$, 'lack of positive feelings': $F(1, 36) = 12.84$, $p < .01$, 'aggravation': $F(1, 36) = 93.31$, $p < .001$.

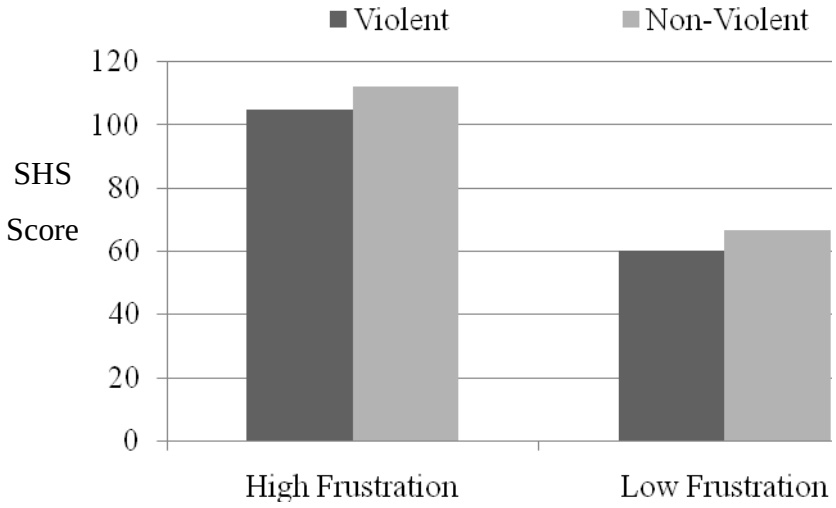

Figure 2: Mean SHS score totals for each condition

A correlation between high aggressive personality, and high scores on the IAT and SHS was also predicted, as based upon findings from prior research. After performing a bivariate correlational analysis, a significant positive correlation was highlighted between aggressive personality scores, as measured by the Buss and Perry Scale and SHS score, suggesting that as aggressive personality increases, so too does the self-reported aggressive state score, $r = .39$, $p < .05$. A significant negative correlation was also present between aggressive personality scores and the IAT result, suggesting that as aggressive personality increases, the time difference between the two critical blocks decreases, indicating that as aggressive personality increases, so too does the automatic aggressive self concept, $r = -.39$, $p < .05$ (Appendix S). The scale was considered to be highly reliable (α = .93, *M* = 85.54, *SD* = 26.44) and further details are provided in Appendix T.

Discussion

Although, as previously mentioned, some highly respected researchers in the field consider the adverse effects of video game violence on aggressive behaviour to have been proven to be conclusive (Anderson, 2004; Anderson et al., 2003; Anderson, Gentile, & Buckley, 2009; Bushman & Anderson, 2001), the findings of this report suggest that there is still much to consider before closing the debate.

In the current study, participants who were assigned to the high frustration groups subsequently reported higher levels of automatic aggressive self concept than participants in the low frustration group, as tested by an implicit attitudes test. Additionally, increases in participant's automatic aggressive self concept were not significantly influenced by the presence of violent video game content, the lack there of, or by an interaction of the video game content and the level of frustration to which participants were respectively assigned. These findings support the original hypothesis that frustration would increase automatic aggressive self concepts in participants, and suggest that violent video game content does not significantly influence increases in automatic aggressive self concept.

Similarly, aggressive state increased significantly in participants who played the games on a higher, more frustrating game difficulty level, as measured by the SHS. Once again, there were no significant results supporting theory stipulated in prior research that participants exposed to violent video game representations would show higher aggressive states. There were also no significant results for an interaction of video game content and frustration arousal factor, further implicating frustration as a significant causal factor of aggression.

Given the significant influence of frustration reflected by the results, further analyses were conducted on the subscales of the SHS to determine the effects of frustration on different aspects of state aggression. The results indicate that higher levels of frustration contributed to an increase in aggravation, mean feelings, unsociability (this subscale however was considered unreliable), and a reduction of positive feelings. There was no significant influence of video game content on the results suggesting that video game violence did not reduce participant's positive feelings, or increase aggravation, mean feelings and unsociability in individuals.

Aggressive personality was also considered as a covariate, as prior research appears to have established that personality traits interact with causal factors in aggressive behaviour, states and cognitions (Anderson & Dill, 2000; Ulhmann & Swanson, 2004). The result provides additional support for prior research, as the results indicate that there is an association between a participant's level of aggressive personality, and the subsequent scores provided on the measures of automatic aggressive self concept and aggressive state. The results indicate that as aggressive personality increases, so too do the reported levels of aggressive state and automatic aggressive self concept, as measured by the SHS and IAT respectively. Simply put, the more aggressive an individual's personality, the more likely they are to have higher levels of aggressive state and automatic self concept.

The aforementioned findings, when considered together, suggest that there is no significant contribution of vicariously learning video game violence on an individual's automatic aggressive self concept, or their aggressive state, when vicarious learning is considered in conjunction with other causal factors of aggression. However it is apparent from the results that frustration arousal and personality traits have an effect on an individual's aggressive states and implicit self concept and thus may potentially influence aggressive behaviour being performed also, as supported by prior research (Hanratty et al., 1972; Harris, 1974; Uhlmann & Swanson, 2004).

In this study, only three causal factors were considered (vicarious learning, personality and frustration), however there are many factors which can influence aggression in individuals, as outlined within Bushman and Anderson's General Aggression Model (2002). In order to provide an ecologically valid assessment of the respective contributions of the components stipulated within the GAM, it is necessary to consider them all in an interactive context (Kirsch, 2003), indeed the model is proposed to function in such a manner (Anderson & Dill, 2000; Bushman & Anderson, 2002). However, as previously noted, some factors are disregarded, or controlled for as confounding variables, such as frustration (Anderson, 2004; Anderson & Dill, 2000; Weber et al., 2006).

This problematic approach to research, where causal factors of aggression are marginalised to emphasise the contribution of a single factor, is exemplified in papers which explicitly suggest that Dylan Klebold and Eric Harris were influenced by violent video games as per social learning processes (Anderson, 2004; Anderson & Dill, 2000; Bartholow & Anderson, 2002; Bushman & Anderson, 2002), but either fail to mention, or play down the significance of the reports that the two adolescents were considered to be outsiders, loners and somehow undesirable by their classmates (Aronson, 2000). The aforementioned papers also neglect to point out that in the case of the Columbine shootings, and in the majority of 28 similar tragic events reported between 1982 and 2001 in the U.S., most of the shooters were mercilessly teased and bullied by their peers (Kimmel & Mahler, 2003).

By overlooking factors of such marked significance, research does little to provide a valid answer to questions raised by societal issues, such as those surrounding the Columbine High School Massacre. The results of this study argue that violent video games may not have influenced the Columbine High school shooters as significantly as previously stated in psychological literature (Anderson, 2004; Anderson & Dill, 2000; Bartholow & Anderson, 2002; Bushman & Anderson, 2002; Kirsch, 2003). Instead, and this is merely conjecture as were the speculatory comments made in previous relevant literature stating that video game violence may have been a contributing factor to the tragedy which occurred at Columbine on 20th April 1999, it seems likely that a significant contributing factor may have been the frustration associated with being teased, bullied and kept on the outside of social groups, as supported by the results of this study which highlights the influence of stress on aggression. Furthermore this would potentially provide an explanation as to why the killers chose to take their own lives; an explanation which would be difficult to derive from modelling the violent representations in the video game Doom, in which characters do not turn the guns on themselves.

When considering the theory proposed by the frustration-aggression hypothesis, that aggression will only occur when frustration is present, and whenever frustration is present frustration will occur (Berkowitz, 1989), it seems irrational to test a model of aggression without including some form of frustration arousal condition and thus undermines the construct validity of such tests, as it may not be aggression which is measured in the absence of frustration. The findings of this investigation reflect this point, as supported by the increase of aggressive state and automatic aggressive self concept in the presence of more frustrating conditions, and conversely when frustration is minimised lower scores of aggression are provided by participants.

It is for these reasons that future research should aim to investigate causal factors of aggression using an ecologically valid approach where the contribution of factors known to be imperative to aggression are measured and analysed as opposed to disregarded and controlled for as a confound, with particular emphasis to frustration being present, unless absolutely and justifiably necessary. Additional influencing aspects should also be considered in conjunction with appropriate causal factors of aggression wherever possible, in order to establish the interactive effects of contributing factors.

Although the results of this study supported the three original hypotheses, there are several limitations which should be addressed in order to improve future research. In future investigations it would be beneficial to use an electronic IAT, as opposed to the pencil and paper IAT used in this study for three reasons. First of all, the results provided by an electronic IAT would provide far more accurate results by measuring in milliseconds. Secondly, the procedure would be far less time consuming for participants, and thirdly as a result of a simpler procedure participants would not become frustrated as a result of performing the IAT its self. For instance, one participant from the low frustration, low violent content condition who provided an outlying result on the IAT (participant provided results associated with an extremely high level of automatic aggressive self concept), vocally expressed that the test was frustrating and caused personal irritation, stating afterwards that they were happy that the IAT was over and potentially partially explaining such a large outlier from the data (raw data is provided in Appendix U).

Another oversight of the current research was to use a computer opponent, as opposed to another participant or a confederate. Although a computer opponent was used in order to increase aggressive feelings in participants (Williams & Clippinger, 2002), the author feels that this may have been a limitation of the study for two reasons. Primarily, a computer opponent's difficulty is subject to the ability of the participant. In some cases, participants underperformed on the easy difficulty level condition and consequently may have been frustrated by the competitive challenge the opponent posed and may subsequently confound results. Conversely participants also over performed on the high difficulty level condition, and may have experienced lower levels of frustration as a result. Secondly, the experimental conditions were designed to lead participants into believing that a prize would be awarded based on their performance, a deceptive tactic which was seemingly successful. However, video game competitions are generally competed between individuals and by applying this principle, the deception may be reinforced and minimise confounding variables.

In addition, if competing participants are tested conjunctively it will allow the researcher to categorise participants who loose into the high frustration condition, and those who win into the low frustration condition. This would provide future experiments with an increase in ecological validity and minimise confounding variables, addressing the two aforementioned limitations of using a computer opponent in this study. Furthermore, by using a knockout tournament style, researchers would have an opportunity to test another aspect of the frustration-aggression hypothesis, goal proximity (Berkowitz, 1989) by assessing participants at different stages of the tournament. An additional bonus of using such a methodology would also mean that a prize could be awarded based on performance in each

category, minimising the deception used in the study and improving the ethical considerations of the study.

Another limitation of this study was the small cash incentive (£25) which was used to increase participants desire to win the game by as many points as possible, in order to induce frustration arousal by blocking the primary drive as achieved by making the game more difficult. A larger incentive would have increased the participant's explicit or implicit desire to fulfil the primary drive and this may increase the effects of the frustration arousal. Additionally, a larger cash incentive may have encouraged more participants to take part in the study and increased the data provided, increasing the validity of the results.

The low participation turnout in this study should be addressed and the author proposes three ideas to increase the number of participants for any future study. The first two have already been discussed; participants will be more interested in taking part if the incentive is larger, and will also be more willing if the questionnaires are simplified and shortened, as can be accomplished by means of an using an electronic IAT. A third proposal is the inclusion of a wider variety of violent and non-violent video games as done in prior research. Whilst recruiting participants, many were unable to partake due to the restrictions associated with gaming experience, but expressed that they played games with similar themes and content. By expanding the amount of games that are used in the study, the associated restrictions can be minimised and potentially increase the number of participants.

To surmise, the current study has provided significant indication that the contribution of vicariously learning video game violence has been overstated in prior research. The results of this research identify frustration as a notable causal factor in increases of aggressive state and automatic aggressive self concept and highlight the importance of including frustration arousal as a measured variable when investigating different aspects of aggression. The findings also provide further support for the significance of aggressive personality traits in aggressive states and self concepts. These findings provide an opportunity to reassess the hierarchy of the GAM and guide research towards considering the interaction of components in the aforesaid model. By doing so, research can provide a valid answer to questions raised by tragic events in our society, one which encourages communities to invest time in bullying prevention programmes in schools, social programmes to instruct parents and teachers how to identify troubled adolescents, and where necessary, how to provide the best assistance to such individuals. The alternative is to minimise the level of violence in video games, which given the results of this study, will only be successful if we can eliminate the frustrations of life's everyday challenges as well.

References

Anderson, C. A. (2004). An update on the effects of playing violent videogames. *Journal of Adolescence, 27*, 113-122.

Anderson, C. A., Berkowitz, L., Donnerstein, E., Huesmann, L. R., Johnson, J. D., & Linz, D. (2003). The influence of media violence on youth. *American Psychological Society, 4*, 81-110.

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., & Bushman, B. J. (2002). Human Aggression. *Annual Review of Psychology, 53*, 27-51.

Anderson, C. A., & Carnagey, N. L. (2009). Causal effects of violent sports video games on aggression: Is it competitiveness or violent content? *Journal of Experimental Psychology, 45,* 731-739.

Anderson, C. A., Deuser, W. E., & DeNeve, K. M. (1995). Hot temperatures, hostile affect, hostile cognition, and arousal: Tests of a general model of affective aggression. *Personality and Social Psychology Bulletin, 21*, 434-448.

Anderson, C. A., & Dill, K. E. (2000). Videogames and aggressive thoughts, feelings, and behaviour in laboratory and in life. *Journal of Personality and Social Psychology*, *78*, 772-790.

Anderson, C. A., Gentile, D. A., & Buckley, K. E. (2009). Violent video game effects on children and adolescents: Theory, research, and policy. *Journal of Youth and Adolescence, 38,* 483-485.

Aronson, E. (2000). *Nobody left to hate: Teaching compassion after Columbine.* New York: Freeman.

Bandura, A. (1989). Social cognitive theory. *Analysis of Child Development, 6,* 1-60.

Bandura, A., Ross, D., & Ross, S. A. (1963a). Vicarious reinforcement and imitative learning. *Journal of Abnormal and Social Psychology*, *67*, 601-607.

Bandura, A., Ross, D., & Ross, S. A. (1963b). Imitation of film-mediated aggressive models. *Journal of Abnormal and Social Psychology*, 66, 3-12.

Bartholow, B. D., & Anderson, C. A. (2002). Effects of violent video games on aggressive behaviour: Potential sex differences. *Journal of Experimental Psychology, 38*, 283-290.

Berkowitz, L. (1989). Frustration-aggression hypothesis: Examination and reformulation. *Psychological Bulletin, 106,* 59-73.

Berkowitz, L. (1990). On the formation and regulation of anger and aggression. *American Psychologist, 45,* 494–503.

Berkowitz, L., & Harmon-Jones, E. (2004). More thoughts about anger determinants. *Emotion, 4,* 151-155.

Bordens, K. S., & Horowitz. I. A. (2001). *Social Psychology*. New Jersey: Lawrence

Earlbaum Associates

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

Bushman, B. J., & Huesmann, L. R. (2006). Short term and long term effects of violent media on aggression in children and adults. *Archives of Paediatrics and Adolescent Medicine, 160,* 348-352.

Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology, 63*, 452–459.

Carnagey, N. L., & Anderson, C. A. (2005). The effects of reward and punishment in violent video games on aggressive affect, cognition, and behaviour. *Psychological Science, 16,* 882-889.

Dietz, T. L. (1998). An examination of violence and gender role portrayal in video games: Implications for gender socialization and aggressive behaviour. *Sex Roles, 38*, 425-442.

Dill, K. E. , & Dill, J. C. (1998). Video game violence: A review of the empirical literature. *Aggression and Violent Behaviour, 3*, 407-428.

Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and uses. *Annual Review of Psychology, 54,* 297–327.

Ferguson, C. J. (2007). Evidence for publication bias in video game violence effects in literature: A meta-analytic review. *Aggression and Violent Behaviour, 12,* 470-482.

Field, A. (2005). *Discovering Statistics Using SPSS*. London: SAGE Publications Ltd. 363-366.

Funk, J. B., Baldacci, H. B., Pasold, T., & Baumgardner, J. (2004). Violent exposure in real life, video games, television, movies, and the internet: is there desensitisation? *Journal of Adolescence, 27*, 23-39.

Gentile, D. A., Lynch, P. J., Linder, J. R., & Walsh, D.A. (2004). The effects of violent video game habits on adolescent hostility, aggressive behaviours, and school performance. *Journal of Adolescence, 27*, 5-22.

Gentile, D. A., & Walsh, D. A. (2002). A normative study of family media habits. *Journal of Applied Developmental Psychology, 23*, 157-178.

Greenwald. A. G., McGhee, D. E., & Schwartz, L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology,74*, 1464-1480.

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

Grusec, J. E. (1992). Social Learning Theory and Developmental Psychology: The legacies of Robert Sears and Albert Bandura. *Developmental Psychology*, *28*, 776-786.

Hanratty. M. A., & O'neal, E., & Sulzer, J. L. (1972). Effect of frustration upon imitation of aggression. *Journal of Personality and Social Psychology, 21,* 20-34.

Harris, M. B. (1974). Mediators between frustration and aggression in a field experiment. *Journal of Experimental Psychology,* 10, 561-571.

Huesmann, L. R., Moise-Titus, J., Podolski, C. L., & Eron, L. D. (2003). Longitudinal relations between children's exposure to TV violence and their aggressive and violent behaviour in young adulthood: 1977-1992. *Developmental Psychology, 29,* 201-221.

Josephson, W. L. (1987). Television violence and children's aggression: Testing the priming, social script, and disinhibition predictions. *Journal of Personality and Social Psychology*, *53,* 882-890.

Kirsh, S. J. (1998). Seeing the world through Mortal Kombat-colored glasses: Violent video games and the development of a short-term hostile attribution bias. *Childhood*, *5*, 177-184.

Kirsh, S. J. (2003). The effects of violent video games on adolescents: The overlooked influence of adolescence. *Aggression and Violent Behaviour, 8,* 377-389.

Kimmel, M. S., & Mahler, M. (2003). Adolescent masculinity, homophobia, and violence: Random school shootings, 1982-2001. *The American Behavioural Scientist, 46*, 1439-1458.

Liebert, R. M., & Baron, R. A. (1972). Some immediate effects of televised violence on children's behaviour. *Developmental Psychology, 6*, 469-475.
Miller, N. E. (1941). The frustration-aggression hypothesis. *Psychological Review, 48,* 337-342.

Signorielli, N., Gerbner, G., & Morgan, M. (1995). Violence on television: The cultural indicators project. *Journal of Broadcasting and Electronic Media, 39*, 278–283.

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

Weber, R., Ritterfield, U., & Mathiak, K. (2006). Does playing violent media games induce aggression? Empirical evidence of a functional magnetic resonance imaging study. *Media Psychology, 8*, 39-60.

Williams, R. B., & Clippinger, C. A. (2002). Aggression, competition and computer games: computer and human opponents. *Computers in Human Behaviour, 18,* 495-506.

Zillmann, D. (1983). Cognition-excitation interdependencies in aggressive behavior. *Aggressive Behavior, 14,* 51-64