Mechanisms driving the effects of violent

and non-violent media on aggression and mood

by

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Abstract

This thesis explores the effects of different types of entertainment media on aggression and positive and negative affect. Chapter 1 provides a comprehensive literature review of the link between media violence and aggression. This chapter also provides a critique of pertinent models and theories, such as the general aggression model. It is then followed by a general methods section (Chapter 2). Chapter 3 examines the questionnaire responses of University of Birmingham students who watched a scene of violence. It was found that graphic violence inhibited likelihood of aggressive behaviour. Viewing violent heroes, rather than violent villains, was found to lead to a greater likelihood of aggression. This finding was built upon in Chapters 4 and 5 using a similar methodology. The findings also indicate a relationship between positive affect and aggression. In Chapter 6, participants played either a graphically violent or non-violent video game and their responses to self-report and behavioural measures were compared. The results indicate that playing a positive-affect-inducing, non-violent video game, leads to an increased likelihood of aggression. In Chapter 7, frequent players of graphically violent and non-violent video games were recruited from online forums. These participants filled out questionnaires chosen to measure personality traits and aggressive behaviour in the real world. For players of graphically violent media, trait aggression and identification with a violent protagonist predicted instrumental aggression. The final chapter of this thesis summarises the experimental findings, discusses research implications, and provides suggestions for further investigation.

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Table of contents

List of figures

List of tables

List of abbreviations

ABT	Aggressive behavioural tendency
AQ	Aggression questionnaire
BAS	Behavioural approach system
BIS	Behavioural inhibition system
GAM	General aggression model
PANAS	Positive and Negative Affect Schedule
RPQ	Reactive-proactive aggression questionnaire
SCT	Social cognitive theory
STAI	State-Trait Anxiety Inventory
STAXI-2	State-Trait Anger Expression Inventory 2

CHAPTER 1: INTRODUCTION

1.1. Aims of the thesis

The principal aim of this thesis is to examine the central issue of whether the watching of media violence can impact upon mood states and aggressive tendencies. Established models of the acute effects of media violence usage on aggression, such as the general aggression model (GAM; Anderson & Bushman, 2002a), have argued that watching a video clip portraying a violent scene induces feelings of anger and increased hostility which are associated with an increased propensity to engage in aggressive behaviours (e.g., Bushman & Huesmann, 2006). These effects are exaggerated when the viewer identifies with and desires to emulate the violent protagonist (Konijn, Bijvank, & Bushman, 2007). This amplification effect results from processes of imitation, consistent with social cognitive theories (e.g., Bandura, 1973; Boon & Lomore, 2001; Galef & Laland, 2005; Lin, 2013). Furthermore, media violence research continues to focus on fantasy scenes of violence. However, researchers assume that graphic representations of violence may exacerbate the negative outcomes of media violence on an individual's likelihood of acting aggressively (e.g., Potter & Smith, 2000). This theory stems from evidence that suggests graphic representations of violence lead to greater emotional shifts and higher degrees of physiological arousal in the viewer, which will translate into an increased likelihood of aggressive behaviour. Implicit in these models are the assumptions that all forms of media violence have the potential to increase aggressive behaviour in the viewer (e.g., Anderson, Bushman, Donnerstein, Hummer, & Warburton, 2015). Furthermore, it is tacitly assumed that interaction with non-violent media should not increase aggressive tendencies (e.g., Bushman & Gibson, 2011).

1.2. Organisation of thesis

The first chapter of this thesis presents a literature review on media violence research. This review starts with a description of media violence, the influential theories surrounding the topic and the development of a working definition of 'aggression'. The literature review then outlines the current theories surrounding different effects of graphic and fantasy violence, considers how we can best measure aggression in a laboratory setting, and provides an overview of research to date on the negative outcomes of media violence use. Next, the literature review sets out some of the emotional changes associated with media violence use and how these mood shifts may be a pathway to aggressive behaviour. The literature review concludes by examining the implications of the research conducted. This first chapter is followed by a general methods section and five experimental study chapters. The thesis closes with a general discussion of the implications of the findings.

1.3. Experimental approaches to studying effects of media violence

Media violence is defined as "depictions of acts of physical aggression by one human or human-like character against another" (Huesmann, 2007, p. 2). Research on this topic has typically investigated violence shown in films and television programmes (e.g., Savage 2004; Wood, Wong, & Chachere, 1991); more recently, media violence research has focused on newer, interactive media such as video games (e.g., Anderson, Gentile, & Dill, 2012; Bartholow, Bushman, & Sestir, 2006). The negative outcomes of media violence have remained a controversial topic ever since the widespread adoption of television in the 1950s (Anderson et al., 2015). As we will investigate in this introduction, the academic

community's opinions are divided as to whether watching and interacting with violent media can be labelled as a significant risk factor for aggressive behaviour.

Laboratory-based experiments have attempted to identify the negative consequences of exposure to violent media, including desensitisation to real-life violence (e.g., Carnagey, Anderson, & Bushman, 2007), reduction in empathetic concern (e.g., Funk, Baldacci, Pasold, & Baumgardner, 2004), increased levels of hostility (e.g., Gunderson, 2006), and both physical and verbal aggressive behaviours (e.g., Bartholow, Sestir, & Davis, 2005; Krcmar & Greene, 2005). Researchers investigating negative outcomes of violent media have also found participants report changes in their mood after watching violence on screen. This may include heightened feelings of anxiety after watching (e.g., Baldaro et al., 2004) and increased feelings of anger (e.g., Arriaga, Esteves, Carneiro, & Monteiro, 2006). However, some studies have failed to find a significant relationship between violent media and aggressive thoughts and behaviours (e.g., Funk, Buchman, Jenks, & Bechtoldt, 2003; Savage & Yancey, 2008; Sherry, 2007; Williams & Skoric, 2005).

Among the most influential researchers whose work provides evidence to support the negative effects of watching media violence are Brad J. Bushman and Craig A. Anderson. Together, these researchers have contributed some of the most cited papers with regards to experimental work on the topic of media violence effects (e.g., Bushman & Anderson, 2015; Bushman & Huesmann, 2006; Bushman, Jamieson, Weitz, & Romer, 2013; Gentile, Swing, Anderson, Rinker, & Thomas, 2016; Konijn et al., 2007). Bushman and Anderson argue that their work conclusively demonstrates that passive viewing or physical interaction with violent media (e.g., watching a violent film or playing a violent video game) has negative effects on the viewer. Typically, their experimental paradigm demonstrates that a participant

will show more aggressive responses following interaction with violent, as opposed to non-violent, media. The reported increases in aggressive responses have been assessed using a multitude of different measures, including emotional Stroop tasks (e.g., Anderson, 1997), the blasting of an opponent with high-intensity noise (Thomaes, Bushman, Stegge, & Olthof, 2008), and the administration of unpleasant chilli sauce to an unwilling subject (Yang, Huesmann, & Bushman, 2014).

Several theoretical models have been advanced to account for the expression of aggressive behaviour in general. Some well-cited models that have been used to explain the effects of violent (and non-violent) media on aggression are excitation-transfer theory (Zillman, 1971), the frustration-aggression hypothesis (Dollard, Doob, Miller, Mower, & Sears, 1939), desensitisation (e.g., Fazal, 2013), social cognitive theory (Bandura, 1973, 1977), and script theory (Huesmann, 1988, 1998; Schank & Abelson, 1977). Perhaps the most influential theory in media violence literature is the GAM, which was first proposed by Anderson, Deuser, and DeNeve (1995; later revised by Anderson & Bushman, 2002a). The GAM has also been used extensively to serve as an explanation for how violent media may impact upon the user (e.g., Anderson, Carnagey, & Eubanks, 2003; Cruz & Bushman, 2015; Gentile, Coyne, & Walsh, 2011; Kirsh, Mounts, & Olczak, 2006; Lin, 2013). These theories will be discussed and critiqued in the following sections.

1.4. Explanations of the effects of entertainment media on aggression, based on popular models of aggression

1.4.1. Excitation-transfer theory

Excitation-transfer theory (Zillman, 1971) may explain how both violent and non-violent stimuli increase the likelihood of acting aggressively. It is widely acknowledged that high-intensity emotions such as anger, fear, and sexual arousal involve a substantial increase in sympathetic activation (e.g., Limjuco, Canono, Manapol, & Ramos, 2016). According to excitation-transfer theory, physiological arousal that occurs due to an emotion decays relatively slowly and can linger on for some time after the cause of the emotion. The intensity with which emotion is felt also depends on the level of arousal existing at the time. As individuals have relatively poor insight into why they are physiologically aroused, an individual can confuse residual arousal with a new emotion (i.e., a misattribution) which leads the individual to feel the subsequent emotion more intensely (Cantor & Zillmann, 1973).

As violent media generally features emotionally arousing stimuli (e.g., Anderson & Bushman, 2001; Ivarsson, 2014), the arousal caused by the viewing of such media may transfer into subsequent events. Anderson et al. (1995) and Anderson and Bushman (2002a) point to the possibility that unusually high and low levels of arousal may be aversive states and may stimulate aggression. Therefore, if a situation occurs after exposure that involves the viewer experiencing heightened feelings of anger (e.g., a hostile situation), the additional arousal from the violent media may further heighten these feelings of anger. This may then

lead to an increased chance of acting on these feelings in an aggressive or violent manner. Thus, residual arousal derived from recent violent media exposure could well add to the arousal resulting from the provocation and thus could exacerbate an aggressive reaction.

Excitation theory suggests that media does not have to contain violent themes to induce aggression, provided it is sufficient to elevate physiological arousal. For instance, driving simulator video games, sports video games, and even perceptual/motor skills games that require intense concentration and rapid responses (e.g., *Tetris*, *Bejeweled*) can increase physiological arousal as monitored by heart rate and blood pressure (e.g., Strack & Deutsch, 2004). Early work from Zillman (1971) found that viewers of arousing, non-violent, erotic material indicated heightened feelings of aggression after watching. This finding was supported by Donnerstein, Donnerstein, and Evans (1975) who reported similar effects. Aggressive behaviour in subjects who have been provoked has also been shown to be increased by exposure to arousing, non-violent sources such as physical exercise (Zillman, Katcher, & Milovsky, 1972) and drugs (O'Neal & Kaufman, 1972). This type of work has failed to be replicated in more recent studies.

A criticism of this theory is that it does not consider changes that violent and non-violent media have on aspects of positive and negative affect. While experimental studies have continued to focus on the effects of violent media on negative affect (predominately on 'anger'), excitation theory would predict that one could respond aggressively to a situation even if one's elevated arousal was coupled with a heightened positive mood. In the latter parts of this thesis, the impact of exciting, positive-affect-inducing non-violent media will be considered as a way of testing and expanding upon the principles of this theory.

6

1.4.2. Frustration-aggression hypothesis

The frustration-aggression hypothesis was first introduced by Dollard et al. (1939). Within this theory, frustration was defined not as an emotional response, but as "an event or action that complicates or obviates the accomplishment of a subjectively relevant task" (Dollard et al., 1939, p. 7). It was predicted that if an individual is frustrated, an aggressive response will always follow. In 1989, Berkowitz proposed a reformulation of the original hypothesis. This revised model argued that frustration only leads to an aggressive response when the triggering event elicits some form of negative affect (Berkowitz, 1989, p. 71). This reformulated hypothesis has proved to be a popular theory in general aggression study (e.g., Marcus-Newhall, Pedersen, Carlson, & Miller, 2000). More recently, this hypothesis has also been used by some researchers to explain the relationship between violent media and aggression (e.g., Breuer, Scharkow, & Quandt, 2015).

An early study conducted by Anderson et al. (1995) found that participants who were deliberately frustrated by being seated in a hot room showed greater hostile affect, physiological arousal, and aggressive tendencies. With regards to entertainment media, it is claimed that frustration can occur through seeing a beloved character on screen hurt, or through difficult controls in a video game (Przybylski, Rigby, & Ryan, 2010). Similarly, video games that are too fast paced or too difficult for the player are likely to increase frustration, which in turn might activate aggressive thoughts (Przybylski, Deci, Rigby, & Ryan, 2014). Some researchers argue that hostile thoughts and aggressive behaviours are worsened if participants are frustrated and there is violence on screen (Williams, 2009). Presumably, this occurs because negative emotions promote aggressive thoughts

independently of the thoughts brought on by violent content (Bonus, Peebles & Riddle, 2015).

It is prudent to ask if past research may have been finding frustration effects rather than media-violence-related aggression effects. Przybylski et al. (2014) ran an experiment involving the non-violent video game 'Tetris', but adapted the mechanics of the game to deliberately frustrate the player. They found that players who were deliberately frustrated behaved more aggressively in a behavioural aggression task after playing than were those who played the regular version of the game. Many experimenters report that violent video games are more frustrating for players than non-violent games (e.g., due to difficulty of game play or complexity of controls), but few measure or control for participants' frustration levels in their studies (e.g., Ewoldsen et al., 2012; Yang et al., 2014).

Predictions made by this model overlap with those made by excitation transfer. This is because both theories predict that both violent and non-violent media that lead to negative affect may increase likelihood of aggression. As such, these theories challenge the notion that violent content is the crucial component of entertainment media that will lead to an increased likelihood of acting aggressively.

1.4.3. Desensitisation

Media-associated increases in aggression have also been linked to desensitisation (e.g., Carnagey, Anderson, & Bushman, 2007; Fazal, 2013). Emotional desensitisation is evident when there is numbing or blunting of emotional reactions to events (e.g., Funk et al., 2004). The process of desensitisation can be directly and purposefully manipulated. For example,

systematic desensitisation has been used as a common technique for decades in behavioural therapy, where the aim is to reduce or eliminate certain emotional responses in anxiety-inducing stimuli (e.g., Wolpe, 1973). A clear definition of desensitisation to violence is "a reduction in emotion-related physiological reactivity to real violence" (Carnagey, Anderson, & Bushman, 2007, p. 2).

Desensitisation has been suggested to occur because of repeated exposure to real-life violence or from exposure to media violence. The initial response of children and many adults to violent media is fear and anxiety (e.g., Cantor, 1998). However, when violent stimuli are repeatedly presented in a positive emotional context (e.g., exciting background music, sounds, rewards for violent actions in the game, etc.), these initial distress reactions are reduced. One indicator that desensitisation has occurred is observation of a reduction in physiological arousal (e.g., heart rate, galvanic skin response, etc.) during exposure to real violence after individuals have been repeatedly exposed to media violence.

Repeated exposure to a stimulus may teach users that certain behaviours are justified (DeWall, Anderson, & Bushman, 2011) and increase the likelihood of an aggressive response. Recently, studies suggest that even a short viewing of media violence can desensitise a viewer to subsequent aggression (e.g., Fanti, Vanman, Henrich, & Avraamides, 2009). Furthermore, repeated viewing of media violence can affect an individual's own opinion of whether violence is acceptable (e.g., Krahé et al., 2011).

Research evidence also suggests that, once desensitised to violence, an individual may be more likely to show aggressive behaviours. This occurs through the reduction of aggressive inhibitions (Huesmann & Kirwil, 2007), diminished empathy for the pain and suffering of

others (Mullin & Linz, 1995), and the weakening of typical aversions to violence (e.g., Smith & Donnerstein, 1998). Anderson and Huesmann (2003) report that individuals who have strong negative reactions to a violent scene are less likely to exhibit aggressive behaviours than those who have a neutral or positive reaction to the violence.

Studies have also shown that there is an acute effect of viewing a scene of fictional violence that can desensitise a viewer to real-life violence (e.g., Carnargey, Anderson, & Bushman, 2007). In one of the earliest studies demonstrating the potential desensitising effect of violent media, Lazarus, Speisman, Mordkoff, and Davison (1962) reported that participants showed less of a psychophysiological response while watching a surgeon perform incisions at the end of the film than at the beginning. Fanti et al. (2009) also suggest that there is an acute desensitisation effect after short-term repeated exposure to media violence, which results in individuals showing less sympathy towards victims of violence. Similarly, Carnagey (2007) reported that participants low in previous exposure to video game violence who played a violent (relative to a non-violent) game for 20 minutes indicated acute physiological desensitisation. This response mediated the effect of video game content on subsequent aggressive behaviour. However, not all research supports these claims. Ramos, Ferguson, Frailing, and Romero-Ramirez (2013), in their study of primarily Hispanic viewers, found no evidence to suggest that viewers of a scene of media violence were less stressed or anxious when subsequently watching a scene of real or fictional violence and did not differ in their empathy scores for the victims.

While it is important to note potential links between desensitisation to media violence and aggression, it should be made clear that this thesis does not directly measure media-violence-induced desensitisation. This is a limitation that should be addressed in future research, using

equipment designed to measure physiological reactions to violent media, such as skin conductance (e.g., Strenziok et al., 2011), heart rate (e.g., Carnagey, Anderson, & Bushman, 2007), and/or systolic/diastolic blood pressure (e.g., Anderson & Bushman, 2001) and/or body temperature (Barlett, Branch, Rodeheffer, & Harris, 2009).

1.4.4. Social cognitive theory (SCT)

Originally named 'social learning theory', Bandura (1973) developed a model based on how observational learning and vicarious reinforcement influences behaviour. In 1986, Bandura changed the name to 'social cognitive theory' (SCT) to emphasise the major role cognition plays in learning and action. SCT emphasises the importance of observing, imitating, and modelling the behaviours, attitudes, and emotional reactions of others (e.g., Bandura, 1973; Bandura, 2001; Coates, Malouff, & Rooke, 2008). The theory predicts that there is a tendency to reproduce the actions, attitudes, and emotional responses of real-life or fantasy models.

SCT posits that learning most likely occurs if there is a close identification between the observer and the model. With regards to media violence, the viewer's identification with violent characters on screen may lead to a greater chance of the viewer modelling subsequent behaviours on the aggressive acts they have witnessed. Identification with media characters is discussed in the following section.

1.4.4.1. Identification with violent protagonist

Identification with a character from entertainment media was first defined as "the viewer, in fantasy, puts himself in the place of a character and momentarily feels that what is happening to that character is happening to himself" (Maccoby & Wilson, 1957, p. 1). Weiss (1966) also reported that when someone identifies with a film character they "participate(s) vicariously in the events feelings and behaviour that relate to the object of identification" (p. 98). It has been argued that people have a fundamental need to form connections with other people and that television offers audience members access to a wide range of other human beings (Hoffner & Buchanan, 2005). Over time, viewers become familiar with characters and performers. The importance of these characters to viewers may extend beyond the viewing situation to include deep concern about what happens in their 'lives' and/or a desire to become like them in significant ways (Giles, 2002).

In media violence research, there is a consensus that the more the person identifies with the actors who are aggressors or victims, the more likely is the person is to be influenced by the scene. Most identification conceptions in media effects research are based on similarity and are often measured as a general 'liking' of an on-screen character (e.g., Cohen, 2001; Konijn & Hoorn, 2005). Other definitions of identification, however, have referred to the process by which individuals put themselves in the place of a character and, during interaction with the media content, vicariously participate in the character's experiences. Cohen (2001) employed this definition, arguing that through identification a viewer loses his or her own identity and assumes the identity of a media character. When identification occurs, the observer desires to emulate the character and uses that character as a role model for future behaviours, consistent with SCT predictions (Hoffner & Buchanan, 2005).

Empathy may also serve as an amplifier for already established attitudes that affect cognition. This can be a powerful tool with regards to media violence effects, as this amplification holds for both 'heroic' and 'villainous' characters. A study conducted by Happ, Melzer, and Steffgen (2013) found that when a story was given to participants to make them feel empathy towards a violent 'villain' within a video game, these participants displayed the fewest helping behaviours and most hostile feelings. Seemingly these participants viewed his violence within the game as more justified. Others have speculated that through training players of violent video games to focus attention on the victims rather than on the perpetrators of violence, the detrimental effects of violent video games might be reduced (Cantor & Wilson, 2003).

Research indicates that identification with media characters can have significant social and psychological consequences. Boon and Lomore (2001) reported that undergraduate students made changes in their appearance, attitudes, values, activities, and other characteristics to become more like admired celebrities. Therefore, the assumption of entertainment media researchers is that SCT remains a plausible explanation for media violence effects, as viewers learn to imitate the role models they see on screen. The mass media contains many examples of characters who solve problems using violence, show no remorse for their aggressive actions, and are rarely punished for behaving aggressively (Carnagey & Anderson, 2004). Viewers may also perceive a heroic character to be a role model for their own future behaviour (Slater et al., 2006). Bushman and Huesmann (2006) also proposed that violent protagonists who are perceived to be heroic may elicit more of a reaction with regards to aggressive thoughts and behaviours than do perceived villains.

Regarding experimental evidence, a number of studies support the theory that the most aggressive participants are those who most strongly identify with and wish to be like the violent character on screen (Funk et al., 2004; Konijn et al., 2007). Happ et al. (2013) have also reported that watching a character for whom the viewer has no empathy (e.g., a villain) being attacked by a heroic figure, causes the viewer to exhibit significantly greater feelings of hostility and anger, and a greater chance of behaving aggressively afterwards. A study conducted by Gentile et al. (2007) also provided evidence to suggest that identification with a violent hero leads to the largest increase in aggression in violent media users.

Some researchers have also argued that violent video games allow greater identification between players and the on-screen characters, which increases the likelihood of imitation of aggressive behaviours (Gentile & Anderson, 2003). A consensus exists that identification with a violent protagonist leads to an increased likelihood of aggressive behaviour. While some researchers are sceptical about a link between aggression and positive affect (e.g., Anderson & Dill, 2000), studies may have overlooked the possibility that identification with a violent protagonist could lead to increased likelihood of aggression via positive affect. This theory will be explored in more detail in later chapters of the thesis along with other potentially important factors of media violence research that have been neglected in empirical study.

1.4.5. Script theory

Script theory (Huesmann, 1988, 1998) predicts that individuals develop knowledge structures responsible for guiding behaviour within any given social context. It is theorised that these cognitive schemata lead to long-term aggression effects. Social scripts are acquired through

the witnessing of violence, and these social scripts are used later to interpret and respond to future events. Mirroring SCT, this theory argues that aggression is largely a process of cognition, in which cognitive schemata and scripts are learned through observation. A person's expectations and behaviours regarding certain social situations can be changed by repeated 'rehearsals' of a behavioural script, and more frequent rehearsal increases script strength and accessibility (Anderson & Bushman, 2002a, 2002b). Thus, if someone witnesses (live or through media representations) hundreds of examples of responding to a personal insult with violence, that person will develop aggressive scripts which will be drawn on when provoked.

In the media violence literature, both SCT and script theory remain popular ways of understanding aggression-related effects. This is through the highlighting of the ways in which scripts are developed and reinforced by media violence and of how they guide behaviour. When viewing violent media, individuals repeatedly observe aggression within a rewarding context. Protagonists in films, television shows, and video games are frequently rewarded for providing violent solutions to problems. Meanwhile, negative consequences (e.g., pain, fear, imprisonment) are often underrepresented in such media. These characteristics effectively make the act of aggression appear as more attractive and less threatening than it truly is in real life, consequently making it easier for viewers and players to imagine themselves acting aggressively and having positive outcomes.

Criticisms directed towards SCT, script theory and the GAM (discussed in the next section) are that the portrayal of the cognitive and affective processes of aggression is largely automatic, mechanistic, and unconscious and that they ignore considerable evidence regarding the genetic (e.g., Ferguson, 2010b) and neurobiological elements that contribute to

aggression (Kumari et al., 2006). There is also an absence of any discussion of the effects of positive/negative affect and arousal. This thesis attempts to expand upon these theories by considering how observational learning and emotional responses to entertainment media may affect aggressive behaviour.

1.4.6 The general aggression model (GAM)

The GAM (Anderson & Bushman, 2002a) describes a multi-stage process which accounts for the expression of aggression. It was created as a synthesis of the theories previously discussed (i.e., SCT, excitation transfer, frustration-aggression theory) and aims to provide a framework that is more expansive than these models, and thus one that is a more substantive platform from which to derive and test hypotheses regarding aggression. The model emphasises three critical stages in understanding a single episodic cycle of aggression: (1) person and situation inputs, (2) present internal states (i.e., cognition, arousal, affect), and (3) outcomes of appraisal and decision-making processes (see Figure 1, p. 18).

'Person inputs' refer to the personality, values, motivations, and beliefs that may predispose an individual to behave aggressively. For example, trait anger, neuroticism, and normative beliefs about aggression are all associated with higher levels of aggression (e.g., Hellmuth & McNulty, 2008; Parrott & Zeichner, 2002). 'Situation inputs' represent more transient features of the environment that can increase aggression. For example, social rejection, hot temperatures, and provocation increase aggression inside and outside the laboratory (e.g., Buckley, Winkel, & Leary, 2004; Bushman & Baumeister, 1998; DeWall & Bushman, 2011). Interaction with violent media also falls into the 'situation input' category.

An individual's internal state has been hypothesised to explain *why* people behave aggressively (DeWall, Finkel, & Denson, 2011). The internal state of an individual can be defined by an individual's cognitions, affect, and arousal. Research has demonstrated that violent video games can temporarily increase aggressive thoughts, aggressive affect, and physiological arousal (e.g., Anderson et al., 2004). Exposure to violent media can increase aggressive behaviour by influencing any combination of these internal states. Angry affect, hostile cognition, and heightened arousal, for example, are all associated with higher levels of aggression (e.g., Carnagey, Anderson, & Bartholow, 2007; DeWall, Twenge, Gitter & Baumeister, 2009). Thus, based on the GAM, a person who is exposed to media violence is more likely to choose an aggressive response.

The third stage includes complex appraisal and decision processes that lead to impulsive or thoughtful actions (Strack & Deutsch, 2004). The initial appraisal is usually very fast, effortless, and automatic, and may be made without conscious awareness. This initial appraisal then leads to either an impulsive or a thoughtful action, which, after taking all other factors into account, may be an aggressive or non-aggressive response. This priming effect may influence appraisals and decision-making processes, which, in turn, can lead to antisocial behaviours (Anderson & Bushman, 2002a, 2002b; Roskos-Ewoldsen, Roskos-Ewoldsen, & Carpentier, 2002). If an aggressive response leads to a positive outcome, the person is rewarded for the decision-making process that led to the aggressive response. Therefore, social knowledge structures develop over time due to exposure and learning. The GAM therefore hypothesises that each new experience or exposure to violence (whether in the real world or in media) represents a 'learning' trial. This learning solidifies aggression-related scripts (Bushman & Anderson, 2002; Greitemeyer & Osswald, 2009). Because violent media often portray violent actions in ways that consistently reward aggression (e.g., the

violent 'hero' commended for his efforts, the rewarding of video game players through

points, in-game items, etc.), normal 'real-world' negative consequences are often

underrepresented. Such portrayals make aggressive actions appear more rewarding and less

damaging than in reality. Repeated exposure to violence solidifies these knowledge

structures, potentially creating aggressive personalities. The GAM therefore predicts how

media violence can impact the user in both the short term (through affecting internal states)

and the long term (affecting changes to personality).
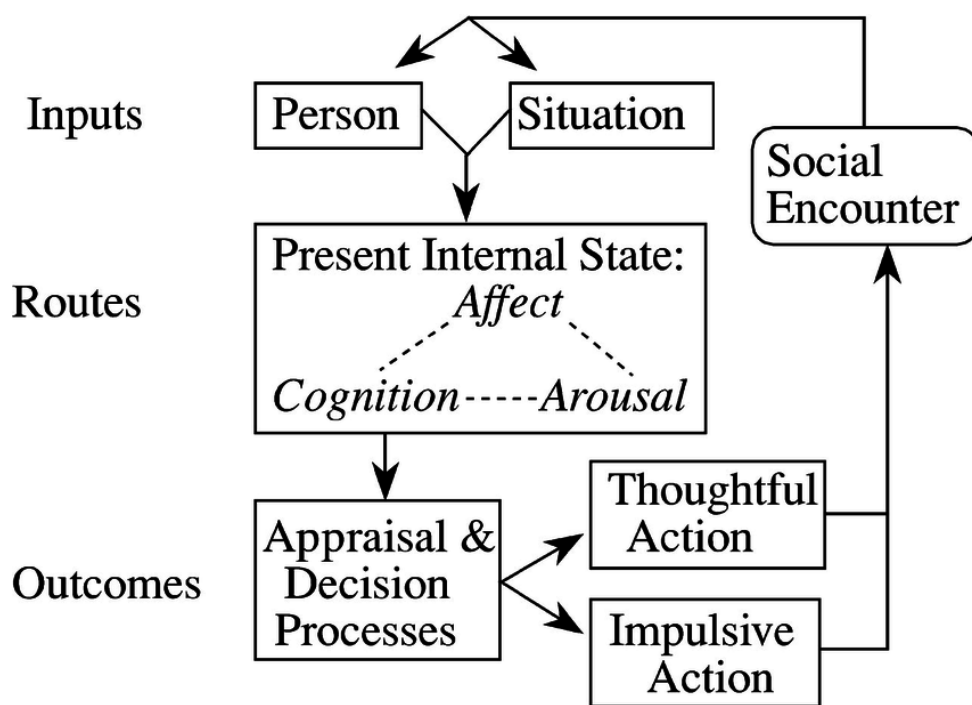
Figure 1. The general aggression model (Anderson & Bushman, 2002a)

1.4.6.1. Criticisms of the GAM

Despite the GAM remaining a popular model in media violence literature, it has come under

criticism. First, discussions of the GAM seldom elaborate on personological variables in great

detail. Furthermore, despite being influential, the GAM has little predictive ability. Rather, it

is a descriptive model of possible factors which can interact to potentiate aggressive behaviours. For example, the present internal state reflects the interaction of three factors: affect, cognition, and arousal. This is a very inclusive list of possible factors which can affect the internal state.

While the GAM supports excitation-transfer theory predictions (stating that increased physiological arousal impacts upon aggression), proponents of this model have disregarded the prospect that non-violent media may also exacerbate aggressive behaviour. Instead, they predict that violent content in the media is the key instigator of violent and aggressive behaviour (e.g., Anderson & Bushman, 2002a; Bushman & Anderson, 2002). However, as discussed in Sections 1.4.1 and 1.4.2, non-violent media that increases physiological arousal can lead to aggression. This suggests that proponents of the GAM may be placing too much emphasis on violent content as the main instigator of aggressive behaviour.

Another criticism directed at the GAM is how the focus of this model is on how situational factors (i.e., media violence) lead to aggressive behaviour. However, GAM supporters claim that there does not appear to be any identifiable group (e.g., age, sex, personality type) that is wholly immune to media violence effects (Anderson & Gentile, 2008). Therefore, the relationship between media violence and violent behaviour should be observable in all populations (Carnagey & Anderson, 2004). This implies that individuals exposed to violent media will engage in aggressive behaviour regardless of personality type, family environment, genetics, or other biological contributions (although these factors may influence the degree of aggressive behaviour). Furthermore, sceptics argue that the impact of these risk factors far outweigh those of media violence effects (i.e., Ferguson, 2015).

Another criticism of the GAM is that there is no distinction made between different types of aggression (Ferguson & Dyck, 2012). Bushman and Anderson (2001) have argued that attempting to determine subtypes of aggression have limited validity and that it is "time to pull the life-support plug" (Bushman & Anderson, 2002, p. 278). However, some contend that examining subtypes of aggression leads to a more comprehensive analysis of emotional, cognitive, and behavioural antecedents and consequences (e.g., Merk, Orobio de Castro, Koops, & Matthys, 2005). Therefore, making distinctions between aggressive acts may have implications for diagnosis, prevention, and intervention (Kempes, Matthys, de Vries, & van Engeland, 2005).

1.5. Defining aggression

To appreciate the possible negative impact of watching media violence on aggression, it is necessary to consider how aggressive behaviour has been conceptualised. This section will consider different definitions of aggression and different types of aggressive behaviour.

Anderson and Bushman (2002a) defined aggressive behaviour as:

> Any behavior directed toward another individual that is carried out with the proximate intent to cause harm, and during which, the perpetrator must believe that the behavior will harm the target, and the target is motivated to avoid the behavior. (p. 28)

Here, the authors clearly define "intent to cause harm" as a requirement when identifying aggression and aggressive behaviour. The definition has been extensively used in research

into aggression and media-violence-induced aggression (e.g., Reidy, Shelley-Tremblay, & Lillenfield, 2011).

From a psychological perspective, aggression is thought to be motivated by hypothetical constructs such as anger, irritation, frustration, fear, and, in some cases, pleasure (Blair, Peschardt, Budhani, & Pine, 2005). From an ethological perspective, aggression has been useful for obtaining or defending food or mates from competitors. Ferguson and Beaver (2009) define aggression as "behaviour that is intended to increase the social dominance of the organism relative to the dominance position of other organisms" (p. 287), suggesting that aggression is an instrumental behaviour which is not necessarily antisocial. Today, moderate aggressiveness may aid us in defending ourselves and our family, standing up for our beliefs, seeking high-status positions in society, developing leadership, and excelling in sports and careers. When allowed to be defined broadly, some have argued that aggression may have more positive qualities than negative (e.g., Ferguson, 2010a).

The apparently positive aspects of aggressive behaviour may be more pronounced when the aggression is of a minor form (DeWall, Anderson & Bushman, 2011). This, however, could be contrasted with violence. The term 'violence' has been defined as aggression that has extreme harm as its goal (e.g., serious injury) and which involves the intentional use of physical force or power that either results in or has a high likelihood of resulting in harm (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). The World Health Organization (2002) has defined violence as:

> The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high

likelihood of resulting in injury, death, psychological harm, mal-development or

deprivation. (p. 5)

Violent acts motivated by self-defence, or defence of one's family, social group, or culture, are generally deemed as acceptable (Queller & Strassman, 1998). However, serious forms of aggression often manifest themselves as antisocial and violent offending behaviours (van Honk, Harmon-Jones, Morgan, & Schutter, 2010). Heightened aggression resulting in extreme violence likely to cause harm to oneself and others is an act which governments seek to curtail (Ferguson & Beaver, 2009).

Although there is considerable variance in the ways in which aggression and violence can be conceptualised, proponents of the negative outcomes of media violence nonetheless would argue that interaction with violent media increases the expression of aggressive and violent behaviours. This is then associated with negative impacts upon society.

1.5.1. Types of aggression

Over the past few decades, many investigators have attempted to characterise aggressive behaviour in humans and other animals. One such classification scheme defines all aggression as belonging to one of two categories: 'predatory attack' or 'affective defence' (Flynn et al., 1970; Siegel & Pott, 1988). These categorisations were initially formulated after the study of animals and the way they carry out aggressive acts. For example, predatory attack was first used to describe cats' active 'stalking' approach to a prey object. Human aggression has been classified in a similar way, and there exists a wide body of literature on both adult and childhood aggression. The terms 'proactive' and 'reactive' (e.g., Crick &

Dodge, 1996) are typical of the terminology used in childhood studies, and 'instrumental' and 'reactive' are typical of the terminology used in adult studies (e.g., Cornell et al., 1996; Weinshenker & Siegal, 2002).

Meloy (2006) describes the following characteristics of affective defence/reactive aggression: (1) there is intense sympathetic nervous system arousal, (2) the response is an emotional, aggressive reaction based upon a real or perceived threat, and (3) this aggression is an immediate (i.e., impulsive) response to the threat stimulus. The concept of this type of aggression has been supported by the work of researchers such as Scarpa and Raine (2000) and Lochman, Palardy, McElroy, Phillips, and Holmes (2004), who have linked heightened sympathetic nervous system activity with aggressive behaviour, particularly when an individual is in an 'angry' state due to perceived provocation (Berkowitz, 1993). Categories of aggression that would fit under this umbrella term include fear-induced, maternal, sex-related, frustration, and territorial aggression.

'Instrumental' aggression in humans is thought to be a homologue of predatory aggression in animals (Meloy, 1997, 2006). The most notable factors of this type of aggression are that: (1) there is a virtual absence of activation to the sympathetic nervous system; (2) there appears to be little conscious awareness of emotion, and, where conscious emotion is present, it is positive (Meloy, 2006); (3) the behaviour is purposeful and planned; (4) there is no perceived threat, but instead the target is actively sought by the aggressor; and (5) the aggression is triggered by a variety of objectives such as accumulation of money, power, control, or gratification of sadistic desires and fantasies. As such, instrumental aggression is a behaviour motivated by the attainment of an external reward or reinforcement. This contrasts with

affective defence/reactive aggression where there is a single objective of reducing the perceived threat.

Scarpa and Raine (2000) suggested that under-arousal of the sympathetic division of the autonomic nervous system may underlie instrumental aggression. Furthermore, researchers propose that individuals attempt to compensate for under-arousal by seeking stimulating and risky situations to raise their arousal level to an optimal state (Raine, Venables, & Mednick, 1997). This is supported by research into psychopaths, who have been characterised as manipulative, parasitic, autonomically under-aroused, stimulation seeking, and emotionally blunted – and have higher rates of violent crimes than non-psychopaths (Hare, 1999). Porter and Woodworth (2006) have also suggested that there may in fact be some emotional outcome for those who engage in instrumental aggression. Those who engage in this type of behaviour may do this because of the pleasure that they take in causing others to suffer. They may also derive gratification or enjoyment from their violent behaviour, driven by thrill seeking or sadistic interests (Porter & Woodworth, 2006). Such feelings contrast dramatically with affective defence which is associated with aversive feelings.

The final experimental chapter of this thesis (Chapter 7) explores differences in long-term violent (and non-violent) video game players. In relation to the aspects of aggression, Chapter 7 seeks to explore differences between reactive and instrumental aggression in players by using a self-report questionnaire designed to measure these different types of aggression.

1.6. Laboratory studies of relationship between media violence and aggression

Due to the difficulty in setting up and running tightly controlled longitudinal studies, laboratory measures may still hold the answers to the question of whether violent media can affect aggression. A major strength of laboratory experiments is that they allow one to make causal inferences, at least in the short term. Short-term effects are those in which a person watches a film or plays a video game for a brief time (e.g., 30 minutes) before relevant measures are immediately obtained (e.g., Anderson & Dill, 2000; Bartholow et al., 2005). Thus, the traditional paradigm for media violence research is a between-subjects design. In this design, the psychological and behavioural changes of participants who either play or watch a piece of violent media are compared to a separate group of participants who engage with non-violent media (e.g., Carnagey & Anderson, 2005; Engelhardt, Bartholow, Kerr, & Bushman, 2011; Sestir & Bartholow, 2010).

Researchers have disputed the duration of media violence effects. Generally, experimental findings indicate that reactions to violent media may dissipate very soon after use, which may be less than four minutes for increased aggressive thoughts, and 5-10 minutes for physiological arousal and aggressive behaviour (e.g., Barlett et al.; Larsen, 2000). However, other research suggests that the effects of playing violent media on aggressive behaviour can last for as long as 24 hours after usage in an experimental setting (Bushman & Gibson, 2011).

1.7. Effects of chronic exposure to media violence

Concerns over the short-term effects of watching media violence in laboratory settings has in part led to research which has focused on the chronic effects (e.g., Anderson et al., 2008). Long-term effects are typically assessed in cross-sectional and longitudinal studies. Results of these longitudinal studies are mixed. One study conducted over the period of a month found no relationship between video game exposure and aggressive acts (Williams & Skoric, 2005). Another longitudinal study did find a small association between video game playing and aggression (Anderson, Gentile, & Buckley, 2007). However, this study poorly controlled for other variables, such as trait aggression or gender (Ferguson, 2015). Although studies into long-term effects of this subject are of interest, longitudinal studies are often correlational in nature (e.g., Ferguson, 2015). This can be misleading about any causal relation, due to possible common association with a third variable or potential for reverse causation.

1.8. Typical participant demographics

With regards to a typical participant involved in a media violence study of acute effects, college/university students are the most common. Within these samples comes a normally well-balanced mix of male and female participants. While studies do typically test both male and female students, there seems to be a reluctance to explore potential sex differences in research. This is surprising given the sex differences in both reactive and instrumental aggression noted above, and it suggests a need for research that better controls for sex differences (Brockmyer, 2015).

A pertinent question is whether males are more susceptible to any negative media violence effects than females. This may be due to the reinforcement of gender stereotypes through portrayals in the media. As discussed, violence is common in television and in other forms of media, and most aggressors in violent media are male (Smith, Nathanson, & Wilson, 2002). Ogletree and Drake (2007) also report that regular video game players estimate that 70% or more of the main characters in popular video games are male, and they list positive traits in these male characters, which include heightened aggression and being 'strong' and 'dominant'. Female video game characters, on the other hand, were rated as more sexually provocative, less strong and aggressive, and more likely to need rescue than male characters. In general, traits such as 'aggressive', 'dominant' and even 'violent' are seen as desirable to males (e.g., Konijn et al., 2007). Males are also more likely to rate themselves as more aggressive and dominant on self-report scales (Carré, Putnam, & McCormick, 2009). Aggressive styles of males and females have also been attributed to the influence of sex roles in determining appropriate aggressive responses. Traditionally, physical aggression is viewed as more appropriate for men, whereas verbal or psychological aggression is viewed as more appropriate for women (e.g., Bettencourt & Miller, 1996).

Several notable studies have failed to find a significant interaction between sex of the player and aggression after using a piece of violent media (e.g., Anderson & Carnagey, 2009; Hasan, Bègue, & Bushman, 2012). However, there are examples of media violence research studies that have yielded significant sex differences in the results. After presenting participants with hypothetical situations, Duselms and Altman (2003) found that men who had played the most violent game endorsed lower sanctions for criminals, while females assigned more severe sentences. The researchers concluded that females and males might be affected differently by exposure to violent video games. Bartholow and Anderson (2002)

found that while both sexes showed increased reactive aggression after playing a violent video game, the effect was more pronounced for men than women. A more recent study conducted by Tian and Qian (2014) also found that Chinese males displayed more aggressive responses with regards to an emotional Stroop task than did females after playing a violent video game.

Cooper and Mackie (1986) conducted the earliest study examining potential sex differences in media violence research. The researchers reported that females were more adversely affected by the media with regards to their aggressive behaviour after interaction with violent media. The researchers concluded that this was because they were inexperienced with regards to interaction with violent stimuli. This view was supported by Anderson and Dill (2000) who also reported that females displayed significantly more hostility and aggressive behaviour after playing a violent or non-violent video game.

However, in the present day, women are much more likely to play and interact with all kinds of different media. For example, data from the Internet Advertising Bureau (2014) indicates that 52% of regular video game players are now female. By contrast, in 2003 only about 28% of the most frequent video game players were female according to data from the Interactive Digital Software Association (2003). Previous research indicates that males often like violent content in video games and are more physiologically aroused by the violence than are females (e.g., Tafalla, 2007). In contrast, females generally dislike violent content in video games (Hartmann & Klimmt, 2006). Therefore, while females may be playing more games than in previous years, the types of game they generally play may dramatically differ to those played by males. Despite this, the evidence does suggest that in the present day females are not naïve with regards to entertainment media and that there is a much higher likelihood of

them being familiar and comfortable with using media in experimental conditions. This means possible reasons for aggression in females, such as unfamiliarity with the stimulus, can be discounted. Researchers can, therefore, develop a better understanding of the effects of entertainment media across both sexes.

1.9. Measurements of aggression

Many experimental paradigms have been created to attempt to measure and quantify aggression in a laboratory-based setting. Laboratory experiments are frequently employed because specific factors thought to affect aggression can be independently manipulated. The laboratory also provides an environment in which aggressive behaviours can be assessed in a safe and ethical fashion (Berkowitz, 1993).

Aggressive tendencies can be assessed using both personality inventories and 'vignettes' describing socially challenging situations. Personality inventories include self-report questionnaires, such as the widely administered aggression questionnaire (AQ; Buss & Perry, 1992). This is routinely used to assess levels of 'trait aggression', or rather the extent to which individuals exhibit aggressive thoughts and behaviours in their everyday life. Kutner and Olson (2008) wrote that future research of media violence effects should focus on "situations involving everyday violence and aggression" (p. 148). While it is difficult to measure these sorts of situations in a laboratory, questionnaire-based measures known as vignettes require participants to imagine a scenario and describe how they would react. These hypothetical situations can be used as a stand in for a real-life situation. As such, they have been argued to be valid representations of real provocative situations (Lobbestael, Cima, & Arntz, 2013) and thus to provide clues about a person's reactive aggressive tendencies.

Participants are required to read a series of hypothetical scenarios where they are asked to imagine themselves in a variety of situations where they are deliberately or unintentionally antagonised (e.g., a person bumps into them on the street, or someone intentionally spills a drink on them in a bar). The participants then rate how angry they would be in that situation and how they would react. Two examples of how this measure has been used in previous work are in Tremblay and Belchevski's (2004) 'Conflict Situation Vignettes' and O'Connor, Archer, and Wu's 'Aggressive Provocation Questionnaire' (2001). Both research studies were developed to pilot and validate hypothetical situation vignettes which can be used to assess an individual's likelihood of acting aggressively. Results from these studies demonstrate a strong correlation between the likelihood of acting aggressively scale and trait aggression subscales (O'Connor, Archer, & Wu, 2001). This indicates that vignettes can be used to reliably assess an individual's aggressive disposition.

Administering self-report measures of aggression may lead to inaccuracies caused by problems such as social desirability and self-presentational concerns, and some researchers are hesitant to link these findings to real-world aggression (e.g., Velez, Mahood, Ewoldsen, & Moyer-Gusé, 2012). However, numerous research examples support the view that self-reports are an easy-to-administer method of capturing likelihood of acting aggressively, and results show high reliability and validity. Thus, results from self-reported measures show strong, positive correlations with other measures of aggressive behaviour. Richardson and Green (2006), for example, examined self-report aggressive behaviour questionnaires. The researchers compared scores on this questionnaire to separate data scores completed by someone who knew the participant. Results indicated that self-reports of aggression were moderately and significantly correlated with targets' reports of aggression. Collectively, these

factors have ensured that self-report measures of aggression remain a popular and informative tool for assessing a participant's likelihood of acting aggressively (e.g., Helfritz-Sinville & Stanford, 2014).

Results of self-report AQs and vignettes after interaction with violent media tend to support the view that violent media is associated with negative outcomes. Fischer, Aydin, Kastenmüller, Frey, & Fischer (2012) found that players of a simulated delinquency-reinforcing video game reported more tolerance for a severe road traffic offence than players of a delinquency-neutral control game. Hasan, Bègue, and Bushman (2012) reported that players of a violent video game showed a greater likelihood of acting aggressively in ambiguous hypothetical situations than did non-violent players, thus demonstrating an indication of reactive aggression in a realistic situation. Similarly, Bonus et al. (2015) found that participants who interact with violent media are more likely to support aggressive solutions to problems in response to ambiguous vignettes.

Giving participants an opportunity to dispense aversive stimuli or punishments to someone else is also a popular method of investigating a participant's reactive or instrumental aggressive behaviour in an experimental setting. As the aggressive behaviour of the participant is quantified based on behaviour on the task, these tasks can be regarded as behavioural measures of aggression. Among these techniques are those which allow participants to dispense electric shocks (e.g., Hammock & Richardson, 1992) or high-intensity 'noise blasts' (e.g., Thomaes et al., 2008) to other participants in a reaction time game. In these methodologies, the administering of a greater intensity of shock or noise blast is representative of greater aggression.

The hot sauce paradigm was created by Lieberman, Solomon, Greenberg, and McGregor (1999) and is an increasingly popular method used in many different types of study investigating various types of aggressive behaviour (e.g., Hollingdale & Greitemeier, 2014; Van der Meij et al., 2015; Yang et al., 2014). In this research design, participants carry out a study under the pretence that the experiment is investigating some sort of 'taste preference' on behaviour. During the study, participants are made aware that the next participant to carry out the study has a strong disliking for hot and spicy flavours. Next, participants are asked to add spicy sauce either to a drink or to food that they believe this participant will consume. Results from this type of study have shown that participants administer more hot sauce with regards to many experimental manipulations, including if they are exposed to guns (Klinesmith, Kasser, & McAndrew, 2006), have opposing political views to those of the next participant (McGregor et al., 1998), or play a violent game, compared to a non-violent game (e.g., Yang et al., 2014).

In support of this experimental approach, Lieberman et al. (1999) found that scores on this paradigm were positively related to both trait and physical aggression scores on the AQ. This supports the convergent validity of the hot sauce paradigm as a measure of aggressive behaviour. Some of the notable advantages of this methodology are that it does not require expensive and elaborate equipment (as in the case of electric shock paradigms) and that the observed behaviour is easily quantifiable (amount of sauce dispensed). One limitation of the hot sauce paradigm is that motivations for adding more sauce are not often documented (Ritter & Eslea, 2005).

Experimental designs used in different fields have also been adapted for use in laboratory-based studies of aggression. The cold pressor task, for example, asks participants to hold their

hand in cold water (normally 0-5ºC) for up to 30 seconds. Participants typically find the task painful after 25 seconds (Fischer & Greitmeyer, 2006). This has previously been used in research to measure levels of pain tolerance (e.g., Lafleche, Pannier, Laloux, & Safar, 1998; Streff, Kuehl, Michaux, & Anton, 2010). However, this method has been adapted to include a dependent measure of aggression. The experimenter asks participants how long they would like the next participant to submerge their hand in the painful and unpleasant situation (e.g., Fischer & Greitmeier, 2006; Przybylski et al., 2010). Longer times administered are indicative of greater levels of aggression.

Results of studies investigating video games and aggressive behaviour with the paradigms report mixed results. This is supported by findings of experimental work that have utilised the hot sauce paradigm and the cold pressor task. An earlier study by Ballard and Lineberger (1999) found that participants who played a violent game punished a future participant by administering a longer time with their hand held in iced water. Hollingdale and Greitemeyer (2014) used the hot sauce paradigm and found that both playing violent video games online and offline compared to playing neutral video games increased aggression towards a non-provoking confederate. However, Ferguson et al. (2015) found no evidence in their study that participants exposed to violent media administered longer time in iced water to future participants. Tang (2012) also failed to find any evidence to show that violent-video-game players administered more hot sauce to a non-provoking confederate than did non-violent-video-game players.

1.10. Types of experimental stimulus

A factor often overlooked in media violence research is the type of experimental stimulus that participants engage with as part of a study. In the past, research has focused primarily on the passive viewing of entertainment media in TV and films. More recently, however, research has tended to focus on more active forms of entertainment media, such as video games.

Researchers have hypothesised that violent video games have a greater effect than violent television/other media. Reasons for this speculation include the higher levels of attention required, higher levels of interactivity, identification with violent characters, reinforcement of violent acts, and the frequency of violent scenes (Carnagey & Anderson, 2004). According to SCT (Bandura, 1994), the interactive nature of violent video games provides an opportunity to rehearse and to be directly reinforced for that aggressive behaviour as video games often reward players for participating and completing violent acts (e.g., by winning extra points and lives).

A meta-analytic review by Paik and Comstock (1994) on the relationship between violent television programmes and antisocial behaviour showed a significant relation ($r = .31$). A meta-analysis by Anderson (2004) revealed a somewhat smaller relationship between exposure to violent video games and increased aggressive behaviour ($r = .26$). These results indicate that there may be little difference between actively or passively engaging with media violence. Results of experimental studies comparing passive viewing with active engagement are mixed. While one study found children displayed greater levels of aggression after playing a video game (compared to passively viewing the same game; Polman, de Castro, & van Aken, 2008), another study reported no difference in aggressive behaviour between

34

active users and passive watchers (Silvern & Williamson, 1987). However, more recent studies have suggested that active engagement with a stimulus, compared to passive viewing, may have greater effects on aggression, hostile cognitions, and increases in blood pressure (Lin, 2013).

It may also be prudent for studies to focus on other elements of violent media type. Studies have so far failed to assess the type of violent content on screen. Similarly, studies often fail to report the degree of violence, realism, or graphicness of the stimuli used in experiments (Crooks, 2003). Furthermore, different types of violence and how they may affect the user continue to be overlooked.

Investigating two different forms of violence may provide answers. Fantasy violence can be defined as a scene whereby those involved use choreographed actions to portray an unrealistic and over-the-top fight scene. These scenes are often found in action films, may be serious or humorously portrayed, and are found in films rated as suitable for children. Graphic violence, however, can be defined as the depiction of especially vivid, brutal, and realistic acts of violence. This type of violence is found predominantly in 18-rated films and may feature excessive blood, gore, and death of characters on screen.

1.11. Graphic vs. fantasy violence

In their study as to what constitutes a 'graphic' scene of violence, Potter and Smith (2000) defined graphic violence as a scene that: (1) featured a human carrying out the violence; (2) involved a perpetrator who obviously intended to cause harm and pain to the victim; (3) involved the use of conventional weapons (such as guns or knives); (4) was in a non-

humorous setting; (5) featured a high number of violent acts within a single setting; (6) involved acts that were motivated by protection of life, personal gain, or retaliation; and (7) rewarded the violent act. Weaver and Wilson (2009) argue that graphic violence features "blood, gore, and close-ups of the aggression" (p. 447) and deemed scenes filmed via close-up shots as more graphic than scenes filmed via long shots.

As well as stating that researchers need to study interactions between graphic and non-graphic media in the next step of effects research, Potter and Smith (2000) wrote that, "Graphic portrayals of violence engage emotions more strongly than non-graphic portrayals" (p. 302). This supports earlier work by Zillmann and Weaver (1997) who state that graphicness triggers physiological arousal. With relation to the GAM, increased arousal should therefore translate into a greater likelihood of hostile thoughts and of acting aggressively (e.g., Anderson & Dill, 2000; Ivory & Kalyanaraman, 2007; Sparks & Sparks, 2002).

More than 20 years ago, Bushman (1995) wrote that graphic depictions of violence are more likely to activate aggressive cognitions. However, experimental research on media violence continues to focus on cartoon and unrealistic fantasy violence (e.g., Blumberg, Bierwith, & Schwartz, 2008; Byrne, Linz, & Potter, 2009; Kirsh, 2006). This could be due to ethical considerations of showing graphic depictions of violence to participants. Recent trends in video production and technological developments have made entertainment media more lifelike and realistic (Carnagey & Anderson, 2004). Maximisation of realism in visual media is generally used to fully immerse the user (Konijn & Hoorn, 2005) and players tend to rate realistic video games more favourably than unrealistic ones (e.g., Wood, Griffiths, Chappell,

& Davies, 2004). Potter and Smith (2000) report that 'graphicness' in a television portrayal serves to bring viewers closer to the action and thereby adds realism to the scene and makes it more shocking. Potter, Pashupati, Pekurny, Hoffman, and Davis (2002) concluded from their research that participants' interpretations of the graphicness of a programme were most highly related to their judgments about how violent the programme was. Similarly, Riddle, Eyal, Mahood, and Potter (2006) also report that an individual's judgments about the degree of violence in the narrative was more strongly associated with the perception of the graphicness of the violent acts. These judgments also related to the harm to the victims more than other factors, such as the number of violent acts or the severity of the acts. Therefore, we can conclude that graphic representations of violence are typically rated as containing more violent content than other scenes of violence in entertainment media.

The more an act of violence generates feelings of uneasiness in the viewer or lessens the viewer's enjoyment, the higher the associated level of perceived violence of that act (Kirsch, 2006; Potter & Tomasello, 2003). If a viewer believes that what they see on TV or in movies could happen in real life, experimental evidence suggests that there will be a greater likelihood they will attend to, remember, and be motivated to perform similar acts of aggression (Kirsch, 2006, 2012). In general, it has been theorised that realistic portrayals of media violence engender greater levels of aggressive behaviour in viewers than do unrealistic media depictions (e.g., Huesmann, Lagerspetz, & Eron, 1984). For instance, adolescents have been shown to report greater reactive aggression if they had previously witnessed acts of violence during a television newscast than if the same acts of violence were viewed as part of a commercial for an upcoming television drama (Kirsch, 2006).

In contrast, fantasy violence has been defined by the Entertainment System Rating Board as "violent actions of a fantasy nature, involving human or non-human characters in situations easily distinguishable from real life" (ESRB, 2017). Situations may be distinguishable from real life by featuring unrealistic characters (e.g., superheroes), over-the-top, caricatured fight scenes, or scenes which take place in a fantasy setting. Table 1 shows the potential differences and similarities between these two types of violence. In many ways, fantasy violence is in direct contrast to graphic violence.

Table 1

Graphic violence vs. fantasy violence (Potter & Smith, 2000 and modified from ESRB, 2017)

Graphic violence	Fantasy violence
Depictions of especially vivid, brutal, and realistic acts of violence	Depictions of choreographed, unrealistic and, caricatured fight scenes
Features a human carrying out the violence	Features a human or non-human (e.g., superhero) carrying out the violence
The violent perpetrator obviously intends to cause severe harm and pain to the target (most commonly fatal)	The violent perpetrator obviously intends to cause harm and pain to the target (may be non-fatal)
Conventional weapons (such as guns or knives) are used	Conventional, unconventional (e.g., environmental objects) or non-weapons (e.g., martial arts) are used
Violence framed in a non-humorous setting	Violence may be framed in a humorous or light-hearted setting
Features a high number of violence acts within a single setting	Likely to revolve around a single fight in one setting (e.g., a martial arts fight)
The acts of the perpetrator are motivated by the protection of life, personal gain, or retaliation	The acts of the perpetrator are motivated by situation-specific context
The violent act is rewarded	The violent act is rewarded and morally justifiable

One reason why fantasy violence may be worth comparing to graphic violence is that often the actions of fantasy violence perpetrators are legitimised. This sends out the message that violence can be appropriate and enjoyable (McIntosh, Murray, Murray, & Manian, 2003). Moreover, in fantasy scenes of violence, the pain and suffering of the victims are often trivialised, absent, or comically presented. Researchers have in the past suggested that violence mixed with humour may exacerbate the link between viewing violence and acting violently (Signorielli, Gerbner, & Morgan, 1995). This is because humour may heighten viewers' arousal levels beyond levels created by viewing violence alone, and/or viewers may become desensitised to violence as comedic violence rarely depicts the negative consequences of violence. In comparison, scenes of graphic violence may feature the 'hero' suffering extreme losses, pain, torture, and injuries before the conclusion of the film. Furthermore, in such cases this may not result in their 'win' (Potter & Warren, 1998). When the victim in the viewed media shows a high degree of pain and suffering, it may be more difficult for the viewer to trivialise and legitimise the violence watched (Kirsch, 2006).

Subsequently, while emotions associated with fantasy violence may include euphoria and excitement, graphic violence may elicit fear, anxiety, and anger. This implies that the types of violence may shift aggression through different pathways. To date, graphic and fantasy scenes of violence have not been directly compared in an experimental study. This presents itself as an interesting topic for further research, as these differing emotional reactions can be investigated alongside their effect on aggressive behaviour.

As well as considering both graphic and fantasy types of violence, it is also important to consider how non-violent stimuli can impact an individual. For researchers to conclude that violence is the key characteristic of the TV/film/video game watched, experimental stimuli

must be adequately matched on key characteristics, such as arousal. However, studies often fail to match stimuli for many key characteristics (Tian & Qian, 2014). Studies that fail to match violent and non-violent media in these characteristics have been criticised on the grounds that violent content may not be the main factor in a stimulus that leads to aggressive behaviour (Crooks, 2003). When controlling for such discrepancies in video game stimuli, the relationship between violent media exposure, aggression, and arousal is more tenuous (Przybylski et al., 2010).

1.12. Potential ethical problems

According to the British Psychological Society Code of Ethics and Conduct (2009), psychological research must be conducted with respect, competence, responsibility, and integrity, as well as with diligent concern for the welfare and dignity of the participants. Conducting research involving media violence may create potential ethical problems. Firstly, the use of disturbing imagery (particularly when showing scenes of graphic violence) may disturb and create negative affect in the viewer (Madan, Mrug, & Wright, 2014; Zillman & Weaver, 1997). Care should, therefore, be taken to ensure participants are comfortable viewing potentially distressing scenes of violence. As with all good ethical practice in experimental studies, participants should also have a right to leave the experiment if they wish and are under no obligation to continue if they find the stimulus too disturbing. They should also be offered support post-study if distressed.

Research that involves behavioural measures of aggression may also present ethical problems. Although it is desirable to create a resemblance to real-world situations to increase external validity, there is a danger that in doing so one might prime participants to behave

aggressively in a similar situation encountered outside the laboratory. For example, the hot sauce paradigm could potentially lead a participant to conduct themselves inappropriately outside of the laboratory situation (Ritter & Eslea, 2005). Similarly, if media violence proponents are to be believed, by participating in these types of experiment participants may become more likely to engage in or become indifferent to aggressive acts. However, others have argued that experimental studies may foster self-reflection and minimise the chance for later inappropriate, ineffective, or dangerous behaviour by considering their own actions in a laboratory setting (Rovira, Swapp, Spanlang, & Slater, 2009).

Despite these concerns, there has been extensive experimental work conducted on media violence effects. In the next section of this thesis, these research studies will be discussed.

1.13. Experimental evidence on the consequences of media violence use

The Columbine High School massacre was an event that drew widespread attention to media violence research and led to increased academic study in the field (Ferguson, 2010a; Leary, Kowalski, Smith, & Phillips, 2003). Eric Harris and Dylan Klebold, who killed a teacher and several classmates before committing suicide, garnered extensive media attention due to links between their actions and the violent video game *Doom* (Calvert, 2000). After this event, several scholars began making increasingly strong statements about causal links between violent games and aggression (e.g., Anderson & Dill, 2000; Anderson & Bushman, 2001; Bartholow et al., 2006; Gentile et al., 2004; Huesmann, 2007). Critics, however, have raised objections to these interpretations, arguing that the data is weak, inconsistent, and unsupportive of the causal view (Olson, 2004; Sherry, 2007). Other studies have failed to find a link between violent game playing and subsequent aggression (Colwell & Kato, 2003;

Durkin & Barber, 2002; Ferguson, Rueda, Cruz, et al., 2008; Unsworth, Devilly, & Ward, 2007; Williams & Skoric, 2005).

Academics have used meta-analyses to review the current literature to form a conclusion as to whether negative outcomes of media violence exist. In an extensive meta-analysis, Paik & Comstock (1994) analysed 217 different studies pertaining to the effect of TV violence on aggressive behaviour and reported a moderate effect of media violence on aggressive thoughts and behaviours ($r = .31$). Results from this study also indicate that animated and fantasy violence had a stronger effect on aggression than did more realistic and graphic media. Of interest in this meta-analysis was that the authors also investigated the effects of non-violent erotica, and this type of pornography also emerged as a strong predictor of aggressive behaviour ($r = .43$). This is inconsistent with previous studies that found viewing only violent pornography to predict aggressive behaviour (Donnerstein, Linz, & Penrod, 1987).

A meta-analytical review conducted by Bushman and Huesmann (2006) reviewed 431 studies involving 68,463 participants. They found that there were overall modest but significant effect sizes for exposure to media violence on aggressive behaviours ($r = .19$), aggressive thoughts ($r = .18$), and angry feelings ($r = .27$). However, critics Elson and Ferguson (2014) report that the authors show publication bias in their selection of studies and that there is an over-interpretation of the effect sizes found. These critics also question the character of the authors themselves as "actively and aggressively" attempting to "quell dissenting views, disparage sceptics, and enforce highly ideological views" (Elson & Ferguson, 2014, p. 6). These comments were met by Groves, Anderson, and DeLisi (2014) who suggest that Ferguson is guilty of poor methodological practices in his own work (e.g., participants

displaying high suspicion as to the aims of the study) and cite this as the primary reason why Ferguson's work shows "frequent failures to replicate what everyone else is finding" (Groves et al., 2014, p. 2).

More recently, Anderson et al. (2010) studied research reports involving more than 130,000 participants, and concluded that, in Western culture, violent media had a significant, albeit modest, effect on aggressive behaviours ($d = .39$), as well as negatively impacting empathic feelings ($d = .36$). However, this meta-analysis has been criticised for its selection of unpublished journals and a bias in favouring the analysis of academic articles that fit the authors' hypotheses (Ferguson & Kilburn, 2010). Ferguson and Kilburn (2009), in their own meta-analysis, report a small effect size for the effects of media violence on aggression ($d = .16$). Ferguson and Kilburn state that, "Results from the current analysis do not support the conclusion that media violence leads to aggressive behaviour" (p. 759). Furthermore, they conclude by commenting, "It cannot be concluded at this time that media violence presents a significant public health risk" (p. 759).

The most recent meta-analysis conducted on media violence effects was carried out by the APA Task Force on Violent Media (2015), who report from their review of the literature that media violence (in particular, violent video games) has an effect on aggression. This is manifested as a moderate increase in negative outcomes such as aggressive behaviour ($d = .37$) and aggressive cognitions ($d = .34$). Despite these findings, the report suggests that there is not enough evidence to support a relationship with outcomes such as criminal violence.

Therefore, we can conclude that the current body of experimental work presents mixed evidence for a causal relationship between media violence and aggression. While research

continues to investigate the effects of media violence on aggression, explanations of pathways to aggression may be helpful in illuminating its developmental origins and outcomes. Research may benefit from investigating how media violence can affect an individual's current emotional state and enduring emotional traits. This research may serve to explain potential negative outcomes.

1.14. Potential mechanisms underlying media-violence-associated increases in aggression

First, it is important to make the distinction between temporary and enduring emotions. Emotional 'state' of an individual is a transitory emotional reaction to internal and/or external triggers. A change in an individual's state is therefore categorised as a temporary emotional change. An individual may exhibit temporary changes in their mood and/or behaviour under certain circumstances, but one cannot say that this is the norm for that person. A 'trait', on the other hand, implies a more permanent presence and a stable level of emotion. Traits present the tendency of an individual to constantly feel, think, and behave in a certain way (Spielberger & Sydeman, 1994).

Anger and anxiety are both examples of possible temporary emotional changes, or long-lasting and enduring traits that are a stable and consistent disposition of the individual (Spielberger & Sydeman, 1994). However, the role of anger and anxiety in media violence research remains understudied, despite these emotional changes often being cited as significant pathways to aggressive behaviour. This will be discussed in the following sections of the introduction.

1.14.1. Anger

'Anger' represents the emotional or affective component of aggressive behaviour. An explanation for how media violence may affect an individual's likelihood to act aggressively may be found in investigating how the enduring traits of anger can interact with media violence effects. Similarly, investigation may benefit from researching how violent media can influence anger as an emotional state. 'State anger' has been defined in early research as a psychobiological, subjective experience that, over time and across situations, consists of subjective feelings that vary in intensity, from mild irritation or annoyance to intense fury and rage (Spielberger, Jacobs, Russell, & Crane, 1983; Ramírez & Andreu, 2006). This internal state is only activated in a specific situational context and fluctuates over time as a function of perceived affronts, injustice, or frustration (Ramírez, Fujihara, & Goozen, 2001). It is typically accompanied by autonomic nervous system arousal such as increases in heart rate and perspiration (e.g., Sukhodolsky, Golub, & Cromwell, 2001).

'Trait anger' on the other hand is considered to be related to the general temperament of the individual (Ramírez, Izquierdo, & Requena, 2004). Angry feelings can be experienced in response to a very wide variety of relatively innocuous triggers, or to a narrower pattern of reactivity to specific classes of stimuli for the person, such as competition, rejection, or perceived unfairness.

Aggressive acts that stem from anger, impulsivity, and high levels of bodily arousal are associated with reactive aggression (e.g., Blair, 2004; Meloy, 2006). Anderson and Bushman (2002b) specifically note several reasons why the dispositional characteristic of anger might

play a causal role in aggression. First, anger reduces inhibition against aggressive acts. Second, anger primes aggressive thoughts, making one more likely to interpret ambiguous situations as hostile. Third, anger energises behaviour by increasing arousal levels, which in turn can lead to aggression if there is significant provocation shortly after the activity. Finally, anger makes one more likely to attend to hostile or violent information (Anderson & Bushman, 2002b).

Anderson and Bushman (2002b) also suggest that violent media can indirectly increase state anger via physiological arousal and through the activation of hostile thoughts. The body of research that has studied the effects of violent media reports effects on aggressive affect, such as anger or hostility, and has typically done so through participants' self-reports. Arriaga et al. (2006), for example, found significantly higher hostile feelings for participants who played a violent game compared to a non-violent one. Anderson and Carnagey (2003) reported that listeners to music with violent lyrics reported greater feelings of hostility and anger. Swing and Anderson (2007) also reported that playing a violent video game for 15 minutes impacted aggressive cognitions in participants. Furthermore, Chen, Schweisberger, and Gilmore (2012) posited that violent-video-game play extends an angry mood, leading to triggered displaced aggression whereby an already agitated person lashes out in response to a mild annoyance. Gentile, Lynch, Linder, and Walsh (2004) also argue that the combination of high hostility and exposure to video game violence leads to an increased risk for higher levels of aggression than for either factor alone.

Research has, however, suggested that anger does not always lead to aggressive behaviour. Averill (2012), for example, found that the most frequent responses in anger episodes were non-aggressive, including calming activities (such as talking through issues), and that only

10% of the anger episodes included responses of direct physical aggression towards another person. Furthermore, Valadez and Ferguson (2012) found that neither type of video game (violent vs. non-violent) nor duration played caused increases or decreases in hostile feelings in a laboratory setting. Ferguson, Cruz, & Rueda (2008) found that, after being deliberately frustrated, participants who showed long-term exposure to violent video games were associated with reduced feelings of anger (and depression) following the frustrating task. As discussed in Section 1.4.2 (p. 7), 'frustration' is of interest to media violence researchers as there is evidence to suggest that, in the short term, frustration can lead to aggressive behaviour.

1.14.2. Anxiety

Aside from anger and frustration, other emotional states have been largely ignored in media violence research to date. One potential avenue that may aid our understanding of media violence effects is to explore the emotional state of anxiety. Research studies present mixed evidence for the role of anxiety on aggressive tendencies. There is evidence that suggests anxiety may act as a protective factor against violence (e.g., Apter, Plutchick, & Van Praag, 1993; DeWall et al., 2009). However, conflicting research studies report that highly anxious people are more likely to behave violently, exhibit behavioural control problems, and display antisocial behaviour (e.g., Erwin, Heimberg, Schneier, & Liebowitz, 2003). Despite the uncertainty surrounding how highly anxious people may react with regards to violent and aggressive behaviour, there appears to be little empirical evidence looking at the possible moderating role of anxiety on media violence effects.

Early work suggests that 'state' anxiety is a transitory emotional state or condition that is characterised by subjective, consciously perceived feelings of dread, tension, and apprehension, as well as by heightened autonomic nervous system activity (Spielberger, Gorsuch, Lushene, & Vagg, & Jacobs, 1983). This stress response consists of heightened arousal, activation of the sympathetic nervous system, and cortisol secretion by the adrenal glands. 'Trait' anxiety refers to the differences between individuals in terms of their tendency to experience state anxiety in response to the anticipation of a threat. People with a high level of trait anxiety experience more intense degrees of state anxiety to specific situations than most people. Furthermore, they may experience anxiety towards a broader range of situations or objects than most people. Those high in trait anxiety are also likely to judge ambiguous situations as more threatening, which may be an indicator of someone who is more prone to aggression (Calvo & Castillo, 2001).

Certain symptoms of anxiety have been well documented in past research and can involve difficulties in concentration, worry, fatigue, irritability, and muscle aches and soreness, as well as negatively impacting academic work, relationships, and physical health (Woodward & Fergusson, 2001). However, research investigating the effects of anxiety on aggression, violence, and offending is mixed. A body of research exists that links high feelings of state anxiety to violent and impulsive behaviours (e.g., Ohring et al., 1996). Similarly, evidence from clinical diagnoses supports the view that a susceptibility to aggression may also be enabled by an altered mood or anxiety state. This may include bipolar disorder, generalised anxiety disorder, or panic disorder (Swann, 2003).

Conversely, an older study conducted on psychiatric patients by Apter et al. (1993) found that, while trait anxiety was positively correlated with violence towards the self (i.e., self-

harm), there was a negative correlation between trait anxiety and violence directed towards others. While those who possess highly anxious traits may perceive more hostility in their environment, they may be less likely than non-anxious counterparts to behave aggressively towards others. This may be due to social anxiety, or rather to a fear that others will judge them negatively for behaving aggressively (DeWall, Buckner, Lambert, Choen, & Fincham, 2010). Some studies have reported that higher levels of anxiety relate to the suppressing of emotions associated with reactive aggressive behaviour (Erwin et al., 2003). Anxious people, for example, generally show signs of being risk-averse, shy, and behaviourally inhibited (Maner et al., 2007). Thus, research suggests that anxiety may relate to a general tendency to avoid situations that may call for aggression, and that it may result in lower levels of aggression when people are placed in an aggressive situation.

Media violence may lead to acute changes in anxiety symptoms such as protective desires and punitive desires (Zillman & Weaver, 1997). As mentioned by Madan et al. (2014), however, there is relatively little experimental research conducted on the causal effects of exposure to media violence on state anxiety. In their own study, Madan and colleagues found evidence to suggest that relatively short video clips (2-3 minutes long) were sufficient to increase levels of state anxiety. The findings of the study conducted by Madan et al. (2014) support the results of an older study conducted by Anderson and Ford (1986) who found that playing a violent (relative to a neutral) video game has been shown to increase state anxiety levels. Similarly, Baldaro et al. (2004) found that, in habitual media violence users, state anxiety increased when playing a violent game as opposed to a non-violent game. However, self-reported hostility scores did not increase. Although there is evidence to suggest that violent media can increase anxiety scores, it remains unclear as to whether this increased anxiety is likely to lead to a greater chance of aggressive or violent behaviour. Measuring

changes to state anxiety after watching a piece of violent media and assessing whether this change interacts with aggressive and violent behaviours may provide clues into how media violence may lead to aggressive behaviours. The use of self-reported anxiety would be a valuable contribution to the media violence literature, as self-reports of anxiety have been shown to have high reliability and convergent validity (De Los Reyes et al., 2012).

1.14.3. Presumed mechanisms – conclusions

While many researchers attempt to measure aggressive behaviour in the laboratory, mediating variables, such as affect (e.g., anger, anxiety) and cognitions (e.g., hostile thoughts), are often overlooked. Future research would benefit from combining questionnaires that assess a participant's current emotional state and personality variables with both questionnaire and behavioural measures of aggressive behaviour.

With regards to anxiety and anger, intuitively the link between anger and/or anxiety and aggression would be via a reactive route. This is because the goal of reactive aggression is to specifically harm another individual and is facilitated by negative emotions that include anger, fear, anxiety, and frustration (Weinshenker & Siegel, 2002). Instrumental aggression, however, appears when there is little conscious awareness of emotion. If there is any emotion at all, it is associated with positive reinforcement, in which the individual may possess feelings such as exhilaration (Meloy, 1997). The aggressive act may also heighten self-esteem, resulting in a greater sense of self-confidence and sadistic pleasure (Meloy, 1997, 2006). Such feelings contrast dramatically with reactive aggression.

1.15. Implications and thesis aims

Despite the mixed results from experimental studies and meta-analyses, the general view appears to be in support of negative outcomes of media violence. In 2012, the International Society for Research on Aggression (ISRA) published a report, highlighting current empirical data, before concluding that "what is clear is that exposure to media violence is one risk factor for increased aggression in both the short run and the long run", as well as highlighting a need for stricter guidelines for ratings of films and video games (ISRA, 2012). Similarly, in 2015 the APA updated their stance on media violence research, concluding that "it is the accumulation of risk factors that tends to lead to aggressive or violent behaviour. The research reviewed here demonstrates that violent-video-game use is one such risk factor." (APA Task Force on Violent Media, 2015, p. 16)

Various government reports on violence and the media (e.g., Brown, 1966) have been submitted since 1987. In 2001, the American Academy of Pediatrics issued a statement suggesting that exposure to television violence was harmful and urged parents to restrict children's access to television violence and to avoid any television exposure for children under two years of age. More recently, in 2007, the Federal Trade Commission (FTC) report concluded that exposure to media violence is correlated with aggression. Also in 2007, the FTC concluded that there is strong evidence that exposure to violence in the media can increase aggressive behaviour in the short term (FTC, 2007).

There are also numerous examples of high-profile lobbying, with demands for a further tightening of controls on violent media in countries such as the US, Australia and Sweden. Losing lobbyists have implied that scientific evidence had little to do with final decisions,

which instead responded to "industry arguments" (Bushman & Huesmann, 2006) or pressure from the "gaming lobby" (Warburton, 2014). Critics, however, contend that proponents of media violence effects "shrug off" conflicting views (e.g., Gentile, 2013) by demanding that naysayers to media violence effects should not be given "valuable (and undeserved)" public attention (Strasburger & Donnerstein, 2014, p. 3). Based on research studies and high-profile cases outlined in this review, there appears to be two very distinct opinions on the potential negative outcomes of media violence. Many researchers believe there is insufficient and inadequate evidence to suggest that violent media leads to aggressive and violent users. Conversely, several researchers believe that all violent media leads to an increased likelihood of aggressive behaviour in the user.

This thesis has therefore attempted to advance the field of the negative outcomes of media violence use by addressing empirical gaps in the literature. To achieve this aim, several under-investigated aspects of media violence research have been investigated. Primarily, this thesis explores: (1) how graphic depictions of violence compared to fantasy violence may impact aggressive behaviour; (2) how different perpetrators of violence may impact aggression; (3) how different types of media violence can impact emotional states – in particular, negative (i.e., anger and anxiety) and positive affect; and (4) how personality types and characteristics of the watcher influence the effect of media violence on aggression.

CHAPTER 2: GENERAL METHODS SECTION

2.1. Violent and non-violent media

2.1.1. Violent video clips

An extensive internet search, using keywords such as 'graphic violence film clip' and 'fantasy violence film clip' was used to generate a pool of potentially suitable videos to use in the experimental studies. Following a close examination of the type of violence portrayed in the clips and the perpetrators of the violent acts, six film clips were selected. The final selection from this search were short clips from the films *American History X* (1998), *Fistful of Dollars* (1964), *Pale Rider* (1985) *Inglourious Basterds* (2009), *Batman: The Dark Knight Rises* (2012), and *Spiderman* (2002). The violent video clips were all easily accessed, readily available clips that can be found on the video hosting site YouTube (www.youtube.com). When listed, all film classifications are in accordance with the British Board of Film Classification.

Within the violent video clips viewed there were two manipulations: the identity of the violent perpetrator (hero/villain) and the type of violence in the clip (graphic/fantasy). A 'hero' violent perpetrator was defined as an on-screen character whose actions were morally justifiable (Ferguson, 2010a). Conversely, a 'villain' was defined as an on-screen character whose actions were not morally acceptable.

Graphic violence was defined in the present study as the depiction of especially vivid, brutal, and realistic acts of violence. In accordance with Potter and Smith's (2000) guidelines as to

what viewers regard as 'graphic violence', the graphic scenes were selected on the basis that they: (1) featured a human carrying out the violence; (2) involved the perpetrator obviously intending to cause harm and pain to the victim; (3) involved the use of conventional weapons (such as guns or knives); (4) were in non-humorous settings; (5) featured a high number of violent acts within a single setting; (6) and involved act/s that were motivated by protection of life, personal gain or retaliation. Graphically violent film clips were also chosen on the basis that they were realistic and highly violent, with the victim's injuries being obviously fatal. Fantasy violence was defined as a scene whereby those involved use choreographed actions to portray an unrealistic and over-the-top fight scene. Violent film clips featuring fantasy violence were also chosen on the basis that they were unrealistic and moderately violent, with the victim's injuries being non-fatal.

A sample of 20 participants was asked to independently rate each video clip. This served as a pre-test pilot for testing whether each video clip was suitable for use within the relevant experimental procedure. To check the suitability of the hero/villain violent perpetrators within the clip, participants were asked the extent to which they felt: (1) sympathy for the violent perpetrator in the clip; (2) empathy with the violent perpetrator in the clip; and (3) identification with the violent perpetrator in the clip. Results of these ratings can be found in Table 2 (p. 60). The participants were also asked whether they believed actions of the violent perpetrator to be 'morally justifiable'.

To check the suitability of the type of violence within the film clips, participants were asked to rate the clip on: (1) how injured they thought the victim/s were in the clip; (2) how long they thought it would take the victim/s to recover; and (3) how realistic they found the clip. Participants were also asked the extent to which they felt sympathy and empathy, and the

extent to which they identified with the victim in the video clip. Each question was answered on an 11-point Likert scale, with scores ranging from 0 (*not at all*) to 10 (*a lot*). For each question, a score of 0-4 was regarded as low, a score of 4-7 was regarded as moderate, and a score of 7-10 was regarded as high. Results of these ratings can be found in Table 2 (p. 60). Participants were also asked whether they believed the actions of the violent perpetrator to be morally justifiable. For those who watched a violent hero (*Pale Rider*; *Inglourious Basterd*s; *Batman: The Dark Knight Rises*), participants unanimously rated the actions of the character as morally justifiable. For those who watched a violent villain (*American History X*; *Fistful of Dollars*; *Spiderman*), participants unanimously rated the character's actions as morally unjustifiable.

Short clips were taken from the following films:

1. *American History X* (1998) – A fictional, graphic scene of violence featuring a villainous character intentionally stamping on a victim's head in the street; certificate 18, 00:02:20 minutes. This video was deemed appropriate for use as pre-experiment ratings of this video clip indicated little–no *sympathy* ($M = 1.35$, $SD = 1.76$), *empathy* ($M = 1.90$, $SD = 2.00$), or *identification* with the villain ($M = 1.25$, $SD = 2.31$), as well as rating the clip as highly *violent* ($M = 8.70$, $SD = 1.13$), highly *realistic* ($M = 8.70$, $SD = 1.38$), and scoring the victim's injuries as severe (*how long will the victim take to recover?*: $M = 9.95$, $SD = 0.22$; *how injured is the victim?*: $M = 9.85$, $SD = 0.45$).

2. *Fistful of Dollars* (1964) – A fictional, fantasy fight scene involving a gang of villainous men attacking a bloodied man while a man laughs; certificate 15, 00:02:03 minutes. This video was deemed appropriate for use as pre-experiment ratings of this

video clip indicated little–no *sympathy* ($M = 0.90$, $SD = 1.00$), *empathy* ($M = 0.80$, $SD = 1.11$), or *identification* with the villain ($M = 0.75$, $SD = 0.91$). Violence ratings indicate that participants viewed the clip as moderately *violent* ($M = 5.90$, $SD = 1.92$) and rated the victim's injuries as being moderately severe (*how long will the victim take to recover?*: $M = 6.10$, $SD = 1.89$; *how injured is the victim?*: $M = 6.65$, $SD = 1.90$).

3. *Inglourious Basterds* (2009) – A fictional, graphic scene of violence involving a man being applauded for attacking a villainous character with a baseball bat; certificate 18, 00:02:31 minutes. This video was deemed appropriate for use as pre-experiment ratings of this video clip indicated moderate feelings of *sympathy* ($M = 4.25$, $SD = 2.69$) and *empathy* ($M = 4.15$, $SD = 3.05$) with the hero. This video clip was also rated as being highly *violent* ($M = 7.65$, $SD = 1.46$), *realistic* ($M = 8.35$, $SD = 1.04$), and as scoring the victim's injuries as severe (*how long will the victim take to recover?*: $M = 9.85$, $SD = 0.37$; *how injured is the victim?*: $M = 9.80$, $SD = 0.41$). Video clip ratings did indicate moderate feelings of *sympathy* with the victim ($M = 5.45$, $SD = 2.84$) and low *identification* with the hero ($M = 3.25$, $SD = 3.16$). This may be in part due to the brutal nature of graphic violence, meaning that viewers may struggle to fully support the actions of the attacker who carries out a graphically violent act and may hold a mixed view on the justification of the graphic violence used.

4. *Pale Rider* (1985) – A fictional, fantasy fight scene of a heroic character fighting a gang of thieves; certificate 15, 00:02:25 minutes. This video was deemed appropriate for use as pre-experiment ratings of this video clip indicated moderate levels of *sympathy* ($M = 4.20$, $SD = 2.86$), *empathy* ($M = 4.90$, $SD = 3.31$) and *identification*

with the attacker ($M = 4.65$, $SD = 2.80$). Low levels of *sympathy* with the victims indicate the viewed violence was justifiable ($M = 1.35$, $SD = 1.69$). Violence ratings indicate that participants viewed the clip as moderately *violent* ($M = 4.20$, $SD = 2.31$) and rated the victims' injuries as being low-moderate in severity (*how long will the victim take to recover?*: $M = 3.95$, $SD = 2.26$; *how injured is the victim?*: $M = 4.45$, $SD = 2.26$).

5. *Batman: The Dark Knight Rises* (2012) – A fictional, fantasy fight scene where the hero of the film engages in a fight with another man, before kicking him through a glass window and taunting him; certificate 12, 00:01:51 minutes. This video was deemed appropriate for use as ratings of this video clip indicated a moderate score for *sympathy* ($M = 4.50$, $SD = 3.44$) and *empathy* ($M = 4.30$, $SD = 3.44$) with the hero. Low levels of *sympathy* with the victim ($M = 3.03$, $SD = 2.44$) also indicate the violence was justifiable. Violence ratings indicate that participants viewed the clip as moderately *violent* ($M = 4.23$, $SD = 2.13$) and low in realism ($M = 2.93$, $SD = 1.98$). The victim's injury was rated as being moderately severe (*how long will the victim take to recover?*: $M = 5.50$, $SD = 1.74$; *how injured is the victim?*: $M = 5.63$, $SD = 1.77$). Although *identification* with the hero ($M = 3.60$, $SD = 2.93$) was low, this may be in part due to him being a 'superhero', meaning a high degree of identification was unlikely.

6. *Spiderman* (2002) – A fictional, fantasy fight scene in which a villainous character violently punches, kicks, and taunts another man; certificate 12, 00:01:40 minutes. This video was deemed appropriate for use as ratings of this video clip indicated little–no *sympathy* ($M = 1.23$, $SD = 2.13$), *empathy* ($M = 1.77$, $SD = 2.40$), or *identification* with

the villain ($M = 2.20$, $SD = 2.72$). Violence ratings indicate that participants viewed the clip as moderately *violent* ($M= 5.83$, $SD = 2.12$) and low in *realism* ($M = 3.13$, $SD = 2.22$), and rated the victim's injuries as being moderately severe (*how long will the victim take to recover?*: $M= 5.33$, $SD = 2.26$; *how injured is the victim?*: $M = 6.77$, $SD = 1.74$).

Table 2

Ratings for all video clips used within the experimental sections of the thesis[1]

	Sympathy with violent perpetrator	Sympathy with victim	Empathy with violent perpetrator	Empathy with victim	Identification with violent perpetrator	Identification with victim	How violent was clip?	How injured is victim?	How long will victim take to recover?	How realistic was violence?
American History X (1998)	1.35 (1.76)	8.60 (1.90)	1.90 (2.00)	8.55 (2.16)	1.25 (2.31)	4.80 (2.73)	8.70 (1.13)	9.85 (0.49)	9.95 (0.22)	8.70 (1.38)
Fistful of dollars (1964)	0.90 (1.00)	7.45 (2.16)	0.80 (1.11)	6.75 (2.17)	0.75 (0.91)	4.30 (3.06)	5.90 (1.92)	6.65 (1.90)	6.10 (1.89)	5.40 (2.83)
Inglourious Basterds (2009)	4.25 (2.69)	5.45 (2.84)	4.15 (3.05)	4.90 (3.12)	3.25 (3.16)	2.30 (2.98)	7.65 (1.46)	9.80 (0.41)	9.85 (0.37)	8.35 (1.04)
Pale Rider (1985)	4.20 (2.86)	1.35 (1.69)	4.90 (3.31)	1.10 (1.37)	4.65 (2.80)	1.00 (2.00)	4.20 (2.31)	4.45 (2.26)	3.95 (2.26)	3.90 (2.49)
Batman: The Dark Knight Rises (2012)	4.50 (3.44)	3.03 (2.44)	4.30 (3.36)	2.50 (2.53)	3.60 (2.93)	1.50 (2.00)	4.23 (2.13)	5.63 (1.77)	5.50 (1.74)	2.93 (1.98)
Spiderman (2002)	1.23 (2.13)	7.33 (2.61)	1.77 (2.40)	6.77 (2.67)	2.20 (2.72)	5.01 (2.99)	5.83 (2.12)	6.77 (1.74)	5.33 (2.26)	3.13 (2.22)

[1] Note that each rating was checked for potential sex differences with a series of independent samples t-tests. No significant gender differences were found in the ratings of the video clips (all *p* < .05).

2.1.2. Non-violent video clip

In addition to the video clips featuring violence, a non-violent clip was also selected due to it featuring a heroic character 'winning', although it contained no intentional violent acts. The video selected is also an easily accessed, readily available clip found on YouTube.

7. *Sebastian Coe wins AAA 1500 metres* (1989) – Footage of a real-life 1500 metres race where, towards the end of the race, the runner falls over, yet recovers to win the race in a dramatic finale; no certificate, 00:03:08 minutes.

2.1.3. Violent and non-violent video games

The video games selected were commercially available and purchased online. Where listed, all age rating classifications are by the Pan European Game Information (PEGI). The video games were selected due to their contrast between extreme graphic violence and exciting, non-violent game play. After playing a video game, participants completed a video game evaluation questionnaire (Anderson & Dill, 2000).

Each participant played one of the two video games for 45 minutes, alone in a cubicle, after completing an in-game tutorial with the experimenter which lasted for approximately 10 minutes.

8. *Hatred*, PEGI age rating 18 (2015) – A graphically violent game whereby the player takes a bird's eye view on a psychopathic protagonist in an open-world environment. The aim of the game is for the player to use an assortment of guns and weapons to kill

as many computer-controlled human characters as possible. The game's objectives

include killing innocent civilians in brutal and graphic ways (e.g., slitting a victim's

throat) and utilising explosive devices to kill as many people as possible. *Hatred* has

been described by the *Metro* (2015) as "the most violent game on earth". To date, no

research has been conducted on investigating its effects on both emotions and

behaviours in a laboratory setting.

9. *Need for Speed: Most Wanted*, PEGI age rating 7 (2012) – A realistic driving

   simulator whereby the player takes an over-the-shoulder perspective of an anonymous

   racing driver. The aim of the game is to compete in various intense races against

   computer-controlled opponents with the aim of becoming the most respected driver in

   the city. The game features an open-world environment. The player can choose which

   races to undertake and is visually rewarded and congratulated by a voiced narrator

   when races are won and objectives (such as quickest lap time) are completed. *Need

   for Speed: Most Wanted* was selected due to it being a non-violent, exciting video

   game that has been described by IGN as "an exhilarating experience" (IGN, 2012). To

   date, no research has been conducted on the use of this game.

2.1.4. Ethical considerations of using graphically violent imagery

The laboratory-based exploration of the effects of watching graphically violent imagery

necessitates the use of such images as stimuli. However, showing individuals graphic

violence whereby the aim is to induce feelings of anxiety and anger needs to be carefully

considered. Firstly, care should be taken to ensure participants are comfortable viewing

potentially distressing scenes of violence. As with all good ethical practice in experimental

studies, participants should be: (1) briefed that the clip may contain distressing and disturbing scenes; (2) told that they have the right to leave the experiment if they wish; and (3) informed that they are under no obligation to continue if they find the stimulus too disturbing to continue watching and will suffer no penalty for withdrawing.

Participants were fully debriefed at the end of the study in line with standards set by the British Psychological Society (2009), and each participant was told about any deception during the experimental procedure. While participants were asked how they were feeling after completing the experiment (to confirm that any effects from the video clip/game, such as feelings of anger or anxiety, had worn off), as an extra check future experiments would benefit from utilising physiological measures (such as skin conductance) to assess whether participants are in a fit state to leave the laboratory post-testing.

2.2. Questionnaires and behavioural measures

Where appropriate, normative values from studies with the largest sample sizes are reported. Cronbach's alpha values are also reported where appropriate; these values provide internal reliability information (excellent = $\alpha \geq 0.9$; good = $\alpha \geq 0.8$; acceptable = $\alpha \geq 0.7$; questionable = $\alpha \geq 0.6$; poor = $\alpha \geq 0.5$; Cronbach, 1951).

2.2.1. Measures of aggression

Three measures of aggression were utilised across experimental conditions to test participants' likelihood of acting aggressively and their aggressive behaviour in a laboratory setting. The aggressive behavioural tendencies (ABT) questionnaire was created for use in the experiments documented in this thesis and is a self-report aggression questionnaire. The

hot sauce paradigm and the cold pressor task are behavioural tasks designed to measure aggressive behaviour.

2.2.1.1. Aggressive behavioural tendencies (ABT)

Measuring aggression using open-ended story stems is a popular method in media violence research (e.g., Anderson & Bushman, 2001; Barlett, Harris, & Baldassaro, 2007). To assess a participant's ABT, a new questionnaire was devised to measure a participant's likelihood of responding aggressively to provocation. As part of this questionnaire, eight vignettes were devised depicting hypothetical situations whereby an antagonist had done something to provoke the participant. The situations outlined require participants to imagine themselves in a social altercation, whereby an imaginary antagonist displayed inconsiderate, rude, antisocial behaviour towards them. Participants were asked to rate how likely they would respond, with all possible responses measuring the likelihood of responding with verbal aggression (i.e., expressing anger, being rude, yelling, swearing, threatening).

These situations were adapted from a questionnaire used in a study conducted by Velez et al. (2012). Situations were anglicised to make them more appropriate for a predominately British set of participants, and, where appropriate, they were kept as close to the original scenarios as possible. An example question is: *"You are eating lunch at the University café; a University of Birmingham student throws some food at you and starts laughing with his friends."* The statements were presented alongside four questions asking participants to imagine how they would respond to the situation, with each subsequent item measuring a more aggressive response. The questions assessed participants' (1) likelihood of expressing anger, (2) likelihood to be rude to the antagonist, (3) likelihood to yell and swear at the antagonist, and

(4) likelihood to physically threaten the antagonist. All aggressive tendencies were measured on an 11-point Likert scale, ranging from 0 (*not at all likely*) to 10 (*extremely likely*).

To test for any potential effects on aggression towards in-group or out-group members, four of the vignettes depicted situations where the antagonist was a University of Birmingham student (in-group member) and four contained a situation where the antagonist was a University of Manchester student (out-group member). The antagonist's identity was counter-balanced across all participants. Although the questionnaire was originally designed to examine participants' responses to both in-group and out-group members, analysis of results across all experimental conditions did not show any noticeable significant main effects of group identity or any interactions. Therefore, 'group identity' was not considered further in any of the analyses documented in this thesis. However, to ensure all participants completed the same questionnaire, the hypothetical situations were kept identical across all experimental conditions, which means that in-group and out-group antagonists were still present in the descriptions of the situation.

As a novel questionnaire, reliability scores and normative data for this questionnaire are not presently available. However, across all experimental conditions, results from participants' baseline responses reveal there to be excellent internal reliability for the questionnaire (experiment 1: $N = 160$, $\alpha = .94$; experiment 2: $N = 60$, $\alpha = .96$; experiment 3: $N = 55$, $\alpha = .97$; experiment 4: $N = 60$, $\alpha = .94$). Descriptive data and a combined reliability score for this questionnaire can be found in Table 3 (p. 74).

2.2.1.2. Hot sauce paradigm

The hot sauce paradigm (based on Lieberman et al., 1999) is an experimental task and a behavioural measure of a participant's aggressive behaviour. Prior to the experiment, participants were emailed a taste preference questionnaire, which assessed their preference for certain flavours (e.g., spicy, plain, sour, etc.). On arrival at the experiment, participants consumed a cup of hot sauce (a mix of two parts 'Franks Red Hot Original Cayenne Pepper Sauce' and one part tabasco sauce) and water (50g). Participants were told that, to avoid experimenter bias, the amount of hot sauce added to the cup was selected for them by the preceding participant. In truth, this amount was fixed for all participants, with 3g of the chilli sauce mixture added. Participants were then asked to complete the other measures of the experiment, which involved the watching or playing violent or non-violent entertainment media.

As the measure of aggression, at the end of the experiment participants were given a cup of water (50g) and asked to add as much hot sauce to the cup as they liked. They were told that this cup, in its entirety, would be consumed by the next participant taking part in the experiment. Participants were also shown a taste preference questionnaire which they believed to be filled out by the next person. This questionnaire led the participant to believe that the person who will be consuming the drink had a strong dislike for spicy food (i.e., the sauce given to the participant to administer). Participants were therefore aware that the more hot sauce they added to the water, the more unpleasant the experience would be for the next participant. The main dependent measure of aggression was, therefore, the weight in grams of hot sauce allocated to the target, determined by weighing the cups before and after the chilli sauce was added. The difference (in grams) was recorded and greater amounts of hot sauce administered were indicative of greater instrumental aggressive behaviour. Participants were told that allocation of the hot sauce would be done outside of the view of the other participant

and the experimenter. Participants were also assured that the amount added could not be traceable back to the participant.

To pilot this experimental measure and to assess whether the hot sauce was sufficiently painfully spicy, ten volunteers (five men, five women; M age = 19.01, SD = 1.11) were asked to taste and rate the hot sauce on an 11-point Likert scale, ranging from 0 (*not at all hot*) to 10 (*extremely hot*). The rating for the hot sauce indicated that the sauce was sufficiently spicy (M = 7.73, SD = 1.03). All volunteers indicated that the sauce was unpleasant and that a greater amount of sauce added would make the taste of the drink more unpleasant and painful.

As discussed in Section 1.9 (p. 29), the hot sauce paradigm remains a popular way of reliably assessing aggression in media violence literature. Some of the notable advantages of this methodology are that it does not require expensive and elaborate equipment (as in the case of electric shock paradigms) and that the observed behaviour is easily quantifiable (amount of sauce dispensed). Participants who completed this experimental process were asked about their motivations for adding high doses of hot sauce. Some responded that it was to cause pain to the person drinking it and because they knew the person drinking did not like hot food. One person even reported that they wanted the person drinking it to "suffer". These answers support claims that this paradigm is an accurate measure of aggressive behaviour.

It is worth noting, however, that some participants did not report that they found the consumption of the drink painful or unpleasant, potentially due to a high tolerance to spicy food or a preference for it. As such, these participants may not realise the severity of their actions when they add a substantial amount of hot sauce to a target's drink.

The validity of the hot sauce paradigm has also been questioned (Ritter & Eslea, 2005), particularly in relation to whether the findings of the paradigm can be generalised to real-world aggression, since adding hot sauce to someone's drink is not a conventional way of acting aggressively (Elson & Ferguson, 2014). Furthermore, there is always the possibility of demand characteristics influencing participants' decisions. Since the researcher asks the participants to prepare the hot sauce for another participant to drink, participants may choose to add sauce because they believe this is what the experimenter wants them to do. To address this problem, each participant who conducted this experimental measure was asked why they added the amount of sauce to the drink, with anyone who showed a possibility of acting due to demand characteristics having their results excluded from the study. Although no participants were excluded due to this, there remains the possibility that participants did not wish to admit to feeling pressured to add hot sauce and so gave an answer which they believed the experimenter would want to hear.

There are also ethical concerns with using this procedure. A lack of clear exclusion criteria based on health problems (e.g., asthma, acid reflux, etc.) may have meant that participants felt pressured to consume a drink that could cause them undue harm. Participants were informed that drinking was entirely optional, and no participants showed any ill effects after consumption. However, future research would benefit from a more extensive screening of health problems for participants who complete this experimental paradigm. It is also important to note that deception of the participant is involved. While deception was necessary in this instance to ensure participants believed they were intentionally causing harm to someone, it remains a possibility that participants were adversely affected by the decisions they made during the task. The British Psychological Society (2009) ethical guidelines have

strict guidance for debriefing subjects, who should be provided with an explanation of the nature, results, and conclusions of the research to "inform them of the outcomes and nature of the research, to identify any unforeseen harm, discomfort, or misconceptions, and in order to arrange for assistance as needed" (p. 22). Every effort was made to ensure that all participants were thoroughly debriefed after completion of the study. However, future research may want to follow up on participants who complete the study to ensure that there are no long-term psychological effects that have developed because of the experimental measures.

2.2.1.3. Cold pressor task

The cold pressor task (based on Przybylski et al., 2014) is an experimental task designed to measure a participant's aggressive behaviour. Participants were informed that they were to undergo a task designed to measure pain tolerance, by placing their hand in a container of ice and water. Participants were told that the length of time they were to hold their hand in the chilled water had been selected for them by the preceding participant. In truth, this time period was fixed for all participants at 30 seconds. The bath was maintained at 3°C and the temperature was verified for each participant using a thermometer.

At the end of the experiment and after engaging with violent or non-violent media, participants were provided with a single item measure that asked: *"Based on your experience in the experiment thus far, how long do you believe the next participant should be instructed to put his or her hand in the chilled water?"* The amount of time participants assigned for the next participant to endure the aversive physiological task was used as a behavioural measure of aggression. A higher number of seconds allocated to the next participant was indicative of greater aggression.

The cold pressor task was selected due to its increasing popularity in media violence literature (e.g., Ferguson et al., 2015), its simple design, and the ability to use the number of seconds assigned to the next participant as an easily quantifiable aggression measure. A major strength of this approach is that, while there is some degree of increased tolerance in some participants, all volunteers reported that the submersion of their hand in the cold water was unpleasant and painful. This contrasts the hot sauce paradigm, for example, where some participants did not find the consumption of the spicy drink as particularly unpleasant.

Limitations of this approach are consistent with the hot sauce paradigm (see 2.2.1.2), in that there was the potential for demand characteristics, and participants could have been adversely affected by their decisions. Again, it would also have been beneficial if future research included a more comprehensive screening procedure to ensure that potentially at-risk participants were not selected to take part (e.g., those with conditions that may exacerbate the effects of submerging body parts in low temperatures).

2.2.2. Emotional mood and personality inventories

In total, four emotional mood and personality inventories were administered to participants across the various experiments detailed in this thesis. These questionnaires were selected due to their widespread use in psychological research.

2.2.2.1. State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI; Spielberger et al., 1983) is a commonly used tool that measures trait anxiety and state anxiety via self-report. The STAI has 40 items, with 20 items allocated to each of the state anxiety and trait anxiety subscales. In all experiments conducted as part of this thesis, participants only answered the 20 questions relating to state anxiety. The state anxiety scale evaluates the current state of anxiety, asking how respondents feel 'right now', using items that measure subjective feelings of apprehension, tension, nervousness and worry (e.g., *"I feel calm"*, *"I feel secure"*). All items were rated on a 4-point Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*). Scores for each question were added together with a higher score indicating greater state anxiety. Descriptive data, a reliability score (Quek, Low, Razack, Loh, & Chua, 2004), and normative data (Spielberger, 2013) for this questionnaire can be found in Table 3 (p. 74).

2.2.2.2. State-Trait Anger Expression Inventory-2

The State-Trait Anger Expression Inventory-2 (STAXI-2; Spielberger, 1999) is a 57-item inventory which measures the intensity of anger as an emotional state (state anger) and the disposition to experience angry feelings as a personality trait (trait anger), as well as anger expression/control. This study only measured participants' self-reported state anger scores; thus, no further information will be provided for the trait anger scale. The STAXI-2 state anger scale assesses the intensity of anger as an emotional state at the time of testing (e.g., *"I am furious"*, *"I am angry"*) and contains 15 questions. All respondents answered on a 4-point Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*). Descriptive data, a reliability score (Spielberger et al., 1983), and normative data (Spielberger et al., 1999) for this questionnaire can be found in Table 3 (p. 74).

2.2.2.3. Positive and Negative Affect Schedule

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item inventory which measures feelings of both positive affect and negative affect at the time of testing (e.g., *"I feel upset"*, *"I feel excited"*). Positive affect refers to the extent to which an individual is experiencing positive emotions and engagement, such as alertness, interest, and energy. Negative affect refers to the extent to which an individual is subjectively experiencing negative emotions, such as contempt, disgust, guilt, and nervousness. All respondents answered on a 5-point Likert scale, ranging from 1 (*not at all*) to 5 (*very*). The ten items relating to positive mood and the ten items relating to negative mood were totalled to give a score for positive mood and negative affect, respectively. Descriptive data, a reliability score (Crawford & Henry, 2004), and normative data (Crawford & Henry, 2004) for this questionnaire can be found in Table 3 (p. 74).

2.2.2.4. Aggression questionnaire

The trait aggression questionnaire (AQ; Buss & Perry, 1992) is a 29-item inventory designed to assess dimensions of general aggressive behaviour. The questionnaire can also be divided into four subscales: verbal aggression (e.g., *"My friends say that I'm somewhat argumentative"*), physical aggression (e.g., *"If I have to resort to violence to protect my rights, I will"*), anger (e.g., *"some of my friends think I'm a hothead"*), and hostility (e.g., *"I am sometimes eaten up with jealousy"*). Each statement is rated on a Likert scale from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). Descriptive data,

reliability scores (Fossati, Maffei, Acquarini, & Di Ceglie, 2003), and normative data (Buss & Perry, 1992) for this questionnaire can be found in Table 3 (p. 74).

2.2.2.5. Reactive-proactive aggression questionnaire

The reactive-proactive aggression questionnaire (RPQ; Raine et al., 2006) is a 23-item inventory. The questionnaire investigates an individual's propensity to engage in specific aggressive behaviour. Eleven items are classed as reactive aggression (e.g., *"I have gotten angry when frustrated"*, *"I have hit others to defend myself"*) and 12 items are classed as proactive (instrumental) aggression (e.g., *"I have taken things from others"*, *"I have used physical force to get other people to do what I want"*). Respondents answer on a 3-point Likert scale, ranging from 0 (*never*) to 2 (*often*). Descriptive data, reliability scores (Raine et al., 2006), and normative data (Raine et al., 2006) for this questionnaire can be found in Table 3 (p. 74).

Table 3

Minimum and maximum possible scores, reliability scores, and normative values (with mean and standard deviation in parentheses) for the aggression and emotion questionnaires used across all chapters

Questionnaire	Min/Max score	α	Normative values
ABT	0/320	.94	----------
STAI – state anxiety	20/80	.86	37.47 (10.99)
STAXI – state anger	15/60	.93	18.58 (6.07)
PANAS – PA	10/50	.89	31.30 (7.70)
PANAS – NA	10/50	.85	16.00 (5.90)
AQ – Total	29/145	.69	77.80 (16.50)
AQ – Physical aggression	9/45	.81	21.10 (7.15)
AQ – Verbal aggression	5/25	.53	14.35 (3.90)
AQ – Anger	8/40	.72	16.85 (5.65)
AQ – Hostility	8/40	.68	20.75 (5.90)
RPQ – Reactive aggression	0/22	.84	7.14 (4.39)
RPQ – Instrumental aggression	0/24	.86	2.84 (3.67)

2.2.3. Other materials

2.2.3.1. Habitual media violence usage questionnaire

The habitual media violence questionnaire (Krahé & Möller, 2010) was designed to measure the amount of violent films and video games an individual interacts with on a regular basis. An adapted version of this questionnaire was used, with participants asked to report their violent-video-game use only and the amount of time they spend playing 'racing' games. Participants were provided with genre lists for electronic video games and for each item, and they were asked to indicate how frequently they play the respective genre on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*very often*). The genres presented to participants were identical to the ones used in the study by Krahé et al. (2011). Krahé et al. (2011) also assigned violence ratings to each of the genres based on their own analysis. Violence ratings ranged from 2.05 to 4.95.

In total, 16 genres were presented: (1) *beat-em ups*, (2) *shoot-em ups*, (3) *first-person shooters*, (4) *third-person shooters*, (5) *tactical shooters*, (6) *survival horror*, (7) *genre mix*, (8) *classic adventure*, (9) *action adventure*, (10) *role-playing*, (11) *general simulation*, (12) *military simulation*, (13) *sports*, (14) *racing*, (15) *construction strategy*, and (16) *military strategy*. Each game category was illustrated by a specific example prominent at the time of the study (e.g., first-person shooters: *Call of Duty*).

Consistent with Krahé et al. (2011), participants' frequency ratings for each of the selected genres were multiplied by the average violence rating scale of that genre, and the resulting

product scores were averaged. This meant there was a minimum score of 3.30 and a maximum score of 16.53. Normative data was taken from Krahé et al. (2011), which features an overall score for habitual violent film use and video game use combined ($N = 303$; $M = 6.75$, $SD = 1.62$) and good internal reliability ($\alpha = .85$).

2.2.3.2. Taste preference inventory

Participants completed an 18-item taste preferences inventory developed by the researcher. Participants were asked to rate 18 different flavours on a 10-point Likert scale, ranging from 1 (*strongly dislike*) to 10 (*strong liking*). This measure acted as an assessment of a participant's own preference towards spicy food and was used to lead participants to believe that their target for hot sauce allocation had a strong disliking of spicy/hot food.

2.2.3.3. Video game evaluation questionnaire

The video game evaluation questionnaire (Anderson & Dill, 2000) assessed players' self-reported ratings of different characteristics of the video game and their own experience. This questionnaire was identical to the one used by Anderson and Dill (2000), and it assessed how: (1) *enjoyable*, (2) *exciting*, (3) *difficult*, (4) frustrating, and (5) *realistic* players perceived the game. Participants were also asked to rate (6) *ease of controls*, (7) *ability of player overall*, (8) *how much ability of player improved between first and last five minutes*, (9) *how hard the player was trying*, and (10) *overall level of action.* All answers were given on a 7-point Likert scale, ranging from 1 (*not at all*) to 7 (*extremely*). Results of this questionnaire were not

merged, but each response was independently selected to test for any potentially confounding differences between the video games.

2.3. Equipment

All participants answered the questionnaires and viewed the experimental videos on a MacBook Air 13-inch laptop. Participants played the video games on a 21-inch BenQ monitor. Participants were given headphones to wear for the duration of the video clips/games.

2.4. General experimental procedure

Participants were tested individually in a cubicle, where they sat with the experimenter who obtained informed consent and read through standardised instructions explaining the procedure of the experiment. Participants first completed the behavioural measures of aggression (if applicable) and were then left alone in the testing cubicle while they filled out any questionnaires that were relevant to the experiment. After engaging with the relevant entertainment media, participants filled out the remaining questionnaires. After this, participants completed the second part of the behavioural measures (if applicable) and any extra materials that were relevant to the experiment. Overall, the experiments took between 60 and 120 minutes to complete. It was ensured that all participants were fully debriefed at the end of the study and any forms of deception used within the experiment were explained. Participants were also probed as to the purpose of the study and given the opportunity to

indicate whether they were aware of any deception used. It was explained that any suspicion or knowledge of the experimental protocols or deception would not lead to a penalty.

2.5. Statistical analysis

Data screening and statistical analysis were carried out using SPSS Version 21 (IBM Corporation).

Before any statistical analyses were performed (e.g., t-tests, analysis of variance [ANOVA], regression analyses), preliminary assumptions of normality and homogeneity of variance were conducted. This was to assess whether parametric or non-parametric tests would be the most suitable. In line with common psychological practice, assumptions of normality and of homogeneity of variance were checked graphically and with Levene's test to assess the equality of variances (e.g., Hazelton, 2003; Hoekstra, Kiers, & Johnson, 2012; Schucany & Ng, 2006). Histograms were checked for non-normal data (i.e., skewed data). The histograms indicated that the mean scores of the dependent variables were normally distributed and Levene's test for the dependent variables was non-significant ($p > .05$). This indicates that the results did not violate the assumptions of normality or homogeneity of variance. Thus, parametric tests were used in the analysis of the results. For correlational analyses, scatter plots for the dependent variables of the experiment were created. The graphs indicated the data was normally distributed with no notable outliers and there was an indication of a linear relationship between variables. These observations indicated that Pearson's parametric tests were the most suitable statistical tests with which to explore any correlations in the data.

Depending on the type of statistical analysis used, effect sizes are reported and discussed as either: (1) Cohens d (d; for paired sample t-tests), with the following suggested norms for interpretation: small = .02, medium = .05, large = .08 (Cohen, 1988); (2) partial-eta squared ($\eta2$; for assessing the size of effect in ANOVA main effects and interactions), with the following suggested norms for interpretation: small = .01, medium = .06, large = .14 (Cohen, 1988); or (3) Pearson r correlation (r; for assessing the size of effect in correlational analyses), with the following suggested norms for interpretation: small = .01, medium = .03, large = .05 (Cohen, 1988, 1992).

CHAPTER 3: INVESTIGATING THE IMPACT OF IDENTIFICATION AND MEDIA TYPE ON MOOD AND LIKELIHOOD OF AGGRESSIVE BEHAVIOUR

3.1. Introduction

As discussed in the general introduction (Chapter 1) of this thesis, the use of violent media has been strongly associated with aggressive and violent behaviour (e.g., Anderson et al., 2010; Anderson & Bushman, 2001; Bushman & Anderson, 2002; Carnagey, Anderson, & Bartholow, 2007; Carnagey, Anderson, & Bushman, 2007; Sestir & Bartholow, 2010). Evidence also suggests that violent media can influence emotional states (e.g., Arriaga et al., 2006; Anderson & Bushman, 2002a, 2002b; Anderson & Carnagey, 2009) which may serve as significant pathways to aggressive behaviour. In this chapter, these assumptions will be tested.

As outlined in detail in Section 1.4.5 (p.14), the general aggression model (GAM) has been used extensively to serve as an explanation for how violent media may impact upon the user (e.g., Anderson, Carnagey, & Eubanks, 2003; Cruz & Bushman, 2015; Gentile et al., 2011; Kirsh, Mounts, & Olczak, 2006; Lin, 2013). Supporters of the GAM have argued that this model remains an extensive and comprehensive guide to how and why some individuals act aggressively. It has also been argued that this model can be used to inform violence treatment programmes aimed at reducing violent behaviours (DeWall, Anderson, & Bushman, 2011). The GAM remains widely accepted by scholars, and many believe the model best explains how the media impacts aggressive behaviour (e.g., Vossen, Piotrowski, & Valkenburg, 2017).

The GAM has, however, previously been the target of criticism (e.g., Ferguson and Dyck, 2012). One criticism is that the model argues that mere exposure to media violence in any form leads to aggressive outcomes (Lin, 2013). This means potential essential characteristics of violent media that may mediate this relationship are overlooked. Two neglected, but potentially important, characteristics are explored in the first experiment of this thesis, namely the type of violence portrayed and the characteristics of the perpetrator.

Research evidence suggests that the type of violence within the media may affect the extent of any effect. First, as will be explored in the next section, results from psychological studies have suggested that graphic and fantasy representations of violence may lead to different negative outcomes in the user. This may include the elicitation of differing emotional responses, as well as a higher likelihood of acting aggressively after interacting with either graphic or fantasy media. While not directly measured in this chapter, excitation-transfer theory (detailed in Section 1.4.1, p. 5) would predict that the type of violence that has the greatest effect on physiological arousal would lead to the greatest effect on aggression.

Second, the on-screen violent perpetrator, and whether the watcher identifies with the character, may affect emotional and behavioural outcomes of violent media. As detailed in Section 1.4.4.1 (p.12) and 1.4.5 (p. 14), SCT and script theory would predict a greater likelihood of copying aggressive behaviour if the viewer watches a violent character whose actions are framed in a positive way (i.e., the aggressive response is justifiable).

This experiment therefore investigated how the type of violence (graphic vs. fantasy) and violent character (hero vs. villain) affects aggression. These will be discussed alongside the

aforementioned theories and models, with the aim of providing a critique, as well as a more complete explanation as to how different types of media violence may impact a viewer.

3.1.1. Graphic vs. fantasy violence

In Section 1.11 (p. 35), the distinction between graphic and fantasy violence was outlined. As discussed, Potter and Smith (2000) suggest that "Graphic portrayals of violence engage emotions more strongly than non-graphic portrayals" (p. 302). Weaver and Wilson (2009) have also argued that graphic violence features "blood, gore, and close-ups of the aggression" (p. 447). These characteristics, along with Potter and Smith's (2010) extensive definition of what constitutes a graphic scene of violence, allow researchers a better chance of selecting appropriate stimuli to test for effects of graphic media against other violence representations. In contrast, fantasy violence has been defined as "violent actions of a fantasy nature, involving human or non-human characters in situations easily distinguishable from real life" (ESRB, 2016). Fantasy violence may contain scenes featuring unrealistic characters (e.g., superheroes), over-the-top, caricatured fight scenes, or scenes which take place in an obvious fantasy setting.

The GAM does not specifically predict whether graphic violence, compared to fantasy violence, will have a greater negative effect on the user. Thus, many studies do not consider the potential impact of graphicness. An alternative explanation as to why graphicness is seldom studied could be to do with ethical considerations with respect to showing graphic depictions of violence on participants. Regardless, Riddle (2014) and Ferguson (2008, 2015) suggest that a worldwide "moral panic" (e.g. Ferguson, 2008, p. 6) means that politicians, governments and the general public show a consistent concern with links between societal

violence and the level of blood, gore, and graphic content in violent media. As graphic media violence continues to grow in popularity, many researchers believe that there should be a greater focus in media violence research on this topic (e.g., Farrar, Krcmar, & Nowak, 2006; Sargent et al., 2002).

Several research studies indicate that more graphically violent media, compared to less graphic media, can lead to greater levels of arousal (Barlet, Harris, & Bruey, 2008; Zillman, 1991). Excitation-transfer theory predicts that increased arousal should translate into a greater likelihood of hostile thoughts and the likelihood of acting aggressively. Experimental evidence supports this claim, indicating that those who interact with more graphically violent media show a greater tendency to an increased likelihood of reactive aggression (e.g., Anderson & Dill, 2000; Bartlett, Branch, Rodeheffer, & Harris, 2009; Ivory & Kalyanaraman, 2007; Sparks & Sparks, 2002).

Research investigating the impact of graphic content has so far failed to provide a comprehensive explanation as to the mechanisms in which graphic, violent imagery might lead to aggressive behaviour (Riddle, 2014). However, there is a growing amount of evidence that suggests brief video clips containing graphic violence are sufficient to elicit negative affect in the watcher (e.g., Kreibig, Wilhelm, Roth, & Gross, 2007; Strenziok et al., 2011; Madan et al., 2014). Similarly, graphically violent media has been shown to lead to heightened feelings of state anxiety and hostility in users, compared to those that interact with fantasy violence (Barlett, Harris, & Bruey, 2008; Berry, Gray, & Donnerstein, 1999; Riddle, 2014; Weaver & Wilson, 2009). As discussed in Section 1.14.2 (p. 48), state anxiety is one potential emotional change that can lead to aggressive behaviour. However, no known studies have investigated how graphic violence may impact feelings of state anger. As previously

discussed, this emotional state has also been frequently linked to aggressive behaviour. As graphic violence has previously been shown to elicit negative affect in viewers, heightened feelings of state anger may well follow viewing such media.

3.1.2. Identification with violent protagonist

Anderson and Dill (2000) have previously written that "the danger in exposure to violent (media) seems to be in the ideas they teach and not primarily in the emotions they incite in the player" (Anderson & Dill, 2000, p. 788). This statement contradicts other predictions of the GAM, namely that changes to an individual's arousal and affect are the main pathways to aggressive behaviour. Anderson and Dill's statement suggests that negative outcomes of violent media occur through learning and reinforcement of aggressive actions. This potentially implicates imitation of behaviour consistent with SCT (Bandura, 1973, 1977).

Script theory would also predict that individuals who are exposed to violent role models in the media learn aggressive knowledge structures which guide future behaviour. Script theory predicts that violent media teaches users that aggressive responses are acceptable in a broad range of social situations (e.g., Anderson & Bushman, 2002a, 2002b). An extension of this theory suggests that individuals are more likely to adapt scripts by incorporating copies of certain actions and behaviours from role models, particularly if the degree of identification with them is high (Boon & Lomore, 2001; Bushman & Huesmann, 2006).

Identification with characters from entertainment media has generally been understood to denote feelings of affinity, empathy, similarity, and liking of the on-screen characters (Konijn et al., 2007; Liebes & Katz, 1990). When identification occurs, this can lead the observer to

emulate the characters and to use them as a role model for future behaviour (Hoffner & Buchanan, 2005; Huesmann, Eron, Klein, Brice, & Fischer, 1983). Several studies have suggested that the likelihood of acting aggressively is increased following identification with a violent protagonist (e.g., Funk et al., 2004; Gentile & Anderson, 2003; Gentile, Saleem & Anderson, 2007; Konijn et al., 2007; Perry & Perry, 1976; Turner & Berkowitz, 1972).

Heroic figures might act as particularly powerful role models. Furthermore, it can be predicted that the most likely target of a viewer's identification is with a heroic character. A hero as depicted in entertainment media can be defined as a person (normally the protagonist) who combats adversity by demonstrating desirable characteristics such as courage and determination. Heroes who fit this description in the media are often tough and aggressive, and they frequently employ violent measures to achieve their goals. It has been suggested that those who watch and identify with violent heroes may be the most likely to behave more aggressively after interaction with the piece of violent media (Konijn et al., 2007). This may be because individuals notice desirable characteristics from these heroes which they then apply to their own behaviour (Epstein et al., 2001; Greenberg, Pyszczynski, & Solomon, 1986; Frosh, Phoenix, & Pattman, 2002).

Few experimental studies have focused on potential negative outcomes after watching an undesirable person act violently on screen. In contrast to heroes, villains are usually the antagonist in entertainment media. The villain's role in the entertainment media is to have a negative effect on other characters; this usually involves some sort of harm to others in pursuit of the villain's goal. Due to this, identification with these types of character is unlikely. As discussed in Section 1.4.4.1 (p. 12), identification with a violent protagonist is likely to lead to the belief that violence is justified. However, as viewers are unlikely to

identify with a villain, there is less chance they will regard a villain's violent acts as justified. Therefore, it can be predicted that a desire to imitate a villain's behaviour is unlikely (Krcmar & Valkenburg, 1999; Meyer, 1972).

As discussed, SCT and script theory generate the prediction that violent media featuring a violent 'hero' will increase the likelihood of aggressive behaviours. However, the mechanisms by which watching a violent villain can lead to increased aggression have not been specified by previous research. One possibility is via an impact on emotional states. To investigate this prediction, researching how viewing a violent villain may affect state anxiety and state anger may be logical, as these negative states have been strongly linked to aggressive behaviours (see Section 1.14, p. 45). If viewing a violent villain leads to greater increases in arousal, then this may have the greatest impact on aggression, consistent with excitation transfer. The GAM also predicts that both negative-affect increases and imitation of violent behaviours are both ways in which violent media leads to aggressive behaviour (with SCT supporting the latter prediction). Therefore, investigating violent heroes and villains separately may be useful in furthering our understanding both of what type of violent media is the most likely to foster aggressive tendencies and of the pathways that may lead to this potentially negative outcome.

3.1.3. Aims and hypotheses

The aim of the first experiment was to investigate how media violence can influence emotional mood states and the likelihood of the expression of aggressive behaviours. The focus of the study was to explore two key elements in various scenes of violence as depicted in movie clips, namely, the type of violence and the character of the protagonist. Thus, the

study investigated the relative effects of watching graphic versus fantasy violence on state anxiety, state anger, and aggressive behaviour. The study further explored how these emotional states and propensity to aggression are affected by watching a violent hero, compared to a violent villain. In the study, aggression was measured using a self-report questionnaire, detailing how the participant would respond after being antagonised in a variety of situations. As such, this questionnaire can be viewed as a better fit for measuring reactive aggression, rather than instrumental aggression, in line with the definitions discussed in Section 1.5.1 (p. 22).

Three hypotheses were developed for the current investigation. First, an aim of the experiment was to test the GAM and the implicit suggestion that any form of violent media will foster aggressive cognitions and behaviours (Anderson & Bushman, 2002a). For the GAM to be supported, watching any video clip featuring a scene of violence should lead to participants indicating a greater likelihood of acting aggressively.

Second, it was hypothesised that the increase in violence would be moderated by the type of media violence watched, with graphic representations of violence having a greater effect than fantasy violence. It was further predicted that graphic violence would elicit stronger feelings of state anxiety and state anger in the viewer than would representations of fantasy violence.

Third, in line with SCT and script theory predictions, it was hypothesised that there would be a larger increase in the likelihood of acting aggressively if the violence on screen was carried out by a hero, compared to a villain. A further aim was to establish whether any increase in the likelihood of acting aggressively for viewers of a violent villain reflected changes in state anger or state anxiety.

3.2. Method

3.2.1. Design

The study featured a 2 (*time*: pre-video/post-video) x 2 (*type of violence*: graphic/fantasy) x 2 (*who commits the violence*: hero/villain) mixed factorial design. *Time* was a within-subject factor and *type of violence* and *who commits the violence* were between-subjects factors. There were three dependent variables of the experiment, which were the *likelihood of acting aggressively (ABT)*, *state anxiety*, and *state anger*.

3.2.2. Participants

Participants were 160 University of Birmingham undergraduates (98 women, 62 men) who took part in the study for course credit. Ages ranged from 18 to 38 years ($M = 19.23$, $SD = 0.73$). All participants gave informed consent prior to taking part in the study. Ethical approval for this experiment was granted by the University of Birmingham School of Psychology Ethics Committee on 10 February 2014. An amendment was made to this application and approved on 19 May 2014.

While the specific aims of this research study were not disclosed to participants, enough information was provided that allowed participants to make an informed decision on whether or not to take part in the experiment. Each participant was treated according to the ethical standards set by the British Psychological Society.

3.2.3. Materials

One of four video clips was shown to participants (see Table 4). Individuals' mood was assessed using the STAI (State-Trait Anxiety Inventory; Spielberger et al., 1983) and STAXI-2 (State-Trait Anger Expression Inventory-2; Spielberger, 1999). Likelihood of aggressive behaviour was assessed using the ABT questionnaire. More detailed descriptions of the measures (including normative scores and reliability analyses) can be found in the general methods section (Table 3, p. 74).

Table 4

Details of the film clips shown to participants in experiment 1

	Hero committing violence	**Villain committing violence**
Graphic violence	*Inglourious Basterds* (2009) 0:2:31 minutes $n = 40$	*American History X* (1998) 0:2:20 minutes $n = 40$
Fantasy violence	*Pale Rider* (1985) 0:2:25 minutes. $n = 40$	*Fistful of Dollars* (1964) 0:2:03 minutes. $n = 40$

3.2.4. Procedure

Participants were tested in accordance with the procedure outlined in the general methods section (Section 2.4, p. 77). When filling in the questionnaires, the participant first completed the ABT questionnaire followed by the STAI and the STAXI-2 questionnaires. Answering the questionnaires took approximately 20 minutes to complete. After completing the questionnaires, participants watched one of the four selected video clips. The video clip to be shown was randomly allocated to the participant prior to testing.

After viewing the clip, participants completed the ABT questionnaire, STAXI-2, and STAI questionnaires for a second time. The approximate time between completing questionnaires was 10 minutes. After being probed as to the purpose of the study, no participants indicated that they suspected any links between the film shown to them and how they responded on any of the questionnaire measures. Overall, the experiment lasted approximately 50 minutes per participant.

3.3. Results

3.3.1. Preliminary analysis

Preliminary analyses explored the possibility of sex main effects or interactions. As there were none, sex was not included in the analysis as an additional factor.

3.3.2. Main analyses

Three separate mixed repeated measures ANCOVA were used to test the three dependent variables of the experiment (ABT; state anxiety; state anger). Table 5 shows the mean scores for participants' responses to all questionnaires, across all four video conditions. Figure 2 (p. 96) presents all graphs for the statistically significant interactions detailed in the following sections.

Table 5

Mean scores and standard deviations (in parentheses) for participants' responses to all questionnaires across the video conditions, pre- and post- video watching (N=160)

Measure	Condition	Pre-video $\overline{x}$	Post-video $\overline{x}$	Test statistic	d
ABT	Graphic/Villain	138.42 (67.74)	137.00 (73.28)	$t(39) = 0.22$	0.04
	Fantasy/Villain	123.23 (47.33)	136.95 (60.84)	$t(39) = 2.83*$	0.50
	Graphic/Hero	148.56 (59.13)	168.28 (64.56)	$t(39) = -3.53***$	0.57
	Fantasy/Hero	128.85 (61.06)	144.93 (70.97)	$t(39) = -2.67*$	0.44
State anxiety	Graphic/Villain	33.62 (7.93)	46.30 (9.37)	$t(39) = -8.31***$	1.33
	Fantasy/Villain	30.40 (6.64)	31.86 (8.29)	$t(39) = -1.33$	0.20
	Graphic/Hero	32.52 (6.80)	37.95 (9.51)	$t(39) = -5.47***$	0.94
	Fantasy/Hero	32.65 (6.15)	32.20 (6.47)	$t(39) = 0.42$	0.07
State anger	Graphic/Villain	15.95 (4.35)	19.32 (5.47)	$t(39) = -4.10***$	0.66
	Fantasy/Villain	15.23 (2.74)	16.98 (5.22)	$t(39) = -2.37*$	0.42
	Graphic/Hero	15.30 (2.91)	16.05 (4.68)	$t(39) = -1.01$	0.17
	Fantasy/Hero	14.48 (1.11)	14.48 (0.91)	$t(39) = -0.00$	< 0.01

* = p < .05
***= p < .001

3.3.2.1. Aggressive behavioural tendencies (ABT)

Results of the mixed repeated measures ANOVA revealed there to be a significant main effect of *time*, and an effect size calculation of .10 suggests a medium effect (pre-video: $M = 134.77$, $SD = 59.50$; post-video: $M = 146.69$, $SD = 68.18$) $F(1,156) = 17.54$, $p < .001$, $\eta 2 = .10$. There was no significant main effect of *type of violence* on likelihood of acting aggressively (graphic: $M = 140.25$, $SD = 66.89$; fantasy: $M = 133.49$, $SD = 60.08$) $F(1,156) = 2.29$, $p = .132$, $\eta 2 = .01$. Furthermore, there was no significant main effect of *who commits the violence* on likelihood of acting aggressively (hero: $M = 147.66$, $SD = 64.55$; villain: $M = 133.91$, $SD = 62.74$) $F(1,156) = 2.04$, $p = .155$, $\eta 2 = .01$.

Analysis did reveal a significant interaction between *time* and *who commits the violence* as shown in Figure 2 (p. 96). Mean scores indicate that, while participants indicated a higher likelihood of acting aggressively after watching a villain acting violently, there was a larger increase in this score when the person in the clip committing violence was a hero. However, an effect size calculation of .03 suggests only a small effect (hero pre-video: $M = 138.71$, $SD = 60.54$; hero post-video: $M = 156.60$, $SD = 68.42$; villain pre-video: $M = 130.83$, $SD = 58.56$; villain post-video: $M = 136.98$, $SD = 66.92$) $F(1,156) = 4.18$, $p = .043$, $\eta 2 = .03$.

Findings did not reveal a significant interaction between *time* and *type of violence* $F(1,156) = 1.01$, $p = .317$, $\eta 2 = .01$. Furthermore, there was no significant interaction between *time*, *type and violence*, and *who commits the violence* $F(1,156) = 2.68$, $p = .104$, $\eta 2 = .02$.

3.3.2.2. State anxiety

Results of the mixed repeated measures ANOVA revealed there to be a significant main effect of time, and an effect size calculation of .30 suggests a large effect (pre-video: $M = 32.16$, $SD = 6.76$; post-video: $M = 37.04$, $SD = 10.18$) $F(1,156) = 68.05$, $p < .001$, $\eta 2 = .30$. There was a significant main effect of *type of violence* on state anxiety scores, with participants indicating a higher level of anxiety in the graphic video condition, and an effect size calculation of .18 suggests a large effect (graphic: $M = 37.61$, $SD = 8.82$; fantasy: $M = 31.60$, $SD = 6.57$) $F(1,156) = 33.17$, $p < .001$, $\eta 2 = .18$. However, there was no significant main effect of *who commits the violence* on state anxiety scores (hero: $M = 33.84$, $SD = 7.52$; villain: $M = 35.37$, $SD = 7.43$) $F (1, 156) = 2.18$, $p = .142$, $\eta 2 = .01$.

As shown in Figure 2, the analysis revealed a significant interaction between *time* and *who commits the violence*. While mean scores indicated that watching a hero acting aggressively led to an increase in state anxiety, watching a villain use violence had a greater effect on participants' levels of anxiety, and an effect size calculation of .10 suggests a medium effect (hero pre-video: $M = 32.59$, $SD = 6.44$; hero post-video: $M = 35.08$, $SD = 8.59$; villain pre-video: $M = 31.74$, $SD = 7.08$; villain post-video: $M = 39.00$, $SD = 11.28$) $F(1,156) = 16.32$, $p < .001$, $\eta 2 = .10$.

Analysis of the results also revealed a significant interaction between *time* and *type of violence*. Viewing a graphic scene of violence, compared to a fantasy scene of violence, led to a significantly larger increase in anxiety levels, and an effect size calculation of .24 suggests a large effect (graphic pre-video: $M = 33.08$, $SD = 7.36$; graphic post-video: $M =$

41.13, $SD = 10.28$; fantasy pre-video: $M = 31.25$, $SD = 6.02$; fantasy post-video: $M = 31.95$, $SD = 7.12$) $F(1,156) = 49.91$, $p < .001$, $\eta2 = .24$ (see Figure 2).

Lastly, analysis of the results also revealed a significant three-way interaction between *time*, *who commits the violence*, and *type of violence*. The greatest increase in state anxiety occurred when the participant viewed a graphically violent film clip featuring a villain carrying out the violence. However, an effect size calculation of .03 suggests this effect was small: $F(1,156) = 4.39$, $p = .038$, $\eta2 = .03$.

3.3.2.3. State anger

Results of the mixed repeated measures ANOVA revealed there to be a significant main effect of time, and an effect size calculation of .11 suggests a medium effect (pre-video: $M =15.24$, $SD = 3.02$; post-video: $M = 16.70$, $SD = 4.74$) $F(1,156) = 19.01$, $p < .001$, $\eta2 = .11$. There was a significant main effect of *type of violence* on state anger scores, with participants indicating a higher level of anger in the graphic video condition (graphic: $M = 16.66$, $SD = 4.51$; fantasy: $M = 15.28$, $SD = 2.99$) $F(1,156) = 7.64$, $p = .006$, $\eta2 = .05$. There was also a significant main effect of *who commits the violence* on state anger scores, with participants indicating a higher level of anger in the violent villain video condition (hero: $M =15.08$, $SD = 2.84$; villain: $M = 16.87$, $SD = 4.52$) $F(1,156) = 12.92$, $p < .001$, $\eta2 = .08$.

The analysis also revealed a significant interaction between *time* and *who commits the violence*. While viewing a hero act violently did lead to an increase in state anger, viewing a villainous character acting violently led to a larger increase in *state anger* levels, and an effect size calculation of .06 suggests a medium effect (hero pre-video: $M = 14.89$, $SD =$

2.23; hero post-video: $M = 15.26$, $SD = 3.44$; villain pre-video: $M = 15.59$, $SD = 3.63$; villain

post-video: $M = 18.14$, $SD = 5.40$) $F(1,156) = 10.51$, $p = .001$, $\eta2 = .06$ (see Figure 2).

Analysis of the results did not find a significant interaction between *time* and *type of violence*:

$F(1,156) = 3.05$, $p = .076$, $\eta2 = .02$. Lastly, there was no significant three-way interaction

between *time*, *type of violence*, and *who commits the violence*: $F(1,156) = 0.45$, $p = .503$, *η2*

< .01.
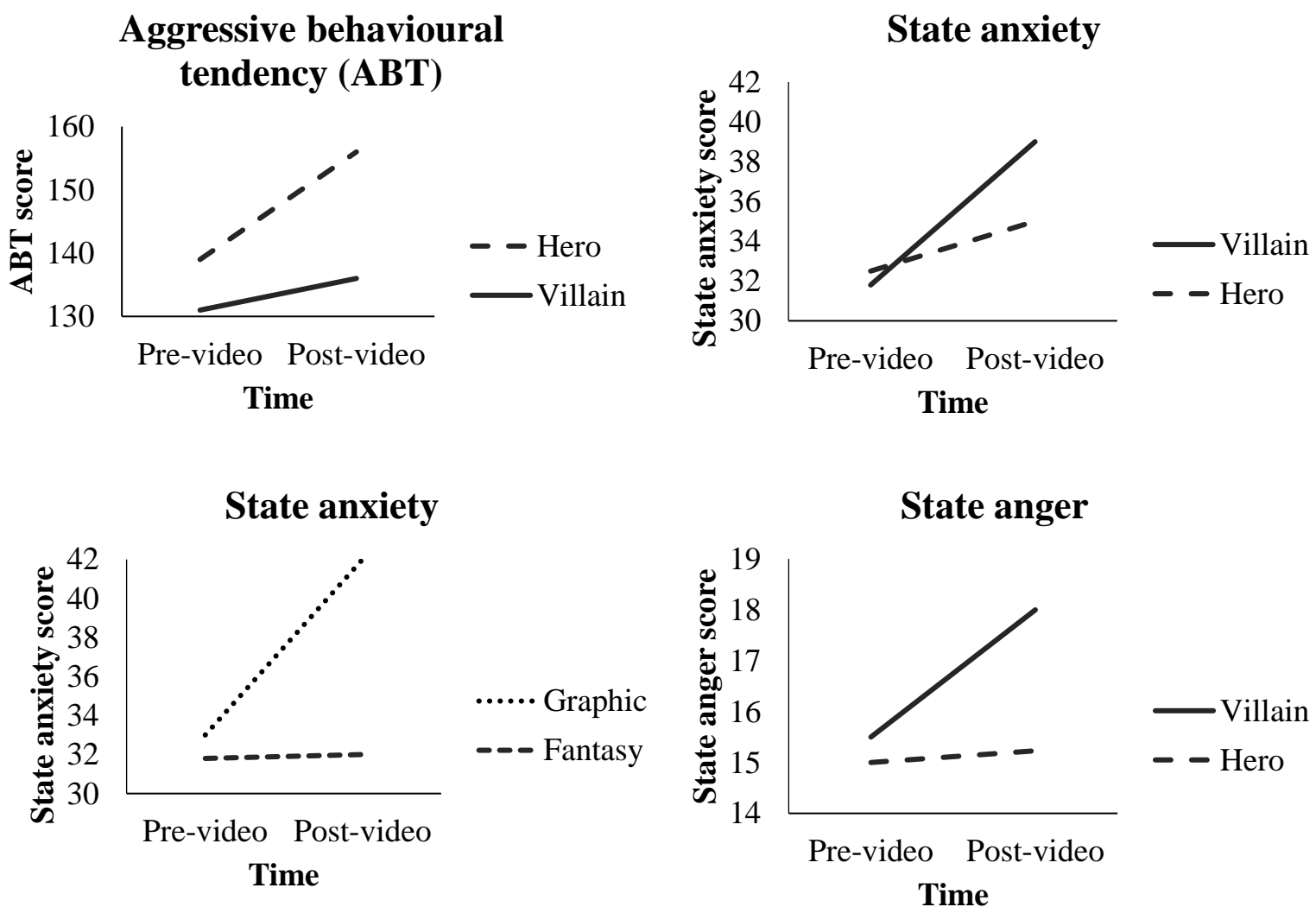
Figure 2. Significant interactions across all video conditions

3.4. Discussion

The aim of this experiment was to investigate how different characteristics of media violence can influence the likelihood of aggressive behaviours. A further aim was to establish whether there are any clear links between state anger, state anxiety, and the likelihood of acting aggressively. The results revealed that watching scenes of fantasy violence featuring either a hero or villain violent perpetrator both increased the likelihood of aggressive behaviour, whereas graphic violence only increases aggression if the perpetrator is a hero. Results also suggest that watching a heroic character act violently has a greater impact on the likelihood of acting aggressively relative to watching a violent villain (although the effect size was small; $\eta2 = .03$), though the latter had a medium-sized effect on feelings of anxiety ($\eta2 = .10$) and anger ($\eta2 = .06$)

The data clearly indicates that acute exposure to short video clips of movie scenes can affect the likelihood of aggression and several indices of emotion. This observation is in keeping with previous studies (Arriaga et al., 2006; Baldaro et al., 2004; Bartholow et al., 2005; Berkowitz, Corwin, & Heironimus, 1963; Bushman & Huesmann, 2006; Gunderson, 2006; Krcmar & Kean, 2005; Madan et al., 2014; Paik & Comstock, 1994). The effects seen were, however, critically dependent upon the nature of video clips and the depiction of violence contained within them.

3.4.1. Effects of different types of media violence on the likelihood of acting aggressively

Many established models investigating the influence of watching media violence on aggression have evolved from the GAM (Anderson & Bushman, 2002a). The GAM predicts that increased arousal as a result of watching the video will lead to increased aggression (e.g., Anderson & Bushman, 2002a; DeWall et al., 2011). Furthermore, it is implicitly assumed that all types of depictions of violence will lead to increases in violence (e.g., Bushman & Gibson, 2011). These assumptions are challenged by the current findings.

The findings support the results of previous studies which suggest that, under certain conditions, short video clips have the potential to affect a watcher's mood and the likelihood of aggressive behaviour. However, results of the experiment demonstrate that not all types of violent media necessarily lead to an increased likelihood of aggressive behaviour. It has been demonstrated that the video clips that elicited the greatest emotional changes did not lead to the greatest changes in the likelihood of aggressive behaviour. This is evident from exploring the effects of each individual video clip. Where the scene featured graphic violence and a villain antagonist, the results indicate that participants did not show an increased likelihood of acting aggressively. Mean scores indicate that participants may be marginally less likely to respond to a potential conflict with aggression. This finding contradicts predictions made by excitation-transfer theory (discussed in Section 1.4.1, p. 5). The results also fail to support the theory that all violent media will increase the likelihood of aggressive behaviour.

Considering the impact of the scene featuring graphic violence and a villain antagonist on the viewer's mood states, this scene did lead to the greatest increases in state anxiety and state

anger. Taken together, these findings cast serious doubt on predictions made by the GAM (e.g., Anderson & Morrow, 1995; Carnagey, Anderson, & Bartholow, 2007; DeWall et al., 2009). This is because this model implies that greater emotional changes (affect) caused by media violence should have the biggest impact on aggressive behaviour. In this experiment, the video clip that elicited the greatest emotional changes led to no change in likelihood of acting aggressively.

3.4.2. Graphic vs. fantasy representations of violence

The GAM predicts that depictions of graphic and fantasy violence will both promote aggression in the viewer. However, due to a higher chance of psychological arousal in the viewer (Potter & Smith, 2000), effects on the likelihood of acting aggressively were predicted to be particularly potent after viewing graphic violence. The data presented here, however, is clearly not in keeping with predictions generated by the GAM, or indeed by excitation-transfer theory. Both models suggest higher psychological arousal will lead to a greater chance of acting aggressively. Critically, depictions of graphic violence, far from having an exaggerated effect upon increasing likelihood of aggression, failed to increase aggression when perpetrated by a villain.

However, results from the experiment do suggest that graphic portrayals of violence have a significantly greater impact on feelings of anxiety than do portrayals of fantasy violence. This is evident from a statistically significant increase in anxiety after watching a graphically violent video clip and a large effect size for this interaction ($\eta2 = .24$), emphasising the marked impact of this type of media. The results show no evidence to suggest that fantasy violence had any significant effect on participants' levels of anxiety, regardless of the identity

of the violent perpetrator. The finding that graphic portrayals can have a greater impact on anxiety than do other forms of violence are in line with observations from previous research studies (e.g., Madan et al., 2014; Potter & Smith, 2000).

Graphic violence depictions did not significantly affect ratings of anger to a greater extent than did fantasy depictions. This contradicts Potter and Smith (2000) who suggest that scenes of graphic violence engage emotions more strongly than do non-graphic portrayals. Where graphically violent media did appear to affect anger, the emotional effect was conditional upon identification with the violent perpetrator.

3.4.3. Identification with violent character

In the current study, it was demonstrated that viewing a violent heroic character leads to the greater likelihood of aggression relative to viewing a violent villainous character. It was, however, shown that when viewing a fantasy scene of violence, both violent hero and violent villain perpetrators can increase likelihood of acting aggressively. Intuitively, one may predict that anger would be associated with aggression. Consequently, watching an aggressive hero should increase both anger and aggression. However, the results of this experiment suggest that this is not the case. Rather, watching an aggressive hero leads to increased aggression in the absence of elevated anger levels.

Explanations for the effect can be derived from SCT and script theory, which argue that individuals more readily imitate behaviour through observational learning. The prediction that desirable characters and media heroes serve as role models for future behaviour and

actions (e.g., Bushman & Anderson, 2002; Greitemeyer & Osswald, 2009) was therefore supported by the results from this experiment.

It can be suggested that a participant's increases in anger after viewing a violent villain in a fantasy scene of violence may drive the increases in the likelihood of acting aggressively. However, there may be other mechanisms that drive aggressive thoughts and behaviours associated with viewing a violent hero. It would be expected that a viewer would react to watching the triumph of a character who is strongly identified with an increase in positive mood. Therefore, an alternative prediction presented is that witnessing the triumphant expression of aggression by a hero leads to a sense of euphoria which in turn can lead to increased aggression. In this experiment, participants may be highly emotionally aroused, but the measures used may not have captured the relevant affect.

Other studies suggest that anger itself may be a positive emotion. Harmon-Jones and Sigelman (2001), for example, found that state-induced anger was associated with left-prefrontal activity in the brain. Left-prefrontal activity has been implicated in positive affect and approach-related processes (e.g., Davidson & Sutton, 1995; Wheeler, Davidson, & Tomarken, 1993; Urry et al., 2004). This raises the initially surprising conjecture that positive mood may be associated with expression of aggressive behaviour. Links between team success, increases in positive affect, and an increased likelihood of acting aggressively have been suggested by some researchers; however, research on this topic is limited (e.g., Moore, Shepherd, Eden, & Sivarajasingamm, 2007).

3.4.4. Limitations

The need to match media conditions has been identified as a critical problem in the field of media studies (Adachi & Willoughby, 2011; Przybylski et al., 2010). One area in which the clips differed was the year in which they were created. Due to technological advancements, the year in which the films were created is likely to have an impact on characteristics such as graphical or auditory quality (Schneider, 2004). This may alter perceived realism, which may enhance the effects of violent content due to heightening states of arousal in the viewer (e.g., Slater, Khanna, Mortensen, & Yu, 2009). As predicted by the GAM, this increased arousal should lead to an increased likelihood of aggressive behaviour. However, Ivory and Kalyanaraman (2007) found no evidence to suggest that newer violent media (made in 2003) had any more impact on aggressive thoughts and behaviour than older media (made in 1995). The researchers did, however, conclude that newer media has a greater impact on physiological arousal.

Reliability coefficients suggest that the ABT questionnaire used in this experiment is a useful tool to measure likelihood of acting aggressively, and many researchers have used similar measures to measure likelihood of aggressive behaviour (see Section 2.2.1.1, p. 64; e.g., Helfritz-Sinville & Stanford, 2014; Lobbestael et al., 2013; Tremblay & Belchevski, 2004). However, it is worth noting that conclusions from the violent video clips can only be applied to a participant's likelihood of *verbal* aggression. While it is worth noting that many studies have reported a significant positive correlation between physical and verbal aggression (e.g., Buss & Perry, 1992; Kaukiainen et al., 1999; Schumacher & Leonard, 2005), an interesting addition for future study would be to include a valid and reliable measure of physical aggression to run alongside the ABT questionnaire.

It should also be noted that out of the four videos used in this experiment, the video clip featuring graphic violence and a villain contained the only instance of punishment for a violent act (arrest of the perpetrator). While scenes that feature the punishment of violent actions have been found to increase hostile emotion in a viewer (e.g., Carnagey & Anderson, 2005), studies have presented mixed findings when exploring how likelihood of aggressive behaviour or cognitions are affected (e.g., Phillips & Hensley, 1984). Further research is needed to investigate how on-screen punishment may affect the likelihood of aggressive behaviour.

3.4.5. Conclusions and implications for future study

Evidence has been presented that suggests violent media does not have uniform effects on emotion and potential behaviour. Regarding aggressive behaviour, evidence from the study suggests that it is the watching of violent, heroic characters that is perhaps more likely to lead to increased aggressive behaviours than the watching of either graphic violence or videos featuring a villainous violent perpetrator. However, watching graphic violence and/or a villainous violent character has pronounced effects on anger and anxiety states.

Although no evidence has been provided that graphic portrayals of violence have the most significant impact on fostering aggressive tendencies, their effects on state anxiety should not be ignored. Increases in anxiety may lead to problems that do not relate to aggression. For example, there is evidence to suggest that substantial elevations of state anxiety may reduce working memory, as well as inhibiting complex reasoning, strategic reasoning, and decision-making (Richards, French, Keogh, & Carter, 2000). Therefore, regular watching of violent

media may negatively affect psychological well-being. While this thesis is focused on the potential implications of media violence on aggression, alternative research should explore how graphic portrayals of violence can impair other aspects of cognition and behaviour.

Chapter 4 aims to test the reliability of the measures of the experiment by attempting to replicate results of the experiment. This will be achieved by adopting an identical methodology to the experiment presented in this chapter, but it will test participants' responses to a different set of film clips. Chapter 4 also aims to better our understanding of how observing fictional depictions of hero and villain characters can influence likelihood of aggressive behaviour. This will enable us to further test predictions made by the GAM, SCT, and script theory, as well as testing the results from this experiment, namely that viewing violent heroes, rather than violent villains, leads to a greater likelihood of acting aggressively.

In addition to the measures presented in this experiment, Chapter 4 will also investigate how violent media may influence positive affect and any potential impact this may have on aggressive behaviour. Therefore, in addition to the materials outlined in this experiment, *positive affect* will be additionally assessed in participants. Measuring this type of emotional arousal was not captured in the experiment presented in this chapter. Investigating the effect of violent media on this mood state will allow for a better testing of excitation-transfer theory predictions that high arousal leads to aggression, since viewing violent heroes may lead to increased positive (rather than negative) affect.

CHAPTER 4: EFFECTS OF IDENTIFICATION WITH A VIOLENT MEDIA CHARACTER ON POSITIVE AFFECT, NEGATIVE AFFECT, AND LIKELIHOOD OF AGGRESSIVE BEHAVIOUR

4.1. Introduction

The first experiment of this thesis established that watching violent heroes, rather than violent villains, leads to an increased likelihood of acting aggressively. Such a finding may support SCT and script theory predictions, suggesting that viewers base aggressive behaviours on imitating role models whom they see act aggressively. The findings of the previous experiment also demonstrate that, under certain conditions, media violence can elicit negative affect in the viewer, specifically feelings of anger and anxiety. However, as will now be discussed, it may also be beneficial for research to investigate how media violence may influence positive affect.

As discussed in Section 1.4.6 (p. 16), the general aggression model (GAM) speculates that emotional changes associated with media violence lead to a higher likelihood of aggressive thoughts and behaviours. This model is built largely upon work that has studied how negative emotions such as anger can both influence the behavioural consequences of watching media violence and in turn be affected by the viewing (e.g., Anderson et al., 1998; Anderson & Dill, 2000; Berkowitz, 1993; Bushman & Anderson, 2002). Similarly, excitation-transfer theory states that high physiological arousal will translate to a higher likelihood of acting

aggressively. This theory would therefore predict that arousal that is elicited by both positive and negative affect can lead to aggression. However, neither this theory nor the GAM explicitly distinguishes between possible positive and negative affect and their impact on aggression. Recently researchers have stressed the importance of examining both negative and positive valences separately to uncover the role of both types of affect in emotions and behaviour (e.g., Hoyt, Craske, Mineka, & Adam, 2015).

This chapter attempts to replicate findings from the previous experimental chapter and to test whether viewing violent heroes, rather than violent villains, leads to an increased likelihood of aggression. However, instead of focusing on the role of imitation and modelling as predicted by SCT and script theory, this chapter focuses on testing the potential mechanism of positive affect increases after viewing a violent hero. The measures used in this experiment will expand upon the previous methodology, which did not consider positive affect as a possible pathway to aggressive behaviour. As such, it is predicted that viewing violent heroes will have an impact upon positive emotional states, which may increase aggression. This prediction is more in line with excitation-transfer theory, which states that increased arousal (regardless of valence) will lead to an increased likelihood of aggression. In the current study, the effects of manipulating anxiety and anger on aggression are contrasted with manipulations of positive affect. The introduction to this chapter begins with a review of the detailed characteristics of these two classes of affect.

4.1.1. Positive and negative affect

Affect has been described as a neurophysiological state that is consciously accessible as a simple feeling and that serves as a component of the longer-lasting emotion and mood of the

individual (Ellsworth & Scherer, 2003). Prominent models categorise affect across two dimensions: valence (positive vs. negative) and arousal (low vs. high; e.g., Lang, 1995; Lang & Bradley, 2010; Russell, 2003; Watson & Tellegen, 1985). Affect is intrinsically bound with the stimulus that elicits it (Frijda, 1986) and measuring an individual's affect after interaction with a stimulus provides clues as to how it has influenced the general mood of the respondent (Tibubos, Schnell, & Rohrmann, 2013).

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Carey, 1988) is based on the two-dimensional conceptual model of mood, whereby the full range of affective experiences are reflected along positive and negative affect scales. The general finding from researchers is that respondents who report high positive affect will indicate a state of high energy, full concentration, and pleasurable engagement (e.g., Watson & Clark, 1984; Watson, Clark, & Carey, 1988). Similarly, the general finding is that those who report low positive affect are characterised by sadness and lethargy (e.g., Watson & Clark, 1984; Russell & Carroll, 1999). Conversely, individuals who indicate high negative affect also indicate aversive mood states which may include disgust, fear, and nervousness (Watson, Clark, & Carey, 1988). However, it is worth noting that a notable limitation of the PANAS is that low activity positive affect states (e.g., 'calm') and negative (e.g., 'bored') mood states are not included in the scale (Efklides & Moraitou, 2013).

The terms 'positive' and 'negative' affect suggest that these two factors are independent of one another and, as such, are strongly negatively correlated. However, the PANAS was developed to provide a scale that measures positive and negative affect as separate and largely uncorrelated constructs. Supporting this claim is evidence from research studies that suggests an individual may experience feelings of positive and negative affect simultaneously

(e.g., Larsen, McGraw, & Cacioppo, 2001; Larsen, McGraw, Mellers, & Cacioppo, 2004). While negative affect is frequently linked to hostility and aggressive behaviour (see Section 1.14, p. 45), elevations in positive affect may also be associated with a greater tendency to act aggressively.

4.1.1.2. Positive affect, approach/avoidance motivation, and aggression

Gray (1987, 1990) argued that two systems lie at the base of the regulation of emotion and behaviour. The behavioural approach system (BAS) is responsible for the motivation to act and it also energises behaviour (Depue & Iacono, 1989; Gray, 1987, 1990). The behavioural inhibition system (BIS) deals with aversive motivation and avoidance behaviour, and its primary purpose is to prevent or stop behaviour that is expected to lead to punishment or loss of reward (Arnett & Newman, 2000; Carver & White, 1994; Gray,1987, 1990). Several models of emotion posit that increases in positive affect, such as eagerness, excitement, and elation (Carver & White, 1994; Gable, Reis, & Elliot, 2000), are associated with activation of the BAS and approach motivation. Conversely, it has been hypothesised that avoidance motivation is associated with elevations in negative affect, predominantly feelings of anxiety (e.g., Gray, 1990).

Numerous studies suggest that approach motivation is linked to aggressive behaviour (e.g., Wingrove & Bond, 1998; Carver, 2004; van Honk et al., 2001; Harmon-Jones, 2003a, 2003b). Individuals who have had their approach motivational system activated (assessed by Carver & White, 1994, using the BIS/BAS scale) through the inducing of positive emotions, such as determination, alertness, and strength, are more likely to show aggressive inclinations following provocation (Harmon-Jones, Gable, & Peterson, 2010). Other research studies have

reported that those who feel 'active' and 'energised' (Frijda, Kuipers, & ter Schure, 1989; Shaver, Schwartz, Kirson, & O'Connor, 1987) and/or 'determined' (Salmivalli, 1999), as well as 'self-assured', 'strong' and 'brave' (Izard, 1991), may be more likely to seek a fight or an aggressive confrontation. This is in line with studies that show increases in positive affect are related to increased BAS activity and aggressive responsiveness to an insult (Carver, 2004; Carver & White, 1994; Harmon-Jones et al., 2010; Gable et al., 2000).

These findings suggest that increases in positive affect may be linked with increases to approach-related behaviour such as aggression. Parallel with the ethological literature, this can be seen especially in relation to instrumental aggression (e.g., Dembacher et al., 2015; MacDonald, 2012). However, positive affect has also been related to reactive aggression. In such instances, a person may confront an instigator of aggression in retaliation to an anger-inducing event (e.g., Carver, 2004; Harmon-Jones, 2003a; Harmon-Jones, 2003b). To date, no studies have been conducted that investigate the potential effects of media violence on positive affect and how this may relate to aggressive tendencies. This is despite previous studies suggesting that elevations to an individual's positive affect state may be achieved through interaction with media (Annesi, 2001).

Results from Chapter 3 suggest that increases in aggression after viewing a fictional violent hero character occur in the absence of anger. Viewing a violent hero character may increase positive affect and energise behaviour, which may explain increases in aggressive tendencies. Potential reasons for how watching a violent hero can impact positive affect and how this may impact aggressive tendencies will now be explored.

4.1.1.3. Identification, positive affect, enjoyment, and aggression

A key element of enjoyment of any event is the outcome. Winning tends to produce a range of pleasant emotional outcomes and increases to arousal, whereas losing produces strong unpleasant emotional changes and a reduction in arousal (McAuley, Russell, & Gross, 1983; Wilson & Kerr, 1999). Regarding entertainment media, those who interact with entertainment media may experience these feelings vicariously through viewing on-screen heroes 'win'. This effect will be more pronounced when there is clear identification with the violent perpetrator (Tesler & Alker, 1983). Experiencing vicarious success may allow an individual to enjoy an appearance of power (Tesler & Alker, 1983) which manifests itself as feelings of strength, optimism, and pride (Hefner, Klimmt, Vorderer, 2007). When viewing a hero lose, however, viewers become defeated, depressed, and angry (Hirt, Zillmann, Erickson, & Kennedy, 1992). Therefore, it would be predicted that viewing a villain triumph over an individual's on-screen hero, and the consequent increase in negative mood, would lead to a large increase in the likelihood of aggressive behaviour in viewers. By contrast, watching a hero win would lead to increased positive mood and an even greater increase in aggression.

Regarding passive viewing and winning vicariously through on-screen characters, the vast majority of research has investigated fans of sports teams. These individuals often experience high identification with their chosen team, and they regard their favourite sportspersons as heroes (e.g., Wann, Melnick, Russell, & Pease, 2001; Sanderson, 2013; Basil & Brown, 2004). Individuals may appear to feel that they can share in the glory of a successful other with whom they are in some way associated. This may even include 'basking in the glory' without having done anything to bring about the success (Dijkstra, Cillessen, Lindenberg, & Veenstra, 2010). Wann, Dolan, McGeorge, and Allison (1994), for example, found that fans

who identified highly with their team experienced a significant increase in pleasant emotions after the difficult win, and a significant increase in unpleasant emotions after their team had lost.

Rises in testosterone have been linked with aggressive behaviour. Research evidence suggests that physically experiencing success and winning may increase levels of testosterone in males (Elias, 1981; Oliveira, Gouveia, & Oliveira, 2009; Mazur et al., 1992; Mazur & Lamb, 1980; Wagner, Finn, & England, 2002) and in females (e.g., Bateup, Booth, Shirtcliff, & Granger, 2002; Edwards & Kurlander, 2010; Oliveira et al., 2009). High testosterone, in combination with low cortisol levels, seems to predict approach motivation/reward sensitivity. In these motivational stances, individuals are more likely to confront the threat, which could result in aggressive behaviour (Terburg, Morgan, & van Honk, 2009).

Vicarious viewing effects have been observed in individuals who watch videos of their past successes (e.g., Carré & Putnam, 2010) and fans who witness wins or losses of their favourite team, showing an increase in testosterone after the match relative to 'losers' (Bernhardt, Dabbs, Fielden, & Lutter, 1998). This effect also occurs away from sport; for example, people who supported the losing candidate in the 2008 US presidential election indicated a drop in testosterone relative to people who supported the winning candidate (Stanton, Beehner, Saini, Kuhn, & LaBar, 2009). This increase in testosterone after viewing 'wins' may be linked to an increased positive mood (Booth et al., 1989; Mazur & Lamb, 1980). Mazur and Lamb (1980) suggested that rising testosterone in winners serves to increase subsequent dominance behaviours aimed at defending and/or gaining further social status, whereas decreasing testosterone in losers serves to increase submissive behaviours aimed at avoiding further threats to status.

Studies have suggested that high-identification groups are more likely to participate in antisocial riots than are low- to moderate-identification groups after viewing a victory either in-person (at the game) or on TV (Mann, 1989). Similarly, numerous studies support the belief that viewing a supported team win promotes aggressive behaviours. Domestic violence and other violent assaults are found to occur more often when a male assailant's supported team wins (Moore et al., 2007; Sivarajasingam, Moore, & Shepherd, 2005).

Research evidence suggests, therefore, that aggressive behaviour may not be the result of negative emotional changes associated with losing but may be the result of increases in positive emotions associated with winning. Sivarajasingam et al. (2005) suggest that this increased likelihood of aggressive behaviour may be due to increases in positive mood states such as self-confidence, assertiveness, and/or patriotism. Experimental work has also shown that simply viewing aggressive, athletic contests as a film clip on television can lead to increased aggression if the character identifies with the aggressor (Lanter, 2011; Russell, Di Lullo, & Di Lullo, 1988). As yet, no research has been conducted to assess whether experiencing vicarious success from violent fictitious heroes from entertainment media can elicit similar reactions from a viewer.

Based on the evidence presented, there is scope to investigate potential interactions between winning vicariously through violent entertainment media and identification with on-screen characters. It seems unlikely that winning vicariously through a violent hero will lead to negative affect. Instead, it seems likely that viewing this type of scene will lead to increases in positive affect (e.g., Isen, Shalker, Clark, & Karp, 1978; Masters & Furman, 1976). Seeing a violent villain 'win' is likely to lead to feelings of negative affect, including elevated levels

of state anger. Therefore, exploring how viewing an on-screen violent hero or villain win their respective fights and its impact on positive affect may provide further evidence of the mechanisms for how violent media can affect an individual's likelihood of acting aggressively.

4.1.1.4. Aims and hypotheses

The aim of the second experiment was to investigate how media violence can influence emotional mood states and the likelihood of the expression of aggressive behaviour. The focus of the study was to explore differences in state anxiety, state anger, positive/negative affect, and the likelihood of aggressive behaviour after watching a violent, fictitious 'hero' win a fight, compared to a violent, fictitious villain.

It was hypothesised that both videos would result in increased aggressive tendencies but via different mechanisms, with the heroic victory acting upon positive affect, whereas the villain winning would act via anger and anxiety.

4.2. Method

4.2.1. Design

The study featured a 2 (*time*: pre-video/post-video) x 2 (*who commits the violence*: hero/villain) mixed factorial design. Sex (male/female) was also entered as an additional two-level factor where a significant main effect or interaction was noticed in the preliminary

analysis. There were five dependent variables which were the *likelihood of acting aggressively*, *state anxiety*, *state anger*, *positive affect*, and *negative affect*. *Time* was a within-subject factor and *who commits the violence* was a between-subjects factor.

4.2.2. Participants

Participants were 60 University of Birmingham undergraduates (41 women, 19 men) who took part in the study for course credit or a cash sum. Ages ranged from 18 to 35 ($M = 20.78$, $SD = 4.49$). All participants gave informed consent prior to taking part in the study. Ethical approval for this experiment was granted by the University of Birmingham School of Psychology Ethics Committee. Each participant was treated according to the ethical standards set by the British Psychological Society.

4.2.3. Materials

One of two video clips was shown to participants (see Table 6). In one of the videos (*Batman: The Dark Knight Rises*), participants viewed a video clip of a fictional hero engage in a fight with another man before throwing him through a glass window. In the other video (*Spiderman*), participants watched a fictional on-screen villain punch and kick another man as part of a fight scene. Mood was assessed using the STAI (State-Trait Anxiety Inventory; Spielberger, et al., 1983), STAXI-2 (State-Trait Anger Expression Inventory-2; Spielberger, 1999) and the PANAS (Watson, Clark, & Carey, 1988). Likelihood of aggressive behaviour was assessed using the aggressive behavioural tendencies (ABT) questionnaire. Normative

114

scores and reliability analyses for these questionnaires can be found in the general methods section (Chapter 2, p. 54).

Table 6

Details of the film clips shown to participants in experiment 2

Hero committing violence	Villain committing violence
Batman: The Dark Knight Rises (2012)	*Spiderman* (2002)
0:1:51 minutes	0:1:40 minutes
n = 30	*n* = 30

4.2.4. Procedure

Participants were tested in accordance with the procedure outlined in the general methods section (Section 2.4., p. 77). When filling in the questionnaires, the participant first completed the ABT questionnaire followed by the STAI, STAXI-2, and PANAS questionnaires. Answering the questionnaires took approximately 30 minutes to complete. After completing the questionnaires, participants watched one of the two selected video clips. The video clip to be shown was randomly allocated to the participant prior to testing.

After viewing the video clip, participants completed the ABT questionnaire, STAI, STAXI-2, and PANAS questionnaires for a second time. After being probed as to the purpose of the study, no participants indicated that they suspected any links between the film shown to them

and how they responded on any of the questionnaire measures. Overall, the experiment took

approximately 60 minutes to complete.

4.3. Results

4.3.1. Preliminary analysis

Preliminary analysis explored the possibility of sex main effects or interactions. In contrast to

experiment 1, significant sex main effects and/or interactions were found in the analysis of

two of the dependent variables of the experiment (state anxiety and positive affect).

Therefore, sex was included as a two-level factor in the analysis of these measures.

For the remaining measures (ABT, state anger, negative affect), no significant sex main

effects or interactions were evident. As there was no substantial effect on results, sex was not

included as an additional factor within the analysis of these measures.

Preliminary to the main analysis, paired samples t-tests were conducted to assess participants'

ratings of the content of the two video clips. The means for the three questions (*"How*

realistic did you find the clip?"; *"How long do you think it will take the victim to recover?"*;

"How violent would you rate the clip?") can be found in the general methods section

(Section 2.1.1, p. 54). The analysis of these scores revealed that participants found both clips

to be equally unrealistic: $t(58) = -0.37$, $p = .714$, $d = 0.10$. There was no significant difference

between how long they believed the victim would take to recover: $t(58) = 0.32$, $p = .750$, $d =$

0.08. However, participants did rate the *Spiderman* clip as being significantly more violent: $t(58) = 2.86$, $p = .006$, $d = 0.73$.

4.3.2. Main analysis

Three separate 2 x 2 mixed repeated measures ANOVAs were used to test three of the five dependent variables of the experiment (ABT; state anger; negative affect). Two separate 2 x 2 x 2 mixed repeated measures ANOVAs were used to test the remaining two dependent variables of the experiment (state anxiety; positive affect).

Table 7 shows the mean scores for participants' responses to all questionnaires (ABT, STAI, STAXI-2, and PANAS) across the two video conditions. This analysis was also rerun with the question *"how violent did you rate the clip?"* as a covariate. This did not substantially influence the results.

Table 7

Mean scores and standard deviations (in parentheses) for participants' responses to

aggressive behavioural tendency and affect measures (pre- and post-video watching)

Measure	Condition	Pre-video $\overline{x}$	Post-video $\overline{x}$	Test statistic	d
ABT	Hero	111.93 (40.60)	122.43 (51.88)	$t(29) = -2.39*$	0.49
	Villain	137.63 (75.82)	154.17 (90.30)	$t(29) = -2.94*$	0.61
State anxiety	Hero	31.43 (6.69)	31.40 (8.56)	$t(29) = 0.21$	< 0.01
	Villain	35.67 (8.20)	38.50 (9.64)	$t(29) = -2.75*$	0.37
State anger	Hero	14.90 (2.79)	14.53 (1.28)	$t(29) = 0.23$	0.23
	Villain	16.07 (3.24)	18.50 (7.31)	$t(29) = -1.87$	0.38
Positive affect	Hero	28.57 (7.61)	29.53 (7.31)	$t(29) = -1.09$	0.20
	Villain	26.17 (7.59)	24.47 (7.25)	$t(29) = 1.80$	0.33
Negative affect	Hero	11.87 (3.89)	11.77 (2.31)	$t(29) = 0.20$	0.04
	Villain	13.97 (5.00)	14.63 (5.09)	$t(29) = -0.86$	0.16

* = p <.05

4.3.2.1. Aggressive behavioural tendencies

Results of the mixed repeated measures ANOVA revealed there to be a significant main effect of *time*, and an effect size calculation of .20 suggests a large effect (pre-video: $M = 124.78$, $SD = 61.67$; post-video: $M = 138.30$, $SD = 74.74$) $F(1,58) = 14.36$, $p < .001$, $\eta 2 = .20$. There was no significant main effect of *who commits the violence* on likelihood of acting aggressively (hero: $M = 117.18$ $SD = 46.24$; villain: $M = 145.90$, $SD = 83.06$) $F(1,58) = 0.72$, $p = .401$, $\eta 2 = .01$.

Analysis did not reveal a significant interaction between *time* and *who commits the violence*: $F(1,58) = 0.72$, $p = .401$, $\eta 2 = .01$.

4.3.2.2. State anxiety

Results of the mixed repeated measures ANOVA revealed there to be no significant main effect of time (pre-video: $M = 33.55$, $SD = 7.72$; post-video: $M = 34.95$, $SD = 9.72$) $F(1,56) = 0.79$, $p = .379$, $\eta 2 = .01$. There was also no significant main effect of sex on state anxiety scores (male: $M = 35.44$, $SD = 8.59$; female: $M = 33.71$, $SD = 7.97$) $F(1, 56) = 0.68$, $p = .412$, $\eta 2 = .01$. However, there was a significant main effect of *who commits the violence* on state anxiety scores with participants indicating a higher level of state anxiety in the violent villain video condition. According to an effect size calculation of .08, this effect was medium sized. (hero: $M = 31.42$, $SD = 7.63$; villain: $M = 37.09$, $SD = 8.93$) $F(1,56) = 6.87$, $p = .011$, $\eta 2 = .08$.

As shown in Figure 4 (p. 180), the analysis revealed a significant interaction between *time* and *who commits the violence*. While mean scores indicated that watching a hero acting aggressively led to a slight decrease in state anxiety, watching a villain act violently increased participants' levels of anxiety, and an effect size calculation of .10 suggests this effect was medium sized (hero pre-video: $M = 31.43$, $SD = 6.69$; hero post-video: $M = 31.40$, $SD = 8.56$; villain pre-video: $M = 35.67$, $SD = 8.20$; villain post-video: $M = 38.50$, $SD = 9.65$) $F(1,56) = 4.89$, $p = .031$, $\eta2 = .10$. As shown in Figure 4, there was also a significant three-way interaction between *time*, sex, and *who commits the violence*. Mean scores indicate that male participants show a reduction in state anxiety after watching a violent hero whereas females show an increase in anxiety (males pre-video: $M = 35.11$, $SD = 9.89$; males post-video: $M = 30.56$, $SD = 8.81$; females pre-video: $M = 29.86$, $SD = 4.13$; females post-video: $M = 31.76$, $SD = 8.64$). After watching a violent villain, males also show greater increases to state anxiety than females. According to an effect size calculation of .07, this effect was medium sized (males pre-video: $M = 36.10$, $SD = 6.28$; males post-video: $M = 40.00$, $SD = 9.37$; females pre-video: $M = 35.45$, $SD = 9.15$; females post-video: $M = 37.75$, $SD = 9.34$) $F(1,56) = 4.06$, $p = 0.49$, $\eta2 = .07$.

4.3.2.3. State anger

Results of the mixed repeated measures ANOVA revealed there to be no significant main effect of time (pre-video: $M = 15.48$, $SD = 3.05$; post-video: $M = 16.52$, $SD = 5.58$) $F(1,58) = 2.32$, $p = .133$, $\eta2 = .04$. There was, however, a significant main effect of *who commits the violence* on state anger scores, with participants indicating a higher level of anger in the violent villain video condition, and an effect size calculation of .13 suggests a medium effect

(hero: $M = 14.72$, $SD = 2.03$; villain: $M = 17.29$, $SD = 5.28$) $F(1,58) = 8.65$, $p = .005$, $\eta2 = .13$.

As shown in Figure 4, the analysis also revealed a significant interaction between *time* and *who commits the violence*. While viewing a hero did lead to a decrease in state anger, viewing a villainous character acting violently led to an increase in state anger levels, and an effect size calculation of .07 suggests this effect was medium sized (hero pre-video: $M = 14.90$, $SD = 2.78$; hero post-video: $M = 14.53$, $SD = 1.28$; villain pre-video: $M = 16.07$, $SD = 3.24$; villain post-video: $M = 18.50$, $SD = 7.31$) $F(1,58) = 4.25$, $p = .044$, $\eta2 = .07$.

4.3.2.4. Positive affect

Analysis revealed there to be no significant main effect of *time* on positive affect scores (pre-video: $M = 27.37$, $SD = 7.62$; post-video: $M = 27.00$, $SD = 7.66$) $F(1,56) = 0.86$, $p = .772$, $\eta2 < .01$. There was also no significant main effect of *who commits the violence* on positive affect scores (hero: $M = 29.05$, $SD = 7.46$; villain: $M = 25.32$, $SD = 7.44$) $F(1,56) = 3.52$, $p = .066$, $\eta2 = .06$. There was a significant main effect of sex on positive affect scores, and an effect size calculation of .11 suggests a medium effect (male: $M = 30.48$, $SD = 8.53$; female: $M = 25.66$, $SD = 6.78$) $F(1,56) = 7.04$, $p = .010$, $\eta2 = .11$.

As shown in Figure 4, the findings reveal a significant interaction between *time* and *who commits the violence*. Viewing a hero commit violence led to an increase in positive mood, whereas watching a villainous character commit violence led to a reduction in positive mood, and an effect size calculation of .15 suggests a large effect (hero pre-video: $M = 28.57$, $SD =$

7.61; hero post-video: $M = 29.53$, $SD = 7.31$; villain pre-video: $M = 26.17$, $SD = 7.59$; villain post-video: $M = 24.45$, $SD = 7.25$) $F(1,56) = 9.68$, $p = .003$, $\eta2 = .15$.

Furthermore, analysis of the results of this experiment revealed a significant three-way interaction between sex and *who commits the violence* on positive affect scores. As shown in Figure 4, mean scores indicate that male participants showed an increase to positive mood, while females showed a marginal decrease after watching a violent hero (males pre-video: $M = 29.67$, $SD = 9.18$; males post-video: $M = 33.78$, $SD = 9.43$; females pre-video: $M = 28.10$, $SD = 7.03$; females post-video: $M = 27.71$, $SD = 5.51$) and a greater reduction in positive affect compared to females after watching a violent villain. An effect size calculation of .13 is indicative of a medium-sized effect (males pre-video: $M = 31.30$, $SD = 7.85$; males post-video: $M = 27.40$, $SD = 7.24$; females pre-video: $M = 23.60$, $SD = 6.16$; females post-video: $M = 23.00$, $SD = 6.97$) $F(1,56) = 8.68$, $p = .005$, $\eta2 = .13$.

4.3.2.5. Negative affect

Results of the mixed repeated measures ANOVA revealed there to be no significant main effect of *time* on negative affect (pre-video: $M = 12.92$, $SD = 4.57$; post-video: $M = 13.20$, $SD = 14.18$) $F(1,58) = 0.38$, $p = .543$, $\eta2 = .01$. There was, however, a significant main effect of *who commits the violence* on negative-affect scores, with greater negative affect being shown in the violent villain video condition, and an effect size calculation of .10 suggests a medium effect (hero: $M = 11.82$, $SD = 3.10$; villain: $M = 14.30$, $SD = 5.05$) $F(1,58) = 6.32$, $p = .015$, $\eta2 = .10$.

Analysis did not reveal a significant interaction between *time* and *who commits the violence*: $F(1,58) = 0.69$, $p = .411$, $\eta2 = .01$.
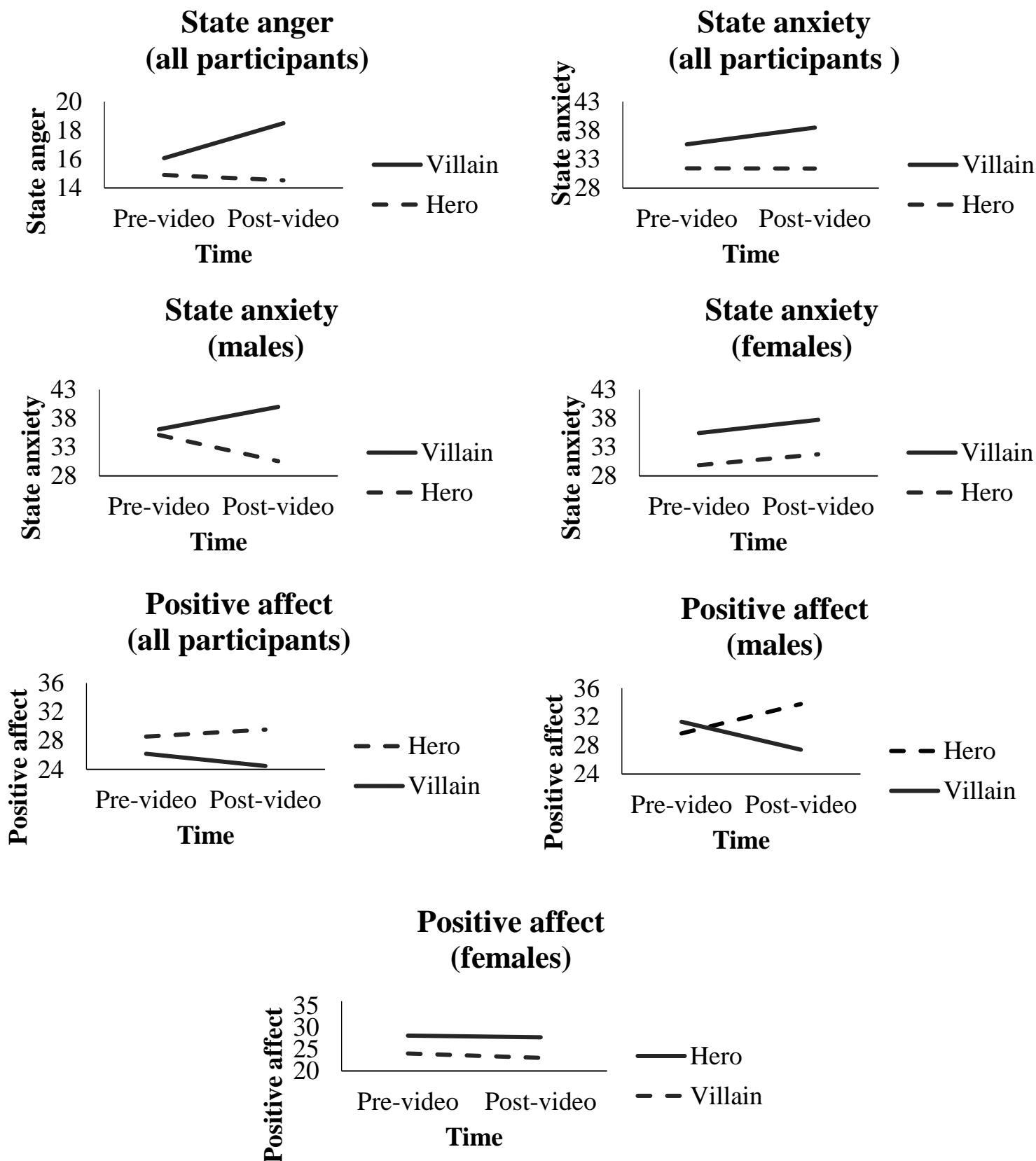
Figure 3. Significant interactions across all video conditions

4.3.2.6. Correlations

Tables 8 and 9 show correlations between the pre- and post-viewing differences in the variables ABT, state anxiety, state anger, positive affect, and negative affect in both video clips used in the experiment. Separate correlations for male and female participants are presented in Tables 10 (p. 126), 11 (p. 127), 12 (p. 127) and 13 (p. 128) respectively.

Table 8

Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect, and negative affect for all participants who viewed a violent hero (n = 30)

	1.	2.	3.	4.	5.
1. ABT	---		.		
2. State anxiety	.31	---			
3. State anger	.23	.60*	---		
4. Positive affect	-.25	-23	-.19	---	
5. Negative affect	-.24	.45*	.77***	-.09	---

* = p < .05
*** = p < .001

Table 9

Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect,

and negative affect for all participants who viewed a violent villain (n = 30)

	1.	2.	3.	4.	5.
1. ABT	---		.		
2. State anxiety	.10	---			
3. State anger	.15	.42*	---		
4. Positive affect	-.24	.08	.08	---	
5. Negative affect	.11	.54**	.30	.16	---

* = p < .05
** = p < .005

Table 10

Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect,

and negative affect for male participants who viewed a violent hero (n = 9)

	1.	2.	3.	4.	5.
1. ABT	---		.		
2. State anxiety	-.30	---			
3. State anger	.18	.73*	---		
4. Positive affect	.52*	-.18	-.22	---	
5. Negative affect	.65*	.83**	.38	.23	---

* = p < .05
** = p < .005

Table 11

Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect,

and negative affect for female participants who viewed a violent hero (n = 21)

	1.	2.	3.	4.	5.
1. ABT	---		.		
2. State anxiety	.41	---			
3. State anger	.32	.51*	---		
4. Positive affect	-.29	-.01	-.04	---	
5. Negative affect	-.05	.37	.57*	-.24	---

* = p < .05

Table 12

Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect,

and negative affect for male participants who viewed a violent villain (n = 10)

	1.	2.	3.	4.	5.
1. ABT	---		.		
2. State anxiety	.32	---			
3. State anger	.12	.62*	---		
4. Positive affect	.29	.34	.04	---	
5. Negative affect	.32	.46	.59*	.30	---

* = p < .05

Table 13

Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect, and negative affect for female participants who viewed a violent villain (n = 20)

	1.	2.	3.	4.	5.
1. ABT	---		.		
2. State anxiety	.06	---			
3. State anger	.16	.34	---		
4. Positive affect	-.44*	-01	.20	---	
5. Negative affect	-.09	.24	.51*	.18	---

* = p < .05

4.4. Discussion

The aim of this experiment was to further investigate how acute exposure to short video clips of movie scenes may influence the likelihood of aggressive behaviour, positive affect, and negative affect. The results revealed that participants who viewed either a violent hero or a violent villain reported statistically significant increases in their likelihood of acting aggressively post-watching. The results also indicate that both video clips induced similar increases in ABT. Analysis of mean scores reveal that watching a violent villain, compared to a hero, led to increases in state anger (although this was non-significant: $p = .071$). There was also a significant, medium-sized ($\eta2 = .10$) increase in state anxiety for those who viewed a violent villain, compared to those who viewed a violent hero. Regarding the impact of the video on positive affect, a statistically significant interaction and large effect size ($\eta2 = .15$) indicates that viewing a violent hero led to an increase in positive affect, while viewing a violent villain led to a decrease in positive affect. Exploration of inter-measure relationships suggests that males who watched a violent hero showed a significant positive correlation

128

between pre-/post- increase in positive affect and likelihood of acting aggressively. These findings and implications for future study are discussed below.

4.4.1. Heroes, villains, and aggression

In experiment 1, it was discovered that the viewing of a fantasy scene of violence featuring either a fictional violent hero or villain leads to a greater likelihood of aggression. Results of experiment 1 also suggest that viewing a violent hero has a greater impact on acute aggressive tendencies. The currently discussed experiment had partial success in replicating these findings. The viewing of a short film clip featuring either a fictitious violent hero or a fictitious violent villain both increased participants' likelihood of acting aggressively (9.38% and 12.01% increase respectively). However, the analysis did not reveal a significant interaction between who committed the violence in the clip and likelihood of acting aggressively. This indicates that viewing violent heroes or villains in a fantasy setting on screen leads to similar short-term effects on the likelihood of aggressive behaviour. This supports studies conducted on the effects of media violence on aggression and predictions made by the GAM that indicate all types of media violence have an acute impact on aggressive tendencies (e.g., Anderson & Bushman, 2002a; Gentile, 2013). However, this finding contradicts predictions from SCT and script theory that viewing desirable role models who carry out aggressive acts leads to a greater chance of imitation than does viewing other types of character. Instead, results of the study indicate that there may be different underlying emotional mechanisms that drive the apparent shift in the likelihood of aggressive behaviour.

4.4.2. Media violence, negative affect, and aggression

Mean scores from the measures utilised in this experiment indicate that participants who viewed a violent villain reported elevated feelings of state anger, although this effect was not significant ($p = .071$). Watching a violent villain also significantly elevated feeling of anxiety in the viewer; however, effect size calculations indicate that this effect was small ($d = 0.37$). The findings of this study therefore support the excitation-transfer predictions that showing emotionally arousing stimuli leads to a greater chance of subsequent aggressive behaviour. However, it is worth noting that the results indicate that while viewing the violent villain, rather than a hero, had a greater impact on emotional arousal, it did not lead to a greater chance of aggression. This means that results of this study do not fully support excitation-transfer theory predictions.

Investigating the correlations between the measures indicates that while viewing a violent villain induces feelings of anxiety and anger, there does not appear to be one mood state which singularly explains the significant increase in the likelihood of aggressive behaviour. Previous research has explored interactions between different aspects of negative affect, such as anxiety/anger (e.g., Aseltine, Gore, & Gordon, 2000), fear/anger (e.g., Diamond, 1977; Spanovic, Lickel, Denson, & Petrovic, 2010) shame/anger (e.g., Tangney, Wagner, Fletcher & Gramzow, 1992), and pain/stress (Berkowitz, 1998). Therefore, it may be a combination of elevations to feelings of anxiety and anger in participants that results in increased likelihood of acting aggressively.

Analysis of the results of participants who viewed a violent hero also produced notable statistical sex differences regarding state anxiety. While females indicated an increase in state

anxiety, males showed a decrease in anxiety after viewing. This finding suggests that males who experience a vicarious 'win' through watching media violence may experience decreased anxious feelings. This supports a relatively small body of evidence that suggests viewing violence on screen may have a positive impact on the emotional mood for certain individuals (e.g., Henning & Vorderer, 2001; Katz & Foulkes, 1962). However, only film clips featuring certain characteristics (e.g., a triumphant hero) may lead to this effect. This research evidence will be further built on in the next chapter of the thesis.

Results of the film clip featuring a violent villain indicate that an increased likelihood of aggressive behaviour can occur with elevations to state anxiety. This contradicts predictions made by the BIS model. The BIS's primary function, as described by Gray (1987, 1990), is to inhibit behaviour, and activation of this system has been primarily linked with elevations to feelings of anxiety (e.g., Arnett & Newman, 2000; Carver & White, 1994). Supporters of the BIS model would, therefore, expect increases in anxiety to inhibit behaviour and, therefore, to reduce the likelihood of aggressive behaviour (e.g., Smits & Kuppens, 2005).

The finding of the present study does, however, support research that suggests moderate increases in anxiety have a relationship with elevations in aggressive behaviour (e.g., Egan & Lewis, 2011; Campbell & Hausman, 2013; Jones, Miller, & Lynam, 2011). It may be that a stimulus requires a greater effect on state anxiety to behaviourally inhibit participants and reduce aggressive inclinations, such as after viewing a piece of graphic violence featuring a violent villain (see results from Chapter 3).

4.4.3. Media violence, positive affect and aggression

A significant interaction between *who commits the violence* and positive affect reveals that watching a villain decreased positive affect, whereas watching a hero increased it. Analysis revealed that men showed a statistically significant increase in positive mood after watching a violent hero, whereas females' feelings of positive mood scores were not significantly affected. Inter-measure relationships indicate that for men who watched a fictitious violent hero there was a significant positive correlation between the difference in pre/post-viewing positive affect scores and the likelihood of acting aggressively scores, and that this effect was large ($r = .52$). This supports the hypothesis of the experiment that significant positive mood increases are associated with an increased likelihood of aggressive behaviour. The results also support predictions that significant elevations of positive mood may be associated with activation of the BAS and an increased likelihood of aggressive tendencies (e.g., Carver, 2004; Carver & White, 1994; Gable et al., 2000; van Honk et al., 2001; Putman, Hermans, & van Honk, 2004)

Previous experimental studies have failed to investigate how media portrayals of violence may influence aspects of positive affect. Instead, a large body of research focuses on its impact on negative emotional states (e.g., Arriaga et al., 2006; Anderson & Carnagey, 2007; Anderson & Ford, 1986; Bryant, Carveth, & Brown, 1981; Madan et al., 2014). The results of this experiment are particularly important, as people who engage with entertainment media tend to report feelings of positivity after playing (e.g., Vorderer, Klimmt, & Ritterfeld, 2004). In this experiment, it has been demonstrated that watching a scene of violent media that leads to increases in positive affect may predict the likelihood of aggressive tendencies, even when

there is an absence of emotional states which have been documented as significant predictors of aggressive behaviour.

With regards to why males may have shown more elevated increases in positive affect after viewing the violent hero perpetrator, previous studies have suggested that viewers of media entertainment may identify more strongly with same-gender characters (Hoffner & Buchanan, 2005), and that males identify more strongly with aggressive and violent characters (Greene & Adams-Price, 1990). Greater identification with an on-screen character has been linked to the enjoyment of viewed media (e.g., Hefner et al., 2007). However, it is worth noting that no notable sex differences were apparent in the pilot testing of the videos (see Table 2 in the general methods section, p. 60).

Another explanation may be that males are more engaged and energised when watching violence on screen. This has been supported by previous work that suggests males enjoy watching media violence more than women enjoy it (Cantor & Nathanson, 1997; Eyal & Rubin, 2003). However, apparent significant decreases in positive affect for males who viewed the violent villain indicates that males do not enjoy watching all forms of violent media equally. This finding may also be evidence of male participants displaying signs of 'vicarious victimisation'. Viewing a 'hero' character, with whom the watcher identifies, suffering physical punishment may, for example, elicit similar effects to those documented in studies on prison inmates (e.g., Daquin, Daigle, & Listwan, 2016). Studies have previously found that, for a prisoner, viewing a fellow inmate attacked can lead to severe negative emotional outcomes – namely, increases in negative-affect states such as anxiety. This is supported by the results of the study described in this chapter, which shows that males who

watched a 'villain' violently attacking a 'hero' showed marked elevations in state anxiety and decreased positive affect.

4.4.4. Limitations

While analysis revealed a non-significant difference between baseline scores in ABT for participants in the hero and villain conditions, mean scores indicate that participants in the violent hero condition had 20% lower scores than their counterparts. There is evidence to show that individuals higher in trait aggression are more affected by media violence in regard to their subsequent anger and likelihood of aggressive behaviour (e.g., Bushman, 1995). Although a limitation to the study (because groups may not have been matched on trait aggressiveness), this difference may potentially explain why the study failed to find a significant interaction between *who commits the violence* in the clip and likelihood of acting aggressively. Future studies featuring more than one condition would benefit from additionally measuring participants' trait aggression scores to control for any potential effect and to better isolate the impact of media violence on aggression and emotional mood.

Another notable limitation of this study is that across both sexes there were only small increases in participants' positive affect after viewing a violent hero. This was due to female participants reporting far reduced increases in positive affect compared to those of males. The lack of positive affect elevation may be due to a lack of engagement with the film clip for female viewers. Due to a lack of male volunteers, the number of males who took part in the study was relatively small. Therefore, predictions made about the positive relationship between positive affect and aggression are made from a restricted sample size. Future studies would benefit from more balanced recruitment regarding participants' sex.

A third limitation of the study is the use of 'superheroes' in the film clips. SCT and script theory predict that observational learning occurs more readily when the observed model is perceived as similar to the viewer in terms of appearance and characteristics. Therefore, there may have been a greater increase in positive affect if a clip with a more realistic hero was selected.

Finally, the study may have benefited from a more comprehensive investigation into the viewers' own feelings towards the characters within the clips. Pilot testing highlighted that participants moderately identified with the violent protagonist in *Batman: The Dark Knight Rises* (Section 2.1.1, p. 54). Conversely, there appears to be a great deal of sympathy for the victim in *Spiderman*. A greater examination into how those who more significantly identified with the violent antagonists may provide clues into who is the most affected by watching media violence. This could have been achieved by asking the participants of this experiment to indicate their levels of identification with the on-screen characters. It may also be prudent to consider how viewers regarded the victims of the violence, and it is worth investigating whether those who 'blame' the victims for any violence suffered may be more affected by the video clips, due to them seeing the violence as more justified.

4.4.5. Conclusions and implications for future study

This study presents evidence to suggest that violent film clips featuring fantasy scenes of both heroes and villains triumphing have the potential to affect aggressive tendencies. However, whether the fictional violent perpetrator is a hero or villain may affect different aspects of emotional mood, which in turn may explain this increased likelihood of acting aggressively.

135

Results of this study indicate that for males, significant increases in positive affect after vicariously 'winning' through a fictitious violent hero are positively associated with an increased likelihood of aggressive behaviour. Increases in anger and/or anxiety after viewing a fictitious violent villain win a fight may explain increase likelihood of aggression in both males and females. These findings currently suggest that any type of violence on screen may elicit a heightened desire to act aggressively after provocation.

To fully understand whether violence in the media is a key determinant of whether someone will act aggressively, it would be beneficial to examine non-violent media that may impact both positive and negative-affect valences. This would also allow the testing of excitation-transfer theory, which predicts that arousing media of any kind can lead to an increased likelihood of aggression. If non-violent media can successfully elicit changes in both affect and aggressive tendency, this would suggest that violent content is not the key characteristic of how entertainment media can affect aggressive behaviour.

Chapter 5 will, therefore, present an experiment which will utilise a predicted positive-affect-inducing video clip that mirrors the film clip featuring a violent hero perpetrator 'winning'. However, the selected clip will contain a scene that does not feature violence. The aim of this study will be to explore how viewing a non-violent scene featuring a hero win can impact positive affect and aggressive tendencies. In addition to the measures presented, this experiment will include a behavioural measure of aggression for a more complete method of measuring aggressive behaviour.

CHAPTER 5: EFFECTS OF A SCENE OF NON-VIOLENT MEDIA ON AFFECT AND AGGRESSION

5.1. Introduction

This thesis has so far established that video clips featuring either heroic or villainous characters carrying out violent acts can increase the likelihood of acting aggressively. The type of character perpetrating the violence interacts with the type of violence portrayed. Thus, watching a hero being violent increases aggressive tendencies irrespective of whether the violence is graphic or fantasy. By contrast, increases in aggressive tendencies are only observed when the viewed villain is portrayed perpetrating fantasy violence.

These findings further suggest that media-violence-induced increases in aggression can result from two different mechanisms, one associated with increases in a positive mood (as when watching a violent hero) and one linked to increases in anger and anxiety (associated with watching a violent villain). The former of these two mechanisms has not been tested in previous psychological study, as research has tended to emphasise how an individual's tendency to act aggressively is related to negative mood (e.g., Anderson & Bushman, 2002b; Blair, 2004; Chen et al., 2012; Meloy, 2006). The findings of the previous experiment, however, point to a potential relationship between positive affect and aggression.

There also remains a possibility that non-violent media may elicit emotional changes which may, in turn, affect the likelihood of aggressive behaviour. If non-violent media can successfully manipulate positive or negative affect, a tentative prediction is that a viewer will

137

indicate a greater propensity for aggression. This finding would suggest that violent content is not the key characteristic of how entertainment media can affect aggressive behaviour. Rather, any form of entertainment media that is successful in eliciting emotional changes may increase the likelihood of acting aggressively. This possibility has been largely ignored in the media violence research literature but is a finding that is supported by excitation-transfer theory (discussed in Section 1.4.1, p. 5).

5.1.2. Choice of comparison video and the importance of affect

Typical experimental paradigms contrast the effects of violent media on aggression with non-violent media (e.g., Anderson, 1997; Bluemke, Friedrich, & Zumbach, 2010; Bushman, 1995; Fleming, Wood, & Debra, 2001; Konijn et al., 2007; Hasan et al., 2013). This, however, raises the issue of the criteria used to match the two video stimuli. Violent media is typically selected on the basis that it will induce high levels of arousal (e.g., Barlett et al., 2008). Research studies have suggested that, in general, violent media tends to be more exciting than non-violent media, as indicated by greater increases in heart rate, skin conductance response, and systolic and diastolic blood pressure (e.g., Anderson et al., 2004; Murphy, Alpert, & Walker, 1991).

To date, few studies have considered how non-violent stimuli affects mood. As demonstrated in earlier chapters, elevations to affective states may be predictive of a greater likelihood of acting aggressively. Consequently, there is a need to match comparison videos in terms of their potential to induce changes in affect.

5.1.2. Violent vs. non-violent content

An overlooked, but critical question for media violence researchers is whether viewing violent content is the primary reason for increases in aggressive responses after viewing (Ferguson et al., 2008). The GAM predicts that violent media (namely video games, TV or films) cause an increased likelihood of aggressive behaviour through a combination of physiological arousal and the activation of angry and hostile thoughts and feelings (e.g., Anderson & Dill, 2000; Berkowitz, 1990; Bushman, 1998). Regarding how violent media, compared to non-violent media, elicits aggression in the user, Anderson (2004) has previously written that "exciting nonviolent games can increase arousal, but only violent games should directly prime aggressive thoughts and stimulate the long-term development of aggressive knowledge structures" (p. 356). Thus, the GAM draws on predictions made by script theory, stressing the emphasis on the interaction between increases in arousal and the priming of aggressive scripts and schema by the violent media (Anderson, 2004; Anderson & Dill, 2000; Bushman, 1998). Thus, a fundamental tenet of these theories is that engaging with non-aggressive but arousing media will not lead to increased aggression as, by definition, aggressive scripts will not be activated under such circumstances.

Although the GAM is highly influential, not all media violence researchers are strong advocates of it. Some researchers have suggested that violent content may be less influential in elevating aggression than has been previously documented (e.g., Adachi & Willoughby, 2011; Ferguson et al., 2008; Jerabeck & Ferguson, 2013; Przybylski et al., 2010). Researchers have suggested that there may be other characteristics of entertainment media that can explain increases in the likelihood of aggressive behaviour. Active and passive participation in competitive events may impact on both negative and positive aspects of

emotion (e.g., Hefner et al., 2007; Hirt et al., 1992) and these situations may be non-violent (such as sporting events). Furthermore, research evidence suggests that the passive viewing or active participation in these competitive events may stimulate aggressiveness. For example, research evidence from a sample of supporters suggests that viewing a competitive rugby match leads to increases in aggression in supporters of the winning team, but not in those of the losing side (Moore et al., 2007). The use of entertainment media involving sporting events has also been suggested as a way of comparing violent and non-violent media that may be matched on key characteristics such as competitiveness and arousal, but does not contain violence (Adachi & Willoughby, 2011; Jerabeck & Ferguson, 2013). Clips featuring popular sports teams (for example, football teams) may, however, add a potential confounding variable of supporter's bias. This may mean that viewers are more affected by seeing their favourite teams win or lose. Selection of a video clip featuring an athlete, or athletes, unaffiliated with a club would reduce the risk of this bias occurring. Therefore, a video clip featuring runners in an athletics event was chosen for this experiment.

As demonstrated in the previous experiment of this thesis, those who view entertainment media may experience elevations in positive affect when viewing on-screen heroes 'win' a fight. This may be because individuals appear to feel that they can share in the glory of a successful other with whom they are in some way associated (Dijkstra et al., 2010). Furthermore, males who viewed the violent hero character showed a positive correlation between elevations in positive affect and the likelihood of acting aggressively. This clearly suggests that increases in positive affect may be linked to aggressive behaviour. Similarly, results from previous experimental chapters in this thesis indicate that elevations in feelings of negative affect (anxiety and anger) as a result of viewing scenes of violence may also be linked with aggressive behaviour. However, as the effects of non-violent media have yet to be

tested, it is not currently known whether increases in positive/negative affect in the absence of violent content can explain increased likelihood of acting aggressively. In line with excitation-transfer theory predictions, it can be hypothesised that if a non-violent clip has an effect on emotional or physiological arousal, it will impact aggression behaviour. This has been shown in previous studies that suggest non-violent, but highly arousing media, may lead to heightened feelings of aggression after watching (Donnerstein et al., 1975; Zillman, 1971).

5.1.3. Behavioural measure of aggression

While many behavioural paradigms exist to test an individual's propensity for aggression, among the most valid and reliable tests of aggression is the hot sauce paradigm (Lieberman et al., 1999). This paradigm remains one of the most popular tests of an individual's unprovoked aggressive tendencies, particularly in media violence research (e.g., Barlett et al., 2009; Fischer, Kastenmüller, & Greitemeyer, 2010; Hollingdale & Greitemeyer, 2013; Lennings & Warburton, 2011). In this research design, participants carry out a study under the pretence that the experiment is investigating some sort of 'taste preference' on behaviour. During the study, participants are made aware that the next participant to carry out the study has a strong disliking for hot and spicy flavours. Next, participants are asked to add spicy sauce either to a drink or to food that they believe this participant will consume. The number of grams of hot sauce added to the next participant's drink is weighed and acts as a measure of aggression.

5.1.4. Aims and hypotheses

Proponents of the GAM believe that violent content in entertainment media is the main promoter of aggressive behaviour in viewers, whereas non-violent media should not increase the likelihood of aggressive behaviour. Excitation-transfer theory predicts that an exciting stimulus (whether it does or does not contain violence) can cause an individual to feel a subsequent emotion more intensely (Cantor & Zillmann, 1973), which may lead to a greater chance for an aggressive reaction following provocation (Prot, Anderson, & Saleem, 2016). Finally, previous psychological research has suggested that aggression is related to increases in negative affect but not in positive affect (e.g., Anderson & Bushman, 2002a, 2002b).

It is currently unclear from previous experiments of this thesis whether violent content is necessary to foster aggressive tendencies. The current study focuses on the potential for non-violent but arousing videos of a non-contact sport to induce increases in aggression. The clip was chosen on the basis that it showed a former nationally famous athlete winning a race after overcoming an early setback. This parallels the stimuli used in the earlier studies in that the protagonist triumphs, the video is arousing, inducing emotional changes, and there is a sense of a competitive struggle. Accordingly, the experiment reported in this chapter was designed to determine whether watching a non-violent sports video which induced an increase in positive affect was associated with increased aggression.

5.2. Methods

5.2.1. Design

In contrast to the previously used experiment design, this study entailed looking at the effects of a single video.

The study featured a repeated measures design with one within-subject factor (*time*: pre-video/post-video). There were six dependent variables of the experiment which were pre-/post- measures of the *likelihood of acting aggressively*, *state anxiety*, *state anger*, *positive affect*, and *negative affect*. Participants also completed the hot sauce paradigm (Lieberman et al., 1999) as a behavioural measure of aggression.

5.2.2. Participants

Participants were 55 University of Birmingham undergraduates (33 women, 22 men) who took part in the study for course credit or a cash sum. Ages ranged from 18 to 27 ($M = 19.25$, $SD = 1.79$). All participants gave informed consent prior to taking part in the study. Ethical approval for this experiment was granted by the University of Birmingham School of Psychology Ethics Committee. Each participant was treated according to the ethical standards set by the British Psychological Society.

5.2.3. Materials

Participants were shown a video clip of a real-life 1500 metres race which took place in 1989 (length: 3:09). In the video, a runner (Sebastian Coe) falls over after an accidental collision with another racer. The runner manages to get up and, in the last few seconds of the race, overtakes the leader to win. The video was accompanied by a cheering crowd and animated commentators.

To assess individuals' mood pre- and post-viewing, participants were asked to complete the STAI (State-Trait Anxiety Inventory; Spielberger et al., 1983), STAXI-2 (State-Trait Anger Expression Inventory-2; Spielberger, 1999), and the PANAS (Positive and Negative Affect Schedule; Watson, Clark, & Carey, 1988). Participants also completed an evaluation questionnaire for the film clip watched, assessing self-reported feelings of identification with the runner, perceived 'violence' of the clip, and how exciting they rated the footage. Measurement of participants' likelihood of aggressive behaviour was assessed using the aggressive behavioural tendencies (ABT) questionnaire with the hot sauce paradigm (Lieberman et al., 1999). The main dependent measure of aggression within the hot sauce paradigm was the weight (in grams) of hot sauce allocated to the target, determined by weighing the cups before and after the hot sauce was added. Greater amounts of hot sauce administered was indicative of higher aggression. The hot sauce used in this experiment was Frank's Red Hot Original Cayenne Pepper Sauce. More detailed descriptions of the measures (including normative scores and reliability analyses) can be found in the general methods section (Table 3, p. 74).

5.2.4. Procedure

Prior to testing, all participants were emailed a taste preference questionnaire which they were asked to complete and send back to the researcher before attending the experiment. On arrival, before signing the consent form, each participant was asked whether they had any food allergies and, if not, were admitted into the study. In the first part of the experiment, participants consumed a cup containing a combination of water (50g) and hot sauce (3g) in which they were told the amount of hot sauce added was decided by the previous participant.

Following this, participants were tested in accordance with the procedure outlined in the general methods section (Section 2.4, p. 77). Participants filled out the ABT, STAI, STAXI-2, and PANAS questionnaires. Answering the questionnaires took approximately 30 minutes to complete. After completing the questionnaires, participants watched the video clip. This was followed by the participant completing the ABT, STAI, STAXI-2, and PANAS questionnaires for a second time.

Next, participants completed the hot sauce paradigm outlined in the general methods section (Section 2.2.1.2, p. 65). To reiterate this procedure, participants were shown a completed taste preference questionnaire which they were told contained information regarding how much the next participant liked certain food flavours. However, the questionnaire was a fabricated version, designed to lead the reader into thinking the next participant had a strong disliking for spicy/hot food (indicated by a score of 0 for *"how much do you like hot/spicy food?"*). Participants were then asked to administer their chosen amount of hot sauce (measured in grams) to a cup of water and told that the next participant would consume the drink in its entirety.

Next, participants completed the video clip evaluation questionnaire. Participants were then probed as to the aims of the study. However, no participant indicated that they suspected any links between the video clip shown to them and how they responded on any of the questionnaire measures. Furthermore, no participants indicated any pre-existing knowledge of the hot sauce paradigm or what the paradigm was investigating. Participants were then fully debriefed and assured that the next participant would not consume the drink they had made for them. Overall the experiment took around 60 minutes to complete.

5.3. Results

5.3.1. Preliminary analysis

Preliminary analysis of the five personality inventories (ABT; state anxiety; state anger; positive affect; negative affect) explored the possibility of sex main effects or interactions. None were found; therefore, sex was not included in the analysis as an additional factor.

5.3.2. Video clip evaluation questionnaire

Scores for video clip evaluation were given on a 0 (*not at all*) to 10 (*a lot*) Likert scale. Participants reported low mean scores of identification with the runner (*"How much did you identify with the winner of the race?"*: $M = 3.62$, $SD = 2.62$), rated the film clip as being moderately exciting (*"How exciting did you find the video clip?"*: $M = 5.79$, $SD = 2.48$), and

also scored the clip as low for its level of violent content (*"How violent would you rate the video clip?"*: $M = 1.35$, $SD = 1.27$).

5.3.3. Main analyses

Mean scores from the hot sauce paradigm indicate that on average, participants administered 4.57g ($SD = 5.26$) of hot sauce to the target. Independent samples t-tests revealed there to be no significant difference between amount of hot sauce allocated by males ($M = 4.80$, $SD = 4.25$) and females ($M = 4.42$, $SD = 5.84$) $t(53) = 1.07$, $p = .291$.

Five separate paired samples t-tests were run to test participants' personality inventory results (ABT; state anxiety; state anger; positive affect; negative affect). Table 14 shows the mean scores for participants' responses to all personality inventories (ABT, STAI, STAXI-2, and PANAS), pre- and post-viewing, alongside results of the paired sample t-tests. Correlations between emotional mood changes pre- and post-viewing, ABT changes, and hot sauce allocation can be seen in Table 15 (p. 149).

Table 14

Mean scores, standard deviations (in parentheses), and results of the paired samples t-tests

for all participants' responses to emotional mood inventories pre- and post-viewing, and hot

sauce administered (in grams)

Measure	Pre-video $\overline{\mathrm{x}}$	Post-video $\overline{\mathrm{x}}$	Test statistic	d
ABT	132.25 (70.17)	135.29 (72.61)	$t(54) = -0.81$	0.11
Hot sauce administered	--------	4.57 (5.26)	--------	
State anxiety	34.98 (8.02)	34.69 (8.05)	$t(54) = 0.35$	0.05
State anger	15.96 (4.01)	15.47 (2.39)	$t(54) = 1.03$	0.15
Positive affect	26.44 (6.11)	27.31 (7.62)	$t(54) = -1.25$	0.17
Negative affect	13.45 (4.26)	12.00 (2.74)	$t(54) = 2.84**$	0.41

*** = <.005*

5.3.4. Correlations

Table 15

Correlations of pre- and post-viewing difference of ABT, state anxiety, state anger, positive affect, negative affect, and amount of hot sauce allocated (n = 55)

	1.	2.	3.	4.	5.	6.
1. ABT difference	---		.			
2. Hot sauce allocated	.17	---				
3. State anxiety difference	-.09	-.14	---			
4. State anger difference	.13	.01	.08	---		
5. Positive affect difference	-.10	.33*	-.25	-.07	---	
6. Negative affect difference	.07	.06	.25	.36*	-.17	---

$* = p < .05$

5.4. Discussion

The aim of this experiment was to investigate the effects of a predicted positive-affect-inducing, non-violent video clip on a viewer's aggressive behaviour. The study also investigated potential associations between the two types of aggression and positive/negative affect. Mean scores indicate that the video clip was successful in significantly reducing participants' self-reported negative affect. The observation from this experiment that viewing an entertaining film clip led to a reduction in negative mood is not surprising and parallels can be seen in the literature (e.g., Henning & Vorderer, 2001; Katz & Foulkes, 1962). Contrary to the hypothesis prior to the completion of the experiment, however, positive affect was unaffected after viewing. Similarly, the prediction that watching the non-violent video clip would lead to increased aggression was not supported.

The results of the study appear to support GAM predictions that non-violent media does not affect aggressive tendency. It should also be considered that non-violent clips do not have a significant impact on emotion. For excitation transfer to occur and lead to an increased likelihood of aggression, the stimulus viewed must be arousing. While there are studies that suggest non-violent media is exciting and affects emotional arousal (e.g., Ravaja, Saari, Salminen, Laarni, & Kallinen, 2006), other studies have not supported this prediction (e.g., Gentile et al., 2016). Due to the contradictory nature of these studies, it remains an important topic to research and further investigation into the emotional and behavioural effects of non-violent media is needed.

The results from the study do, however, show a significant, medium-sized ($r = .33$) positive correlation between increases in positive affect and administration of larger doses of hot sauce, as measured by the hot sauce paradigm. The results also indicate a significant, medium-sized ($r = .36$) positive relationship between state anger and negative affect. This suggests a positive relationship between negative affect and anger, as has been suggested in previous studies (e.g., Berkowitz, 2000; Watson, 2000).

5.4.1. Aggression and positive affect

The results of this experiment and those from the previous chapters indicate that increases in positive affect may be significantly correlated with aggressive behaviour. This finding casts doubt on previous studies that suggest an increased propensity of aggressive behaviour arising from interaction with entertainment media is solely associated with negative affect (Anderson & Bushman, 2002a, 2002b). The findings also contradict conclusions drawn from previous research studies that have repeatedly shown that the emotional state of anger has the

150

strongest relationship with aggression (e.g., Huddy, Feldman, & Cassese, 2007; Skitka, Bauman, Aramovich, & Morgan, 2006; Cheung-Blunden & Blunden, 2008).

As previously discussed, self-reports of elevated feelings of positive affect indicate feelings of strength, concentration, and pleasurable engagement (e.g., Watson & Clark, 1984). Instrumental aggression involves deliberation and articulation of a goal. Consequently, an individual who is more actively engaged with the experiment may consider the dosage of hot sauce they added to a future participant's drink more carefully. This may result in a greater desire to act aggressively if the participant believes that they will be rewarded. Previous research has suggested that unprovoked aggressors may derive pleasure from inflicting pain on another individual and that this may serve as the reward (Reidy, Zeichner, & Seibert, 2011). This means it is possible that the opportunity to cause harm to another individual generated further positive affect and served as the impetus to initiate aggression (Reidy, Zeichner, & Martinez, 2008). This theory would fit with predictions that positive affect is associated with approach behaviour and thus that instrumental aggression may occur when a participant feels energised after engagement with entertainment media (Carver & Harmon-Jones, 2009; Carver, 2004; Corr & Perkins, 2009).

5.4.2. Limitations

Several limitations to this study should be acknowledged. Across participants of the research study, PANAS scores indicate that the video was unsuccessful in elevating positive affect in viewers. As this clip was chosen on the basis that the video would induce elevated feelings of positive affect, caution must be applied when considering the results of the study. An apparent lack of engagement with the video clip for this specific set of participants may have

impacted a participant's lack of emotional mood change after viewing. A key factor in engagement and enjoyment with a piece of media entertainment is identification with the main character (Vorderer et al., 2004). Reasons for the video clip failing to elevate feelings of positive affect may, therefore, be because of low identification with the winner of the race or because participants' responses indicate that they found the video clip only moderately exciting.

A further limitation of this study was that, due to a single video clip being tested, there was no comparison video to compare emotional and behavioural changes to. While the pre-/post-design of the experiment allowed an investigation into how ABT and mood questionnaire scores were affected by the video clip, it was not possible to infer potential differences in aggression between non-violent and violent video clip viewers. Therefore, future studies would benefit from the inclusion of a violent media condition to assess how different types of entertainment media may differ in their impact on aggression.

5.4.3. Conclusions and implications for future study

As predicted, the results of the currently discussed study support the prediction that positive affect increases are associated with aggression. In the next study, an attempt will be made to expand on the findings of this experiment while simultaneously addressing the limitations detailed in the previous section. The crucial component of the next study will be to ensure that participants are more engaged with the stimulus. This is predicted to lead to greater shifts in emotional arousal, aiding the investigation into associations between aggressive behaviour and positive and negative affect.

While the thesis thus far has focused on passive viewing of stimuli, there is evidence from research studies that more active engagement in entertainment media through video games may have more success in manipulating the arousal level of participants. Video games ensure active engagement rather than passive viewing, and they have been shown to elicit greater arousal and changes in affect than does viewing video clips (Carnagey & Anderson, 2004). Research on the impact of video games on aggression has tended to focus on potential negative emotional shifts (e.g., Ballard & Wiest, 1996; Gentile et al., 2004; Valadez & Ferguson, 2012), and it has failed to consider how games may influence positive affect. Therefore, the results from the next experiment will add to the literature that considers how entertainment media can affect both positive and negative valences of emotional mood.

The prediction for the next experiment will be that an exciting yet non-violent game will lead to increases in both emotional arousal and aggressive behaviour. By contrast, a graphically violent video game that triggers large shifts in anxiety and anger will not result in increased aggression. This finding would be consistent with results from experiment 1, whereby graphic violence (featuring a violent villain antagonist) led to large increases in anxiety and anger but did not cause a shift in the likelihood of aggressive behaviour.

CHAPTER 6: THE EFFECTS OF PLAYING A GRAPHICALLY VIOLENT OR NON-VIOLENT VIDEO GAME ON AGGRESSION AND MOOD

6.1. Introduction

The results from the previous experimental chapters of this thesis have provided evidence that viewing violent media induces changes in both negative and positive affect and increases the likelihood of aggressive behaviours. These findings are only partially accounted for by proponents of the GAM (who believe that violent media increases negative affect which influences aggressive behaviour) and excitation-transfer theory (which predicts that any physiological arousal because of media can lead to an increased chance of acting aggressively when provoked). However, the possibility that violent media (and other forms of media) may foster aggressive inclinations through elevations in positive affect has not been considered.

The current chapter aims to highlight how increases in positive affect can influence aggression. A study is presented that analysed the acute emotional and behavioural changes in players who engaged in either a graphically violent video game or a non-violent racing game. As will be discussed in the next section, video games may have a greater effect on physiological arousal and enjoyment compared to TV/film viewing (Vorderer, Bryant, Pieper, & Weber, 2006). The playing of video games within the experimental setting was predicted to lead to emotional arousal in players, with the valence of these changes being dependent on the type of game played. The non-violent, competitive game was predicted to

lead to increases in positive affect, whereas the graphically violent game was predicted to foster increases in negative affect.

The results from the first experiment of the thesis support the hypothesis that graphic representations of violence, in comparison to fantasy violence, have greater effects on negative indices of emotion (namely anger and anxiety). However, results from this experiment also suggest that viewing graphic violence does not necessarily lead to a greater likelihood of acting aggressively. This finding challenges claims from both the research and public domain that consider graphic violence in entertainment media to be associated with aggressive and violent behaviour, and that consider graphic violence to be a public health risk (e.g., Bushman, 2013; France-Presse, 2013; McGraw, 2007; Romer, 2013; Benedetti, 2007).

The current experiment will compare a positive-affect-inducing non-violent game with a graphically violent game to test the hypothesis that violent media leads to aggressive behaviour through increases in negative affect. This chapter will investigate whether increases in positive or negative affect have a greater relationship with aggressive behaviour. If a non-violent video game that induces positive affect is found to have an association with aggressive behaviour, the finding will present a robust challenge to existing theories that claim that violent content within entertainment media is the sole instigator of aggressive behaviour. Currently, there is limited research evidence on how different types of entertainment media may influence emotional mood and aggression. The chapter will also explore potential differences in a subgroup of players who report elevated positive affect after playing a graphically violent game, compared to those who do not.

6.1.1. Violent video games vs. violent television/films

Considerable research in the last decade has focused on exploring the effects of violent video games on aggression (e.g., Anderson et al., 2008; Greitemeyer, 2014; Greitemeyer & McLatchie, 2011; Gunter, 2016; Huesmann, 2010; Sauer, Drummond, & Nova, 2015; Velez, Greitemeyer, Whitaker, Ewoldsen, & Bushman, 2016). Video games, compared to television viewing, allow the player to be more involved in the content of the media. The players are in control of their on-screen avatar and make decisions about movement, actions, and behaviours within the game (Malliet, 2006). As explored below, the current body of research studies is divided as to whether video game playing, compared to more traditional media viewing, has a greater effect on behavioural outcomes.

The impact of an audience member's reactions to the passive viewing of TV/film clips and more active engagement with video games have been compared in previous research studies (e.g., Polman et al., 2008). However, there is no consensus as to whether video games elicit a greater tendency to aggressiveness for players as compared to television/film watchers (e.g., Anderson, 2004; Lin, 2013; Paik & Comsock, 1994; Polman et al., 2008). A literature review conducted by Vorderer et al. (2008) looked at several possible ways in which video games, compared to television/film, promote greater elevations in positive and negative mood. The authors discuss how substantial increases to aspects of both positive- and negative-affect valences are a direct result of active engagement with the stimulus, particularly as controlling an avatar within a video game allows for players to be rewarded/punished for their actions and enables them to overcome difficult challenges (Jalette & Mundorf, 2009; Vorderer et al., 2008).

Some research studies have suggested that video games, compared to television and film, may lead to weaker effects on aggression due to unrealistic graphics, abstract violence, and (in some cases) non-human playable characters. However, video games have become more realistic and engaging, and the portrayal of violence has become increasingly more realistic (Nowak, Krcmar, & Farrar, 2008). Researchers agree that video games are advancing and changing rapidly (e.g., Calvert & Tan, 1994; McGloin, Farrar, & Fishlock, 2015; Sherry, 2007; Tamborini, Eastin, Skalski, & Lachlan, 2004) and that new games provide increasingly realistic and immersive play. Similarly, researchers speculate that such advances in-game technology may result in more dramatic effects on the behavioural and emotional reactions of players (Carnagey & Anderson, 2004; Gentile & Anderson, 2003). Increases in the severity of media violence are also associated with a greater increase in arousal, as measured by blood pressure, body temperature, and skin conductance (Barlett et al., 2009; Ivory & Kalyanaraman, 2007). Therefore, video game research utilising older generation video games may be outdated and inappropriate to the current debate.

As discussed, research that has focused on the effect of media violence on aggression has tended to frame results within the GAM. The GAM predicts that video games and the viewing of violent television and films lead to greater instances of aggressive behaviour through several mechanisms – namely, through an interaction between increased physiological arousal and elevations in aspects of negative affect, such as anger, hostility, and frustration (as discussed in Section 1.4.2, p. 7, and Section 1.14.1, p. 46). Uniquely to video game usage, the GAM predicts that active engagement with violent entertainment media has a greater impact on aggression through enactive learning due to direct experience with violence (SCT; Bandura, 2007). The GAM predicts that the level of interactivity and

engagement with violent content that players experience leads to the learning, activation, and reinforcement of aggressive scripts that will impact on future aggressive behaviour.

Researchers also argue that violent video games allow players to identify themselves with characters and that this increases imitation and modelling of aggressive behaviours (Gentile & Anderson, 2003). Increased interactivity means gamers must choose who and when to 'kill' within a game (Reynolds, 2002) and are often rewarded for their actions in terms of points, virtual 'trophies', and progression to more game content (e.g., the next level of the game; Peng, 2008). Anderson et al. (2015) discuss how viewers of violent television and films have the choice of taking the perspective of the killer or the victim, but in violent video games the player must always take the perspective of the killer. According to script theory, this means that aggression-related scripts are reinforced when playing violent video games.

6.1.2. Violent video games and affect

Research that investigates the impact of video games on affect has tended to focus on negative outcomes of the media. Consequently, video game research has tended to investigate how violent games impact upon feelings of anger (e.g., Unsworth et al., 2007) and hostility (Arriaga et al., 2006). There does, however, exist a small body of research that has investigated more positive indices of emotion in video game players. One topic of interest is users' involvement and engagement with media. Research has shown that how engaged a user is with entertainment media influences how the user responds and is affected by it (Kim & Biocca, 1997; Lombard & Ditton, 1997; Steuer, 1992). A study conducted by Nowak et al. (2008) has highlighted a potential relationship between positive engagement, hostility, and both verbal and physical aggression. Interestingly, this relationship was evident for players of

both a violent and a non-violent game, albeit the effect was more pronounced for players of the violent video game. The conclusion drawn from this experiment was that engagement with arousing media facilitates hostile thoughts and aggressive actions.

Positive engagement and immersion are linked in positive affect as both are defined by a sense of pleasure or enjoyment resulting from intense concentration and focus on a leisure activity. This experience of intense focus has been linked to both enjoyment and learning (Csikszentmihalyi, 2014; Rathunde & Csikszentmihalyi, 1993). Positive engagement with playing violent video games may therefore support SCT explanations of how violent media affects a player's behaviour. This is because violent video games may teach viewers that aggression is acceptable, and they may encourage imitation of aggressive behaviours (Richmond & Wilson, 2008). Similarly, viewing violence in a positive context may promote the teaching of aggression-related 'scripts', as outlined in script theory.

SCT may, therefore, provide an explanation for a potential relationship between positive affect, playing violent video games, and subsequent aggressive behaviour. However, the results of the study by Nowak et al. (2008) suggest that positive engagement increases in the absence of violent content, which suggests a relationship between positive affect and aggressive behaviour. Similarly, results from previous experiments in this thesis have explored a potential relationship between positive mood and aggressive behaviour following the watching of either violent or non-violent media. A potential explanation for this is that engagement with and elevations in emotional arousal associated with entertainment media may be predictive of a greater propensity to engage in aggressive behaviour. This would contradict the popular model that suggests elevations in positive affect influence likelihood of acting aggressively through an increased desire to imitate models. Instead, this finding would

suggest that an elevated mood state, regardless of valence, has the potential to increase an individual's propensity for aggression.

In video games, successful completion of in-game objectives will lead to increases in positive affect, which is connected to high arousal (Vorderer et al., 2008). This effect is stronger if a difficult challenge is overcome or the game features a competitive element (against other human- or computer-controlled characters). This emotional state leads to a euphoric experience of enjoyment in players and to an increase in motivation to continue the playing process and to face future game situations (Vorderer, Hartmann, & Klimmt, 2003). This may trigger elevations in positive affect, such as feelings of invincibility, alertness, and energy, which have previously been linked to a desire to seek out aggressive confrontations (Frijda et al., 1989; Shaver et al., 1987). In a recent study, Bonus et al. (2015) report that both violent and non-violent games can lead to enhanced aggressive cognitions. The authors note that this may be because exciting non-violent games require intense concentration and rapid responses and may "activate aggressive cognitions to motivate achievement" (Bonus et al., 2015, p. 481). The authors conclude by stating that non-violent games, contrary to conclusions made by the GAM, can indeed affect aggressive thoughts and behaviours and that the study as to why this may be the case requires further inquiry. The authors also suggest that future research should focus on exploring how video game players' emotional indices are affected by in-game content.

6.1.3. Methodological considerations

Recently, there has been greater attention paid to matching games on key characteristics such as realism (Greitemeyer, 2014), player skill (Nowak et al., 2008; Matthews, 2015; Schrader & McCreery, 2008), frustration (Chumbley & Griffiths, 2006; Ivory & Kalyanaraman, 2007), and competitiveness (Adachi & Willoughby, 2011). Game matching is a critical issue in the context of media violence study; otherwise, confounds may interfere with the interpretation of results. Studies have also attempted to identify potential differences in games to control for any discrepancies within subsequent statistical analyses. A popular tool for this is the video game evaluation questionnaire. This can be given to participants across two (or more) conditions, such as violent game vs. non-violent game (e.g., Hasan, Bègue, & Bushman, 2012). This method allows for potential differences in video game characteristics that were not the subject of study to be controlled for, and it allows users to provide answers to a broad array of specific questions relating to their video game experience (e.g., Krahé et al., 2011; Jerabeck & Ferguson, 2013; Potts, Dedmon, & Halford, 1996; Slater, Henry, Swaim, & Anderson, 2003).

Anderson and Dill (2000) and Bushman (1995) assert that violent movies and video games tend to be more exciting and conducive to arousal than are non-violent games. This arousing and exciting nature of violent games may be associated with aggression. Excitation-transfer theory suggests that arousal is a force that energises or intensifies behaviour (Zillmann, 1991). Individuals who become aroused do not experience an immediate return to baseline when the arousing stimulus is removed. Instead, such arousal is carried into future situations and can affect subsequent behaviour. When an individual encounters a provoking situation following an arousing event, their residual arousal may be attributed to the provoking

161

situation, instead of the previously arousing event. This effectively enhances aggressive

reactions in a process known as excitation transfer (Zillman, 1971). Therefore, when

individuals consume violent media, whether passively (television and movies) or actively

(video games), they may become more aggressive in situations that occur immediately

afterwards.

Where studies compare differences between participants exposed to exciting and arousing

media violence and control subjects exposed to calm and boring stimuli, any reported

differences in aggression between groups may be due to the differences in excitement or

arousal elicited by the material, rather than to the violent content itself (Ferguson & Savage,

2012). Therefore, it may be that the influence of violent content is over-exaggerated, with

previous research studies comparing exciting, violent games to less exciting, non-violent

counterparts. One example of a study criticised in this regard was conducted by Friedrich and

Stein (1973) who compared the aggressive reactions of participants who watched an exciting,

violent film clip to those who watched a TV presenter reading from a book. Similarly,

Bushman (1998) compared aggressive responses from participants who watched a fight scene

from a film to those who viewed a nature documentary about gorillas in their natural habitat.

In one of the few studies to examine the impact of excitement and violence on aggressive

inclinations, Huston-Stein, Fox, Greer, Watkins, and Whitaker (1981) tested whether media

portrayals of high action–high violence would elicit significantly more aggression than those

with high action–low violence. The findings suggest that high action was associated with

aggression. However, there was no effect of violent content.

Previous studies have also suggested that time exposure within a video game experimental

condition is important for reliability of results. Ending a testing session after a short period

may result in frustration due to players having never mastered the controls rather than to the violent content of the games. As such, short exposure sessions may inadvertently introduce frustration-related confounds (Sherry, 2007). Thus, while many studies have short time exposures of around 20-30 minutes (e.g., Kneer, Elson, & Knapp, 2016), other studies have suggested that 45 minutes of game time is necessary to master controls and ensure full engagement with the media (Jerabeck & Ferguson, 2013).

6.1.4. Selection of video games

As discussed, violent games may typically be more exciting than non-violent video games. Therefore, when comparing violent and non-violent games, it is important to consider the selection of non-violent comparison games and to ensure that non-violent games are exciting and emotionally arousing. An underused genre of game that may fit this criterion is racing games. Research involving the inclusion of racing games is limited, but the playing of this genre has previously been shown to lead to elevations in arousal and excitement (e.g., Fischer, Kubitzki, Guter, & Frey, 2007) and to increase the accessibility of thoughts that are positively related to risk-taking (Anderson et al., 2004; Fischer et al., 2007). Some popular driving games (such as *Mario Kart*) are cartoon-like and aimed at children, but players are encouraged to use unconventional 'weapons' to give the player an advantage in the race. As such, this type of game encourages (albeit minor) acts of aggression within the game (Olson et al., 2007). Other games (such as *Grand Theft Auto*) feature the driving and racing of cars in more realistic environments, but players are also allowed to perform aggressive acts, such as crashing into other cars or running over pedestrians. Games within the *Need for Speed* franchise, however, are set in a realistic environment and feature 'real' cars, the focus for the player is on the driving experience, and the player is not required to act aggressively within

the game. Therefore, it was predicted that games within this series would provide an ideal platform to test against violent video games, as arousal and excitement are likely to be elicited through the playing of a non-violent exhilarating experience.

Comparatively, selection of a violent game was considered on the basis that the game would be likely to lead to increases in arousal and negative emotional affect in players. The violent perpetrator within the game and the level of violence were also carefully considered to further explore findings from the first experiment of this thesis that graphic violence featuring a villainous antagonist will elicit no change in aggressive behaviour despite having substantial effects on self-reported negative affect (namely anxiety and anger). The game selected for this experiment was *Hatred*, which features graphic violence and brutal, bloody executions of unarmed civilians and armed emergency response units by the player. Research has found that seeing blood in video games is associated with increases in heart rate and arousal (Barlett et al., 2008). Similarly, auditory cues, such as screaming victims, also produce emotional arousal, as measured by increases in the galvanic skin response and through self-report questionnaires (Jeong & Biocca, 2012). Newspapers and journalists have previously labelled *Hatred* as a "mass murder simulator" (Stuart, 2014) and "the most violent game on earth" (Jenkins, 2015). While this game does not feature competitive elements, players are rewarded with points for completing in-game objectives and by advancing to later levels.

6.1.5. Cold pressor task

Having run the hot sauce paradigm with success in the previous chapter, it was of concern that there might be raised suspicion within the undergraduate sample as to this methodology. Therefore, an additional behavioural measure of aggression was utilised in this experiment.

The cold pressor task (also described in Section 2.2.1.3, p. 69) is a popular experimental measure used to assess a participant's aggressive behaviour. It was originally used to measure pain tolerance of participants (e.g., Stephens & Allsop, 2012; von Baeyer, Piira, Chambers, Trapanotto, & Zeltzer, 2005). However, the methodology has been adapted to provide a measure of aggression (e.g., Quartana & Burns, 2007; Vasquez et al., 2005). In this task, participants hold their hand in a basin of water and ice (typically with a temperature of 0-6 degrees Celsius), a stimulus that produces a slowly mounting pain of mild to moderate intensity (von Baeyer et al., 2005). The participants are told that the time in which they must submerge their hand was selected for them by the previous participant. In truth, the time period is fixed for all participants at 30 seconds. Participants who complete this unpleasant exercise are then asked to select an amount of time for the next participant. A greater number of seconds given to the next participant is indicative of greater aggression.

The cold pressor task has now become a popular tool in media violence research. Ballard and Lineberger (1999) were the first to use this experimental design when testing the effects of violent versus non-violent video games, and they found that participants who played a violent game 'punished' a confederate with a significantly longer time in the iced water than did those who played a non-violent game. Conversely, Ferguson et al. (2015) found no evidence to suggest that short-term exposure to media violence significantly affected participants' empathy or the amount of time they assigned a future participant to the iced water. Both Ritter and Eslea (2005) and Ferguson et al. (2015) have paid tribute to this methodology and note it as being a salient measure of aggression that allows participants an opportunity to aggress by administering more time in the iced water, but which also provides them with a non-aggressive option by allowing them to administer less time than they received or even no time at all.

6.1.6. Aims and hypotheses

The aim of the current experiment was to test predictions that draw from previous experimental chapters of this thesis. The focus of this study was to compare behavioural and emotional responses for players who engage with a predicted positive-affect-inducing, non-violent video game (*Need for Speed: Most Wanted*) with those who play a predicted negative-affect-inducing, graphically violent video game (*Hatred*). Based on evidence from previous studies contained within this thesis, the graphically violent video game was predicted to foster substantial increases in negative affect in players. However, in direct contrast to the GAM, it was hypothesised that the game would not lead to an aggressive response. In comparison, the non-violent game was predicted to lead to an increased likelihood of acting aggressively. Also of interest in this study was any potential personality, emotional, and behavioural differences between players who report elevations in positive affect after playing a graphically violent game, compared to those who did not.

6.2. Methods

6.2.1. Design

The study featured a 2 (*time*: pre-video/post-video) x 2 (*content*: violent/non-violent) mixed factorial design. There were seven dependent variables of the experiment, which were pre-post measures of the *likelihood of acting aggressively*, *state anxiety*, *state anger*, *positive*

affect, and *negative affect*. Participants also completed the hot sauce paradigm (Lieberman et al., 1999) and the cold pressor task as behavioural measures of aggression.

6.2.2. Participants

Participants were 60 University of Birmingham students (28 women, 32 men) who took part in the study for course credit or a cash sum. Ages ranged from 18 to 29 ($M = 19.90$, $SD = 1.87$). Participants were invited to take part in the study if they had prior experience with video games and described themselves as 'casual' or 'frequent' video game players. Thirty participants played the graphically violent video game and 30 participants played the non-violent video game. All participants gave informed consent prior to taking part in the study. Ethical approval for this experiment was granted by the University of Birmingham School of Psychology Ethics Committee. Each participant was treated according to the ethical standards set by the British Psychological Society.

6.2.3. Materials

Participants played either a violent or a non-violent video game. In the violent video game (*Hatred*), participants play a character where the aim of the game is to shoot and execute civilians as well as armed response units in order to advance to subsequent levels which increase in difficulty. In the non-violent video game (*Need for Speed: Most Wanted*), participants play as the driver of a car and compete in races against computer-controlled characters to unlock new challenges that also get progressively more challenging. Prior to the

45-minute game-playing time, each participant was given a tutorial to teach them the controls of the game.

Mood was assessed using the STAI (State-Trait Anxiety Inventory; Spielberger et al., 1983), STAXI-2 (State-Trait Anger Expression Inventory-2; Spielberger, 1999), and the PANAS (Positive and Negative Affect Schedule; Watson, Clark, & Carey, 1988). Participants also completed a video game evaluation questionnaire which assessed how *enjoyable*, *exciting*, *difficult*, *frustrating*, and *realistic* players perceived the game to be and asked participants to rate *ease of controls*, *ability of player overall*, *how much ability of player improved between first and last five minutes*, *how hard the player was trying*, and *overall level of action*. These were scored on a Likert scale, ranging from 1 (*not at all*) to 7 (*extremely*).

Participants' trait aggression was also assessed by the Buss-Perry aggression questionnaire (AQ; Buss & Perry, 1992). Likelihood of aggressive behaviour was assessed using the aggressive behavioural tendencies (ABT) questionnaire, the hot sauce paradigm, and the cold pressor task. The main dependent measure of aggression within the cold pressor task was the amount of time (in seconds) allocated to a future target. Greater amounts of time administered were indicative of higher aggression. More detailed descriptions of the measures (including normative scores and reliability analyses) can be found in the general methods section (Table 3, p. 74).

6.2.4. Procedure

Participants first signed a consent form and completed the first part of the hot sauce paradigm. After this, participants completed the cold pressor task as detailed in the general

methods section (Section 2.2.1.3, p. 69). To reiterate this procedure, participants first placed their hand in a container of iced water (kept at a constant temperature of 3°C). Participants were told that the length of time they were to hold their hand in the chilled water was selected for them by the preceding participant. In truth, this time period was fixed for all participants at 30 seconds. To assess how unpleasant the experience was, participants were asked three times, *"how much pain are you currently in?"* (after 5, 15, and 30 seconds). Participants were asked to vocally report their answer using a 10-point scale, ranging from 1 (*no pain at all*) to 10 (*in extreme pain*), and this score was noted by the experimenter.

Following this, participants were tested in accordance with the procedure outlined in the general methods section (Section 2.4, p. 77). Participants filled out the ABT, AQ, STAI, STAXI-2, and PANAS questionnaires. Answering the questionnaires took approximately 35 minutes to complete. After completing the questionnaires, participants played through an in-game tutorial while the experimenter watched to answer any questions related to game play or controls. Following this, the experimenter left the room and participants played either the violent or non-violent game for 45 minutes. This was followed by the participant completing the ABT, STAI, STAXI-2, and PANAS questionnaires for a second time. Participants then completed the video game evaluation questionnaire.

Next, participants completed the second part of the hot sauce paradigm before completing the second part of the cold pressor task. To reiterate, in this procedure participants were provided with a single item measure that asked: *"Based on your experience in the experiment thus far, how long do you believe the next participant should be instructed to put his or her hand in the chilled water?"* The amount of time participants assigned for the next participant to endure the aversive physiological task was used as a behavioural measure of aggression. The higher

the number of seconds allocated to a future target is indicative of greater aggressive behaviour.

Finally, participants were probed as to the aims of the study. Sixty participants were tested; however, five participants indicated that they were aware of the deception within the hot sauce paradigm. Therefore, the data for these five participants was not included in this part of the analysis. This exclusion rate is consistent with other studies that have noted similar levels of suspicion and applied a similar method of exclusion (e.g., Adachi & Willoughby, 2011). Participants were fully debriefed and details of both the hot sauce paradigm and cold pressor task were explained to them. Overall, the experiment took approximately 120 minutes to complete.

6.3. Results

6.3.1. Preliminary analysis

Preliminary analysis of the five personality inventories (ABT; state anxiety; state anger; positive affect; negative affect) and the two behavioural measures of aggression (hot sauce paradigm and cold pressor task) explored the possibility of sex main effects or interactions. None were found; therefore, sex was not included in subsequent analyses as an additional factor.

6.3.2. Video game evaluation differences

As expected, the violence ratings were higher for the violent video game than for the non-violent video game (violent game: $M = 6.63$, $SD = 0.81$; non-violent game: $M = 3.53$, $SD = 1.72$) $t(58) = 8.95$, $p < .001$. The violent game was also rated as being less *enjoyable* (violent game: $M = 4.00$, $SD = 1.78$; non-violent game: $M = 5.43$, $SD = 1.30$) $t(58) = -3.56$, $p = .001$, and less *exciting* (violent game: $M = 4.00$, $SD = 1.74$; non-violent game: $M = 5.53$, $SD = 1.43$) $t(58) = -3.72$, $p < .001$.

The violent and non-violent games did not differ on *difficulty*, *frustration*, *ease of controls*, *the ability of player overall*, *how much ability of player improved between first* and *last five minutes*, *how hard the player was trying*, *how realistic the game was*, or *the level of action* (all $p > .05$).

Differences in video game ratings are not uncommon in previous research studies (e.g., Adachi & Willoughby, 2011; Bonus et al., 2015; Carnagey, Anderson & Bushman, 2005). Consistent with data analysis procedures outlined in these studies, differences between conditions in *enjoyment* and *excitement* ratings were considered as potential covariates in the main analyses. Enjoyment was viewed as an acceptable difference between conditions as elevations in positive affect were predicted for players of the non-violent game. Therefore, differences served to validate the hypothesis that playing the non-violent game would be viewed as a pleasurable activity. However, as excitement has been previously noted as a potential experimental confound in the study of aggression, this variable was added as a covariate in subsequent aggressive behaviour analyses. This did not have any substantial effect on results.

6.3.3. Main analyses

Behavioural responses to the hot sauce paradigm and the cold pressor task were tested separately using independent samples t-tests. A 2x2 mixed factorial ANCOVA was used to test one of the dependent variables of the experiment (*ABT*). Four separate 2x2 mixed factorial ANOVAs were used to test the four dependent variables of the experiment (*state anxiety*; *state anger*; *positive affect*; *negative affect*).

Table 16 (p. 175) shows the mean scores for participants' responses to all questionnaires (ABT, STAI, STAXI-2, and PANAS) across the two video game conditions.

6.3.3.1. Hot sauce paradigm

As the study required participants to believe they were administering hot sauce to someone who did not enjoy the taste of spicy food, several manipulation checks were carried out prior to analysis. Mean scores indicate that the fake participants' taste preference scale was consulted when making up the drink to a moderately high degree ($M = 6.16$, $SD = 3.12$) and was moderately useful in influencing participants with regards to the amount they added to the next individual's drink ($M = 6.18$, $SD = 3.11$). Furthermore, participants reported that the fake participants did not like spicy food ($M = 1.56$, $SD = 1.33$). Participants also regarded the drink as moderately hot ($M = 4.65$, $SD = 2.31$). Thus, in these aspects, it was concluded that the hot sauce paradigm provided a sufficient measure of participant aggression.

A univariate ANCOVA was conducted with the amount of chilli sauce administered as the dependent variable, with video game type (violent vs. non-violent) as the independent variable and responses to the question *"how exciting did you find the game?"* as a covariate. Participants who played the non-violent game, compared to the violent game, significantly differed in the amount of hot sauce they administered to the next participant, with non-violent-video-game players allocating a greater amount of hot sauce to a future target. An effect size calculation of .14 suggests a large effect of video game condition on amount of hot sauce allocated to a target (violent: $M = 5.27$, $SD = 4.90$; non-violent: $M = 10.96$, $SD = 7.74$) $F(1, 57) = 8.77$, $p = .005$, $\eta2 = .14$. These results can be seen in Table 17 (p. 176).

It was hypothesised that hot sauce scores would be at least moderately related to scores on a trait aggression questionnaire. Consistent with past research (e.g., Lieberman et al., 1999, $r = .30$; Ferguson & Rueda, 2009, $r = .25$), hot sauce administered was positively, moderately correlated with the physical aggression subscale of the Buss-Perry questionnaire. However, this correlation did not quite achieve statistical significance ($r = .23$, $p = .081$).

6.3.3.2. Cold pressor task

A manipulation check was first carried out which analysed participants' self-reported feelings of pain during the task. A repeated measures, one-way ANOVA, with *time with hand submerged* as the factor, revealed there to be a significant overall main effect $F(1,118) = 169.73$, $p < .001$. Post-hoc pairwise comparisons revealed there to be a significant mean difference between participants' self-reported feelings of pain from 5 to 15 seconds (5 seconds: $M = 3.83$, $SD = 1.88$; 15 seconds: $M = 5.00$, $SD = 1.95$; $p < .001$) and from 15 to 30 seconds (15 seconds: $M = 5.00$, $SD = 1.95$; 30 seconds: $M = 6.58$, $SD = 2.22$; $p < .001$). This

supports the prediction that participants were aware that the allocation of longer time in the iced water for future participants would result in greater feelings of pain.

A univariate ANCOVA was conducted with the *amount of time administered* to the next participant as the dependent variable, with video game type (violent vs. non-violent) and responses to the question *"how exciting did you find the game?"* as a covariate. Participants who played the non-violent game allocated more time for a future participant to submerge their hand in the iced water compared to participants who played the violent game; however, this did not quite achieve statistical significance, and an effect size calculation of .04 suggests only a small effect (violent: $M = 30.50$, $SD = 12.06$; non-violent: $M = 35.17$, $SD = 10.79$) F $(1, 57) = 3.02$, $p = .088$, $\eta2 = .04$. These results can be seen in Table 17 (p. 176).

It was hypothesised that amount of time administered in the iced water would be at least moderately related to scores of the physical aggression subscale of the Buss-Perry questionnaire. Indeed, the analysis revealed a statistically significant, medium-sized positive correlation between time administered in iced water and physical aggression on the Buss-Perry scale ($r = .42$, $p = .001$).

Table 16

Mean scores and standard deviations (in parentheses) for all participants' responses to aggressive behavioural tendency and affect measures for both video game conditions (pre- and post-play)

Measure	Condition	Pre-video $\bar{x}$	Post-video $\bar{x}$	Test statistic	d
ABT	Violent video game	136.90 (68.42)	146.90 (73.34)	$t(29) = -1.80$	0.33
	Non-violent video game	147.53 (60.73)	171.37 (63.08)	$t(29) = -4.19***$	0.77
State anxiety	Violent video game	34.90 (7.92)	42.47 (9.83)	$t(29) = -3.77**$	0.70
	Non-violent video game	35.87 (7.89)	36.13 (7.97)	$t(29) = -2.68$	0.05
State anger	Violent video game	15.53 (2.53)	18.93 (6.43)	$t(29) = -3.25**$	0.80
	Non-violent video game	16.13 (4.17)	18.20 (5.74)	$t(29) = -3.32**$	0.67
Positive affect	Violent video game	28.03 (6.13)	26.37 (7.12)	$t(29) = 1.40$	0.26
	Non-violent video game	26.07 (6.01)	32.23 (6.93)	$t(29) = -5.67***$	1.04
Negative affect	Violent video game	13.40 (3.63)	16.93 (5.64)	$t(29) = -3.43**$	0.66
	Non-violent video game	12.23 (2.45)	14.03 (4.35)	$t(29) = -3.50**$	0.83

*** = p <.005*
*** = p < .001*

Table 17

Mean scores and standard deviations (in parentheses) for all participants' responses to hot sauce administered in the hot sauce paradigm (n=55; in grams) and time administered in the cold pressor task (n = 60; in seconds) after playing a graphically violent and a non-violent video game

Measure	Condition	$\bar{x}$	Test statistic	$\eta2$
Hot sauce allocated	Violent video game	5.27 (4.90)	$F(1,52) = 8.77*$	.14
	Non-violent video game	10.97 (7.74)		
Time administered (cold pressor task)	Violent video game	30.50 (12.06)	$t(57) = 3.02$	.04
	Non-violent video game	35.17 (10.79)		

* = p = .05

6.3.3.3. ABT

Results of the mixed factorial ANCOVA revealed there to be a significant main effect of *time*, and an effect size calculation of .12 suggests a medium effect (pre-video: *M* = 142.22, *SD* = 64.36; post-video: *M* = 159.13, *SD* = 68.93) $F(1,57) = 7.93$, $p = .007$, $\eta2 = .12$. There was no significant main effect of *video game* on likelihood of acting aggressively (violent: *M*

=141.90 SD = 65.76; non-violent: M = 159.45, SD = 61.91) $F(1,57)$ = 0.28, p = .598, $\eta2$ = .01.

Analysis did reveal a significant interaction between *time* and *video game* as shown in Figure 4. Mean scores indicate that playing the violent game did not significantly increase ABT score; however, playing the non-violent video game did. An effect size calculation of .08 suggests the effect of video game condition on ABT was medium sized (violent pre-video: M = 136.90, SD = 68.42; violent post-video: M = 146.90, SD = 73.34; non-violent pre-video: M = 147.53, SD = 60.73; non-violent post-video: M = 171.37, SD = 63.08) $F(1,57)$ = 5.11, p = .028, $\eta2$ = .08.

6.3.3.4. State anxiety

Results of the mixed factorial ANOVA revealed there to be a significant main effect of *time*, and an effect size calculation of .17 suggests a large effect (pre-video: M = 35.38, SD = 7.86; post-video: M = 39.30, SD = 9.43) $F(1,58)$ = 12.20, p = .001, $\eta2$ = .17. There was no significant main effect of *video game* on likelihood of acting aggressively (violent: M = 38.69 SD = 8.88; non-violent: M = 36.00, SD = 7.93) $F(1,58)$ = 2.06, p = .157, $\eta2$ = .03.

Analysis did reveal a significant interaction between *time* and *video game* as shown in Figure 4. Mean scores indicate that while participants indicated no significant changes in anxiety after playing the non-violent game, players indicated a significant increase in anxiety after playing the violent video game, and an effect size calculation of .15 suggests a large effect of video game condition on anxiety (violent pre-video: M = 34.90, SD = 7.92; violent post-

video: *M* = 42.47, *SD* = 9.83 ; non-violent pre-video: *M* = 34.90, *SD* = 7.92; non-violent post-video: *M* = 36.13, *SD* = 7.97) *F*(1,58) = 10.60, *p* = .002, *η2* = .15.

6.3.3.5. State anger

Results of the mixed factorial ANOVA revealed there to be a significant main effect of *time*, and an effect size calculation of .17 suggests a large effect (pre-video: *M* = 15.83, *SD* = 3.44; post-video: *M* = 18.57, *SD* = 6.05) *F*(1,58) = 12.20, *p* = .001, *η2* = .17. There was no significant main effect of *video game* on likelihood of acting aggressively (violent: *M* = 17.24 *SD* = 4.48; non-violent: *M* = 17.17, *SD* = 4.96) *F*(1,58) = 0.00, *p* = .953, *η2 < .01*.

Analysis did not reveal a significant interaction between *time* and *video game*: *F*(1, 58) = 1.20, *p* = .279, *η2* = .02

6.3.3.6. Positive affect

Results of the mixed factorial ANOVA revealed there to be a significant main effect of *time*, and an effect size calculation of .12 suggests a medium effect (pre-video: *M* = 27.05, *SD* = 6.10; post-video: *M* = 29.30, *SD* = 7.57) *F*(1,58) = 7.76, *p* = .007, *η2* = .12. There was no significant main effect of video game on likelihood of acting aggressively (violent: *M* =27.20 *SD* = 6.63; non-violent: *M* = 29.15, *SD* = 6.47) *F*(1,58) = 1.71, *p* = .196, *η2* = .03.

Analysis did reveal a significant interaction between *time* and *video game* as shown in Figure 4. Mean scores indicate that while participants indicated no significant changes in positive

affect after playing the violent game, players indicated a significant increase in positive affect after playing the non-violent video game, and an effect size calculation of .29 suggests a large effect of video game condition on positive affect (violent pre-video: $M = 28.03$, $SD = 6.13$; violent post-video: $M = 26.37$, $SD = 7.11$; non-violent pre-video: $M = 26.07$, $SD = 6.01$; non-violent post-video: $M = 32.23$, $SD = 6.93$) $F(1,58) = 23.51$, $p < .001$, $\eta2 = .29$.

6.3.3.7. Negative affect

Results of the mixed factorial ANOVA revealed there to be a significant main effect of *time*, and an effect size calculation of .27 suggests a large effect (pre-video: $M = 12.82$, $SD = 3.12$; post-video: $M = 15.48$, $SD = 5.21$) $F(1,58) = 21.48$, $p < .001$, $\eta2 = .27$. There was also a significant main effect of *video game* on likelihood of acting aggressively (violent: $M = 15.17$, $SD = 4.64$; non-violent: $M = 13.13$, $SD = 3.40$) $F(1,58) = 4.96$, $p = .030$, $\eta2 = .08$.

Analysis did not reveal a significant interaction between *time* and *video game*: $F(1, 58) = 2.27$, $p = .137$, $\eta2 = .04$.
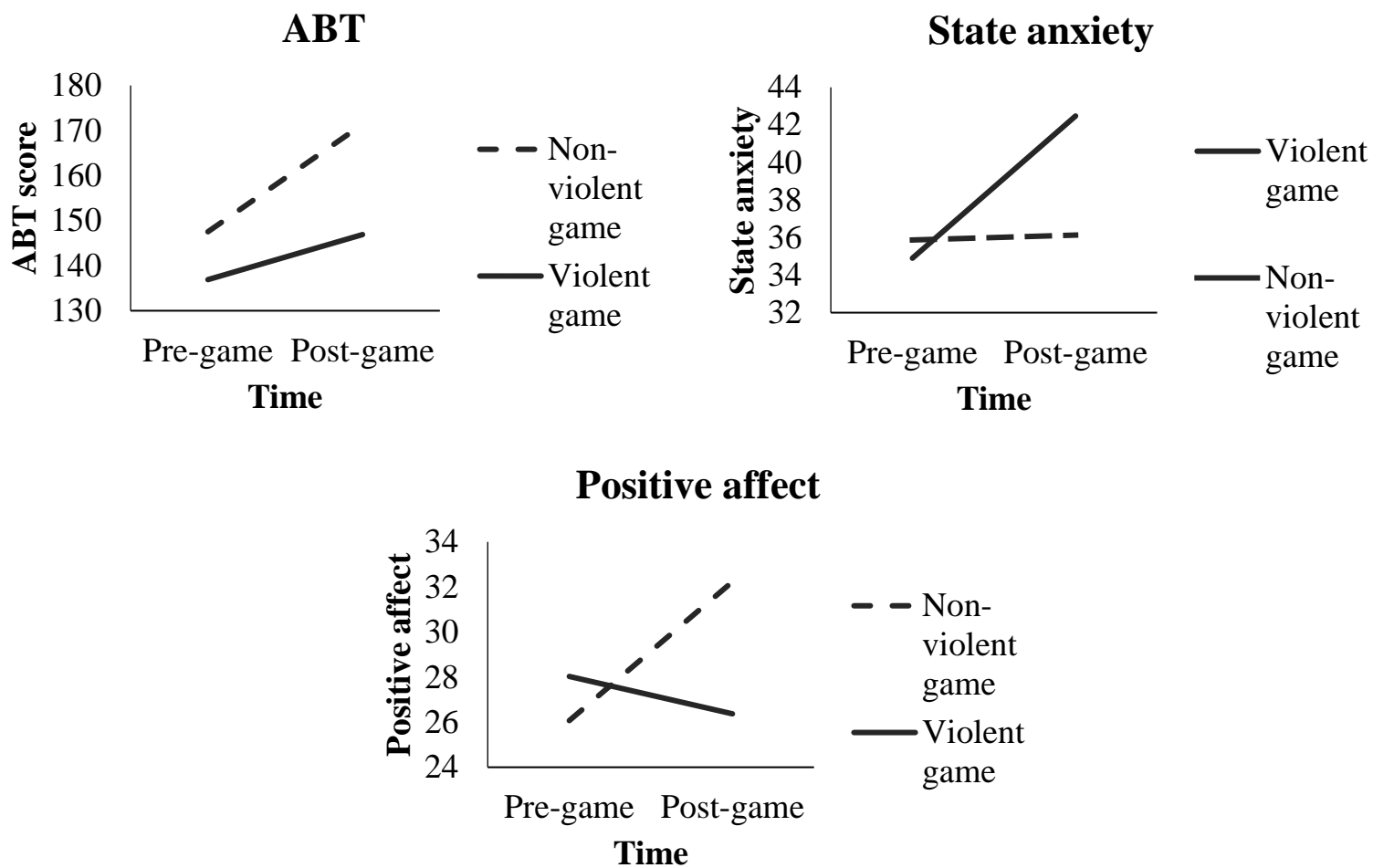
Figure 4. Significant interactions across both video game conditions

6.3.4. Correlations

Tables 18 and 19 show bivariate correlations between the pre-/post- differences in the variables ABT, state anxiety, state anger, positive affect, and negative affect, as well as the responses to both the hot sauce paradigm and the cold pressor task.

Table 18

*Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect, negative affect, and to hot sauce administered in the hot sauce paradigm (in grams) and time administered in the cold pressor task (in seconds) after playing the **violent** video game*

	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*
1. ABT difference	---						
2. Hot sauce allocated	*.03*	---					
3. Time administered	*-.16*	*-.06*	---				
4. State anxiety difference	*.13*	*-.10*	*-.23*	---			
5. State anger difference	*.48**	*-.07*	*-.05*	*.53***	---		
6. Positive affect difference	*.12*	*-.23*	*.01*	*-.15*	*.34*	---	
7. Negative affect difference	*.04*	*-.07*	*-.05*	*.59***	*.67***	*.20*	

* = p < .05
** p < .005
note that for 'hot sauce allocated', n = 27

Table 19

Correlations of pre/post-viewing difference of ABT, state anxiety, state anger, positive affect,

negative affect, and to hot sauce administered in the hot sauce paradigm (in grams) and time

*administered in the cold pressor task (in seconds) after playing the **non-violent** video game*

	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*
1. ABT difference	---						
2. Hot sauce allocated	*.13*	---					
3. Time administered	*-.12*	*.01*	---				
4. State anxiety difference	*.33*	*-.24*	*-.05*	---			
5. State anger difference	*.26*	*-.07*	*.06*	*.30*	---		
6. Positive affect difference	*.42**	*.02*	*.16*	*.10*	*.20*	---	
7. Negative affect difference	*.16*	*-20*	*-.19*	*.20*	*.10*	*.10*	

* = p < .05
note that for 'hot sauce allocated', n = 28

6.3.5. Comparisons of violent-video-game players

Questionnaire scores and behavioural measures of aggression were compared between

players who reported increases in positive affect after playing the graphically violent video

game (PA+) and players who reported decreases in positive affect after playing (PA-).

Descriptive statistics and results of independent samples t-tests can be found in Table 20.

Table 20

*Mean scores, standard deviations (in parentheses) and Mann-Whitney U-test comparisons for pre/post-viewing difference of ABT, state anxiety, state anger, positive affect, negative affect, and hot sauce administered (in grams) and time administered (in seconds) and AQ scores for players of the **violent** video game who showed positive affect increases (PA+) or positive affect decreases (PA-; n = 30)*

	PA+ (*n* = 7)	PA- (*n* = 23)	Test statistic
ABT difference	19.86 (31.65)	7.00 (30.19)	*U*(28) = 53.00
Hot sauce allocated	4.20 (2.78)	5.52 (5.31)	*U*(28) = 51.50
Time administered	30.71 (9.76)	30.44 (12.87)	*U*(28) = 76.00
State anxiety difference	7.29 (5.02)	11.74 (11.78)	*U*(28) = 64.50
State anger difference	6.00 (6.14)	2.61 (5.51)	*U*(28) = 45.50*
Positive affect difference	8.00 (2.38)	-4.61 (4.02)	*U*(28) = 0.00***
Negative affect difference	5.71 (5.25)	3.17 (5.81)	*U*(28) = 65.00
AQ: anger	15.71 (6.87)	13.87 (8.77)	U(28) = 65.50
AQ: hostility	18.14 (12.10)	13.22 (8.77)	U(28) = 56.50
AQ: verbal aggression	17.00 (7.26)	16.22 (7.00)	U(28) = 76.00
AQ: physical aggression	17.43 (11.00)	15.26 (8.54)	U(28) = 71.00
AQ: Total score	68.29 (27.85)	58.57 (25.84)	U(28) = 62.00

* = *p* < .05
*** = *p* < .001

6.4. Discussion

This experiment aimed to investigate acute emotional and behavioural changes in players of a graphically violent video game compared to players of a non-violent, competitive video game. It was hypothesised that the non-violent game would lead to elevations in positive affect in players and significantly increase their likelihood of aggressive behaviour. Conversely, it was predicted that the graphically violent video game would foster substantial increases in negative affect but would not lead to increases in aggressive behaviour. The results of the study broadly supported these hypotheses. Thus, playing a competitive, non-violent video game elicited increases in positive affect and led to a greater likelihood to engage in aggressive behaviour. However, it also induced increases in anger and negative affect. A significant, medium-sized ($r = .42$) positive correlation was also found between positive affect and the AQ. This finding leads to the striking conclusion that a positive mood can be enhanced by engaging with entertainment media and that this may be a crucial mechanism that underpins some forms of aggressive behaviour.

Playing a graphically violent video game led to participants reporting substantial increases in anxiety as well as anger and negative affect. However, it did not lead to an increased likelihood of aggressive behaviour. These findings are consistent with those observed in Chapter 3 and suggest that graphic violence in the media is not associated with increased aggressive behaviour in most people.

6.4.1. The effects of graphically violent and non-violent media on aggression

The results of this experiment support the view that playing a graphically violent video game can significantly increase negative affect (e.g., Gentile et al., 2007). However, the findings do not support the widely held view that playing graphically violent media fosters increased aggression (e.g., Anderson et al., 2003; Anderson et al., 2010; Bushman & Anderson, 2015; Bushman & Huesmann, 2006; Greitemeyer & Mügge, 2014). Instead, the data supports the limited research evidence that suggests non-violent, competitive games can lead to a greater chance of aggressive behaviour (e.g., Adachi & Willoughby, 2011).

In the experiment described in this chapter, players in the non-violent-video-game condition, compared to those in the violent-video-game condition, reported a significantly increased chance of aggression when provoked. Effect size calculations also suggest that the size of this interaction was medium ($\eta2 = .08$). In one of the behavioural measures of aggression, non-violent-video-game players allocated significantly more hot sauce to a target and this was compounded by a large effect size ($\eta2 = .14$). Similarly, players in this video game condition administered longer amounts of time to a future participant in the cold pressor task, although this did not quite achieve statistical significance ($p = .088$) and the effect size was indicative of only a small effect ($\eta2 = .04$). Taken together, these findings indicate that playing non-violent video games can affect aggression and that violent content is not necessary to achieve this increased propensity to aggress.

The findings of this study suggest that the GAM provides an incomplete model of the origins of aggression. They further suggest that the assumption that violent content is the critical characteristic of entertainment media that fosters aggressive behaviour is grossly over-

exaggerated. However, it should be noted that the GAM remains a popular model for interpreting media violence effects (e.g., DeWall, Anderson, & Bushman 2011; Fikkers, Piotrowski, & Valkenburg, 2016; Hasan et al., 2012; Prot et al., 2016).

The results of this study support the results from Chapter 3 that suggested graphic violence carried out by a villain does not lead to aggressive behaviour. One explanation for this finding may be framed within SCT. Villainous characters are disliked if they display immoral behaviour (Raney & Bryant, 2002). As the actions of the violent character in the graphically violent-video-game condition seem unjustifiable, it is highly unlikely that the players formed an emotional connection with the character. As SCT posits that imitation of behaviours is more likely when the model is liked and identifiable, players of this type of game may not have wished to emulate the behaviours and actions of the controlled character. Conversely, positive affect increases, and identification with the villainous character may lead to exaggerated effects, which will be explored further in this discussion and in the next experimental chapter of the thesis.

Another finding of the present study was that non-violent, emotionally arousing stimuli can foster increases to aggression. While some studies have reported no differences in the effects of violent/non-violent media on aggression (e.g., Funk et al., 2003; Ferguson, 2015; Williams & Skoric, 2005), the finding that non-violent entertainment media can lead to a higher chance of aggression is a novel result. This may be because previous studies have failed to investigate the potential underlying mechanism of positive affect on aggression. Results of the study suggest that increases in positive affect after engagement with entertainment media have a significant relationship with aggressive behaviour. Future studies should continue to investigate the relationship between emotional changes and aggressive behaviour. Similarly,

research should continue to explore how competitive, exciting, non-violent media can influence aggressive behaviour.

6.4.2. Emotional changes and relationships with aggression

6.4.3. Positive affect

Despite the popularity of entertainment media, most research studies do not consider the effects of media on positive aspects of affect. In previous chapters of the thesis, short video clips have had mixed success regarding their impact on positive affect. However, in this experiment it was found that the non-violent video game fostered a significant increase in positive affect, and this effect was large ($d = 1.04$). This suggests that non-violent media can have a marked effect on player's positive affect. A significant relationship between positive affect and likelihood of acting aggressively after provocation also suggests that positive affect may be more closely associated with aggression than has been considered in previous studies.

As explored in Section 4.1.1.2 (p. 108), positive affect has been linked to activation of the behavioural approach system (BAS) which deals with the motivation to act. In an experimental setting this may lead to an increased likelihood of aggressive behaviour (e.g., Carver, 2004; van Honk et al., 2001; Harmon-Jones, 2003a, 2003b; Putman et al., 2004; Wingrove & Bond, 1998). This prediction is in line with studies that find increases in positive affect to be related to increased BAS activity and aggressive responsiveness to an insult (Carver, 2004; Carver & White, 1994; Gable et al., 2000). The results further support the findings from previous studies that discuss a positive relationship between video game enjoyment and aggression (McGloin et al., 2016). However, this study is the first to link

positive affect increases after playing a non-violent game to aggression. Increases in positive affect appear to have energised behaviour in participants and made non-violent-video-game players more likely to aggress.

A minority of participants reported increases in positive affect after playing the graphically violent game ($n = 7$). Mean scores indicate several potential differences in emotional mood, behaviour, and personality types of these players compared to those that did not show increases in positive affect. These differences included a higher mean score for the AQ and state anger, as well as lower levels of state anxiety after playing. Furthermore, there is some indication that this subgroup of players had higher trait aggression. Bushman (1995) and Josephson (1987) have previously considered an interaction between trait anger, violent-video-game play, and subsequent aggression. Bushman (1995) also reported that individuals with high trait aggression were more likely to seek out and enjoy violent media content. Therefore, players who enjoy graphically violent games may be more likely to aggress than those who do not enjoy this type of game, and they may also have a more aggressive personality. This will be explored in more detail in the next chapter of the thesis.

6.4.4. Negative affect and state anger

Results of the study highlight differences and similarities in how violent and non-violent video games affected negative aspects of a player's emotional mood. Analysis of results from players in both video game conditions indicates that both graphically violent and non-violent, competitive games have a significant impact on aspects of negative affect and state anger. The finding that non-violent media had an impact on these aspects of negative affect, as well as on positive affect, supports the view that entertainment experiences are multidimensional

and may elicit a multitude of different emotions of both positive and negative valences, such as euphoria, strength, frustration, anxiety (e.g., Klimmt, 2003; Ravaja et al., 2006). Feelings of anger have been noted as a motivational pull to continue with a game, and anger-inducing situations have been found to affect certain aspects of both negative and positive affect valences (Tibubos et al., 2013). The combination of positive and negative-affect valences may have further energised non-violent-video-game players, meaning aggression was more likely. Future media violence research should continue to explore possible interactions between positive- and negative-affect increases on aggressive behaviour.

6.4.5. State anxiety

Results of the study indicate that playing a graphically violent video game fostered significant elevations in state anxiety in players, and the effect was medium sized ($d = .70$). This finding supports previous claims that engagement with graphically violent media severely impacts state anxiety (e.g., Madan, Mrug, & Wright, 2014; Potter & Smith, 2000). This suggests that video game players may respond with empathic distress to the wounding and death of on-screen characters (Ravaja, Turpeinen, Saari, Puttonen, & Keltikangas-Järvinen, 2008; Zillmann & Weaver, 1997) and supports the prediction that feelings of anxiety are triggered when an individual must carry out acts of graphic violence within a video game (e.g., Lang, Newhagen, & Reeves, 1996).

The results of the study indicate that playing a graphically violent video game that fosters substantial increases in state anxiety does not lead to an increased likelihood of aggression. This finding supports conclusions from Chapter 3 of the thesis and suggests that increases to

state anxiety serve as a protective factor against aggression (e.g., Apter et al., 1993; DeWall et al., 2009).

6.4.3. Strengths, limitations, and ideas for future study

The results of the experiment have expanded on the existing media violence literature by presenting positive affect as a potential new mechanism that may explain the relationship between entertainment media and aggression. The finding that a non-violent video game is more likely than a graphically violent video game to foster an increased likelihood of aggression also has important implications for the academic debate surrounding media violence. The results of this experiment suggest that research would benefit from further exploration of how violent *and* non-violent media influence positive and negative affect, and how this impacts aggressive behaviour.

A limitation of the study was the significant difference in how 'exciting' players found the two games. The finding that the non-violent video game was rated as more exciting was unexpected, especially considering that researchers have previously reported that, generally, violent video games are rated as more exciting than non-violent games (e.g., Anderson & Dill, 2000; Bushman, 1995). Future studies should consider the impact of excitement, possibly by using a greater number of video game conditions (e.g., exciting vs. non-exciting, violent vs. non-violent). As well as controlling for how exciting the player found the game in the analysis of the results, it is also worth noting that the experiment in this chapter did match video game conditions on a wide variety of other characteristics. This is an improvement on research studies that have failed to accurately match video games on any game characteristics (e.g., McCarthy, Coley, Wagner, Zengel, & Basham, 2016). As 'frustration' has previously

been cited as a pathway to aggressive behaviour (see Section 1.4.2, p. 7), it is particularly important to note that none of the players reported a high degree of frustration in either video game condition. Therefore, frustration as a result of playing the video games used in this study cannot be considered as a reason for any potentially aggressive outcomes.

Future study may benefit from exploring (in greater detail) how players' individual differences affect emotional and/or behavioural outcomes. The tendency to become 'engaged' with video games has been proposed as a potential variable that may influence their effects (Funk et al., 2003). Utilising a questionnaire, such as Brockmyer et al.'s (2009) game engagement questionnaire, would allow for a more comprehensive evaluation of players' "progression of ever-deeper engagement in game-playing" (Brockmyer et al., 2009, p. 624).

Following script theory, feelings of engagement have been linked to a greater inclination to adapt strategies learned in the virtual world to real life (e.g., Tamborini et al., 2006). This means that those more engaged with a video game may be at greater risk of basing subsequent behaviours on the actions of aggressive characters. Engagement has been used as a way of determining the magnitude of feelings of enjoyment that occur when feeling intrinsically rewarded for completing in-game tasks and overcoming challenging parts of the game (Brockmyer et al., 2008). Measuring this would give a greater indication of how much a video game influences positive affect (e.g., Csikszentmihalyi & Csikszentmihalyi, 1988). The game engagement questionnaire allows researchers to evaluate participants' immersion in a game, which is typically used to describe how much players have 'thrown themselves' into the game-playing experience (e.g., Baños et al., 2004). This has been noted as the most useful way of measuring how much players are truly involved with the game and how much

they have been able to block out any real-life distractions. Therefore, measuring immersion would provide researchers with a clearer indication that participants are taking the game seriously (Baños et al., 2004; Wirth et al., 2007). With these points considered, the game engagement questionnaire would be a useful measurement to run alongside the PANAS questionnaire to better test the impact of the game on engagement, and the effect this has on both positive affect and aggression.

6.4.4. Conclusions

An established view of violent-video-games literature is that violent games increase aggression whereas non-violent games do not (e.g., Anderson, 2004). These results are often framed within the GAM, and they suggest that violent video games foster negative affect which in turn leads to an increased likelihood of aggression. The present study provides evidence that graphic violence fosters negative emotions but is less likely to lead to aggressive behaviour than does non-violent media that affects both negative and positive emotional valences. Similarly, the results of this experiment suggest that there may be a relationship between positive affect and acute aggressive behaviour. The findings also contradict previous research evidence that suggests violent content is necessary to elicit aggression.

Thus far, the thesis has only considered acute effects of media violence on emotional mood and aggressive behaviour. Results from the experiment tentatively suggest that there are personality and emotional and behavioural differences between players who reported increases in positive affect after playing a graphically violent video game compared to those who did not. However, due to a small sample size it is difficult to draw conclusions from this

finding. Chapter 7 will aim to investigate player differences between those who enjoy playing graphically violent games and those who enjoy playing non-violent games.

CHAPTER 7: COMPARING THE PERSONALITIES AND BEHAVIOURS OF HABITUAL PLAYERS OF VIOLENT AND NON-VIOLENT VIDEO GAMES

7.1. Introduction

The previous experimental chapters of this thesis have investigated the acute effects of watching and playing violent and non-violent media. The results of these experiments suggest that, under certain circumstances, interaction with entertainment media can lead to acute changes in emotions and aggression. In the previous experimental chapter, it was reported that playing a graphically violent game (and one which has caused controversy in the public realm) did not lead to general increases in players' aggressive behaviour. Players of this type of video game also generally reported increases in negative affect after playing, with the greatest elevation being feelings of anxiety. However, there was a subgroup of players who reported increases in positive affect, rather than negative affect, after playing. This is indicative of enjoyment and positive engagement with the stimulus. The results of this experiment also provided tentative evidence that this subgroup of players had higher trait aggression and were more likely to aggress when provoked than the typical player.

Thus far, the long-term ramifications of interaction with violent media have not been considered in this thesis. The current experiment used novel groups of participants, who would be expected to be avid players of violent and non-violent games, to explore any potential personality differences. The aim was to assess whether regular players of a graphically violent game, compared to a non-violent game, display more aggressive

personalities and are more likely to act aggressively. For consistency, the participants selected were regular game players of the same games used in the previous chapter, a graphically violent game (*Hatred*) and a non-violent game (*Need for Speed: Most Wanted*). This experiment also aimed to investigate potential underlying mechanisms of aggressive behaviour. Previous research studies have identified several potential pathways to aggression that may interact with long-term media violence use. The mechanisms tested were selected based on these findings and are outlined in the subsequent sections of this introduction.

7.1.1. Trait aggression

Trait aggression was selected as a variable of interest as it has previously been cited in the literature as both a product of habitual media violence use and a possible moderator of the relationship between violent media use and aggressive acts (e.g., Anderson & Dill, 2000; Bartholow et al., 2005; DeWall, Anderson, & Bushman, 2011; Huesmann & Miller, 1994; Lynch, 1994, 1999; Uhlmann & Swanson, 2004). Trait aggression is typically measured with the Buss-Perry aggression questionnaire (AQ; Buss & Perry, 1992) which scores respondents on four subscales: physical aggression, verbal aggression, anger, and hostility. The AQ does not measure specific acts of aggressive behaviour, but rather focuses on a generalisation about a person's own behaviour, reflecting a tendency or disposition to act in a certain way (Archer & Webb, 2006).

In one of the most cited papers investigating the effects of media violence, Bushman (1995) examined violent media use and trait aggression of the viewer. The results of the study suggested that individuals who scored highest for trait aggression also reported greater feelings of anger and increased reactive aggression after engaging with violent media. This

suggests an interaction between aggressive personality and media violence use on aggressive behaviour. Bushman also found that high trait-aggressive individuals were more likely to choose to watch violent media, highlighting a relationship between aggressive personality and preferred media content. Huesmann and Taylor (2003) note that social comparison theory may provide some evidence as to why aggressive individuals seek media violence. The theory, while highly speculative, predicts that an aggressive individual is generally not accepted in society as others do not like to be around aggressive peers (Anderson & Huesmann, 2003). Therefore, to counter this threat to self-worth, aggressive individuals seek out aggressive media to reaffirm their behaviour, which makes them feel more justified with regards to their actions (Huesmann, 1998).

Bushman (1995) also posited that repeated exposure to media violence forms aggressive cognitive-associative networks, suggesting that individuals who habitually engage with media violence develop more aggressive personalities. The GAM, which provides a superficial model, explains that regular exposure to violent content results in development and reinforcement of aggression-related knowledge structures. These knowledge structures include a hostile attribution bias, positive attitudes towards the use of violence, and the belief that violent solutions are normative, effective, and appropriate. This prediction has been supported by other studies that suggest that a combination of trait aggression and regular media violence use will result in an increased likelihood of aggression in the long term (Anderson & Bushman, 2002b; Bartholow, Anderson, Carnagey, & Benjamin, 2005). Based on this evidence, it was predicted that players who regularly play a graphically violent video game would show a higher score for trait aggression.

7.1.2. Habitual media violence usage

Numerous research studies have suggested that the more time a user spends engaging with violent media, the greater the effect on aggression (e.g., Anderson, 2004; Engelhardt et al., 2011; Krahé et al., 2011; Krahé & Möller, 2010). While previous experimental chapters of this thesis have linked the short-term effects of media violence to elevations in affect and arousal, long-term increases in aggressive behaviour because of habitual media violence usage have been linked to observational learning and desensitisation.

Observational learning refers to the desire to copy behaviours based on viewing others performing similar behaviours (Bandura, 1973, 1977; Shettleworth, 2010). Within the context of media violence, repeated observation of violence can teach users that aggression is appropriate, and this leads to the acquisition of social scripts that encourage aggressive behaviour (Bushman & Huesmann, 2006). As discussed in Section 1.4.4.1 (p. 12), a key mechanism that may underlie observational learning is identification with a media character. Peng, Lee, & Heeter (2010) have previously argued that those who report identification with a violent-video-game character exhibit a significantly higher likelihood of acting aggressively in a behavioural task. Identification with a graphically violent-video-game character will be further explored in the next section of this introduction.

Repeated exposure to emotionally arousing media can also lead to habituation of emotional reactions (Anderson & Bushman, 2002a, 2002b; Dexter, Penrod, Linz, & Saunders, 1997; Drabman & Thomas, 1976; Griffiths & Shuckford, 1989; Linz, Donnerstein, & Penrod, 1988; Mullin & Linz, 1995). This process is known as desensitisation and has been used to explain a reduction in distress-related physiological reactivity to media portrayals of violence.

Previous experimental chapters of this thesis have suggested that, in general, graphically violent media fosters negative emotional reactions (namely state anxiety) in players. Desensitisation because of repeated engagement with violent media stimuli is thought to reduce anxious arousal after exposure. In the absence of this negative emotional state, regular users of graphic violence may show a positive affect and aggressive response after viewing violence that would otherwise have been inhibited by anxious arousal (Averill, Malmstrom, Koriat, & Lazarus, 1972; Bartholow et al., 2006; Huesmann & Kirwil, 2007; Krahé et al., 2011; Mullin & Linz, 1995). In the current study, it was hypothesised that habitual violent-video-game usage would predict aggressive traits and behaviour.

7.1.3. Identification with a graphically violent character

Previous experimental chapters of this thesis have considered the role of viewing violent heroes and villains on subsequent aggressive behaviour. Identification with an on-screen character refers to the viewer/player imagining themselves as the avatar. Similarly, the viewer/player imagines that they are carrying out the actions they see on screen (Chory-Assad & Cicchirillo, 2005). In other words, identification occurs when an audience member loses his or her own identity and assumes the identity of the media character. Identification with a violent character has been noted as having a significant effect on whether someone who engages with violent media wishes to model future behaviour on the character's actions (Konijn et al., 2007). Typically, within entertainment media, a violent hero engages in repeated acts of violence that may result in the pain and/or death of a victim. However, this violence is often framed as justified within the narrative (Smith, Lachlan, & Tamborini, 2003).

Previous research studies have suggested that identification with a violent character can only occur if the virtual violence does not violate inner moral standards and cause aversion or dissonance (Bandura, 1990, 2002; Tangney, Stuewig, & Mashek, 2007). In general, violence that conflicts with one's inner moral standards may trigger negative emotional states such as guilt, remorse, and anxiety (Klimmt, Schmid, Nosper, Hartmann, & Vorderer, 2006). On-screen characters' actions that trigger these emotional states have also been found to be negatively correlated with enjoyment (Hartmann & Vorderer, 2010). Therefore, it would not be expected that a typical viewer or player would identify with a violent villain, particularly if their actions seem morally unjustifiable. If someone does identify with this type of character, it may be indicative of an atypical moral code. This may suggest that the viewer is more accepting of the violent acts, hinting at a more aggressive disposition. If identification with a violent hero teaches that when provoked one should retaliate aggressively, a player who identifies with a violent villain who engages in unprovoked aggression may learn that instrumental aggression is acceptable. This finding would, therefore, be consistent with SCT predictions that viewers model their behaviours on viewing a desirable character (in this case a villain) acting in a certain way. This study is the first to consider identification with violent villains as a potential reason for acting aggressively. Therefore, the hypothesis for the experiment described in this chapter was that identification with the main character of a graphically violent game predicts instrumental aggression.

7.1.4. Aims and hypotheses

The aim of the current experiment was to compare the personality and aggressive behaviours of regular players of a graphically violent video game (*Hatred*) and a non-violent (*Need for Speed: Most Wanted*) video game. The hypotheses for the experiment were: (1) regular

players of *Hatred* will score higher on a measure of trait aggression than regular players of *Need for Speed: Most Wanted*; (2) regular players of *Hatred*, compared to *Need for Speed: Most Wanted*, will score higher on measures of reactive and instrumental aggressive behaviour; (3) habitual media violence usage will predict reactive and instrumental aggressive behaviour; and (4) identification with the main character of *Hatred* will predict instrumental aggressive behaviour.

7.2. Methods

7.2.1. Design

A factorial design was used to compare behavioural and personality differences of regular players of a graphically violent video game (*Hatred*) and a non-violent racing game (*Need for Speed: Most Wanted*). The variables were trait aggression (and subscales), reactive aggression, instrumental aggression, habitual violent/non-violent-video-game usage, and identification with the main character of the preferred game. A correlational design was also implemented to examine the relationship between these measures.

7.2.2. Participants

Participants were 140 volunteers (90 males, 50 females) recruited from two popular websites used primarily for gaming discussions (forums.steampowered.com; www.neoseeker.com). Ages ranged from 13 to 45 ($M = 21.98$, $SD = 6.04$). Participants were invited to take part in the study if they were regular players of the respective video game, or rather reported three

hours or more a week playing the video game (Entertainment Software Association, 2010). The assumption of the participant recruitment was that regular players of the selected games would positively engage with the video games. Thus, these participants would show similar emotional reactions to those in the previous experiment who exhibited positive affect increases after playing the video game. To recruit regular players of the two games under investigation, a link to the questionnaire and a brief description of the study was posted in the *Need for Speed: Most Wanted* and *Hatred* forums of the two websites. Ethical approval for this experiment was granted by the University of Birmingham School of Psychology Ethics Committee.

7.2.3. Materials

Aggressive personality was assessed using the Buss-Perry AQ (Buss & Perry, 1992). Participants were also asked to consider their own specific aggressive behaviour, measured by the reactive-proactive aggression questionnaire (RPQ; Raine et al., 2006). Amount of time spent playing violent games was assessed using an adapted version of the Habitual Media Violence questionnaire (Krahé et al., 2011). The score given for the amount of time spent playing sports games was used as a measure of habitual non-violent-video-game play. Identification with the main character was assessed with a one-item Likert scale (*"When considering how you feel after playing Hatred/Need for Speed: Most Wanted, please indicate the extent to which you identify with the main character of the game"*) with scores ranging from 1 (*not at all*) to 10 (*a lot*). Participants were also asked to give their reasons for why they regularly play their chosen type of game.

7.2.4. Procedure

A brief description of the study and a link to the questionnaire was posted on the gaming websites previously identified. These were posted in specific locations of the websites relevant to the video games, allowing for a targeted response from participants who were interested in them. Respondents followed a link in the written description on the forum and, in one sitting, filled out several demographic questions, the AQ, RPQ, and habitual video game play questionnaires. Participants also indicated the extent to which they identified with the main character of the game. Lastly, participants answered a question aimed at identifying their reasons for playing their chosen type of game. This was an open-ended question, with participants encouraged to be truthful and as detailed as possible. Answering the questionnaires took approximately 20 minutes to complete. After finishing the questionnaires, participants were debriefed via a short text explanation detailing the aims of the experiment. Participants were informed that if they had any questions relating to the experiment or would like more information about the study they could contact the experimenter directly by email.

7.3. Results

7.3.1. Preliminary analysis

As there were no significant sex main effects or interactions, sex was not included in subsequent analyses as an additional factor.

7.3.2. Main analyses

To test for personality and behavioural differences in players, a series of independent samples t-tests were performed with video game played as the independent variable and all other measures taken in the experiment as dependent variables. Results of the independent samples t-tests and descriptive statistics for the experiment can be seen in Table 21.

Table 21

Mean scores, standard deviations (in parentheses), and t-test *comparisons for the aggression questionnaire subscales, reactive and proactive aggression, habitual violent- and non-violent-video-game play, and identification with the main character for regular players of a graphically violent video game and regular players of a non-violent game (N = 140)*

	Graphically violent-video-game players ($n = 70$)	Non-violent-video-game players ($n = 70$)	Test statistic	d
AQ: anger	19.30 (12.23)	15.67 (8.09)	$t(119.64) = 2.07^*$	0.36
AQ: hostility	24.29 (17.44)	13.87 (10.24)	$t(111.53) = 4.31^{***}$	0.82
AQ: verbal aggression	16.39 (7.20)	12.39 (6.17)	$t(138) = 3.53^{**}$	0.60
AQ: physical aggression	25.46 (15.38)	15.03 (10.77)	$t(123.56) = 4.65^{***}$	0.80
AQ: Total score	85.43 (46.60)	56.96 (26.87)	$t(110.33) = 4.43^{***}$	0.78
Reactive aggression	9.29 (7.71)	7.71 (4.44)	$t(123.70) = 1.70$	0.26
Instrumental aggression	4.43 (6.87)	1.81 (2.69)	$t(89.73) = 2.97^{**}$	0.55
Habitual violent-video-game play	7.45 (1.99)	5.34 (2.32)	$t(138) = 5.25^{***}$	1.00
Habitual non-violent-video-game play	1.04 (1.20)	2.61 (1.00)	$t(138) = -8.45^{***}$	1.43
Identification with main character	3.13 (3.65)	2.50 (2.56)	$t(123.81) = 1.18$	0.20

$* = p < .05$
$** = p < .005$
$*** = p < .001$

7.3.3. Bivariate correlations

Correlations between the experimental measures were examined using Pearson's correlation coefficient tests. Of interest was the relationship between identification with the main character and habitual media violence usage on trait aggression and reactive/instrumental aggressive behaviour. Results of these correlations can be found in Tables 22 (p. 207) and 23 (p. 208).

Correlations were first examined for any relationships between the AQ subscales and reactive/instrumental aggressive behaviour. For both regular players of a graphically violent video game and players of a non-violent game, AQ total score and subscales of anger, hostility, physical aggression, and verbal aggression were all positively correlated with each other and were indicative of large effects (all $r > .54$, all $p < .001$).

For both regular players of a graphically violent video game and players of a non-violent game, AQ subscales of anger, hostility, and physical aggression were all positively correlated with both reactive aggression (all $r > .41$, all $p < .001$) and instrumental aggression. The analysis also revealed that these correlations were all indicative of medium- to large-sized effects (all $r > .48$, all $p < .001$). While verbal aggression did strongly correlate with reactive and instrumental aggression for non-violent-video-game players (all $r > .59$, all $p < .001$), it did not correlate with reactive and instrumental aggression for graphically violent-video-game players (all $r < .22$, $p > .065$).

Regarding the relationships of interest, for regular players of a graphically violent video game there was a medium-sized, positive correlation between identification with the main character

205

of the game and anger, hostility, verbal aggression, and physical aggression (all $r > .41$, all p < .001). There was also a large, positive correlation between identification with the main character and proactive and reactive aggression (all $r > .58$, all $p < .001$). Lastly, there was a significant correlation between habitual violent video games played and verbal aggression ($r = .32$, $p = .007$), and between habitual violent video games played and proactive aggression ($r = .27$, $p = .022$). All other correlations were not statistically significant (all $p > .05$)

For regular players of a non-violent video game, there was a significant, small-sized correlation between identification with the main character and verbal aggression ($r = .27$, $p = .026$). There were also small- to medium-sized, significant correlations between habitual media violence usage and verbal aggression, physical aggression, and AQ total score (all $r > .29$, all $p < .014$). All other correlations were not statistically significant (all $p > .05$)

Table 22

Relationship of identification with main character and habitual violent media usage with

*personality traits and behaviour for regular **graphically violent**-video-game players (n = 70)*

	Identification with the main character	Habitual violent media usage
AQ: anger	.61***	.27*
AQ: hostility	.57***	.16
AQ: verbal aggression	.41***	.32**
AQ: physical aggression	.51***	.17
AQ: total score	.63***	.26
Reactive aggression	.58***	.23
Proactive aggression	.66***	.27*

       * = $p < .05$
      ** = $p < .005$
     *** = $p < .001$

Table 23

Relationship of identification with main character and habitual violent media usage with

*personality traits and behaviour for regular **non-violent**-video-game players (n = 70)*

	Identification with the main character	Habitual violent media usage
AQ: anger	.03	.18
AQ: hostility	.10	.24
AQ: verbal aggression	.27*	.39**
AQ: physical aggression	.20	.29**
AQ: total score	.23	.37**
Reactive aggression	.16	.17
Proactive aggression	.12	.05

$* = p < .05$
$** = p < .005$

7.3.4. Multiple regression analyses

To understand which of the measured variables would be predictive of reactive and

instrumental (proactive) aggression, two separate backward regression analyses were

performed. The predictors entered into the model were AQ subscales of anger, hostility,

physical aggression, and verbal aggression scores, habitual violent and non-violent-video-

game usage, and identification with the main character. Tables 24 (p. 210) and 25 (p. 211)

show significant predictors in the best-fitting models.

For regular players of a graphically violent video game, a backward regression analysis revealed that AQ subscales of anger, physical aggression, and verbal aggression predicted reactive aggression: $\Delta R2 = .71$, $F(1, 65) = 57.42$, $p < .001$. For instrumental aggression, AQ subscales of anger and verbal aggression positively predicted this behaviour. Consistent with the pre-experimental hypothesis, identification with the main character was a positive predictor of instrumental aggression: $\Delta R2 = .62$, $F(1, 65) = 38.29$, $p < .001$. Contrary to the pre-experimental hypothesis, habitual violent-video-game usage was not selected for entry into the model and did not predict reactive or instrumental aggression in either group of players ($p > .05$).

For regular players of a non-violent video game, a backward regression analysis revealed that AQ subscales of anger and physical aggression predicted reactive aggression. Time spent playing non-violent video games also negatively predicted reactive aggression: $\Delta R2 = .58$, $F(1, 65) = 29.96$, $p < .001$. For instrumental aggression, AQ subscales of anger, hostility, and physical aggression positively predicted this behaviour: $\Delta R2 = .36$, $F(1, 65) = 14.15$, $p < .001$. Again, habitual violent-video-game usage was not selected for entry into the model and did not predict reactive or instrumental aggression ($p > .05$).

Table 24

*Predictors of reactive and instrumental aggression for regular players of a **graphically***

***violent** video game (n = 70)*

	β	SE		t	*p*-value
			Reactive aggression		
AQ: Anger	0.31	0.06		5.10	<.001
AQ: Physical aggression	0.16	0.69		2.38	.020
AQ: Verbal aggression	0.18	.08		2.45	.017
			Instrumental aggression		
AQ: Anger	0.26	.07		3.63	.001
AQ: Verbal aggression	0.21	.09		2.39	.020
Identification with the main character	0.62	.18		3.52	.001

Table 25

*Predictors of reactive and instrumental aggression for regular players of a **non-violent game***

(n = 70)

	β	*SE*		*t*	*p*-value
			Reactive aggression		
AQ: Anger	0.31	0.06		5.10	<.001
AQ: Physical aggression	0.16	0.69		2.38	.020
Habitual non-violent-video-game usage	-0.97	0.37		-2.61	.011
			Instrumental aggression		
AQ: Anger	0.09	.04		2.18	.033
AQ: Hostility	0.07	.04		1.93	.058
AQ: Physical aggression	0.91	.03		2.80	.007

7.3.5. Summary of results

The results of the experiment show that regular graphically violent-video-game players score higher than non-violent-video-game players on all measures of trait aggression and for instrumental (but not reactive) aggression. Instrumental aggression in regular players of a graphically violent video game also appears to be predicted by trait anger, hostility, and identification with the main player of the game.

7.4. Discussion

The study presented in this chapter aimed to investigate personality and behavioural differences in regular players of a violent video game and a non-violent video game. The experiment also considered underlying mechanisms that may be predictive of reactive and instrumental aggression. It was theorised that regular players of a graphically violent video game would possess more aggressive personalities and score higher on a measure of reactive and instrumental aggression. It was also hypothesised that the time spent playing violent video games (habitual violent-video-game play) would predict reactive and instrumental aggressiveness. Finally, for regular players of a graphically violent video game, identification with the main character was hypothesised to predict instrumental aggressive behaviour.

The results of the study had mixed success with regards to their support for these hypotheses. Statistical analyses revealed that regular players of the graphically violent video game, compared to players of the non-violent video game, displayed more aggressive personalities as recorded by the Buss-Perry AQ. This was evident from overall scores to the questionnaire and for each of the four subscales (anger; hostility; physical aggression; verbal aggression). Similarly, regular players of the graphically violent video game, compared to players of the non-violent game, reported a statistically higher likelihood to engage in instrumental aggressive behaviour. There was no significant difference in reactive aggression between the two groups of players.

For regular players of a graphically violent video game, the correlational analysis revealed a positive relationship between habitual violent-video-game usage and instrumental aggression. However, further analysis revealed that this variable was not a significant predictor of either

reactive or instrumental aggression. In comparison, the analysis revealed that identification with the main character of a graphically violent video game significantly predicted instrumental aggression. These findings are considered in more detail in the following sections of this discussion.

7.4.1. Differences between players

Regular players of the graphically violent video game scored higher than the normative data (taken from Buss-Perry, 1992; $N = 1253$) on each of the trait aggression subscales (anger: 19.30 vs. 16.85; hostility: 24.29 vs. 20.75; verbal aggression: 16.39 vs. 14.35; physical aggression: 25.46 vs. 21.10) and for reactive and instrumental aggressive behaviour (reactive: 9.29 vs. 7.14; instrumental: 4.43 vs. 2.79). Similarly, and in support of pre-experimental predictions, regular players of the graphically violent video game, compared to players of the non-violent video game, indicated more aggressive personalities and reported greater indices of instrumental aggression. Effect size calculations reveal that this effect was greatest for AQ subscales of hostility and physical aggression ($d = 0.82$ and 0.80 respectively). This finding is in line with research studies that report a significant relationship between regular media violence usage, aggressive personalities, and behaviour (Anderson & Bushman, 2001; Bartholow et al., 2005; Bushman & Anderson, 2002).

While graphically violent-video-game players also reported higher reactive aggression scores, this was not statistically significant ($p = .091$). This may indicate that entertainment media which features a character carrying out either reactive or instrumental aggression has a selective effect on these aggressive behaviours in the player. This supports the distinction of the two aggression subtypes as described by researchers (e.g., Berkowitz, 1998; King et al.,

213

2009; Scarpa & Raine, 2000; Siever, 2008). However, due to the correlational nature of this study, further research is needed to corroborate this assumption.

7.4.2. Habitual media violence usage

The results of the experiment show a positive relationship between habitual violent media usage and instrumental aggression in players of a graphically violent video game. However, the regression model did not show habitual usage of violent media as a significant predictor of reactive or instrumental aggression. Previous studies have suggested that limiting time spent playing violent games may reduce the effects of violent media on aggression and lead to less aggression in society (e.g., Anderson, 2004; Gentile, 2013a, 2013b; Savage & Yancey, 2008). The results of the current study suggest that this would be ineffectual. Future studies should attempt to investigate other ways to mitigate any potential long-term effects of media violence usage. Similarly, merely limiting media violence exposure would not address other potential player characteristics that may predict aggression, such as their identification with the violent character (as will be discussed in the next section).

The finding that for non-violent-video-game players, habitual non-violent-video-game play has a negative association with reactive aggression has several important implications. Firstly, this finding suggests that while exciting non-violent media can lead to acute increases in aggressive behaviour (as demonstrated in Chapter 6), these effects are not long term. This provides a critique of previous studies that have attempted to link acute changes in experimental settings to long-term effects (e.g., Anderson, 2004; Bushman & Huesmann, 2006; Gentile et al., 2011).

7.4.3. Identification with the main character

A major finding of the current experiment was that for regular players of a graphically violent video game, identification with the main character significantly predicted instrumental aggression. This finding supports previous research that has indicated that the most at-risk individuals of media violence effects are those who identify with violent characters.

Previous experimental chapters of this thesis have shown that, generally, graphic representations of violence do not foster aggressive behaviours. However, the current study suggests a relationship between an aggressive personality, identification with the violent main character in a graphically violent video game, and instrumental aggression. While the measures of this experiment are focused on minor forms of aggression, future research should consider the impact of these characteristics on more extreme violent acts. Surette (2002), for example, found that juvenile delinquents who display high trait aggression are most at risk of modelling violent crimes on scenes from violent entertainment media. Surette (2002, 2014) also suggests that a small percentage of aggressive individuals who identify with media characters are more likely to engage in 'copycat' violent crimes and to view entertainment media as significant and more influential in their own aggressive behaviour.

While the debate continues as to whether habitual violent-video-game use impacts aggressive and violent behaviour, it may be prudent to instead focus on interventions for at-risk players. Thus, special attention should be paid to players who identify with violent characters. Additional research methodologies, including the use of in-depth interviews (e.g., Hagell & Newburn, 1994), should be considered for at-risk individuals.

7.4.4. Limitations

While the study did consider trait aggression as a potential moderator of aggressive behaviour, previous research studies have suggested other personality traits and demographic information that may also act as moderators. These may include family environment (Pinker, 2003), times of stress (Ferguson et al., 2008), or intelligence (e.g., Dubow, Boxer, & Huesmann, 2009). Future research may benefit from building a more complete model of how these factors may interact with both short-term and long-term media violence usage. Finally, Ferguson et al. (2008) have previously considered that video game violence may not be a direct cause of violent behaviour, but it may impact on its form. Future research should continue to explore how entertainment media may shape aggressive and violent behaviours, especially for those who identify with violent characters. It would also have been beneficial to have questioned respondents on how long they have played the games (in terms of years, rather than hours a week) to better understand the long-term implications of video game play.

Another limitation of the study concerns the flaws in self-report questionnaires, such as an over-reliance on participants being honest and, therefore, an increased chance of response bias. The use of online questionnaires may be an issue as there is no researcher present when the participant fills in the survey. This means that there is little disincentive for participants to respond with false responses (Hoskin, 2012), and that there is little control over how much attention the participant pays to various parts of the questionnaire. It is also not possible for participants to ask the researcher any questions related to the experimental measures. It must also be noted that the study contained no behavioural measures of aggression – thus, the predictions made about aggression may lack reliability. Future research may benefit from using online surveys as a way of identifying different types of video game player, before

testing willing participants in a laboratory, utilising the behavioural measures of aggression outlined in previous chapters of this thesis.

7.4.5. Conclusions

Numerous research studies have attempted to link habitual media violence usage with aggressive personalities and behaviour. The prediction of these studies is that the more exposure individuals have to violent media, the more aggressive they will become. In this experimental study, regular players of a violent video game, compared to players of a non-violent video game, were found to score higher on measures of trait aggression and instrumental aggression. Amount of time spent playing violent media was not a significant predictor of aggressive behaviour.

The study also suggests that identification with a violent character is the key predictor of aggressive behaviour when engaging with violent media. A combination of an aggressive personality and identification with a violent perpetrator seems to be the most likely predictor of aggressive behaviour. Future research should expand upon these findings by considering other personality types of regular players of violent media. Furthermore, future research studies should consider how identification with a violent character can develop in violent-video-game players and how this may influence aggressive behaviour.

CHAPTER 8: GENERAL DISCUSSION

8.1. Restatement of aims and summary of theoretical contribution

There has been considerable research conducted in the last decade which has focused on exploring the effects of violent media on aggression (e.g., Anderson, 2009; Anderson et al., 2008; Bartholow et al., 2005; Bushman & Huesmann, 2006; Gentile, 2013; Greitemeyer & Mügge, 2014; Gunderson, 2006; Velez et al., 2016). Established models of the acute effects of media violence usage on aggression have argued that violent media may: (1) induce negative-affect states which increase an individual's likelihood of acting aggressively (e.g., frustration-aggression theory; Berkowitz, 1989); (2) encourage the imitation and modelling of aggressive behaviours from media role models (SCT; Bandura, 1973); (3) promote the learning and reinforcement of aggression-related 'scripts' (script theory; e.g., Huesmann, 1986); and (4) affect physiological arousal that may lead to a greater chance of an aggressive response when provoked (e.g., excitation-transfer theory; Zillmann, 1983). The general aggression model (GAM; Figure 5) integrates the theories, with the aim of providing a comprehensive framework for understanding human aggression and violence (Anderson & Bushman, 2002a).

The GAM, in particular, has been so persuasive, both within a research setting and with government agencies, that it can act as a pertinent reference point to illustrate the progress made by the studies presented in this thesis. The effect of the media on aggression is believed to be limited to its violent content, since non-violent media is not predicted to affect the propensity for aggressive behaviours (e.g., Anderson, 2004). Furthermore, previous research

has suggested that all media violence leads to increased aggressive behaviour, and graphically violent portrayals have been cited as a public health risk, in both the academic and public realms. Engaging with this type of violence in the media has, therefore, been cited as a significant risk factor in fostering aggressive and violent individuals in society (Gentile, 2014; Rose, 2013; Taylor & Huesmann, 2014).

This thesis used a series of experimental tests to primarily examine the acute effects of violent and non-violent media on aggression. The results reported in this thesis: (1) indicate that graphic portrayals of media violence do not generally lead to increased aggressive behaviour; (2) suggest that non-violent media can also lead to increased aggressive behaviour; (3) show that increases in positive affect after engagement with entertainment media have an association with aggressive behaviour; and (4) demonstrate that a player's identification with a violent main character is a significant predictor of aggressive behaviour. These findings challenge many of the conclusions of previous research studies. Critically, the results of the thesis suggest that the GAM should be adapted to incorporate the key characteristics of entertainment media and the user. In the next part of this general discussion, the pertinent theories in media violence literature will be synthesised with results from the experimental chapters of this thesis.
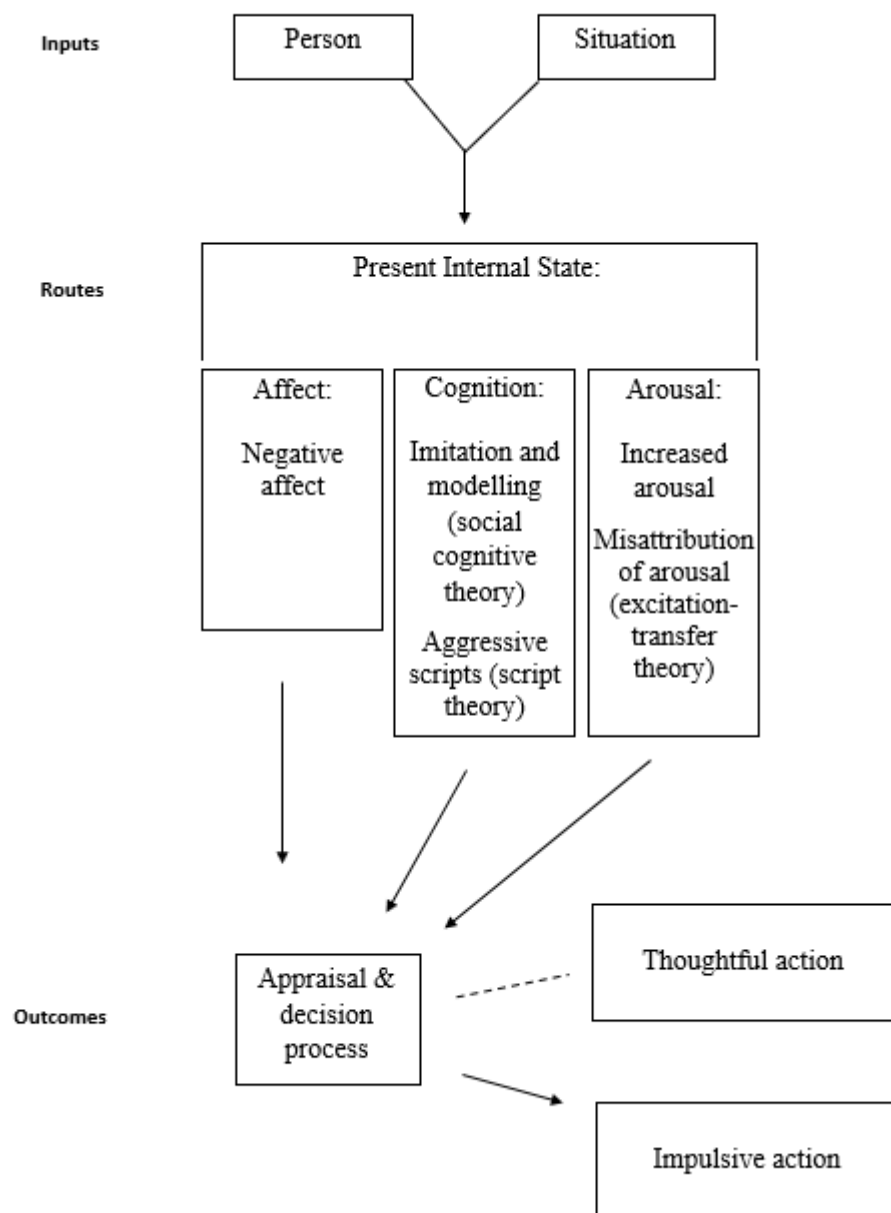
Figure 5. An integrated model based on the original general aggression model (Anderson & Bushman, 2002a)

8.2. Summary of results

Chapter 3 aimed to investigate two characteristics of violent media, namely how the identity of the perpetrator (hero vs. villain) and the type of violence (graphic vs. fantasy) influences aggression and mood. As well as being considered a public health concern, results from research studies suggest that brief video clips containing graphic violence lead to greater negative affect, arousal, and aggressive behaviour than do less graphic portrayals (e.g., Barlett et al., 2008; Bartlett & Rodeheffer, 2009; Krcmar & Farrar, 2009; Kreibig et al., 2007; Madan et al., 2014; Strenziok et al., 2011; Zillman, 1991).

Negative affect has been predicted by previous theories as a key predictor of aggressive behaviour. Therefore, viewing violent villains should also lead to aggression, as violence that conflicts with one's inner moral standards may trigger negative emotional states such as guilt, remorse, and anxiety (Klimmt et al., 2006; Tangney et al., 2007). Conversely, research studies have reported that the viewing of violent heroes may have greater effects on aggressive behaviour due to social learning, imitation, and the reinforcement of aggressive 'scripts'. It has been suggested that those who watch violent heroes may be the most likely to behave more aggressively, possibly through a social cognitive route of imitation and modelling behaviours (e.g., Epstein et al., 2001; Konijn et al., 2007).

The experiment presented in Chapter 3 demonstrated that viewing heroic, rather than villainous, perpetrators of violence leads to more aggressive responses from viewers. However, graphic violence, compared to fantasy violence, does not lead to an increased likelihood of aggression. Participants who watched a scene of graphic violence featuring a violent villain showed the greatest elevations in negative affect. However, this effect seemed

to inhibit aggression, as viewers of this scene showed no significant increase in their likelihood of reactive aggression.

The findings from Chapter 3 have several implications. The results provide a critique of the predictions made by previous theories that negative affect resulting from viewing media violence fosters aggressive behaviour. Similarly, the findings contradict claims that graphic violence is the most likely form of media to elicit aggressive behaviour. Instead, a heightened negative emotional state after viewing graphically violent media may inhibit acute aggressive responses in the general population. The results of the experiment do, however, support the hypothesis that viewing heroic characters may have a greater influence on aggressive behaviour than does viewing villainous characters. This finding indicates that viewing certain types of on-screen character may predict aggressive behaviour. This finding supports SCT predictions that viewers of media violence may imitate the behaviours of aggressive role models. The findings also suggest that there are different emotional mechanisms that moderate the effects of media violence on aggressive behaviour when watching violent heroes on screen. Viewers of fantasy violence featuring a heroic main character showed a higher likelihood of aggressing with no notable changes in their negative affective state.

The results of this experiment highlight a lack of consideration that previous theories (such as the GAM) have paid to media characteristics and their effects on affective states and behaviour. Under certain circumstances, media violence may not lead to an increased propensity to aggress, which contradicts claims that any form of media violence will lead to aggressive behaviour (Anderson et al., 2015).

Figure 6 shows a new, integrated model, highlighting how different characteristics of entertainment media can be incorporated into a synthesised model. Based on the results from Chapter 3, the 'situation' input has been modified to include two potentially key characteristics of media violence. Viewing both villainous characters in a fantasy setting and graphically violent hero characters lead to aggression through a negative-affect route. However, a greater increase in anger and anxiety through watching graphic violence with a villainous main character inhibits aggressive behaviour. Viewing hero characters in a fantasy setting also leads to a higher likelihood of aggression. However, this is not through increases in negative affect.

Figure 6. An integrated model for the effects of media violence on aggression (based on the results from Chapter 3)

The aim of Chapter 4 was to further consider the effects of hero and villain characters on

mood and aggression. Results from Chapter 3 demonstrate that viewing violent villains

triumph on screen leads to increased negative affect in viewers, namely anxiety and anger

(Hirt et al., 1992). Researchers have speculated that increases in negative affect due to the

viewing of violent media will lead to an increased aggressive response (e.g., Breuer et al., 2015; DeWall et al., 2009). However, in Chapter 3, viewers of a violent hero reported the greatest increase in their aggression scores despite negative mood states being unaffected. Viewing a hero character triumph in a physical altercation was therefore predicted to lead to elevations in positive affect (e.g., Isen et al., 1978; Masters & Furman, 1966). Previous research has failed to consider how positive affective states, experienced due to the viewing of certain types of entertainment media, may have a positive relationship with aggression.

The results from Chapter 4 suggest that different emotional mechanisms underlie increases in aggression following the viewing of violent heroes and villains. The findings reveal that viewing a violent hero led to an increase in positive affect, whereas viewing a violent villain led to a decrease in positive affect. The hypothesis that viewing violent heroic, rather than violent villainous, characters would lead to a greater likelihood of acting aggressively was not supported. Instead, viewing both characters carrying out acts of aggression led to the participants indicating an increased chance of reacting aggressively to provocation. The results indicate, however, that there were contrasting mechanisms that underlined this effect.

This experiment was also the only experimental chapter of the thesis that contained statistically significant sex main effects and interactions. Male participants showed a statistically significant increase in positive mood after watching a violent hero, whereas females' positive mood scores were not significantly affected. Furthermore, for male participants, the increase in positive affect had a significant, positive relationship with their likelihood to react aggressively.

The results of this experiment provide counter-evidence to the claim that entertainment media fosters aggressive behaviour through elevations to purely negative affective states. Instead, results from this chapter suggest violent media can lead to increases in positive affect. The results of the study are the first to highlight an association between media-violence-induced positive affect and aggression. This suggests that positive affect increases may activate the approach motivational system (Carver & White, 1994) which leads to aggressive inclinations following provocation (Harmon-Jones et al., 2010). Figure 7 combines this finding with results from the previous experimental chapter to further expand the integrated model of how entertainment media may influence aggressive tendencies. Based on the results from chapters 3 and 4, the 'affect' route has been modified to include positive affect. Viewing a violent hero win a fight leads to increases in positive affect (in males), which leads to an increased likelihood of aggression.
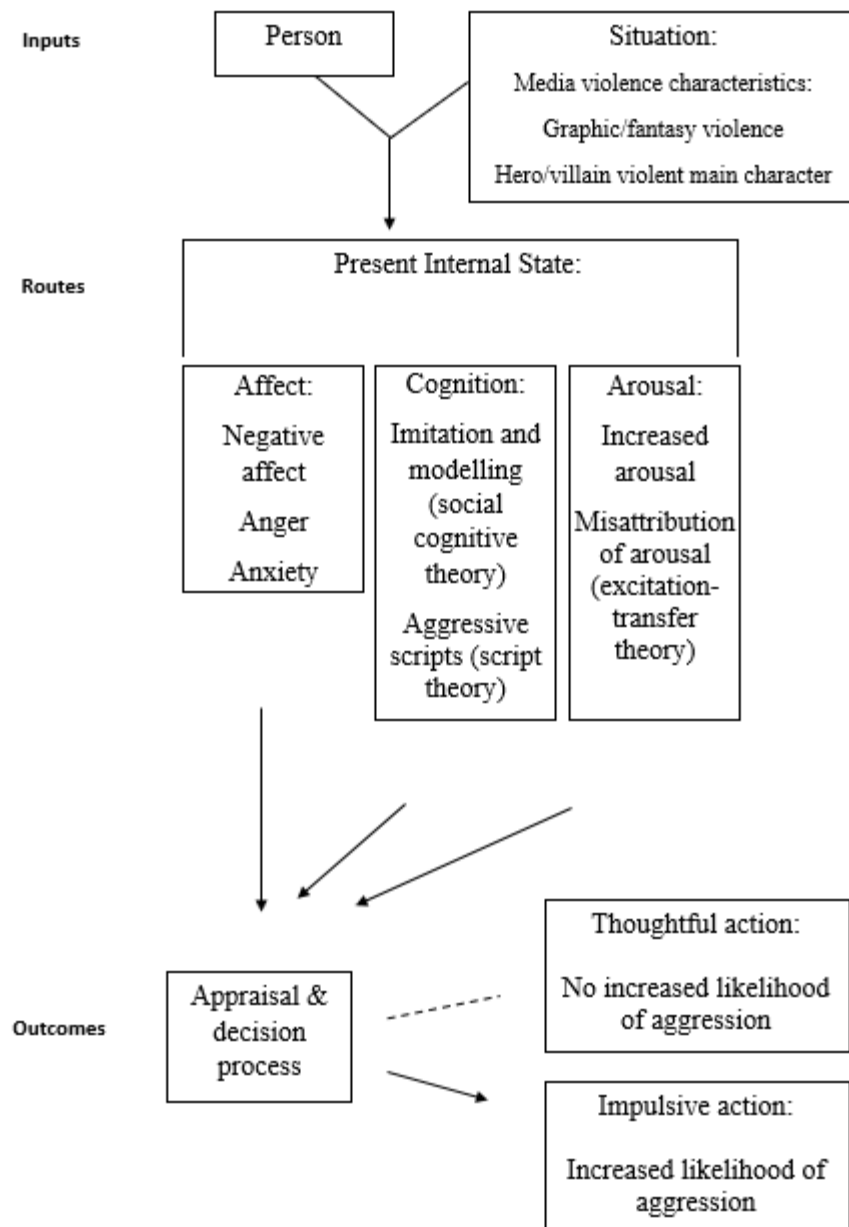
Figure 7. An integrated model for the effects of media violence on aggression (based on the results from Chapters 3-4)

Positive affect increases as a result of engagement with violent and non-violent media were considered as a potential instigator of aggressive behaviour in Chapters 5 and 6. Previous research studies have suggested that non-violent media does not lead to aggression (e.g., Bushman & Gibson, 2011); however, many of these studies have been criticised for failing to adequately match violent and non-violent games on key game characteristics (e.g., Adachi & Willoughby, 2011). Similarly, the studies have failed to assess the impact of non-violent media on positive and negative affect. Chapters 5 and 6, therefore, investigated how engagement with violent and non-violent media can influence positive affect and negative affect. To allow for a more complete way of measuring aggression, these chapters also assessed aggression through behavioural measures. These experimental paradigms were commonly used practices in media violence literature, designed to reliably measure aggressive acts towards a person.

The non-violent video clip used in Chapter 5 did not significantly increase positive affect in viewers, nor did it have an impact on aggression. Despite this, there was evidence of a positive relationship between positive affect increases and aggressive behaviour. In Chapter 6, however, it was found that a non-violent racing game fostered increases in positive affect in players. Furthermore, the non-violent video game led to significant increases in aggression. The chapter also supported the results from Chapter 3 and demonstrated that engaging with graphically violent media does not lead to substantial increases in the likelihood of aggressive behaviour, despite fostering significant increases in anxiety and anger states.

The results of Chapter 6 provide a substantiated challenge to the current body of media violence literature. The finding that non-violent media can also lead to acute changes in aggressive behaviour suggests that violent content is not the key characteristic of

entertainment media affecting aggressive behaviour. This demonstrates that any model attempting to explain the effects of entertainment media on aggression should be adapted to include non-violent entertainment media as a potential instigator and should consider positive affect as a potential mechanism of aggression. The results also provide further evidence that, for the general population, graphically violent media does not significantly impact upon aggressive behaviour. Figure 8 shows a further developed integrated model, highlighting how these findings can be combined with the results from previous chapters. The 'situation' input has been further modified to include no violence as a media characteristic. Non-violent media fosters an increased likelihood of aggression through elevations in positive affect.
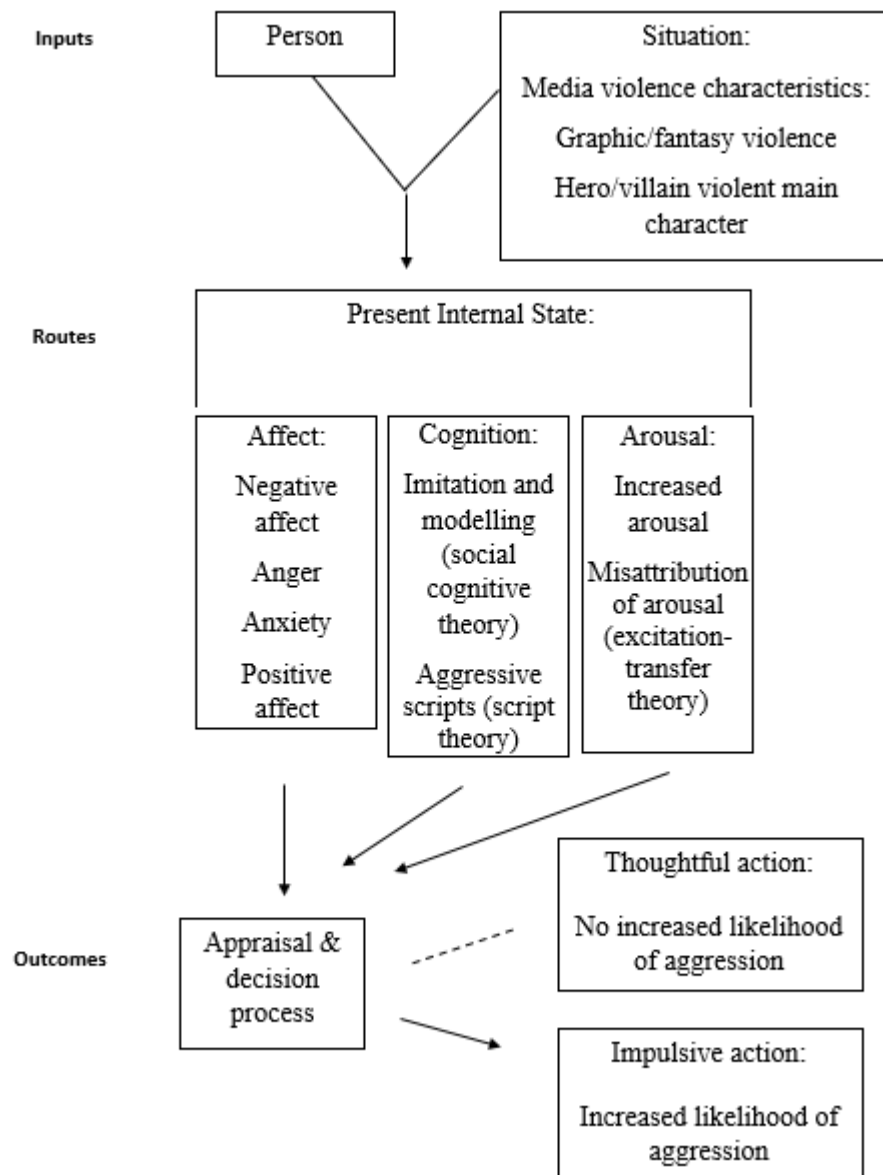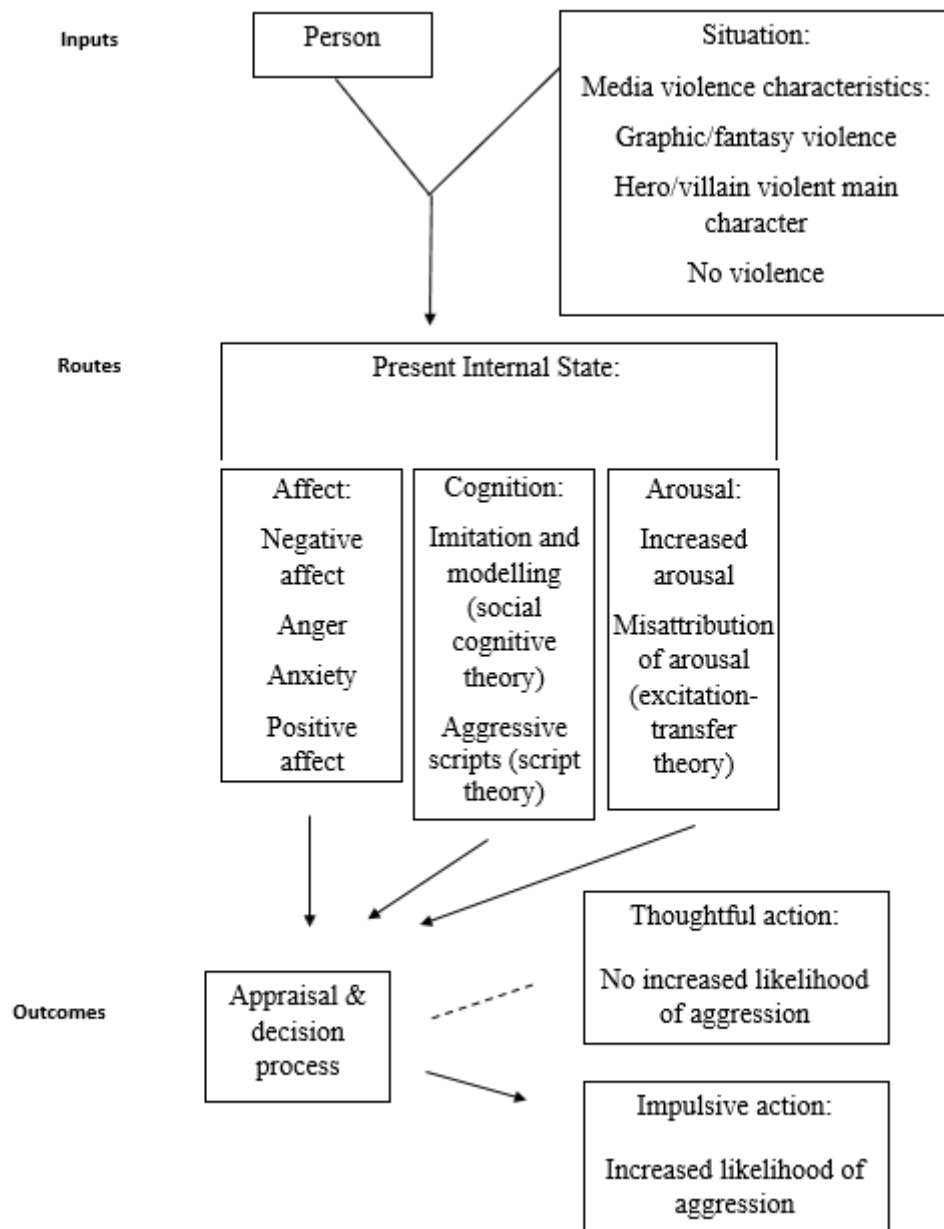
Figure 8. An integrated model for the effects of media violence on aggression (based on the results from Chapters 3-6)

The aim of Chapter 7 was to explore how the characteristics of video game players may influence aggressive behaviour. In contrast to the other experimental chapters of this thesis, this chapter was concerned with regular video game players rather than with exploring acute effects of entertainment media. Results of Chapter 6 suggested that there was a subgroup of graphically violent-video-game players who enjoyed the game and displayed more aggressive

personalities. Three personological characteristics of regular players of graphically violent video games were therefore considered in this study. These characteristics were habitual media violence use, trait aggression, and identification with the violent main character. These factors were selected due to previous studies suggesting that these characteristics may act as potential moderators in the effect of media violence on aggressive behaviour (e.g., Bushman, 1995; Konijn et al., 2007; Krahé et al., 2011). For consistency, regular game players of the same games used in Chapter 6 were selected. Therefore, personality and behavioural differences of regular players of a graphically violent video were compared with regular players of a non-violent racing game. A key feature of the violent game was that the violent player controls a character who engages in unprovoked, instrumental aggression. For a more complete indication of how long-term use of these games affects aggression, this study also investigated the differences in reactive and instrumental aggression in players.

The key finding of Chapter 7 was that a combination of trait aggression and identification with a graphically violent main character significantly predicted instrumental aggression in the regression model. Habitual media violence usage did not predict reactive or instrumental aggression. This finding contradicts claims that repeated exposure to media violence will lead to aggressive inclinations (e.g., Huesmann & Kirwil, 2007). The finding suggests that there are key personal characteristics that impact the effect of media violence. Thus, if a person does not identify with the violent character, the effects of media violence on aggression are negated.

The findings have important implications for academic research and public policy. As the debate continues surrounding graphically violent media and aggression, future interventions should consider how video game players relate to on-screen characters. The results of this

study also reaffirm conclusions drawn from previous chapters of this thesis, namely, that pertinent theories in media violence literature fail to account for key characteristics of both the media and the person engaging with the violence on screen. Figure 9 presents a more refined model, accounting for the findings of all the previous chapters discussed in this thesis. This new model allows for a more comprehensive explanation of how violent and non-violent media impacts aggressive behaviour and mood. Based on the results from the experimental chapters of this thesis (Chapters 3-7), 'person' inputs have been modified to include trait aggression and identification with the main character. For regular players of a graphically violent video game, these two personological characteristics can predict instrumental aggressive behaviour.

Inputs

Person:

Trait aggression

Identification with violent character

Situation:

Media violence characteristics:

Graphic/fantasy violence

Hero/villain violent main character

No violence

Routes

Present Internal State:

Affect:

Negative affect

Anger

Anxiety

Positive affect

Cognition:

Imitation and modelling (social cognitive theory)

Aggressive scripts (script theory)

Arousal:

Increased arousal

Misattribution of arousal (excitation-transfer theory)

Outcomes

Appraisal & decision Processes

Thoughtful action:

No increased likelihood of aggression

Instrumental aggression

Impulsive action:

Increased likelihood of aggression

Figure 9. A comprehensive model for the effects of media violence on aggression (based on the results from Chapters 3-7)

8.4. Thesis implications and ideas for future study

The findings of this thesis have important societal implications, both in the research and public domains. The finding that non-violent media can influence positive affect, which in turn may have an association with aggressive behaviour, is a novel finding and suggests that future research should pay more attention to how non-violent media influences emotion and aggression. Future aggression research would benefit from considering the effect on aggression of negative-affect-inducing non-violent media and positive-affect-inducing violent media. Exploring these types of entertainment media would enable a more detailed investigation into how entertainment media influences affective states and aggressive behaviour. While further research is needed to make evidence-informed recommendations for practice, a major finding of this thesis is that exciting non-violent media may lead to acute aggressive increases. This demonstrates that violent content is not a unique characteristic of entertainment media that increases aggression.

As noted at the end of Section 1.4.2 (p. 7), a limitation of the methodologies used within the experimental chapters is the lack of objective measures of arousal. Future research would benefit from recording physiological responses to entertainment media. Measuring physiological reactions to media violence would have numerous benefits. These include: (1) a more objective way of assessing reactions to entertainment media and an elimination of some of the potential confounds of self-report questionnaires, such as demand characteristics or dishonesty regarding how the media was perceived; (2) the ability to explore the potentially important mechanism of media-induced physiological arousal on aggression; (3) the ability to assess whether viewers of disturbing scenes have returned to a calm state before leaving the

laboratory; and (4) the ability to accurately measure desensitisation to violent media (as described in Section 1.4.3, p. 8) and its effects on aggressive behaviour.

With regards to ideas for future research, increased popularity for virtual reality video games (Heineman, 2016), where player interaction and immersion is at its highest, may also be indicative of a future shift in the landscape for this type of research. This lends itself to a potential research question as to whether immersing oneself in a virtual world and carrying out violent acts through the eyes of the violent perpetrator has the potential to lead to a greater chance of acting aggressively in the real world. To date, research investigating the impact of graphically violent virtual reality games on the general population is limited. Based on the findings of this thesis, one would suggest that this effect would depend on the emotional effect the game has on the player.

8.5. Conclusions

This thesis offers new insight on the topic of media violence. The results of the experiments presented in this thesis suggest that, under certain circumstances, media violence has acute effects on mood and likelihood of aggressive behaviour. However, non-violent media also has the potential to lead to similar effects. Therefore, the commonly held view that violent content is needed to foster aggressive behaviour has been challenged.

The thesis demonstrates that entertainment media can lead to increased positive affect, and it presents a novel finding that this increase has a positive relationship with aggressive behaviour. This finding contradicts previous psychological research that suggests entertainment media leads to negative affect which in turn increases the likelihood of

aggression. This finding suggests that violent content is not a key characteristic of violent media that leads to aggressive behaviour. Instead, any type of media that leads to increases in positive affect may lead to an increased chance of acting aggressively.

The results of the studies presented within this thesis have also explored how graphically violent media, so often the cause of controversy and panic within the academic and public domains, affects mood and behaviour. The results suggest that, generally, graphically violent media leads to negative affective states and that this appears to inhibit aggressive behaviour. This suggests that government agencies, policy makers, and parents should cease their concerns on how violent media is negatively impacting the general population. However, for regular players of graphically violent media, who positively engage with the media, there is evidence that trait aggression and identification with the main character of the game may predict instrumental aggressive behaviour. It is suggested that practitioners and policy makers pay careful consideration to this subgroup. Treatments and interventions should be designed to investigate ways in which aggressive behaviour may be reduced in this small percentage of players of violent video games.

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