PERSONALITY AND EXECUTIVE FUNCTIONING AS EXPLANATORY VARIABLES IN MEDIA TECHNOLOGY USE AND RESPONSIVENESS TO MEDIA TECHNOLOGY

by

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Overview of thesis

The impact of media on recipients has been the focus of considerable research effort from a broad spectrum of disciplines ranging from the neurosciences to sociology .Typically, this research has focused on the extent to which the viewing of violent media or playing of violent video games induces aggressive tendencies in the viewer or game player .However, in recent years, research effort has shifted on to why individuals use social network sites and how such sites influence behaviour (Gonzales & Hancock, 2011). The aim of the present thesis is to explore both avenues.

Media violence research has a long history which can be traced back to the early half of the twentieth century. However, the role of personality traits as explanatory variables, or, drivers for the preference of such media, as well as the susceptibility to its effects, remained neglected until the latter half of the century. Similarly, neuropsychological explanations for the postulated effects of violent media consumption had not received attention until the first decade of the new millennium. Such research efforts have focused on how brain regions associated with anger and aggression, and emotion regulation, are impacted through contact with violent media (e.g., Kelly et al., 2007)

To date, research in the topic area in the neuropsychological realm has generally emphasised the neural underpinnings of media violence exposure, as measured by Functional Magnetic Resonance Imaging (fMRI) and Electroencephalogram (EEG), at the expense of behavioural data. Whilst such investigative tools undoubtedly provide great insight in to brain-based accounts of social behaviour, in the case of fMRI, there is some dispute over whether the statistical procedures underpinning its use give rise to false-positive results (Bennet, Baird, Miller & Wolford, 2010; Vul, Harris, Winkielman & Pashler, 2009). As such, the validity of neuroimaging data is reinforced further when supported with behavioural data. The present work examines whether deficits in neural functioning arising from violent media

consumption, which have been reported in neuroimaging studies (e.g., Kelly et al., 2007), can be replicated at the behavioural level using a variant of a widely used measure of executive functioning: The Stroop Test. Personality traits, absent from much of the early media violence research, which may moderate responsiveness to such media at the social-cognitive (attitudinal) level, and drive approach motivation to such novel stimuli, are also measured.

As technology has evolved so too has the rise of new and novel forms of media. Such developments have shifted the consumer of media technology from simply being a passive recipient to that of an active participant. For example: from the watching of films and television to the active participation in computer games with others across the world via the internet. Scientific interest in media technology has also developed in conjunction with these progressive changes in personal media and technology as researchers seek to explain why individuals engage with new media and how it impacts upon the individual.

Recent years have the seen the widespread proliferation of websites dedicated to the phenomenon of social networking. Social networking sites allow an individual to create a personal webpage, construct an online identity, post information about the self, and, build up a social network with others online with similar interests or relationships in common. The widespread use of such sites indicates that the general psychology of site users is normative (Buffardi & Campbell, 2008).

However, in the behavioural sciences a growing corpus of literature has focused on the personality traits of site users, how such traits influence online behaviour, and how this relates to indices of well-being, such as self-esteem (e.g., Gonzales & Hancock, 2011). Consequently, as with media violence research, research interest focuses on the way that personality traits influence both engagement with social media sites and the way such media influences behaviour and well-being.

Much of the media interest in to this area of research has focused on the personality

trait of narcissism. Narcissism is associated with a preoccupation with the self, a lack of empathy, grandiose and exhibitionist behaviours, elevated levels of self-esteem, a vindictive and domineering interpersonal style, and a propensity to engage in shallow, meaningless relationships (Buffardi & Campbell, 2008; Dickinson & Pincus, 2003; Mehdizadeh, 2010). Indeed, use of social networking sites involves a high degree of self-presentation and the proliferation of a large number of shallow relationships. As a result, engagement with such sites may be attractive to individuals with elevated levels of narcissism. However, most of the research effort in this area has focused on the overt, grandiose narcissist, at the expense of the shy, anxious and introverted subtype. As a result, little is known about how the shy anxious narcissist engages with social media relative to the overt, grandiose subtype. It is this gap in the scientific literature that the present work seeks to address.

The work presented in this thesis explores both of these lines of enquiry. The initial experiments focus on the role of trait aggression and psychopathy as explanatory variables in the responsiveness to depictions of real and fantasy violence, and, whether viewing violent media attenuates executive functioning. This is followed by a look at the relationships between narcissistic subtypes and use of social networking sites and how this relates to self-esteem. This thesis points to a need to consider the role of personality traits in explaining why individuals use media, as well as how they engage and respond to such media.

ABSTRACT

The current thesis investigates the impact of personality traits of forensic interest – narcissism, psychopathy and trait aggression – as explanatory variables for the engagement, interaction and responsiveness to different forms of media. Firstly, the thesis compares the impact of viewing real and fantasy violence on attitudes to violence and perceptions of the consequences of violence whilst controlling for the moderating influence of trait aggression and psychopathy. The impact of media violence on executive functioning, as measured by the Stroop Test, is also considered. The second part of the thesis investigates how overt and covert narcissism are manifest on the personal profiles of social networking site users, how they relate to self-reported levels of self-esteem, and how the different subtypes are manifest in different online behaviours. The general conclusion from all studies is that viewing violent media or use of social networking sites (SNS) may not enhance antisocial acts. However, personality traits of forensic interest interacting with such media – narcissism and trait aggression – may result in violence / aggression to others and being subject to hostile and domineering relationships. However, for the covert narcissist, SNS use may accrue them a greater sense of self-worth. The findings presented herein are limited by a lack of power and the use of student samples to research aggression and executive functioning.

DEDICATION

For Mum and Andy: for their unfaltering support throughout. Thank you for the *"passion, drive, motivation and commitment"* pep talks during the very difficult times when life got in the way.

In memory of Gran ('Flossy') - who's probably standing on a cloud somewhere with her hands in the sink wishing everyone *"the best of British"* - and 'Lish 3', who I like to think hangs around from time-to-time. Both passed away during the course of this project and are greatly missed but never forgotten. Look after each other, and, if you can read this, please reserve me a fluffy cloud: I hear there is quite a waiting list on those bad boys!

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Thank you to Ian for keeping me on track and general support throughout the duration of the write-up of this thesis. Particularly at the very end when I had a little wobble!

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<u>Introduction</u>

Throughout history, violence and terror have been major themes of drama, mythology, literature and popular culture (Gerbner, 1988). Debate over the influence such media has on recipients has taken place for centuries. However, scientific scrutiny of the media-violence aggression relationship did not begin until the late 1920's and early 1930's (Attorney General's Report, 2010). From the latter half of the twentieth century the impact of media violence on aggressive attitudes and behaviours became an issue of concern for researchers, policy makers and health care professionals alike (Byron, 2008; Chafee, 1972; Gerbner, 1969; Huesmann & Miller, 1994; Lazarsfield, 1955; Maccoby, 1954; National Institute of Mental Health, Television and Behavior Report, 1982). It is hypothesised that the short-term effects of media violence exposure include an increased likelihood of aggressive thoughts, aggressive affect, and verbal and physical aggression (Anderson, Berkowitz, Donnerstein, Huesmann & Johnson et al., 2003). Long-term effects include desensitisation to violence, the acquisition of aggressive behavioural scripts, aggressive interpretational schemas and aggression-supporting beliefs about social behaviour (Anderson et al., 2003). Therefore, the general conclusion that may be drawn is that exposure to violent media increases aggressive behaviour.

However, critics argue that media researchers have inferred a causal relationship between exposure to violent media and aggressive behaviours from a body of research that is mainly correlational (Grimes & Bergen, 2008). As such, observed variable changes may arise from unmeasured, moderating variables (e.g., personality). Consequently, violent media may not induce aggressive behaviour in a causal, predictable manner. As a result, it has been suggested that the extent of the media violence-aggression relationship has been exaggerated. (Ferguson & Dyck, 2012; Ferguson & Kilburn, 2009; Savage & Yancey, 2008).

Increased access to a range of media, both conventional and novel, means understanding why people engage and respond to media is perhaps more pertinent today than ever before. Personal media technology advances rapidly and is highly accessible, and there is now more opportunity for individuals to access and interact with media technology.

In the UK, people of all ages watch more TV than ever before on a range of devices, such as computers or mobile phones (TV Licensing, 2011). As of 2011, 91% of 5-15 year olds lived in a house with internet and 43% of 12-15s had computer/internet access in their bedrooms (Ofcom, 2011). In addition, internet access via mobile devices had risen to 29% (12-15s) and 9% (8-11s; Ofcom, 2011). As a result, the home and the associated media technology contained therein, has become of considerable focus in relation to leisure time for both children and adults alike. Consequently, there is a need to further delineate the exact nature of the media violence-aggression relationship, as well as gaining a clearer understanding in to the reasons why individuals engage with media technology.

<u>Aggression</u>

Human aggression has various forms and includes: physical aggression; verbal aggression; direct aggression; and indirect aggression (Anderson & Bushman, 2002). The unifying feature of all types of aggression is that aggression intends to harm the target and the target is motivated to avoid the behaviour (Baron & Richardson, 1994). For the purposes of the present research this definition of aggression as maladaptive, undesirable and antisocial is adopted.

Direct aggression is overt and occurs in the presence of both the aggressor and target (Buss, 1961). It can be verbal or physical, with the recipient of such behaviour being able to identify the aggressor and retaliate immediately (Cross, 2010). Indirect aggression aims to sabotage social relations (Card, Stucky, Sawalani & Little, 2008). It refers to behaviours

which harm by-proxy, such as social exclusion or rejection (Fesbach, 1969; Lagerspetz, Bjorkqvist & Peltonen, 1988). Examples of indirect aggression include gossiping and spreading rumours. A further distinction can also be drawn between the terms violence and aggression. These terms are often confused with one-another and are often used interchangeably (Anderson & Huesmann, 2003). Aggressive acts intend to harm or injure however, extreme harm is the goal of violence, such as murder (Anderson & Bushman, 2002).

The present work focuses on social-cognitive and neuropsychological explanations of aggressive behaviour after exposure to media violence. Next follows explanation and description of the types of aggressive behaviour before examining aggression from the perspectives of social-cognition and neuropsychology.

<u>Reactive aggression vs Instrumental aggression</u>

Reactive aggression is unplanned and arises from perceived provocation (Anderson & Bushmann, 2002). It is affect-laden and characterised by behavioural disinhibition (Anderson & Huesmann, 2003). Instrumental aggression is a more predatory form of aggression in that it is proactive not reactive (Anderson & Bushmann, 2002). It occurs without provocation, is thought and goal orientated, and, lacks the affective component of reactive aggression (Dodge & Coie, 1987; Ramirez & Andreu, 2006). In cases of instrumental aggression, harm to the victim is a by-product of the motivation to accrue the aggressor some reward, profit or advantage. Consequently, Anderson & Huesmann (2003) propose that aggressive acts can be further distinguished based on immediate or ultimate goals. However, such a demarcation may be overly simplistic. For example, aggression carried out during a criminal act, such as robbery, may have the hallmarks of reactive aggression (e.g., anger and impulsivity) as the

perpetrator moves towards a goal, yet this occurs in the pursuit of profit oriented goals that

are often associated with the use of instrumental aggression (Anderson & Huesmann, 2003).

The General Aggression Model and attitudes to violence

The General Aggression Model (GAM; Bushmann & Anderson, 2002) was developed as an

explanatory framework for media violence-aggression relationships and emphasises social-

cognitive and social-learning approaches to aggression (DeWall & Anderson, 2011).

However, it must be noted that, whilst the GAM is popular with social psychologists, its

influence and use outside of the field of Social Psychology is negligible. Theories of

aggression pertinent to the GAM are presented in table 1.

Table 1 Theories influential to the GAM

Theory	Authors	Description
Cognitive Neo-association Theory	Berkowitz (1989)	Negative affect stimulates thoughts, memories, motor responses and affect linked with fight and flight responses. Frequently and simultaneously activated concepts develop strong associations. Concept activation spreads to related concepts and increases their activation.
Social Learning Theory	Bandura (1977)	Aggression acquired by observation (directly or via media). Behaviour modelled using attention, retention, reproduction and reinforcement.
Script Theory	Huesmann (1988)	Watching violence results in rehearsal and learning aggressive scripts Scripts are associated concepts, goals and action plans. Rehearsal enhances script accessibility by creating additional concept links and strengthening existing links.
Social Information Processing (Hostile Attribution Bias)	Crick & Dodge (1994)	Attribution of hostile intent to behaviours when benign or situation

		ambiguous. Relates to how individuals perceive, attend, interpret and make decisions about social stimuli and situations.
Excitation Transfer Theory	Zillmann (1983)	Physiological arousal from one stimulus dissipates slowly. This augments the excitatory response to another stimulus, even though the hedonic valences of the stimuli may differ.
Social Interaction Theory	Tedeschi & Feson (1994)	Aggression produces change in the target's behaviour. Aggression motivated by goals.

Source: Anderson & Bushmann (2002).

The GAM proposes that exposure to media violence increases arousal, induces aggression-related affect (e.g., anger), and activates aggressive cognitions and expectations (Anderson & Bushman, 2001). In terms of long-term effects, the GAM proposes that after repeated exposure to violent media, aggression-related behavioural scripts and cognitive associations are acquired and developed, which then guide future behaviour (Huesman, 1998). Essentially, this is the process of attitude formation, which arises as a result of personal experiences, the influence of others and emotional reactions (Hogg & Vaughan, 2005).

Attitudes are clusters of feelings, thoughts and ideas, and behavioural intentions towards objects, groups, events or symbols (Hogg & Vaughan, 2005). Repeated exposure to novel stimuli (e.g., media violence), in the absence of reinforcement, results in greater preference to the object - a phenomenon known as the mere exposure effect (Zajonc, 1968). Exposure to such media also allows for observational learning, which is a tendency to reproduce actions, attitudes and emotional responses of real-life or symbolic models (Hogg & Vaughan, 2005). Repeated viewing of media violence may link the concept of aggression with an increasing number of contexts and concepts, and as the number of related elements increases, a more generalised concept – an attitude – is formed (Hogg & Vaughan, 2005). Consequently, an individual may learn and develop an internal value system where

aggression solves personal and social problems, and attains goals (Rule & Ferguson, 1986).

A meta-analysis of attitude-behaviour studies by Kraus (1995) showed that attitudes substantially predict future behaviour, particularly when moderated by attitude stability, attitude certainty, attitude accessibility, direct experience and affective-cognitive consistency. Pro-violent attitudes have been shown to be concurrently related to assault and predict psychological aggression in intimate partner relationships (Fincham, Cui, Braithwaite & Pasley, 2008), aggressive behaviour in middle school students (Mcconville & Cornell, 2003), and adolescent males' use of violence (Gellman & Delucia-Waak, 2006). Consequently, as outlined in the GAM, one of the ways in which violent media may induce subsequent aggression is by shifting attitudes to be more accepting of violence. Administration of an attitudinal measure, such as the Attitudes to Violence Scale (Funk, Elliot,Urman, Geysa, Flores & Mock, 1999), pre and post-violent media consumption, may allow for the detection of attitude change.

A review of the media violence-aggression literature by Browne & Hamilton-Giachritsis (2005) noted that the effects of violent media increase the likelihood of aggressive behaviour, and, that this effect is more prominent in young males. This is reflected in Paik & Comstock's (1994) meta-analysis which showed that, in experimental studies, males are more aggressive than females after exposure to violent media. However, in survey studies the effects were marginally equal. Combined Cohen's d effect sizes (small $d \geq 0.20$; medium $d \geq 0.50$; large $d \geq 0.80$) to ascertain the magnitude of effect of experimental and survey studies were reported as $d = 0.77$ for males and 0.53 for females. In terms of effects by age, pre-school children (0-5 years) showed the highest effects of all child groups ($d = 1.02$), followed by university age students (18-21 years; $d = 0.77$), older children (6-11 years; $d = 0.65$), adolescents (12-17 years; $d = 0.46$), and adults (22+; $d = 0.37$).

The rise in the effect size in the university aged group may be reflective of the

developmental stage of individuals in this age band. Synaptic pruning (i.e., grey matter reduction) in prefrontal networks which underpin executive functioning following age 17 has been shown in imaging data (Gogtay, Giedd, Lusk, Hayashi & Greenstein et al., 2004). It begins in adolescence and continues at a lower rate into adulthood (Petanjek, Judas, Simic, Roko, Rasin, Uylings & Rakic et al., 2011). Whilst this phenomenon of neuronal reorganisation increases functional connectivity between brain regions, thus increasing efficiency, it is also associated with non-linear (i.e., a trough) developmental changes in performance of cognitive tasks (Dumontheil, Houlton, Christoff & Blakemore, 2010). For example, Taylor, Barker, Reidy & McHale (in press) reported that 17 year olds performed better than 18 year olds, but not 19 year olds, on the Delis Kaplan Executive Function System (D-KEFS) Letter Fluency Test of response/strategy formation. Seventeen year olds also outperformed 18 and 19 year olds on the number of correct free sorts and perceptual sorts of the D-KEFS Sorting Test of concept formation. Significant performance deficits in 18 year olds relative to 17 and 19 year olds were also reported in the free sort description score and sort recognition description score of the D-KEFS.

Adolescence and early adulthood is a period of heightened vulnerability to risk-taking and problems in regulation of affect and behaviour (Romer & Hennessy, 2007; Steinberg, 2005). It is also associated with increased sensation seeking and seeking out of novel stimuli (Arnett, 1994; Spear, 2000). For example, greater sensation seeking is associated with increased alcohol intake in youth between 14-22 years of age (Romer & Hennessy, 2007). It can also be argued that this increased propensity for sensation seeking may be achieved through engagement with violent media. Indeed, Arnett (1994) reported that sensation seeking scores for individuals in late adolescence and early adulthood (16-18 years) correlate with aggression scores. This indicates young adults may manifest an increased propensity for sensation seeking in the form of aggressive attitudes and behaviour. Consequently, young

adults may be highly susceptible to the effects of media violence on cognition, arousal and affect. The maturation of the frontal lobes in later adulthood would be associated with greater regulatory competence, and by implication, diminished susceptibility to the effects of media violence on antisocial or aggressive behaviours. It may also be that the cognitive structures of adults are less malleable than younger research participants (Williams & Skoric, 2005).

An alternative explanation for the elevated effect size in the university aged group may be that many students of psychology are required to participate in research as part of their studies. Many of these subjects will be familiar with the media violence-aggression debate. Consequently, the rise in Cohen's *d* in this age group may simply be as a result of demand effects as opposed to the occurrence of any genuine psychological or physiological processes arising from exposure to media violence. In addition, if the age of participants in this group was skewed towards the lower end of the range (i.e., 18/19) - where a trough in (executive) functional ability has been reported (e.g., Taylor et al., in press) - the effects of violent media may be stronger.

Overall, meta-analyses support a significant link between aggressive behaviour, aggressive cognitions, aggressive affect, and violence in film, television and video games (e.g., Anderson & Bushman, 2001; Wood, Wong & Chachere, 1991), albeit to differing degrees (Ferguson, 2007; Ferguson & Kilburn, 2009). Ferguson's (2007) meta-analytic review of the video game violence literature used a range of statistical procedures to test for publication bias, and found evidence for a publication bias in experimental studies where aggressive behaviour was the outcome variable (Ferguson, 2007). Ferguson & Kilburn (2009) report that effect sizes are largest when proxy and unstandardized/unreliable measures of aggression are used ($r = .25$ and $r = .24$, respectively). Effect sizes for aggressive behaviour towards another person and violent behaviour were considerably lower ($r = .08$ and $r = .02$). After correction for publication bias, the overall effect size for media violence exposure on

subsequent aggression was $r = .08$, with uncorrected effect size results reported as $r = .14$. Additionally, whilst the strongest effects are found in laboratory studies (Ferguson, 2007; Paik & Comstock, 1994) – which would indicate causality – it must be noted that aggression in the laboratory (e.g., administering noise blasts to opponents) does not reflect real-world aggression. Consequently, much of the literature is suggestive of a link between violent media and benign forms of aggression. In such instances, aggression occurs within the setting of a research environment and does not require the aggressor to perform cost-benefit analyses prior to the initiation of behaviour.

Traits vs States

There has been a tendency for media violence researchers to ignore the moderating influence personality traits may play in influencing aggression at the state level. Consequently, it is important to distinguish between state and trait.

Traits are *"any enduring characteristic of a person that can serve an explanatory role in accounting for the observed regularities and consistencies in behaviours"* (Reber & Reber, 2001; [p.758]) and are relatively fixed and enduring. States, however, are temporary emotional conditions, comprised of subjectively and consciously perceived feelings, and fluctuate and vary in intensity (Horikawa & Yagi, 2012). For the purposes of the present research it is this conceptualisation of feelings as being consciously perceived which is adopted. This is because a conscious awareness of feelings is required in order for them to be detected and measured by self-report questionnaires.

Traits may influence state through physiological arousal, cognitive biases for trait congruent information (i.e, detection and attention), trait congruent social-information processing, and the conscious experience of trait congruent affect. For example, it has been reported that neuroticism is related to negative affect (Costa & McCrae, 1980), and heart rate

during a seminar presentation was significantly correlated with self-reported state anxiety and self-reported trait social evaluation anxiety (Kantor, Endler, Heselgrave & Kocovski, 2001). Similarly, on Stroop tasks, adults high in trait anger show greater interference (i.e., fixate for longer), when presented with angry faces staring at them (Putnam, Hermans & van Honk, 2004), and college students high in trait anger attribute more hostility to characters in vignettes (Epps & Kendall, 1995).

<u>Trait aggression</u>

As stated previously, media violence research has often failed to account for personality variables which may moderate how susceptible individuals are to the effects of violent media imagery. One of the ways media violence could exert its effects is via trait aggression. Trait aggressiveness is a propensity to engage in physical and verbal aggression, to hold hostile cognitions, and to express anger (Buss & Perry, 1992). Individuals high in trait aggression are likely to have rich, complex hostile schemata and belief systems. These will link a broad range of concepts and situations to aggressive thought and associated affect (Bushmann, 1995). Moreover, the accessibility of hostile cognitions and affect may be more readily accessible for such individuals (Bartholow & Anderson, 2002), and as noted in the section on the GAM, attitude accessibility is a strong moderating factor in attitude-behaviour relations (Kraus, 1995). Bettencourt, Talley, Benjamin & Valentine (2006) carried out a meta-analysis of studies relating to personality and aggressive behaviour and showed that individuals scoring high on trait aggressiveness – and the highly and positively correlated personality variable of trait hostility - engage in higher levels of aggressive behaviour than those scoring low on trait aggression. Such individuals displayed high levels of aggression to others after provocation and under neutral conditions.

The mediating influence of high trait aggressiveness in the misattribution of hostile

intent to others actions may increase anger and result in hostility and negative affect

(Tiedens, 2001). Indeed, this misattribution - referred to as the hostile interpretation bias

(HIB) - is predictive of reactive aggression (Loebbesteal, Cima & Arntz, 2013), and has been

replicated across ages and nationalities (Crick & Dodge, 1994). Moreover, hostile attributions

to ambiguous vignettes depicting relational (indirect) provocations, predict electrocortical

activity in frontal regions, which is reflective of an enhanced attendance to a given stimuli

(Godleski, Ostrov, Houston & Schlienz, 2010). This shows that individuals with the HIB are

overly sensitive to related cues, and allocate more cognitive resources to the attention,

detection and processing of such stimuli (Godleski et al., 2010). Dodge (1980) demonstrated

the HIB by asking aggressive and non-aggressive children to interpret situations which

depicted one person harming another. The situations depicted involved deliberate, non-

deliberate, and ambiguous acts of aggression (hostile intent vs non-hostile vs an accident).

Dodge (1980) found that, when hostile intent was ambiguous, the aggressive group perceived

more hostile intent than the non-aggressive group. However, when the ambiguity was

diminished, both groups of children were able to infer true intent (Dodge, 1980).

Trait aggression and the Five-Factor Model of Personality

Within the realms of personality research, personality can be distinguished on the basis of

personality variables and personality dimensions (Bettencourt et al., 2006). As noted by

Bettencourt et al, (2006), personality variables refer to measurable constructs (e.g, trait

aggression), whereas, personality dimensions refer to the dimensions identified in Costa &

McRae's empirically derived Five-Factor Model of Personality (FFM; e.g., Costa & McCrae,

1992; see Table 2).

Table 2: The Five Factor Model of Personality

Factor	Dimensions	Behaviours	Facets
Openness	inventive/curious vs consistent/cautious	Intellectual curiosity, divergent thinking, active imagination, willingness to consider new ideas. High scorers are unconventional and independent thinkers. Low scorers are conventional and prefer familiarity.	Fantasy Aesthetics Feelings Actions Ideas Values
Conscientiousness	efficient/organised vs easy going/careless	Degree of self-discipline and control. High scorers are determined and organised and plan for events in their lives. Low scorers tend to be careless, undependable and easily distracted from goals / tasks.	Competence Order Dutifulness Achievement striving Self-discipline Deliberation
Extraversion	outgoing/energetic vs solitary reserved	High scorers are sociable, energetic, optimistic, friendly and assertive. Low scorers (introverts) are reserved and independent socially.	Warmth Gregariousness Assertiveness Activity Excitement seeking Positive Emotions
Agreeableness	friendly/compassionate vs cold/unkind	Concerns characteristics relevant to social interaction. High scorers are trusting, helpful, soft-hearted and sympathetic. Low scorers are suspicious, antagonistic, unhelpful, sceptical and uncooperative.	Trust Straightforwardness Altruism Compliance Modesty Tender-mindedness
Neuroticism	sensitive/nervous vs secure/confident	Relates to emotional stability, and personal adjustment. High scorers are prone to mood swings and are volatile in their emotions. Low scorers are calm, well-adjusted and not prone to extreme maladaptive emotional states.	Anxiety Angry hostility Depression Self-consciousness Impulsiveness Vulnerability

Adapted from Atkinson, Atkinson, Smith, Daryl, Bem & Nolen-Hoeksema (2000), Maltby, Day & Macaskill (2007)

Trait aggressiveness is negatively related with the Agreeableness dimension of the FFM (Ruiz, Smith & Rhodewalt, 2001). As noted by Bettencourt et al., (2006), and shown in table 2, a high score on the Agreeableness dimension is indicative of someone who is interpersonally oriented who focuses on the needs of others. Conversely, high scores on the dimension antagonistic to Agreeableness – Antagonism – would be indicative of someone who is hostile and irritable, who is mistrustful, and has little regard for others. Also of pertinence to trait aggressiveness is the Neuroticism dimension of the FFM, which is

associated with negative affect and psychological distress. Individuals scoring highly on this dimension have a tendency to engage in irrational thought and have a low stress tolerance. (Bettencourt et al., 2006).

The Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992) was used by Sharpe & Desai (2001) to ascertain which FFM dimensions were most predictive of trait aggressiveness. The authors report that Agreeableness, which was highly and negatively related to all subscales of the BPAQ, and Neuroticism, are most predictive of trait aggressiveness. The Neuroticism dimension was more highly and positively related to the Anger and Hostility scales of the BPAQ than the Physical and Verbal Aggression scales. This reinforces the association between neuroticism and the experience of negative affect, and indicates respondents scoring highly on this dimension experienced the affective component of trait aggression more than displaying physically and verbally aggressive behaviours.

Trait aggression and media violence

A number of studies indicate individual differences variables, such as trait aggression, play a moderate responsiveness to media violence. The results of some of these studies are summarised below.

Bushman (1995) proposes that: (1) individuals with high trait aggressiveness will have more aggression related cognitive-associations relative to those with low trait aggressiveness, (2) high trait individuals are more likely to prime aggressive concepts after exposure to violent stimuli, (3) quantitative analysis of aggressive tendencies can be attained through the administration of self-report measures. Bushman (1995) showed that individuals with high trait aggressiveness were more likely to choose a violent film than those with low trait aggressiveness, reported feeling more angry after viewing a violent video than low trait participants, and tended to give more painful "noise blasts" to opponents in a reaction time task after viewing a violent video. Comparable results have also been reported in other

studies (Kiewitz & Weaver III, 2001; Zillmann & Weaver III, 2007).

Interestingly, Bushmann (1995), and Black & Bevan (1982), indicate that for some individuals, feeling angry is rewarding. More specifically, individuals may choose to watch violent films because they may be viewed as an obtainable anger-related stimulus which can be framed in terms of reward, therefore increasing the likelihood of approach motivation occurring (Aarts, Ruys, Veling, Ruys, Renes & de Groot et al., 2010). It is also of note that activation of brain regions associated with approach motivation and positive affect, such as the mesolimbic dopamine (DA) pathway and left anterior cerebral hemisphere, are also associated with anger and aggression (Carver & Harmon-Jones, 2009).

 Consequently, attraction to media with violent content, as well the inducement of aggression related affect resulting from engagement with such media, may arise from activation of the Behavioural Approach System (BAS).

The BAS, along with the Behavioural Inhibition System (BIS), form part of Jeffrey Gray's biological model of personality (e.g., Gray, 1990). The BAS regulates appetitive motives and is a motivational system related to reward seeking behaviours which initiates behaviour towards rewards and away from punishment (Amodio, Mater, Yee & Taylor, 2008). The BAS is associated with feelings of joy and optimism (Gable, Reiss & Elliot, 2000; Gray & MacNaughton, 2000), and is positively related to the extraversion dimension of Costa & McRae's FFM, and negatively related to the neuroticism dimension of the same model (Smits & Boeck, 2006). The BAS is associated with aggression and secondary psychopathy (Wingrove & Bond, 1998; Newman, MacCoon, Vaughn & Sadeh, 2005), with extreme BAS levels being associated with impulsivity (Wallace, Newman & Bachoroski, 1991).

The BIS regulates aversive motives and is positively associated with the neuroticism dimension of the FFM (Smits & Boeck, 2006), and vulnerability to anxiety and trait anxiety (Carver & White, 1994). High BIS levels are related to anxiety disorders (Fowlers, 1988),

and low BIS levels are related to primary psychopathy (Newman et al., 2005). The BIS augments arousal and attention, and motivates risk assessment and behavioural caution (Amodio et al., 2007; Smits & Boeck, 2006). The primary role of the BIS is to inhibit on-going behaviour so that cues related to punishment, non-reward and novelty can be processed, and a response prepared (Amodio et al., 2007; Smits & Boeck, 2006).

Aarts et al., showed anger was associated with greater motivation to obtain an object when angry facial expressions were paired with randomly selected objects (everyday items such as a pen or plate). Angry, neutral and fearful facial expressions of two male and female actors were selected, as were ten objects. Five randomly selected objects were linked to neutral faces, and five other objects were linked to fearful or angry faces. Objects were then presented, followed by the flashed faces. After object presentation, participants then indicated their motivation to obtain the object on a 21-item scale (*not at all to very much*). Participants were less motivated to obtain objects linked to fearful faces than to obtain objects linked to neutral faces, presumably because this activated the BIS. However, participants were more motivated to obtain objects linked to angry faces than to obtain objects linked to neutral faces, therefore indicating activation of the BAS.

Whilst engaging with violent media may not necessarily result in material gain, it may accrue the recipient benefits in other ways, and therefore, increase approach motivation towards it. For example, kudos for viewing it, positive affect via activation of anger related brain regions and monamine systems associated with reward (i.e., dopamine), or, fuelling antisocial or deviant thoughts and fantasies which the individual finds rewarding.

Also of interest to the concept of trait aggression are gender differences in aggression. It has been proposed that males are more aggressive than females (Geen, 1990). Therefore, males may be more sensitive to the effects of violent media (e.g., Bartholow & Andersdon, 2002). However, gender differences in aggression may be more qualitative than quantitative,

with females engaging in the more indirect forms of aggression than their male counterparts (Bjorkqvist, 1994).

Whilst meta-analyses on gender differences in aggression indicate sex differences in aggression may be small – mean gender difference effect sizes have been reported as **.**22 and **.**29 (Eagley & Stephen, 1986; Bettencourt & Miller, 1996) – evidence indicates males may be more sensitive to aggressive cues (Bartholow & Anderson, 2002), and become more aroused by aggressive-relevant emotional stimuli (Knight, Guthrie, Fabes & Page, 2002). From the perspective of the GAM, and as detailed by Bushmann (1995), males would have more highly developed aggression based cognitive associations and would therefore be more likely to prime aggression related concepts after exposure to violent stimuli. This would also influence arousal (e.g., heart rate and blood pressure) and affect (e.g., hostile feelings). Males may therefore be more susceptible to the effects of violent media content as a consequence of elevated baseline levels of aggression. Whilst this hypothesis is not tested in the present work, this literature is cited as an exemplar of the role trait aggression may play in moderating the impact of violent media on consumers.

As such, it can be seen that studies examining the media violence-aggression relationship should try and account for the moderating role of individual differences variables by including measures of personality. As discussed, such factors may moderate susceptibility to the effects of violent media imagery. One such widely used and validated measure in the aggression literature is the Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992).

Neuropsychology of aggression

As discussed subsequently, viewing of media violence may influence behaviour by acting on the neural circuitry involved in emotion. Consequently, the present section gives an overview

of the neuropsychology of aggression.

The neural substrates of anger and aggression comprises of a prefrontal-subcortical circuit consisting of the evolutionary older brain structures in the subcortex and the more recently developed brain regions of the prefrontal cortex. Scarpa & Raine (2000) note that three interrelated areas of the brain have been associated with the manifestation or inhibition of aggression: (1) the brain stem and hypothalamus, (2) the limbic system (including the temporal cortex), and (3) the prefrontal cortex.

Reviews on the neural circuitry underpinning anger and aggressive behaviour implicate regions of the PFC as being involved in the control and regulation of anger-related affect and aggressive behaviour. In general, higher-order, prefrontal brain regions moderate the activity of subcortical structures associated with emotion (Buffkin & Lutrell, 2005; Davidson, Putnam & Larson, 2000; Filley, Price, Nell). Structures involved in emotion include the hypothalamus, hippocampal formation, cingulate gyrus, parahippocampal gyrus, septal region and the amygdala (Phan, Wager, Taylor & Liberzon, 2004). A detailed discussion of each region implicated in aggression is beyond the scope of the present work however, amygdala-related explanations of aggression are explored further below.

Prefrontal regions of interest in relation to anger and aggressive behaviour are: dorsolateral prefrontal cortex (DLPFC), orbitofrontal cortex (OFC) ventromedial prefrontal cortex (VMPFC), ventrolateral prefrontal cortex (VLPFC), medial PFC (mPFC), and the anterior cingulate cortex (ACC; Denson, 2011). Similarly, Tekin & Cummings (2002), note that the DLPFC, OFC and ACC pre-frontal-subcortical circuits are linked to executive functions, social behaviour and motivational states in humans, and are therefore of pertinence to neurobiological explanations of anger and aggression. Damage to these circuits results in cognitive and behavioural deficits comparable to PFC lesions (Heyder, Sucham & Daum, 2004).

Amygdala

The amygdala is an almond-shaped, structurally and functionally heterogenous collection of at least 13 nuclei, located deep within the anterior part of the medial-temporal lobe (Sander, Grafman & Zalla 2003). It is an essential part of the phylogenetically older brain region known as the limbic system and is involved in emotional reactions, memory and aversive conditioning (Wang, 2009). The amygdala can be divided in to three primary areas: the basolateral nuclei, central nucleus, and medial (corticomedial) nuclei. The basolateral complex comprises of the lateral nucleus (LA), the basal nucleus (BA), and the accessory basal nucleus (AB; Sah, Faber, Lopez De Armentia & Power, 2003). The corticomedial nuclei comprise of the nucleus of the lateral olfactory tract (NLOT), bed nucleus of the accessory olfactory tract (BAOT), anterior cortical nucleus (CoA), posterior cortical nucleus (CoP), and the periamygdaloid cortex (PAC). The centromedial nuclei consist of the central nucleus (CeA), medial nucleus (M), and the amygdaloid region of the bed nucleus stria terminalis (BNST; Sah et al., 2003). Figure 1 is a simplified diagram of the connections of the amygdala. Table 3 lists the main inputs and outputs of the CeA of the amygdala.

In reactive aggression, the sensory cortex and sensory thalamus relay perceptual information relating to threat behaviours (e.g., aggressive postures or gestures) to the LA. The LA then projects to the BA, where perceptual information is integrated with input from the orbitofrontal region of the PFC relating to social context and visceral decision-making. Defense behaviours arise from excitatory input to the midbrain (dorsal periaqueductal gray matter; dPAG), either directly from the BA, by input from the medial hypothalamus, or, via BA projections to the CeA (Carlson, 2004; Davidson et al., 2001; Siegal., Roeling, Gregg & Kruk, 1999).
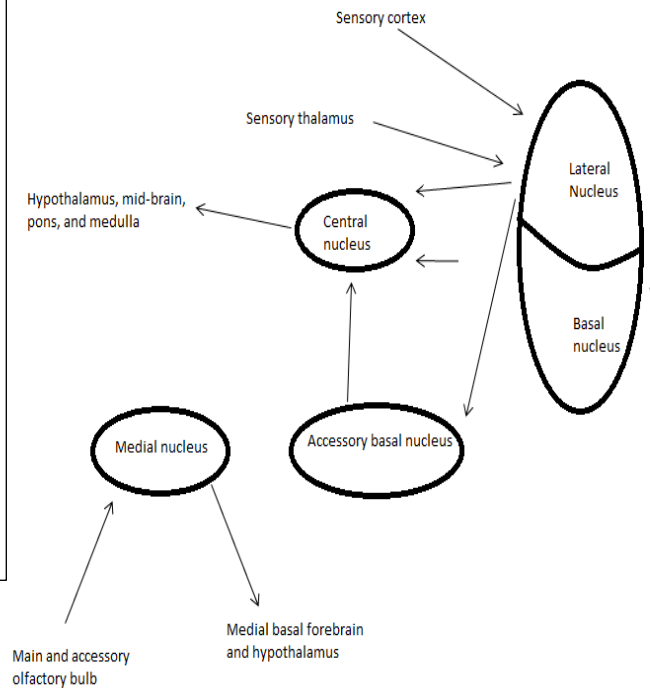
Source: Carlson (2004). **Figure** 1 A simplified diagram of the divisions and connections of the amygdala associated with emotions.

Table 3: Afferents (inputs) and efferents (outputs) of the central nucleus of the amygdala

Nuclei	Sensory Inputs	Afferents	Efferents
Central	Gustatory & visceral	PFC	BNST
	Visceral	PRC	Olfactory system
	Somatosensory	ETC	Hypothalamus
	Auditory	SBC	Thalamus
	Visual	Thalamus	Midbrain
		Brainstem	Pons
			Medulla
			Ascending cholinergic and monoamine systems

Source: Sah et al., (2003). PFC (Prefrontal Cortex); Perirhinal Cortex (PRC); Entorhinal Cortex (ETC); SBC (Subiculum of the hippocampus); Bed Nucleus of Stria Terminalis (BNST).

The amygdala is implicated in a number of processes such as mediating learned fear responses and directing the expression of emotions (Wang, 2009). Table 4 is taken from

Carlson (2004) and summarises the regions of the brain associated with emotional responses which receive input from the central nucleus of the amygdala.

Table 4: Brain regions receiving input from the central nucleus of the amygdala and the emotional responses controlled by these regions.

Brain region	Behavioural and physiological responses
Lateral hypothalamus	Sympathetic activation: increases in heart rate, blood pressure, and paleness
Dorsal motor nucleus of vagus	Parasympathetic activation: ulcers, urination, defecation
Parabrachial nucleus	Increased respiration
Ventral tegmental area	Behavioural arousal (dopamine)
Locus coerulus	Hypervigilance (norepinephrine)
Dorsal lateral tegmental nucleus	Cortical activation (acetylcholine)
Nucleus reticularis pontis caudalis	Increased startle response
Periaqueductal gray matter	Freezing (behavioural arrest)
Trigeminal, facial motor nuclei	Facial expressions of fear
Paraventricular nucleus	Adrenocorticotropic hormone (ACTH), glucocorticoid secretion
Nucleus basalis	Cortical activation

Source: Carlson (2004).

Stimulation of the amygdala promotes aggressive responding (Adamec, 1991), whereas, amygdala damage is linked with blunted emotional reactivity (Davis & Whalen, 2001). Increased activity in the amygdala is associated with the experience of negative affect (Abercrombie, Schaefer, Larson, Oakes & Lindgren et al., 1998), which predisposes towards aggression and violence. Therefore, the conclusion that can be drawn is that reactive aggression arises from heightened activity in the amygdala region and associated negative affect. Indeed, individuals defined as impulsively aggressive as a result of the presence of Intermittent Explosive Disorder (IED), exhibited exaggerated amygdala reactivity to faces expressing anger (Coccaro, McCloskey, Fitzgerald & Phan, 2007). Similar results have been reported in individuals with psychopathic traits (below).

A psychopathic personality is associated with an increased risk for physical and verbal aggression (Book & Quinsey, 2004; Reidy, Shelley-Tremblay & Lillenfield, 2011), reactive and instrumental aggression (Blair, 2010; Glenn & Raine, 2009; Reidy et al., 2011; Reidy, Zeichner, Miller & Martinez, 2007), and indirect aggression (Warren, 2009). Whilst the association between psychopathy and instrumental aggression is robust and well replicated the link between psychopathy and reactive aggression is more ambiguous (Reidy et al., 2011). Brain-based accounts of the construct have indicated that children and adolescents with conduct disorder and callous-unemotional traits - precursors to the development of psychopathy - are associated with amygdala hyporeactivity to fearful faces (Marsh, Finger, Mitchell, Reid & Sims et al., 2008). Such evidence relates to deficits in fear conditioning and sensitivity to the distress cues of others which have been demonstrated by psychopathic individuals and those with psychopathic traits (Birbaumer, Viet, Lotze, Erb & Hermann et al., 2005; Blair, 2007; Carre Hyde, Neumann, Viding & Hariri, 2012), and may predispose to the use of instrumental aggression.

However, research in the area has often considered psychopathy as a categorical construct and has failed to examine how the individual facets of psychopathy relate to subtypes of aggression and brain function (Carre et al., 2012). For example, the lifestyle facet of psychopathy - as measured by the Self-Report Psychopathy Short Form (SRP-SF; Paulhus, Neumann & Hare, in press) - is associated with reactive aggression (Hall, Benning & Patrick, 2004). Indeed, a recent study on the neural substrates of psychopathic traits in subclinical participants by Carre et al., (2012), showed a positive association between amygdala reactivity to angry faces and the lifestyle factor of psychopathy measured by the SRP-SF. The same paper also showed a negative correlation between amygdala reactivity to fearful facial expressions and the interpersonal facet of the SRP-SF, thus reiterating previous work showing reduced amygdala reactivity to the distress cues of others. Consequently, Carre et

al., (2012) demonstrate that different dimensions of the psychopathy construct contribute to specific forms of aggression (also see Reidy et al., 2007), and that heightened reactivity of the amygdala to potential interpersonal challenge may serve as a predisposing factor to reactive aggression in psychopathy (Carre et al., 2012).

Raine and colleagues revealed that murderers, particularly affective (impulsive) murderers, have diminished prefrontal yet increased subcortical metabolism compared to matched controls (Raine, Buschbaum & LaCasse, 1997; Raine, Buschbaum, Stanley, Lottenberg, Abel & Stoddard, 1994; Raine, Meloy, Bihrle, Stoddard, LaCasse & Buschbaum, 1998). Raine et al, (1998) showed that both predatory murderers (i.e, killers with prior intent who's actions are planned and regulated) and affective murderers have significantly elevated activity in subcortical hemispheric structures in the right, but not left hemisphere (amygdala, hippocampus, thalamus, and midbrain), relative to controls. Consequently, both murderer groups would experience heightened levels of aggression-related affect relative to controls, but the predatory murderers, who evidenced prefrontal functioning comparable to controls, would be more adept at regulating and controlling the urge to act on aggressive impulse. As such, it is hypothesised that attenuation of inhibitory mechanisms in the PFC and hyperarousal of the temporal lobe and amygdala regions (i.e., frontotemporal limbic dysfunction) may be responsible for reactive aggression (Kronenberger, Mathews, Dunn, Wang, Wood & Giaque et al., 2005).

Functional brain imaging of voluntary inhibition of reaction to emotional stimuli (suppression), and cognitive reinterpretation of stimuli to diminish negative affect (re-appraisal), indicate frontal regions such as the OFC, dorsomedial prefrontal cortex (DMPFC), VLPFC, ACC, and DLPFC are engaged (Banks, Eddy, Angstadt, Nathan & Phan, 2007). Activation of these frontal areas co-varies with left amygdala activity during cognitive emotion regulation (Banks et al., 2007). This is consistent with the proposed specialisation of

the right and left amygdala: right amygdala may be dominant for fear conditioning, whereas, the left amygdala mediates negative affect (Colman-Mesches & McGaugh, 1995; LaBar, Gatenby, Gore, LeDoux & Phelps, 1998). Banks et al., (2007) reported increased prefrontal activation during reappraisal-based control of negative affect. This indicates frontal regions are associated with modulation of amygdala reactivity.

Dorsolateral Prefrontal Cortex

The DLPFC is connected with the OFC and ACC and is involved in organisation, attention, planning and behavioural control. DLPFC damage impairs the capacity to generate hypotheses (Buruss, Hurley, Taber, Rauch, Norton & Hayman, 2000). Patients with DLPFC impairment show concrete thinking, perseveration, inability to change tasks, inability to filter / ignore environmental distractions, and inability to organise or plan (Duffy & Campbell, 1995; Mega & Cummings, 1994).

Inhibitory continuous theta burst stimulation (cTBS) of the left-DLPFC is associated with increased aggressive responding after loss of money in a laboratory monetary gain task (Perach-Barzilay, Tauber, Klein, Christyakov, Nee'eman & Shamay-Tsoory, 2013). Similarly, a recent meta-analysis on prefrontal structural and functional brain imaging findings in violent, antisocial and psychopathic individuals revealed DLPFC deficits were limited to the left hemisphere (Yang & Raine, 2009). As left-sided DLPFC patients evidence diminished attention, cognitive flexibility, goal-directed behaviour and impulse control, it may be that this region is linked to antisocial features such as impulsivity and poor behavioural control (Yang & Raine, 2009).

Based on the above it can be seen that DLPFC deficits have the potential to impair the control of negative affect and aggression. For example, in episodes of reactive aggression, DLPFC deficits may result in difficulties in generating hypotheses relating to alternative

behavioural strategies and their outcomes; problems organising and planning alternative behavioural strategies; diminished capacity to amend aggressive behaviour once initiated, or, refrain from employing aggressive behaviour (i.e., response perseveration); and finally, difficulty filtering out and ignoring stimuli in the environment which may drive aggressive behaviour.

Orbitofrontal Cortex

The OFC is the cortex on the orbital surface of the frontal lobe linking the cognitive analysis of complex social phenomena with automatic learned and unlearned emotional responses mediated by the autonomic nervous system and the amygdala (Carlson, 2004; Elliot, Dolan & Frith, 2000). Input is received from visual association areas (interpretation and recognition of form), the somatosensory cortex (processing of sensory modalities), VTA (reward, motivation, cognition and emotion), temporal cortex and amygdala (Carlson, 2004; Elliot et al., 2000). Sensory input to the OFC from the temporal lobe comes from a number of different streams. Input from the temporal pole is segregated in to dorsal (auditory), medial (olfactory) and ventral (visual) streams (Olson, Plotzker & Ezzyat, 2007). The OFC integrates information from these various streams in to a coherent whole. For example, perceived verbal and visual slurs are integrated and combined to produce a global perception of insult (Potegal, 2012). Output from the OFC is to the inferior temporal (object recognition) and entorhinal (memory) cortices, anterior cingulate (see below), VTA, hypothalamus (mediation of autonomic, endocrine and behavioural functions) and caudate nucleus (control of voluntary movement, learning and memory, approach-attachment behaviour to normal and romantic targets, and affect; see Villablanca, 2010).

Damage to the OFC or its circuits impairs emotional and social functioning and responding (Cicerone & Tanenbaum, 1997; Elliot et al., 2000). Lesions induce impulsivity,

inappropriate euphoria, lack of affect and social irresponsibility, misinterpretation of others moods, disregard for others and a lack of concern for personal actions, poor insight and reduced initiative (Crump, 2005). Abusiveness, anger, and deficits in moral reasoning have been reported in patients with early acquired OFC damage (Bechara, Damasio, Tranel & Damasio, 1999). Similarly, violent, impulsive and aggressive behaviour has been shown in a patient with bilateral OFC and amygdala damage (Blair & Cipolotti, 2000).

Anterior cingulate cortex

The ACC is part of the brain's limbic system and is linked with executive control via connections with the PFC (Bush, Phan & Posner, 2000). The three major functional subdivisions of the ACC are identified as the affective, cognitive and motor components (Yucel, Wood, Fornito, Riffkin, Velakoulis & Pantelis, 2003). The rostral-ventral-ACC division is involved in emotion, and the cognitive and motor subdivisions are subserved by the dorsal-ACC (dAcc) and the caudal-ACC (cACC), respectively (Yucel et al., 2003). The cognitive subdivision has strong reciprocal interconnections with the lateral PFC and forms part of a distributed attentional network (Devinsky et al., 1995).

Bush et al., (2000) summarises the functions linked with the dACC as being as follows: the modulation of attention or executive functions via the influence of sensory and/or response selection, error detection, conflict monitoring, motivation, novelty, working memory, and anticipation of cognitively demanding tasks. Bush et al., (2000) also note that the affective subdivision assesses the salience of emotional and motivational information and regulates emotional response (Bush et al., 2000). Bush et al., (2000) cite evidence which shows a reciprocal, inverse relationship between the cognitive and affective subdivisions of the ACC. For example, cognitively oriented Stroop tasks increase the Functional Magnetic Resonance Imaging (fMRI) signal in the cognitive region of the ACC but diminish the signal

in the affective subdivision. Conversely, elevated activity in the affective region of the ACC during an Emotional Counting Stroop task deactivates the cognitive region of the ACC. This is supported by evidence indicating that individuals experiencing intense emotional states, such as severe depression, and film-induced emotion, show deactivation of the cognitive region of the ACC (Lane, 1998; Mayberg, 1997).

ACC deficits are associated with inattention, apathy, reduced motor initiation, akinetic mutism, emotional instability, poor insight, dysregulation of autonomic functions, and diminished performance in the development and execution of plans (Crump, 2005). ACC activity is associated with aggression. For example, use of narrative scripts based on autobiographical information, created to induce anger states, indicates that the ACC is activated as part of a neural circuit in paralimbic regions associated with anger (Dougherty, Shin, Alpert, Pitman & Orr et al., 1999). Activation of such a circuit after consumption of violent media would underpin the affective component of the GAM, and by implication, down-regulate the dACC (e.g. Lane, 1998), thus inhibiting the capacity to diminish negative affect via cognitive strategies. Consistent with this postulate is the suggestion that, when unjustly wronged, the dACC intiates regulatory behaviour via activity in the DLPFC (Kramer, Jansma, Tempelmann & Munte, 2007). Furthermore, a recent meta-analysis showed that reappraisal of emotional stimuli is associated with activation in the dACC and medial PFC (Kalisch, 2009).

Executive functioning and aggression

Executive function (EF) is an umbrella term for a number of cognitive processes, which are primarily located within the frontal lobes (Alvarez & Emory, 2006). Examples of such processes include: attention, working memory, planning, verbal reasoning, problem solving, inhibition, mental flexibility, multi-tasking, initiation and monitoring of actions (Chan, Shum,

Toulopolou & Chen, 2008). Generally, EF can be viewed as a process or ability in which behaviour is guided towards a goal through effort, especially in non-routine situations (Banich, 2009).

Individuals scoring low on measures of EF have increased tendencies for aggression (Kramer, Kopyciok, Richter, Rodrigues-Fornells & Munte, 2011). Studies indicate that individuals with a history of aggressive behaviour exhibit reduced activation in frontal lobe regions, diminished prefrontal gray matter, hyperactivity of the amygdala to emotionally negative stimuli, and poorer performance on tests of executive functioning (Bufkin & Luttrell; Brower & Price, 2001; Coccaro et al., 2007; Filley et al., 2001; Raine et al., 1998; Raine, Lenz & Bihrl et al., 2000; Siever, 2008; Wang, Mathews, Lurito, Lowe & Dzemidic et al., 2002).

Morgan & Lilienfield's (2000) meta-analysis of measures of EF in antisocial behaviours indicated that antisocial groups performed worse than comparison groups on the following EF measures: Category Test of the Halsted-Reitan Neuropsychological Battery (concept formation and problem solving); Porteus Maze Q Score (ability to plan and change problem-solving approaches); Perseverative Error of the Stroop Interference Test (response inhibition); Wisconsin Card Sorting Test (abstract reasoning, response perseveration, response strategies to changing contextual contingencies); and Verbal Fluency Test (effortful self-initiation, self-monitoring, response inhibition). The review revealed differences in effect size (Cohen's d) according to antisocial behaviours. Large effect sizes were reported for criminality ($d = 1.09$) and delinquency ($d = .86$), medium for conduct disorder (CD; $d = .40$), and small for psychopathy ($d = .29$). Effect sizes were in the small-to-medium range ($\geq .5$) for all measures except the Porteus Maze test ($d = .80$).

Ogilvie, Stewart, Chan & Shum's (2011) meta-analysis showed a robust association between EF deficits and antisocial groups compared to controls. Ogilvie et al., reported a

grand mean effect size of $d = .44$ for EF and antisocial behaviours. Antisocial group analyses revealed the largest effects were for criminality ($d = .61$), and externalizing behaviours, such as conduct disorder ($d = .54$). A medium effect was found for psychopathy ($d = .42$). Interestingly, some of the more contemporary measures of EF yielded the largest effect sizes, including the Self-ordered Pointing Task ($d = .83$), Spatial Working Memory Task ($d = .54$), Risky Choice Task ($d = .63$), and the Delayed Matching to Sample Task ($d = .59$). Such tasks tap working (i.e., short-term) memory, which provides an interface between perception, long-term memory and action that enables goal-directed behaviour (Baddeley, 1998; Baddeley & Petrides, 1996), such as attenuation of negative affect.

The inverse relationship between EF and aggression evidenced in such studies is also mirrored in non-clinical samples. Hoaken, Shaughnessy & Pihl (2003) selected participants on the basis of performance on two tasks of executive functioning, a Spatial Conditional Association Learning Task (capacity to learn conditional associations between unrelated stimuli) and the Self-Ordered Pointing Task (non-spatial executive working memory), and reported that low EF individuals were more aggressive in their responding and tended to select higher-intensity electric shocks to a mock opponent in a laboratory measure of aggression – the Taylor Aggression Paradigm (TAP) - than their low EF peers.

Kramer et al., (2011) had high and low trait aggression participants perform numerous measures of EF, and reported high trait aggressive participants had significantly reduced latency scores (i.e., performed their first move quicker) in the Tower of London (TOL) task. Such a result was interpreted by the authors as indicating that the high trait aggression group were more impulsive than their low trait aggression peers. This was supported further with the addition of a regression analysis on scores in the high trait aggression group which revealed that the I7 Impulsivity Scale (Eysenck, Pearson, Easting & Allsop, 1985), significantly predicted performance in the TOL task. Furthermore, LeMarquand, Pihl, Young,

Tremblay & Sequin et al., (1998) reported high trait aggression adolescent boys evidenced poorer inhibitory control than a low trait aggression group on a Go/No Go task (Kramer et al., 2011).

Although the authors reported no significant difference between the two aggression groups on all other behavioural measures of EF, a trend towards statistically significant group differences was revealed in the error rate of the Stroop Task. Interestingly, this trend indicated that the low trait aggression group had a higher error rate in the interference condition of the Stroop test (i.e., more errors when the words and colours differed) than the high trait aggression group. This is supported by EEG studies which showing individuals high in trait aggression able to refrain from retaliation after provocation have enhanced prefrontal activity (Kramer, Buttner, Roth & Munte, 2008; Kramer, Kopyciok, Richter & Munte, 2009).

Neuropsychological functioning and media violence

Recent research has focused on the neural basis of the media violence-aggression relationship. Such endeavours seek to identify neural circuits that moderate aggressive behaviour which are also affected by media violence (Kronenberger, Mathews, Dunn, Wang, Wood & Giaque et al., 2005).

Cognitive strategies of emotion regulation, such as suppression and reappraisal, increase prefrontal activation and attenuate subcortical activity. Consequently, hypofunctioning of frontal lobe regions involved in EF can result in hyperfunctioning of subcortical structures, resulting in behaviour being driven by structures such as the amygdala. As discussed below, similar brain activation patterns have been observed in individuals exposed to violent media, in a number of recent studies examining the media-violence aggression relationship using fMRI paradigms.

Wang, Mathews, Lurito, Lowe & Dzemidic et al., (2002) showed past viewing of violent media was related to diminished activity in the DLPFC, a region implicated in cognitive modulation of amygdala activity (Hariri, Mattey & Tessitore, 2003). Strenziok, Krueger, Deshpande, Lenroot, van de Meer & Grafman (2010) observed an inverse relationship between neural activity in prefrontal regions and the levels of violence displayed in videos. That is, over time, the greater the level of video violence the greater the degree of brain deactivation. The authors report desensitization and downward linear adaptation (diminished brain activation) towards increasingly aggressive videos in a fronto-parietal network, which included the left lateral orbitofrontal cortex (left ltOFC). However, no explanation regarding the time frame associated with the OFC returning to a normal level of functioning was provided. The authors also observed that, over time, SCR's decreased from low to mild to moderate aggression level videos. For the low levels of aggression videos SCR adaptation was positive, which the authors interpreted as sensitization to aggression based stimuli. For the mild and moderately aggressive videos SCR adaptation was negative, particularly for the moderate aggression video. Participants with the most media violence exposure in their daily life showed the greatest desensitization. Kelly, Grinband & Hirsch (2007) report exposure to media violence (shootings, stabbings and acts of physical violence taken from mainstream commercial motion pictures), but not exposure to equally arousing media (non-aggressive physical interactions such as dance and sport), led to a diminished response in right lateral orbitofrontal cortex (right ltOFC) and a decrease in right ltOFC-amygdala interaction. Moreover, the authors note that reduced right ltOFC responses were characteristic of those participants that reported greater tendencies to reactive aggression. Similar results have also been reported elsewhere (Wang, Mathews, Kalnin, Mosier & Dunn et al., 2009).

However, to date, the empirical evidence highlights a discrepancy between

statistically significant neuroimaging data and actual behavioural performance. For example, Wang et al., (2009) report no statistically significant between group differences in Counting Stroop and Emotional Stroop performance after 30 minutes of violent or non-violent video game play. Despite this, the non-violent video game group evidenced greater activation in the PFC, and showed significantly greater activation in the left-DLPFC, during performance of a Counting Stroop task. The violent video game group also demonstrated significantly greater activation in the right amygdala during performance of the Emotional Stroop task. Increased activity in the left-DLPFC is associated with the capacity to voluntarily suppress negative emotions (Peña-Gómez, Vidal-Piñeiro, Clemente, Pascual-Leone, & Bartrés-Faz, 2011; Ochsner, Bunger, Gross & Gabriel, 2002). Consequently, the non-violent game group would be more adept at modulating amygdala activity through reappraisal-based cognitive strategies

Whilst there is some evidence that media violence compromises executive functioning at the behavioural level – as indicated by compromised Stroop Colour and Word Test (SCWT; Golden, 1978) and Connor's Continuous Performance Test (CPT; Connor, 2000) performance (Kronenberger et al., 2005) - replication of this finding has proven elusive. This in part may be due to the make-up of samples which have consisted of clinical groups with histories of antisocial behaviours. Such groups exhibit attenuation of executive functioning relative to controls at both the neural and behavioural (Mathews, Kronenberger, Wang, Lurito, Lowe & Dunn, 2005). They may therefore be more susceptible to the postulated effects of violent media exposure on executive abilities than subclinical groups. However, Wang et al., (2009) reported a near significant drop in Emotional Stroop Task performance in a subclinical group ($p = .08$). Consequently, there is a need to ascertain whether such a finding could be replicated to meet the inclusion criteria of statistical significance in a normal, healthy, sample. Neuropsychological measures of executive function such as the Stroop Test (Stroop, 1935), which is known to activate areas of the brain associated with

abstract reasoning processes - of which it can be argued cognitive emotion regulation is representative of - and response inhibition - such as the DLPFC (see below) and (dorsal) anterior cingulate (Macdonald et al., 2000) - may allow the investigation and measurement of the effect of short-term exposure to media violence on executive functioning.

Real and fantasy violence

To date, little experimental research has compared the potential differences of real and fantasy violence on attitudes to violence in adult populations. Moreover, studies which have addressed this issue are 40 years old, have methodological shortcomings (see below), and do not directly compare reality and fantasy violence, preferring instead to manipulate the reality-fantasy distinction by construing the same film clip as either reality or fantasy (e.g., Thomas & Tell, 1973).

Fantasy violence is defined as violent actions of a fantasy nature, involving human or non-human characters in situations easily distinguishable from real life (Entertainment Software Rating Board). Research in children has indicated exposure to fantasy violence increases aggression and decreases pro-social behaviour (Linder & Gentile in press), but that the magnitude of this effect is more marked in females (Sawin, 1981). However, children below the age of 8 years of age may have difficulty distinguishing reality from fantasy due to underdeveloped frontal lobes (Bar-On, Broughton, Buttross, Corrigan, et al., 2001). Additionally, children, like simian primates, have an innate tendency to imitate whomever they observe (Butterworth, 1999; Huesmann & Taylor, 2006; Wyricka, 1996). For example, neonatal macacques, chimpanzees and humans automatically mimic adult facial expressions (Myowa-Yamakoshi, Tomonaga, Tanaka & Matsuzawa 2004; Meltzoff & Moore, 1977). Such a phenomenon may arise from the activity of mirror neurons which are active during the observation of an action and when an action is being performed. This social learning allows

for the detection of contingencies in the social world, such as context appropriate behaviours, and is reflective of the social learning approach to aggression which informs the GAM.

A study conducted with more mature participants has indicated viewing of real violence, not fictional violence, induces an increase in aggressive behaviours (Thomas & Tell, 1973). However, this study failed to use a comparison control group. Previous studies have also been confounded by using a confederate of the experimenter to anger, and therefore pre-arouse and pre-prime participant's aggression-related cognitions, before exposing them to violent media imagery and measuring the effects (Berkowitz & Alioto, 1973; Geen, 1975; Thomas & Tell, 1974). Whilst such studies indicate that fantasy violence may augment and / or perpetuate pre-existing anger states and cognitions, they do not show whether it directly induces an anger-like state, activates pro-violent attitudes, or changes perceptions of violence.

More recently, studies examining the effects of fantasy violence on aggressive cognitions and behaviours have yielded inconsistent results. For instance, Ivory & Kalyanaram (2007) report no effect of video game exposure on aggressive thoughts and feelings. Williams & Skoric (2005) report that after controlling for age, gender and pre-test aggression scores, violent video game play averaging 56 hours over a one-month period, did not predict aggressive cognitions post-test in participants with a mean age of 27.7 years (range 14-68). Moreover, after the experimental treatment, participants did not show significant increases in aggressive behaviours (arguments with friends or partners). Age significantly predicted normative beliefs about aggression and arguments with friends, indicating older participants were less likely to report aggressive cognitions and behaviour. A marginally significant Game x Age interaction was calculated for the argument with friend measure. This indicated the effects of game play were strongest in older participants, who were more likely to argue with friends, post-treatment. Such a finding is counter to Paik & Comstock's meta-analysis on the effects of television violence which was cited in the section

on the GAM, in which older participants were less influenced by scenes of violence. Conversely, and as noted by William & Skoric (2005), a meta-analysis by Sherry (2001), which focused on the effects of violent video games, showed a weak but significant association between age and effect size. Williams & Skoric argue that their results may indicate that younger participants may have become habituated to video game violence throughout their lives, whereas, the experience of game play may be more intense for older participants (Williams & Skoric, 2005).

Barlett & Rodeheffer (2009) reported violent video game play was associated with increased aggressive thoughts, with increasingly realistic simulations of violence stimulating significantly more aggressive feelings and arousal over the course of play. Sherry's (2001) meta-analysis on violent video games showed that games with violence carried out by human or fantasy characters had a stronger influence on aggression than games with sports-related violent content. This may result from game features, such as the level of graphic violence and amount of game action influencing non-specific arousal (Sherry, 2001). Additionally, Kirsh & Olczak (2000) biased the social information processing of men towards aggression (e.g., increased levels of hostile attribution of intent), but not women, as a result of exposure to a violent comic book.

As shown above, studies have yielded inconsistent, and weak, marginally significant results, which may give rise to type one errors. However, they have been cited in order to build a rationale for testing the influence of fantasy violence on aggression empirically. Also many of them have used stimuli that require participants to actively play a role in carrying out aggressive acts. For example, in violent video games, the player has to carry out violent acts in order to be rewarded, attain goals, or progress through the game. Similarly, the consumption of violent images and literature makes the reader visualise actual acts of violence, thereby forcing them to engage their imagination and become an active participant

in a violence-laden storyline (McCloud, 1993). Consequently, little contemporary research has explicitly considered the effects of fantasy violence on adults when delivered through more passive forms of media such as film and television. Moreover, to the authors' knowledge, no study to date in adults has compared real and fantasy violence, and measured attitudes to violence, perceptions of the consequences of violence, and frontal functioning, whilst simultaneously controlling for the effects of personality. It is this gap in the pre-existing literature which the present work seeks to address. Consequently, part of the present work compares the potential differential impact of real and fantasy violence on attitudes to violence, perceptions of the consequences of violence and executive functioning, whilst controlling for the mediating factor of trait aggressiveness. The next section of the thesis examines the literature on the construct of narcissism and how this is manifest in the recent media phenomenon of social networking sites.

Chapter 2: Narcissism

Narcissism

The term 'narcissism' is taken from the character in Greek mythology known as Narcissus. According to the myth, Narcissus rejected the attentions of many potential lovers and was condemned to unrequited love by an avenging goddess called Nemesis. Upon seeing his own reflection in a pool of water, Narcissus became infatuated and transfixed by his own reflection, gazing upon himself until he eventually died (Herron, 1999; Stone, 1998).

Narcissism as a character trait was described by Jones (1913/1951) in his description of the 'God-complex'. Individuals presenting with the 'God-complex' are self-important, self-admiring, inaccessible, overconfident and exhibitionistic, with a desire for uniqueness and praise from others (Jones, 1913; 1951). Waelder (1925) described individuals with a narcissistic character as condescending, feeling superior to others, and pre-occupied with themselves and admiration. Waelder also notes such individuals exhibit a marked lack of empathy, as evidenced by romantic relationships being based on physical pleasure over emotional intimacy. Such descriptions appear congruent with the revised 4th edition of the *Diagnostic and Statistical Manual* (DSM-IV-TR, American Psychiatry Association, 2000, p.714-717) definition of narcissistic personality disorder (NPD):

> "A pervasive pattern of grandiosity (in fantasy or behavior), need for admiration, and lack of empathy, beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:

> (1) Has a grandiose sense of self-importance (e.g., exaggerates achievements and talents, expects to be recognized as superior without commensurate achievement).

> (2) Is preoccupied with fantasies of unlimited success, power, brilliance, beauty, or ideal love.

(3) Believes that he or she is "special" and unique and can only be understood by, or

 should associate with, other special or high-status people (or institutions).

(4) Requires excessive admiration.

(5) Has a sense of entitlement, i.e., unreasonable expectations of especially

favorable treatment or automatic compliance with his or her expectations.

(6) Is interpersonally exploitative, i.e., takes advantage of others to achieve his or

her own ends.

(7) Lacks empathy: is unwilling to recognize or identify with the feelings and

needs of others.

(8) Is often envious of others or believes that others are envious of him or her.

(9) Shows arrogant, haughty behaviors or attitudes.

However, Holdren (2004) argued that the DSM diagnostic criteria for NPD are too narrow in their focus and fail to capture the diverse nature of the narcissistic personality. While many narcissists are overt in their narcissistic dispositions, this does not reflect the whole spectrum of narcissistic behaviours. Indeed, narcissists can also be covert in their dispositions and present as shy, inhibited, ineffective and timid (Masterson, 1981).

Clinicians and theorists suggest a distinction be drawn between subtypes of the trait,

which are labelled as overt and covert narcissism (Gabbard, 1989; Cooper & Roningstam, 1992). This is based on a certain degree of heterogeneity in the clinical presentation of the trait. Some measures of narcissism correlate positively with indicators of well-being, whereas, others correlate negatively with the same measures of well-being (Wink, 1991). Indeed, the DSM has a tendency to focus on overt narcissism, which is characterised by grandiosity, exhibitionism and entitlement. Such emphasis occurs at the expense of covert narcissism, which is characterised by shame sensitivity, vulnerability, introversion, inhibition, and anxiety-proneness (Gabbard, 1989). Whilst the emphasis of the present work is on subclinical narcissism, it must be noted subclinical narcissists will exhibit the features of clinical narcissism, but to a lesser degree (Bergman, Fearrington, Davenport & Bergman, 2011). Consequently, clinical manifestations of the trait are of relevance to its subclinical counterpart. A brief introduction to the two narcissistic subtypes is provided below.

<u>Overt and covert narcissism</u>

Agency refers to a focus on the self and autonomy. Conversely, communion is a focus on other people and social relationships (Mosher & Danoff-Burg, 2005). Overt narcissism is associated with inflated positive self-views on agentic traits such as physical attractiveness, intelligence and power (Mehdizadeh, 2010). It is associated with a low level of agreeableness and a high degree of extraversion (Paulhus & Williams, 2002), as well as a pervasive sense of entitlement (Emmons, 1984). Overt narcissists report secure or dismissive attachment styles, and being domineering and vindictive in relationships, yet experience little interpersonal distress as a result (Dickinson & Pincus, 2003). High scores on the most widely used measure of overt narcissism – the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979) – are reflective of individuals who are extraverted, experience-seeking and energetic, who are self-confident, with a tendency to assume leadership roles. High NPI scores are also characterised

by conceit, egotistical tendencies, and open expressions of grandiosity (Raskin & Novacek, 1989).

Overt narcissists are chronic self-enhancers. For example, Wallace & Baumeister (2002) showed high NPI scorers' performance on a range of tests improved when the tasks were increasingly challenging. Participants were required to fetch objects from a hole with tweezers without making errors by touching side of hole and setting off an alarm. They were then offered the chance to win increasing monetary rewards if they performed 5% quicker with 5% less error in a second round of the same task, followed by a third round of 25% improvement over the 2 domains relative to the first round. Participants were then given 5 minutes practice, informed that other participants would be given 15 minutes practice, and that 15 minutes practice was associated with greater success rate. Moreover, they were informed that task success after 5 minutes practice would put them in the top 5% of task performers. This was the 'high challenge' condition. Participants in a 'low challenge' condition were told participants were given either 5 minutes practice or no practice at all, and that practice time was negatively associated with task performance.

Results indicated that higher NPI scores were associated with greater improvement in the high challenge condition – which offered greater opportunity for self-enhancement – than the low challenge condition. Low narcissism scores performance was similar in both challenge conditions. High NPI scores were also associated with the greater improvements in speed and accuracy in the high challenge condition relative to the low challenge condition. The authors also replicated these results using maths problems and a darts throwing task. In a fourth experiment Wallace & Baumeister reported high narcissism scores were associated with better creativity test performance (coming up with uses for a knife) when test performance could be evaluated by others, than when test performance was only self-evaluative, or, non-existent. Such a finding indicates that for overt narcissists, self-enhancing

exhibitionism, which garners the admiration of others, is a more potent motivator of task performance than the desire for self-validation (Wallace & Baumeister, 2002)

A central tenet of narcissism is the use of social relationships to regulate self-esteem (Buffardi & Campbell, 2008). Indeed, overt narcissists are highly-skilled at initiating relationships and using them to look popular, high-in-status and successful (Buffardi & Campbell, 2008). These are then used to reinforce positive self-views, and indicate that the overt narcissist constructs positive views of the self via their proactive engagements with the environment. However, relationships are generally superficial and short-term and lack warmth and interpersonal intimacy (Mehdizadeh, 2010). Overt narcissists appear as charming and demand the attentions of others, yet are oblivious to their needs (Rose, 2002). Consequently, overt narcissists pursue relationships in order to confirm and regulate narcissistic esteem (Morf & Rhodewalt, 2001). Social relationships offer the potential for self-enhancement, for example, the preference for high-status, "trophy" romantic partners and showing off (Campbell, 1999; Wallace & Baumeister, 2002).

Overt narcissists appear as self-confident and grandiose on the surface, yet this 'masks' deep seated feelings of inferiority (Boson, Lakey, Campbell, Zeigler-Hill, Jordan & Kernis, 2008). Current social-personality perspectives on narcissism postulate that insensitive and inadequate parenting in early life gives rise to feelings of shame and low self-esteem. Narcissists protect against these feelings by suppressing them and constructing highly positive self-views which are regulated through personal and interpersonal strategies (Boson et al., 2008). Examples of such strategies include derogation and manipulation of others (Morf & Rhodewalt, 2001; Campbell & Foster, 2002), seeking positive feedback on task performances and having low criticism sensitivity (Atlas & Them, 2008), and a tendency to rate the self highly and exaggerate positive qualities (Paulhus, 1998; Mehdizadeh, 2010) Consequently, narcissism is a product of the conflict between deep-seated inferiorities and

surface-level feelings of superiority, which mask self-loathing, but require constant reinforcement (Boson et al., 2008).

Covert narcissists share some features with their overt counterparts such as self-absorption and arrogance (Rose, 2002), entitlement, exploitativeness, lack of empathy and grandiose fantasies (Cooper, 1998). However, they are also characterised by higher stress vulnerability, shyness and worry. Covert narcissists lack self-confidence, have a concern with appearance, experience depression and have unfulfilled expectations (Cooper, 1998; Dickinson & Pincus, 2003). Covert narcissists lack the capacity to initiate and maintain social relationships and modulate their self-esteem through interpersonally based self-enhancement strategies. Instead, they rely on external feedback from others to modulate self-esteem (Dickinson & Pincus, 2003). Such individuals feel conflicted about, and deny, their sense of entitlement, thus leading to angry outbursts, which is followed by subsequent feelings of shame and depression (Cooper, 1998; Dickinson & Pincus, 2003). High scores on measures of covert narcissism are associated with fearful and preoccupied attachment styles, an increased tendency for social avoidance, and, based on diagnostic interview, elevated representations of Avoidant Personality Disorder (Dickinson & Pincus, 2003).

Atlas & Them (2008) showed that covert narcissism was related to maladaptive cognitions, affect and behaviour arising from feedback on a public speaking task. The authors report that higher scores on the Hypersensitive Narcissism Scale (HSNS-R2, Wink & Cheek, 1998) – a measure of covert narcissism – were associated with criticism sensitivity, avoidance of feedback opportunities, experiencing high levels of internalised emotions, and rumination. Cooper (1998) notes covert narcissists fear exposure as frauds and therefore prefer to engage in relationships with individuals they perceive as inferior to themselves, who they may 'rescue'. They also tend to focus on how little their true worth is acknowledged, engage in denigrating self-talk, fail to accomplish tasks and attain awards which are within

their capabilities, and harbour contempt and discontentment towards others whose accomplishments they resent (Cooper, 1998).

Empirical support for the overt-covert distinction has been provided by Wink (1991) who explored the lack of correlation between the NPI and another measure of narcissism – the Narcissistic Personality Disorder Scale (NPDS; Ashby, Lee & Duke, 1979) – with their associations with other measures of the construct. Wink (1991) carried out a principal components analysis on six narcissism scales. Three of the scales emphasised the grandeur and exhibitionism of overt narcissism, whereas, three emphasised the vulnerability and sensitivity of covert narcissism. Wink reported two orthogonal dimensions that supported the overt-covert distinction: grandiosity/exhibitionism (overt narcissism) and hypersensitive/vulnerable (covert narcissism). This lead Wink to label the subtypes as the "two faces of narcissism" which can be tapped using two sets of uncorrelated scales. This finding has also been replicated by Rathvon & Holmstron (1996).

<u>Self-esteem and narcissism</u>

Self-esteem is an individual's evaluation of the self which ranges from very negative to very positive (Rosenberg, 1965,) and comprises of two major subtypes: 1.) explicit, and 2.) implicit. Explicit self-esteem (ESE) is a conscious, controllable, reflective self-evaluation, consisting of feelings related to self-liking, self-worth and acceptance (Zeigler-Hill, 2006). Conversely, implicit self-esteem (ISE) consists of automatic self-evaluations which occur outside of conscious awareness (Zeigler-Hill, 2006). The relationship between these two subtypes of self-esteem is of particular interest to the construct of narcissism and the overt-covert dichotomy of the trait.

Secure high self-esteem can be seen as positive attitudes about the self which is reflective of a positive relationship between ESE and ISE (high ESE and high ISE). High ISE

is proposed to buffer against challenges to the self-concept, which in turn, diminishes the drive to engage in undesirable, compensatory strategies (e.g., self-deception, derogation of others and aggression; Dijksterheuis, 2004). Conversely, fragile high self-esteem comprises of positive feelings of self-worth susceptible to challenge due to underlying insecurities associated with low ISE. Such feelings require continual validation and a degree of self-deception in order to be maintained (Zeigler-Hill, 2006). This discrepant high self-esteem is characteristic of the overt narcissist because it can be viewed as a pattern of overt grandiosity which conceals unacknowledged, negative attitudes towards the self (see Zeigler-Hill, 2006).

This is supported empirically by Jordan, Spencer, Zanna, Hoshino-Browne & Correll (2003) who used the Rosenberg Self-esteem Scale (RSE; Rosenberg, 1965) and Self-esteem Implicit Association Test (IAT; Greenwald & Farnham, 2001) to demonstrate that participants with high ESE but low ISE had the highest narcissism scores. Moreover, these narcissism levels were higher than for any other combination of ISE and ESE.

However, Boson et al., (2008) note that replication of the 'mask' model has been inconsistent and that this may arise from a flawed or incomplete model of the construct, such as a failure to incorporate subtypes of the trait in to the model (Boson et al., 2008). However, it may also be that, in comparison to ESE measures, ISE measures have poorer predictive and convergent validity and lower test-retest reliability (Boson et al., 2008).

In comparison, the covert narcissist has been shown to experience low self-esteem (Rose, 2002). This type of narcissism is associated with feelings of inferiority and general dissatisfaction with the self (i.e., it lacks the self-deception of overt narcissism). Such individuals crave approval from others but are too insecure to demand it (Pincus, Ansell, Pimentel, Cain, Wright & Levy, 2009). They also lack the personal efficacy to sate such desires using the grandiosity of the overt narcissist due to inner feelings of unworthiness and insecurities (Zeigler-Hill, 2006).

Rise in (overt) narcissism

Studies on American college students have shown a steady increase in scores on the NPI (Twenge, Konrath, Foster Campbell & Bushman, 2008; Twenge & Foster, 2008). Between 1982 and 2007, nationwide NPI scores for college students rose significantly and systematically, so that by 2007, 70% of U.S. college students scored more highly on the NPI than students in 1982 (Twenge et al., 2008). Such a rise indicates that American college students place increasingly greater emphasis on self-aggrandisement relative to co-operation, are increasingly likely to report exploiting others for personal gain, rate themselves unduly high in leadership qualities, attractiveness, power and importance, and will react with anger to criticism (Campbell, Bush, Brunel & Shelton, 2005; John & Robins, 1994; Campbell, Rudich & Sedikides, 2002).

A conflicting report by Trzesniewski, Donnelly & Robins (2008), showed that NPI scores for students at the University of California remained unchanged between 1982 and 2007. However, Twenge, Konrath, Foster Campbell & Bushman (2008) note that enrolment of Asian-American students, who score lower on individualistic traits, including narcissism (Foster, Campbell & Twenge, 2003) doubled during this period, thus masking a rise in narcissism comparable to that of the nationwide study conducted by Twenge et al., (2008). Twenge & Foster (2008) analysed the dataset used by Trzesniewski et al., (2008) for the period 2002 - 2007 - when ethnicity data was available – and reported Asian-American students scored significantly lower on the NPI than Whites, and lower than Whites, Blacks and Hispanics combined. Within-group analysis showed that mean NPI scores for White and Asian-American students increased between 2002 – 2007 ($d = .17$; and $d = .12$, respectively), with 59% of Whites and 57% of Asian students scoring more highly on the NPI in 2007 than

in 2002. Whilst these significant findings were not reflected in Black and Hispanic students, the findings were in the same direction as the other ethnic groups (Twenge & Foster, 2008).

Traditionally collectivistic cultures which downplay the importance of the self (Markus & Kitayama, 1991) also show increases in overt narcissism. Cai, Kwan & Sedikides (2012) report that, in a Chinese sample, age and socioeconomic status had negative and positive relationships with narcissism, respectively. The authors also report higher narcissism scores in persons from only-child families and urban areas (relative to rural areas), and that individualistic values predict individual differences in narcissism. The authors conclude that changes in the sociocultural environment of China, such as increasing affluence, urbanisation, controls on the amount of children families should have, and endorsement of individualistic values, is making the Chinese population increasingly narcissistic. Consequently, it can be seen the rise in narcissism, as measured by the NPI, has increasing prevalence in both individualistic and traditionally collectivistic cultures undergoing sociocultural change.

Social Network Sites

Social networking sites (SNS) are a form of computer mediated communication which combine email, instant messaging, blogging, website creation, and multimedia content sharing (Livingstone, 2008). They are a virtual community where individuals build social relations, and create, share and exchange information and ideas, with other individuals with similar background, interests or real-life connections. Such websites allow users to construct a public or semi-public profile within the parameters of the site platform, show a list of other site users they have a connection with, and view and move through their list of connections and that of other users in the system (Boyd & Ellison, 2007). Examples of such sites include: Myspace; Google+; Twitter; and Facebook. As Facebook is the focus of the present research,

the following discussion is limited to the features of Facebook. However, commonalities exist across many SNS and readers interested in the history, development and use of such sites are referred to Boyd & Ellison (2007).

As of August 2012 Facebook was the most popular of the SNS (Experian Benchmark and Trend Report, 2012). In December 2012, Facebook had over a billion active monthly users, 82% of which resided outside of the USA and Canada (Facebook.com, 2013). Facebook also reports that, on average, 618 million were active daily users and 680 million users accessed the site using mobile products (e.g., phones) on a monthly basis (Facebook.com, 2013). This trend is reflected in the UK, where, as of March 2011, the UK had 30 million users of Facebook – around 50% of its population (Daily Mail, 2011). As this figure is now 2 years old, and the use of SNS continues to grow (see Experian Benchmark and Trend Report, 2012), this percentage may have increased further.

People joining Facebook are asked to provide information on their name, age, gender, educational establishments attended, their location and their employer. For each bit of information users have privacy settings which control who can view each bit of information (e.g., public, friends, only the profile user). Profile owners are also encouraged to provide a profile picture for their webpage. Users then have the option to add to their personal information further in the about me section. This includes describing the self and citing quotations of interest. Users can also specify qualifications obtained and year of graduation, significant life events, sexual orientation and relationship status, films, books and music of interest, as well as a map of the world users can use to identify to others places they have visited. Consequently, Facebook users have a heightened level of control over self-presentational strategies relative to face-to-face communication. For example, being able to choose flattering photos and, in the "about me section", which aspects of their personalities they reveal, exaggerate or downplay. Consequently, Facebook provides an outlet for an

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imagined or ideal self to be constructed and projected on to the world. As a result, Facebook -
and SNS in general –are ideal platforms for highly precise image-management strategies, as
well as the pursuit of large numbers of trivial relationships that serve to reinforce positive
self-views of positive agentic traits (Kramer & Winter, 2008; Mehdizadeh, 2010).

Profile owners are asked to identify other site users to become 'Friends' with, or,
celebrities with a fan page they can 'like'. Bi-directional confirmation of friendship is
required however, for fan pages this is not required. Where friendship requests are denied,
site users can still subscribe to another person's profile so their status updates can still be
read, but for most other information, access remains restricted. Site users are encouraged to
post 'status updates' which allow other site users to know what they are thinking or feeling,
and to identify where they are, and with whom, (i.e., other Facebook users) using a 'tag'
feature. There is also the capacity to post videos and photos to profiles, scores obtained from
video games played via the Facebook site, or, to link external applications - apps - such as
those on mobile phones used to aid fitness regimes. Consequently, all information on external
apps will be posted to individual profiles in the form of a 'status update'. All such
information is posted and recorded on their profile in the form of a 'timeline', which is
essentially a chronological documentation of the SNS users' online activity.

<u>Narcissism and Social Media</u>

In recent years researchers have focused on the way personality variables are manifest in
forms of computer-mediated communication. One such domain of interest which has received
significant attention is the way in which narcissistic dispositions are used in the self-
presentation features of SNS, such as Facebook (e.g., Buffardi & Campbell, 2008;
Mehdizadeh, 2010; Ong, Ang, Ho, Lim, Goh, Lee & Chua, 2011). Such sites offer site users
the opportunity to self-promote via self-descriptions and status updates, display vanity in

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profile pictures and the photos section of such sites, and engage in a large number of shallow relationships by having a large number of friends (Buffardi & Campbell, 2008).

Whilst still an empirical question, the widespread popularity of SNS suggests that the general psychology of its users will be generally normative relative to others in society with similar demographics (Buffardi & Campbell, 2008). However, can the same be said of individuals who voluntarily relinquish restricted access to their personal profile for the purpose of scientific endeavour? Self-selection bias in human subject pools is a flaw endemic within much psychological research and poses a serious threat to the external validity of research findings (see Freyd, 2012 for discussion). A brief summary of research findings pertaining to self-selection in experimental participation is provided below.

Individual difference variables and the personal interests of potential research participants (i.e., whether they find the area of investigation interesting) are likely to influence the type of study an individual chooses to voluntarily participate in. For example, Carnahan & McFarland (2007) compared measures of personality variables of participants responding to one of two recruitment adverts. The first was worded 'Male college students needed for a psychological study on prison life', whereas, the second advert was worded 'Male college students needed for a psychological study'. The authors reported that participants responding to the 'prison' advert scored more highly on measures of machiavellianism, narcissism, aggressiveness, authoritarianism, and social dominance, and lower on empathy and altruism than participants responding to the neutral advert.

Jackson, Procidano & Cohen (1989) report that introductory psychology students responding to a recruitment advert for a study on personality feedback were more broadminded, extraverted and good-natured than participants signing up for a study on proofreading. More recently, Witt, Donellan & Orlando (2011) report that subjects who chose to participate in research in a laboratory setting scored more highly on extraversion and the

related facets of cheerfulness, gregariousness and excitement seeking, than participants who participated in entirely online studies. Such a setting offers greater opportunity for social interaction and may therefore be more appealing to those with a sociable, outgoing disposition, which is characteristic of the trait of extraversion (Witt et al., 2011). In-person participants were also more altruistic and less cautious than online participants. Witt et al., also report negative correlations between conscientiousness and the related facets of achievement striving, dutifulness, self-efficacy, self-discipline and cautiousness, and the time of study sign up in the semester (i.e., the more conscientious students signed up as a research participant sooner in the semester than the less conscientious students). This replicates the findings of Aviv, Zelenski, Rallo & Larsen (2002), who also reported that the personality traits of extraversion and openness were positively correlated with time of study sign up in the semester.

Whilst previous work has generally found a positive association between NPI scores and self-promotional content on SNS (e.g., Buffardi & Campbell, 2008; Mehdizadeh, 2010; Ong et al., 2011), it may be argued that the type of user who volunteers for such a study may have more narcissistic tendencies than those who choose not to volunteer. Narcissism is associated with extraversion (Bradlee & Emmons, 1992), and extraversion is associated with a preference for in-person research participation (Witt et al., 2011). However, high NPI scorers may be drawn to an online research study on SNS and personality as they may seek to confirm hypotheses relating to an overly positive self-image which may help to boost self-esteem. Consequently, it is somewhat unsurprising that narcissistic dispositions have been identified by researchers when examining the SNS profiles of research participants. However, it is of note that Buffardi & Campbell (2008) reported no significant difference in mean narcissism scores between participants who signed up to their study and subsequently granted access to their personal Facebook profile and those participants who did not grant access. As

Buffardi & Campbell (2008) consisted of undergraduates between 18-23 years of age, such a finding indicates that, in their sample at least, NPI scores of profile owners granting access to their accounts were normative relative to others with similar demographics.

A similar study by Mehdizadeh (2010) showed that scores on the NPI-16 (Ames, Rose & Anderson, 2006) – a shortened unidimensional measure of narcissism derived from the NPI – correlated positively with the number of times Facebook was checked a day and the amount of time spent on the site per session. Positive correlations were also reported between narcissism and self-promotional content in the following sections: Main Photo, Photos, Status Updates, and Notes. Negative relationships were reported between self-esteem and Facebook checks, self-esteem and the amount of time spent on the site per session, and self-esteem and self-promotional content of the main profile photo.

Ong et al., (2011) report that, after controlling for age, school grade and gender, narcissism predicted self-reported frequency of status updates of Singapore adolescents (12-18 years) over and above extraversion. After controlling for the same variables, narcissism also predicted self-ratings of physical attractiveness, over and above extraversion, on subjects profile picture using the following adjectives on a five-point likert scale: physically attractive; fashionable; glamorous; and cool. However, narcissism failed to predict the number of Facebook friends and the number of photos over and above extraversion. Consequently, the authors concluded that narcissism predicted self-generated content, but not system-generated content, after controlling for extraversion (Ong et al., 2011).

Although accumulating evidence indicates narcissism is manifest in SNS it must be noted that research in the area comprises of samples of adolescents and university age students. Narcissism is more prevalent in the young (Cai et al., 2012) and declines with age (Foster, Campbell & Twenge, 2003). Moreover, use of social media is strongest in adolescence and early adulthood (Facebook.com, 2013). Consequently, the probability of

detecting the largest and most significant effects is maximised using samples consisting of adolescents and young adults. Also of note is the fact that, to date, many studies have focused the overt, grandiose, features of narcissism. As such, little attention has been given to how the covert form of narcissism is manifest in the personal profiles of users of SNS. The one study identified by the present author addressing this gap was published in Dutch, with no English translation of the complete manuscript available. However, the abstract, which was available in English, reported that higher scores on measures of overt and covert narcissism, extraversion and openness, were associated with a higher degree of self-presentation in text and photo on the SNS studiVZ (Brailovskia & Bierhoff, 2012). Such a finding highlights commonalities between the subtypes of the trait and indicates that covert narcissists may be more willing to embrace their exhibitionistic desires in online environments. Indeed, it could be that the relative anonymity and removal of face-to-face communication -which has the potential for negative feedback via verbal and non-verbal communication - offered by SNS, provides a less threatening environment in which self-enhancement strategies can be operationalized. Congruent with this postulate is research indicating that shyness - a marker of covert narcissism (Cooper, 1998) - is connected to a preference for computer mediated communication (Sheeks & Birchmeier, 2007). As noted by Kramer & Winter (2008), this is in line with research showing that people with social anxieties - such as those scoring highly on covert narcissism - have an increased need for control that is more suited to non-spontaneous (asynchronous) communication than face-to-face (synchronous) communication (Hertel, Schroer, Batinic, Konradt & Naumann, 2005).

In addition, there has been no exploration as to whether constructs relating to narcissism, such as social desirability bias (SDB), are uniquely related with subtypes of narcissism and features of SNS personal profiles. One measure – the Paulhus Deception Scales (PDS; Paulhus, 1998) – which was created as a measure of socially desirable

responding on questionnaire measures, may allow for this to be explored further. Indeed, the PDS partitions SDB in to two factors with much relevance to the construct of narcissism and the overt-covert dichotomy: self-deceptive enhancement (SDE) and image management (IM). Use of the PDS may allow the exploration of how facets underpinning narcissistic subtypes are manifest on SNS, both as separate entities and in combination, and whether these influence ESE. It is this gap in the research literature that the present research seeks to address. Consequently, the second part of the thesis investigates how both overt and covert narcissism is manifest in the content of personal Facebook profiles, whether subtypes of narcissism have a different relationship with social desirability and the dimensions of the construct (i.e., image management and self-deceptive enhancement), and whether self-esteem is predicted by subtypes of narcissism and / or features of SNS personal profiles.

Aim and structure of the thesis

The aim of the current thesis is to investigate how personality variables of forensic interest influence engagement with, and responsiveness to, conventional and interactive forms of internet-mediated stimuli. The first two studies presented aim to elucidate how real and fantasy violence influence attitudes to violence and perceptions of the consequences of violence whilst controlling for the mediating influence of trait aggression and psychopathy. These studies also aim to replicate frontal deficits arising from media violence exposure - reported in neuroimaging studies - at the behavioural level. The third study aims to delineate how subtypes narcissism are manifest in the self-presentational features of SNS, the influence these have on user activity and time spent on such sites, and, how this relates to explicit self-esteem. Ethical approval for all studies was sought, and given, by the ethics board of the University of Birmingham (Appendix 1).

Chapter 3: Experiments

Experiment 1

Hypothesis 1: After acute exposure to scenes of real and fantasy violence attitudes to violence in the real and fantasy violence groups would become more pro-violent. This effect would be more marked in the 'real' group.

Hypothesis 2: Perceptions of the consequences of violence would decrease in the violence groups but this effect would be less marked in the 'fantasy' group.

Hypothesis 3: Changes in post-treatment attitudes scores would be moderated by the trait aggression covariate.

Hypothesis 4: Changes in post-treatment perceptions scores would be moderated by the trait aggression covariate.

Hypothesis 5: Executive functioning would become poorer in the violence treatment groups, particularly in the 'real' violence group.

Design

The present study used a mixed design. The between-subjects factor was Group (media violence: real vs fantasy vs control). The within-subjects factor was Treatment (pre vs post). The independent variable was type of violence and the dependent variables were attitudes to violence, perceptions of the consequences of violence, and Stroop response times and accuracy. Trait aggression was measured as a covariate.

Participants

Participants were 51 undergraduate students (mean age 19.27; SD .87; 48 female) recruited from the University of Birmingham's research participation scheme (RPS). Participants received course credit for their participation.

Measures

Attitudes to violence scale (Funk, Elliot, Urman, Flores & Mock, 1999).

An amended, anglicised version of The Attitudes To Violence Scale (ATVS; Funk et al, 1999; see Appendix 2) was administered to measure the extent to which participants agree with pro-violent attitudes towards interpersonal violence. Questionnaire items comprise of statements on a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*), which reflect attitudes with strong links to violence. The scale postulates a two-factor structure to Attitudes To Violence. The "Culture of Violence" subscale statements reflect a pervasive identification with violence as a valued activity (eg; ''People who use violence get respect''; "It's okay to use violence to get what you want"). The "Reactive Violence" subscale statements justify the use of violence as a response to actual or perceived threats ("If a person hits you, you should hit them back"; "Parents should tell their kids to use violence if necessary"). Some of the questionnaire items were reverse scored (eg; "If someone tries to start a fight with you, you should walk away"; "I'm afraid of getting hurt by violence"). Both the author's initial unrotated one-factor solution, labelled pro-violence attitudes, and the rotated solution, which yielded the "Culture of Violence" and "Reactive Violence" subscales, exhibited acceptable internal reliability for non-clinical groups (Cronbach's alpha values between 0.7 – 0.8; Bland & Altman, 1997). Cronbach's alpha was reported as 0**.**86; 0**.**75; 0**.**80 respectively (Funk et al., 1999). In the amended version, the word gun was replaced with knife (Mitchell, Rutherford, Wrinch & Egan, 2008), and the item "I could see myself joining a gang" was removed.

Perceptions of the consequences of violence (Mitchell, 2000).

The Perception of The Consequences of Violence (Mitchell, 2000; see Appendix 3) measure comprises of a short paragraph about two males becoming involved in a fight scenario. The fight scenario is followed by questions on a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*), which assess the level of agreement with various potential outcomes the victim may sustain (eg; "Do you think Bruce would require a brain scan". A principal components analysis, carried out by the present author on 222 undergraduate respondents, yielded an initial 6 factor solution (see Appendix 4). Alpha values ranged from **.**40 - **.**79 with a total scale alpha of **.**72.

Counting Stroop task

The Counting Stroop Task is a button press Stroop interference variant. Participants report by button-press the number of displayed objects appearing on a screen. X's in groups of one, two or three are presented as congruent events (eg; 'X' 'XX' and 'XXX'). For incongruent / "interference" events, one to three identical numerals are shown, in which the numerals shown do not correspond to the numerals in the group (eg; '3', '11' or '222').

The Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992)

The BPAQ (Appendix 5) is a 29-item self-report questionnaire. It asks respondents to rate each item on a 5-point scale (1 = *extremely uncharacteristic of me*, 5 = *extremely characteristic of me*) and comprises of four subscales. A 9-item Physical Aggression scale (AQ-P; 'I get into fights a little more than the average person'), a 5-item Verbal Aggression scale (AQ-VA; 'I tell my friends openly when I disagree with them'), a 7-item Anger scale (AQ-A; 'I have trouble controlling my temper'), and 8-item Hostility scale (AQ-H; 'I wonder why sometimes I feel so bitter about things'). The authors report Cronbach's alpha

coefficients for internal consistency as .85 for AQ-P; .72 for AQ-VA; .83 for AQ-A; and .77 for AQ-H. The alpha value for total score is .89, thus indicating considerable internal consistency. Test-retest correlations over nine weeks are reported as .80 for AQ-P; .76 for AQ-VA; .72 for AQ-A; and .72 for AQ-H. Total score is reported as .80.

<u>Stimuli</u>

Prior to the experiment, all stimuli were shown to a small focus group of PhD students (n=5, 2 females, 3 males, mean age 24.4 years, SD = 11.8) to ascertain whether the level of violence in the real and fantasy violence videos were comparable. The focus group was also used to ascertain whether the events depicted in all three of the videos were a comparable level of excitement.

Real Violence: The Best Boxing Fight Ever: Pacquiao vs Diaz

http://www.youtube.com/watch?v=O8yoVL8gjxE&feature=related

A ten-minute highlights video of an exciting boxing match.

Fantasy Violence: WWF Over The Edge 1999

http://www.youtube.com/watch?v=5ptNvbRugek&feature=related

A ten-minute wrestling video of a World Wrestling Federation (WWF) event.

Control: Anzac Match 09 – Essendon v Collingwood-Last 10 minutes

http://www.youtube.com/watch?v=_veayKpZiVI

The final nine and-a-half minutes of an exciting Australian Rules Football match in which one of the teams comes from a significant losing position to win the match.

Procedure

Participants volunteered to take part in the study by responding to a request for participants on the University of Birmingham's Research Participation Scheme (RPS). Participants then met the experimenter at a testing cubicle at an arranged time in the department of the university. Participants were instructed to take a seat in front of the computer situated in the room which was set up to show the control, real, or fantasy violence video. Consequently, participants were randomly allocated to one of the three conditions of the IV. Participants were requested to fill in a consent form, and the attitudes to violence and Perceptions questionnaires. After questionnaire completion participants completed the Counting Stroop Test, presented to them on the computers. Participants were asked to respond as quickly as possible, but to not sacrifice accuracy for speed. There were 20 trials in each condition in which four neutral blocks were alternated with four interference blocks. Stimulus duration lasted until a response had been logged by the computer. On completion of the Stroop test participants were instructed to complete the Buss-Perry Aggression Questionnaire. Participants were then asked to complete the Attitudes to Violence and Perceptions measures before embarking on the Counting Stroop Test for a second time. After completion of the second Stroop Test participants were then thanked for their time and debriefed via a debrief form.

Results

Data screening and statistical analyses were carried out using SPSS Version 19 (IBM Corporation). Effect sizes are reported as partial eta squared (partial η_2; small $\geq$ **.01**; medium $\geq$ **.06**; large $\geq$ **.14**; Cohen, 1969) and Cohen's *d* (small $\geq$ **.2**; medium $\geq$ **.5**; large $\geq$ **.8**; Cohen, 1988). Calculations for Cohen's *d* were carried out using an effect size calculator which had the capacity to correct for dependence between means in repeated-measures designs (Morris & Deshon, 2002). The calculator is available at:

. Cohen's *d* was chosen as an appropriate measure of the magnitude of a given effect because of its widespread use in experimental studies and meta-analytic procedures. Whilst partial η2 has been criticised for overestimating the magnitude of a given effect (Ferguson, 2009), it is reported here for the following reasons: it benchmarks Cohen's (1969) advice on small, medium and large effects; it is easily calculated by SPSS and can be applied to all research designs (Richardson, 2011).

Questionnaire scores

Summary statistics for questionnaire responses are reported in Table 5. Table 5 shows that scores on the attitudes to violence scale remained stable in the fantasy violence and control groups, with the largest increase being evidenced by the real violence treatment group. Scores on the perceptions measure remained stable for both violence treatment groups however, post-treatment scores diminished in the control group. No overtly large, between-group differences were evident on either measure pre or post-treatment.

Table 5: Means, standard deviations and effect sizes (Cohen's *d*) for questionnaire responses by treatment group.

		Attitudes to Violence Scale		*d*	Perceptions of the Consequences of Violence		*d*
	N	Pre	Post		Pre	Post	
Real violence	17	21.8± 3.8	24 ± 6.7	**.**72	56.9 ± 7.7	56.1 ± 7.6	**.**13
Fantasy violence	17	23.9± 3.4	23.8 ± 4.6	**.**05	54.6± 5.2	53.9 ± 5.4	**.**11
Control	17	23.8± 4.4	23.5 ± 5.9	**.**08	57.4± 5.3	55 ± 8.2	**.**51

Results in the table are presented as mean ± standard deviation.

Multivariate analyses

Questionnaire responses were analysed using a two-way (3*2) mixed Multivariate Analysis of Covariance (MANCOVA) with a between-subjects factor of Group (Real Violence vs Fantasy Violence vs Control), a within-subject factor of Treatment (Pre-treatment vs Post-

treatment) and trait aggression as the covariate. The main effect of Group was non-significant (Pillai's trace = 0.72, F (4, 94) = 0.88, $p > .05$, partial $\eta2 = .04$) however, a significant main effect of Treatment was calculated (Pillai's trace = 0.15, F (2, 46) = 3.91, $p < .05$, partial $\eta2 = .15$). In addition, a significant Treatment*Trait aggression interaction was also calculated (Pillai's trace = 0.18, F (2, 46) = 5.10, $p < .01$, partial $\eta2 = .18$). The Treatment*Group interaction was non-significant (Pillai's trace = 0.14, F (4, 94) = 1.73, $p > .05$, partial $\eta2 = .07$).

Follow-up analyses

Analysis of Covariance (ANCOVA) was carried out on the questionnaires to ascertain whether the significance of the multivariate statistics resulted from changes in one or both of the outcome variables. Results from the univariate analyses are reported in Table 6.

Table 6: Follow-up ANCOVA analyses of questionnaire responses

Source	\multicolumn{4}{c	}{Attitudes to Violence Scale}	\multicolumn{4}{c}{Perceptions of the Consequences of Violence}
	df	*F*	*p*	*Partial η2*	*df*	*F*	*p*	*Partial η2*
Within subjects								
Treatment	1/47	7.95	.01	.15	1/47	.07		< .01
Treatment*Trait aggression	1/47	10.17	.005	.18	1/47	.34		.01

Only *p* values of .05 or less are reported.

Test of Hypothesis 1

Hypothesis 1 stated that acute exposure to scenes of visual violence will result in elevation of pro-violent attitudes within the violence treatment groups (i.e., higher mean scores on the attitudes to violence scale post-treatment), compared to a non-violence viewing control group. The descriptive statistics reported in Table 5, alongside the univariate analyses listed in Table 6, illustrates that this hypothesis was partially supported. More specifically, that mean, post-treatment attitudes to violence scores increased in the real violence treatment

group but not in the fantasy violence or control treatment groups. Whilst absolute change appeared minimal, both *d* and partial η2 effect size statistics are representative of moderate-to- large effects with regards to pre - post-treatment changes in attitudes to violence scores.

Test of Hypothesis 2

Hypothesis 2 stated that acute exposure to scenes of visual violence will result in diminished, perceptions of the consequences of violence scores within the violence treatment groups post-treatment compared to a non-violence viewing control group. The mean scores illustrated in Table 5, alongside the univariate analyses listed in Table 6, indicates that this hypothesis failed to be supported. Table 5 shows mean scores and their respective standard deviations for each of the violence treatment groups remained relatively constant pre-treatment and post-treatment. The Cohen's *d* statistic associated with both violence treatment groups is also representative of a small effect. This is further supported by the small partial η2 statistic of < **.**01 associated with the treatment effect on the perceptions measure. However, the control group evidenced a diminished mean score change of 2.4. In addition, a Cohen's *d* statistic of **.**51, which is representative of a moderate effect, was calculated in relation to post-treatment score change, in the control group. However, this effect failed to meet the inclusion criteria required for statistical significance at the $p \leq$ **.**05 level. A post-hoc power analysis carried out on the perceptions measure ANCOVA revealed the relevant statistical test had virtually no power to detect a small difference between the groups (Power $1 - \text{beta} =$ **.**108; Critical *F* (47) = 4**.**047; Non-centrality parameter = **.**515), and would require a sample size of 779 to attain a power calculation of **.**8.

Test of Hypothesis 3

The third hypothesis predicted that changes in mean attitudes to violence scores post-treatment would be mediated by the trait aggression covariate. For the attitudes to violence measure this prediction was supported, as evidenced by the significance of both the multivariate and univariate interaction statistics. In addition, the partial η2 value of **.**18 associated with the Treatment*Trait aggression interaction for the attitudes measure indicates this to be a large effect. The association between trait aggression and attitudes to violence is expanded further in subsequent analyses.

Test of Hypothesis 4

Hypothesis 4 predicted that any changes in post-treatment scores on the perceptions measure would be mediated by the trait aggression covariate. Table 6 shows that the ANCOVA analysis associated with the perceptions measure failed to support the significant Treatment*Trait aggression interaction of the multivariate statistic.

Trait aggression scores

In order to test the validity of the significant Treatment*Trait aggression interaction a new variable - BPAQ Type - was computed by using a median split to split the data file into two groups of participants that scored either high (BPAQ total > 62; *n* = 27) or low (BPAQ total < 62; *n* = 24) on trait aggression. In order to control the Type 1 error rate a Bonferonni correction was applied, resulting in a newly adjusted alpha value of **.**01 (**.**05/4). Independent sample t-tests showed a significant difference between high and low trait aggression groups on attitudes to violence pre (*t* (49) = 4.66, *p* < 0**.**005; one-tailed; *d* = - 1**.**31) and post-treatment (*t* (49) = -4.57, *p* < 0**.**005; one-tailed; *d* = - 1**.**28). Paired-samples t-test to ascertain within group differences in ATVS scores pre and post-treatment were non-significant for the

low trait aggression group (t (23) = .47, p > .05; one-tailed; d = .09).

Post-hoc power analysis revealed the relevant statistical test had virtually no power to detect a small difference between the groups (Power 1 – beta = .112; Critical t (23) = 1.714; Non-centrality parameter delta = .441), and would require a sample size of 765 to attain a power calculation of .8. A significant pre-post-treatment change was detected in the high trait aggression group (t (26) = 1.81, p < .05 one-tailed; d = - .41). Dichotimization of continuous variables by media splits has drawbacks – reducing effect sizes and different categorisation and treatment of similar scores (MacCallum, Zhang, Preacher & Rucker , 2002) – however, results indicated that participants with higher levels of trait aggression also tended to have concurrent attitudes more supportive of violence than individuals scoring low in trait aggression. In addition, high trait aggression individuals also became more pro-violent in their attitudes to violence after acute exposure to scenes of violent imagery. However, the low trait aggression group did not exhibit a significant shift in self-reported attitudes to violence after exposure to the experimental treatment.

Correlations between trait aggression and outcome variables

Table 7 lists the inter-scale correlations for trait aggression, pre / post-treatment attitudes to violence and perceptions of the consequences of violence, and the difference score for the aforementioned outcome variables. As expected, attitudes to violence scores were positively correlated with trait aggression both pre and post-treatment, as was the difference score for the measure. Such results show high trait aggression scores are associated with high ATVS scores. The statistics yielded indicate a strong relationship between trait aggression and pre and post-treatment attitudes to violence scores, and a moderate relationship for trait aggression and the attitudes to violence difference score. This was based on the advice of Cohen (1988) regarding the use of the correlation coefficient as a measure of the size of an

effect: correlations of $\geq$ **.1** represent a small effect, $\geq$ **.3** a medium effect and $\geq$ **.5** a large effect. Pre and post-treatment scores on the perceptions of the consequences of violence measure failed to correlate significantly with pre / post-treatment attitudes to violence scores or the trait aggression covariate (all $p >$ **.05**).

Table 7: Inter-scale correlations between pre / post-treatment outcome variables and the trait aggression covariate.

	BPAQ	Pre-ATV	Pre-PCV	Post-ATV	Post-PCV	Diff-ATV	Diff-PCV
BPAQ		.58***	.18	.66***	.09	.40**	**-** .08
Pre-ATV			.20	.77***	.13	.12	- .05
Pre-PCV				.21	.60***	.10	- .30*
Post-ATV					.13	.05	- .06
Post-PCV						.05	.59***
Diff-ATV							- .04

All tests calculated are one-tailed Pearson's correlation coefficients (*r*). Difference scores were calculated by post – pre for the outcome variables. BPAQ, Buss-Perry Aggression Scale; Pre-ATV, Pre-treatment Attitudes To Violence; Pre-PCV, Pre-treatment Perceptions of The Consequences of Violence; Post-ATV, Post-treatment Attitudes To Violence; Post-PCV, Post-treatment Perceptions of The Consequences of Violence; Diff-ATV, Difference score for Attitudes To Violence; Diff-PCV, Difference score for the Perceptions of The Consequences of Violence.
***Significant at $p <$ **.001** level.
** Significant at $p <$ **.01** level.
* Significant at $p <$ **.05** level

Executive functioning as measured by the counting Stroop task

Response times

Mean pre-treatment counting Stroop response times for the three experimental treatment groups are shown in Figure 2.

Fig 2: Pre-treatment group response times in the congruent and incongruent conditions of the counting stroop task.
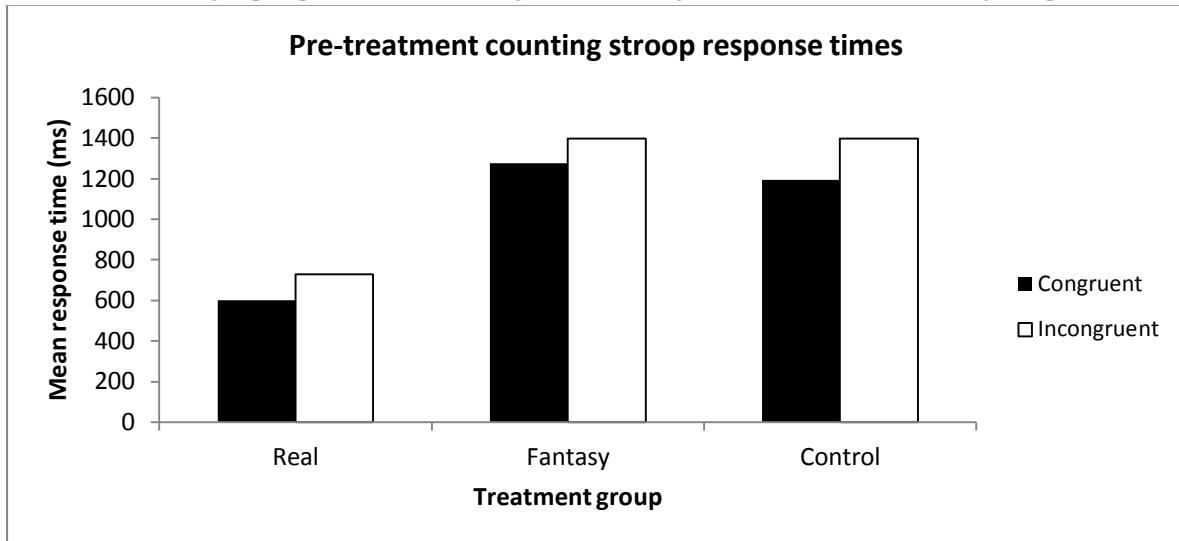
Results revealed response times in the Real Violence group were significantly quicker than the Fantasy and Control groups in both the congruent and incongruent conditions of the counting Stroop task. There was no significant difference in response times between the Fantasy Violence and Control groups.

Response times were analysed using a three-way mixed Analysis of Variance (ANOVA). The 3*2*2 ANOVA had a between-subjects factor of Group (Real Violence vs Fantasy Violence vs Control) and two within-subject factors of Treatment (Pre-treatment vs Post-treatment) and Stroop Condition (Congruent vs Incongruent). Results from the ANOVA analyses are reported in table 8.

Table 8: Results of ANOVA on counting Stroop response times.

Source	df	F	p	Partial η^2
Between subjects				
Group	2/48	37.86	.0005	.61
Within subjects				
Treatment	1/48	23.81	.0005	.33
Stroop condition	1/48	68.51	.0005	.59
Treatment*Group	2/48	246.10	.0005	.91
Stroop Condition*Group	2/48	.68		.03
Stroop Condition*Treatment	1/48	4.84	.05	.09
Stroop Condition*Treatment*Group	2/48	3.99	.05	.14

Only *p* values of .05 or less are reported.

It can be seen from Table 8 that six sources produced significant effects: Group, Treatment, Stroop Condition, and interactions between Treatment*Group, Stroop Condition*Treatment

and Stroop Condition*Treatment*Group. Planned comparisons carried out on post-treatment reaction times showed that acute exposure to scenes of violence did not differentiate the violence treatment groups from a control group in either the congruent or incongruent conditions of the Stroop task (t (48) = - .29, p > .05; t (48) = - .09, p > .05). No difference between real and fantasy violence groups was calculated in either congruent or incongruent conditions (t (48) = - .95, p > .05; t (48) = - 2.06, p > .05)

Fig 3 Post-treatment group response times in the congruent and incongruent conditions of the counting stroop task
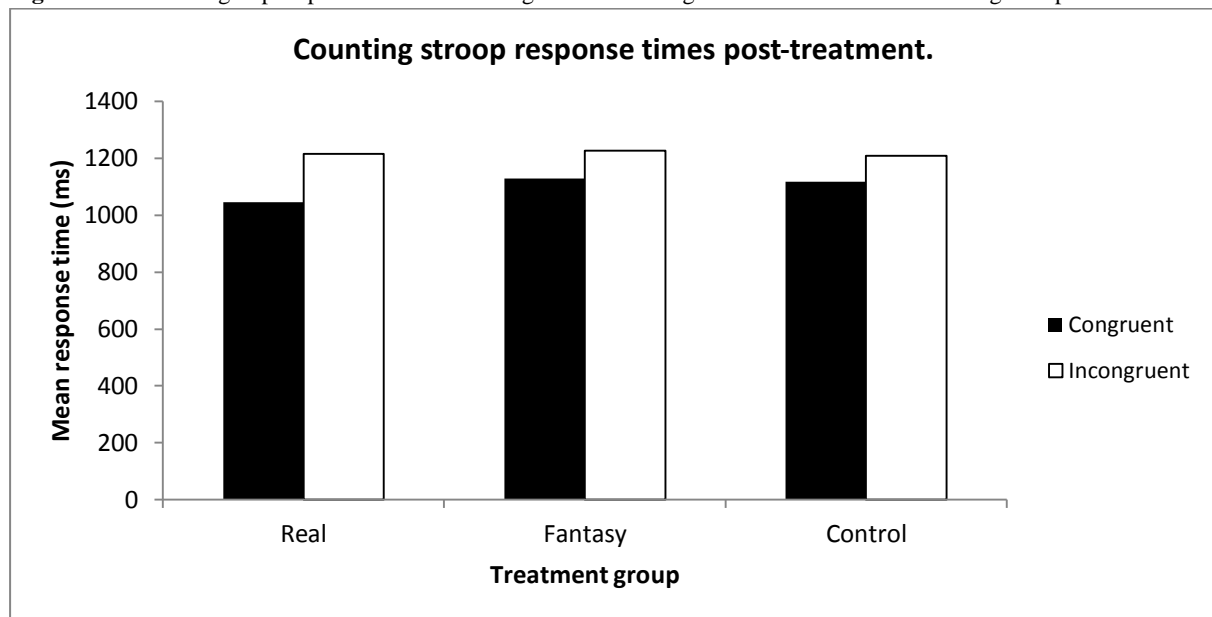
Results show response times in the Real Violence group increased were comparable to the Fantasy and Control groups post-treatment. There was no significant difference between group response times in either condition of the stroop task post-treatment.

Response accuracy

Descriptive statistics for the response accuracy data are presented in Table 9. Response accuracy rate in the incongruent condition of the counting Stroop task was compromised in all three groups both pre and post-treatment. All groups exhibited stable response accuracy performance in the congruent condition of the task pre and post-treatment. The real violence and control groups displayed improved response accuracy performance in the incongruent condition of the Stroop task. The biggest change in the percentage of correct responses reported was evidenced in the incongruent condition of the Stroop task by the real violence treatment group.

Table 9: Response accuracy scores by group pre-treatment and post-treatment.

	Pre			Post		
	Congruent Condition	Incongruent Condition	d	Congruent Condition	Incongruent Condition	d
Real violence	98.04± 2.22	92.12± 6.60	1.04	98.16 ± 2.08	96.18 ± 2.67	.76
Fantasy violence	98.99 ± 1.07	96.18 ± 2.74	1.14	97.97 ± 2.51	96.03 ± 2.87	.69
Control	98.31 ± 1.59	94.63 ± 3.56	1.12	98.46 ±1.68	96.18 ± 2.48	.82

Results in the table are presented as mean ± standard deviation

Response accuracy scores were subject to a 3*2*2 ANOVA (Group*Treatment*Stroop Condition). Results from the response accuracy ANOVA analysis are shown in Table 10.

Table 10: Results of 3*2*2 ANOVA on counting Stroop response accuracy scores.

Source	df	F	p	Partial $\eta2$
Between subjects				
Group	2/48	1.61		.06
Within subjects				
Treatment	1/48	5.05	.05	.09
Stroop condition	1/48	53.14	.0005	.53
Treatment*Group	2/48	4.88	.01	.17
Stroop Condition*Group	2/48	1.68		.05
Stroop Condition*Treatment	1/48	9.89	.005	.17
Stroop Condition*Treatment*Group	2/48	2.08		.08

Only p values of .05 or less are reported.

Table 10 shows that four sources produced significant effects: Treatment, Stroop Condition, and interactions between Treatment*Group, and Stroop Condition*Treatment. Planned comparisons carried out on post-treatment accuracy scores failed to reveal that acute exposure to scenes of violence compromised response accuracy performance compared to a control group in either the congruent (t (48) = - .62, p > .05), or incongruent condition (t (48) = - .62, p > .05). Similarly, no significant differences in post-treatment response accuracy

performance were found between the real and fantasy violence groups in either the congruent or incongruent condition of the Stroop task (t (48) = .26, p > .05; t (48) = .16, p > .05).

Test of Hypothesis 5

Hypothesis 5 predicted that executive functioning would be compromised in the violence treatment groups' post-treatment compared to the non-violence treatment control group. Despite the calculation of a number of significant statistics, this hypothesis was not supported. The rationale for this particular interpretation of the data is explored further in the discussion section.

Discussion

Experiment 1 investigated the impact of real and fantasy violence on attitudes to violence, perceptions of the consequences of violence and executive functioning while controlling for the influence of trait aggression. An exploration as to why some hypotheses were supported and others refuted is provided below.

Results from experiment 1 indicate acute exposure to scenes of real (sport related) violence to be associated with an increase in pro-violent attitudes. The reason for such a finding may be related to the context within which the on screen violence occurs. Professional, licensed boxing, such as that viewed on TV, is highly regulated and controlled violence put on for the purposes of entertainment. It involves two willing and consenting parties, there are no unsuspecting victims and little effort is required in terms of moral, evaluative judgements (e.g., justified vs unjustified aggression) .Whilst the content of the boxing video was undeniably violent, it's depiction of violence under the guise of athleticism and sporting prowess provides an arena within which violence and aggression is socially acceptable. Consequently, violence under the guise of sporting entertainment may be

constructed and interpreted by the viewer as a form of 'pro-social aggression'. With this in mind, it is plausible that participants exposed to this particular type of stimulus would respond by exhibiting a rise in attitudes supportive of violence when tested post-treatment.

From the perspective of the General Aggression Model it may be argued that non-violent features of the scene shown in the video influenced the way in which the violence was construed and interpreted. Just as the violent content of the scene would activate violence / aggression based cognitive-associative networks, cognitive-associative networks related to non-violent scene features would also be activated in parallel. In the present case this would involve activating concepts in memory related to sporting events and entertainment (e.g., lights and music) and any associated affect related to such concepts. The positive affect associated with such primed cognitions and expectations, alongside the interpretation of boxing as a form of 'pro-social aggression', may act as a salient, positive emotional biasing factor, resulting in the increase in pro-violent attitudes.

The lack of significant shift in terms of perceptions of the consequences of violence for participants in the real violence group may stem from the fact that there was little evidence of injury throughout the boxing video with which to alter perceptions of the consequences of violence. A more graphic, violent content may have influenced perceptions of violence more markedly.

Whilst wrestling may be deemed similar to boxing in that it is 'entertainment violence', a large number of participants exposed to the wrestling clip found the events depicted amusing or would pass comments such as 'I used to watch this was when I was younger'. Whilst humour and nostalgia are associated with positive affect (e.g., Strick, Holland, van Baaren & van Knippenberg, 2009; Batcho, 1995), this did not influence participants to be more accepting of violence post-treatment. Theatrics feature prominently in this genre of fight-entertainment and this rather salient aspect of the video stimuli may have

negated the impact of the violent content. In addition to this, it is widely acknowledged that wrestling is staged and the outcome known by the 'fighters' prior to the match. Consequently, viewers may consider the content of the stimuli as little more than exaggerated role-play as opposed to being representative of violence of any significant form, thus greater attention may have been given to the theatrics as opposed to the violent content. As such, it can be seen from experiment 1 that acute exposure to fantasy violence in the form of wrestling is a rather 'safe' and benign form of media violence which failed to influence attitudes to violence in the present sample of undergraduate students. Similarly, there was no compromise in terms of perceptions of the consequences of violence for the reasons outlined above.

The interaction between trait aggression and treatment indicated that participants scoring highly on the Buss-Perry scale exhibited an increase in attitudes to violence after being subjected to the experimental treatment. This is supportive of previous work by Bushmann (1995) and Zillman &Weaver III (2006) which reported an increased use in impulsive aggressive responses after viewing of violent media by subjects scoring highly on the physical aggression and hostility subscales of the Buss-Perry Aggression Questionnaire. It is possible such individuals garner a certain enjoyment out of exposure to violent imagery. Bushman (1995) and Bruggemann & Barry (2002) report such individuals are drawn to and enjoy media depictions of violence. As stated previously, violent media may be viewed as an obtainable anger-related stimulus which can be framed in terms of reward, therefore increasing the likelihood of approach motivation occurring (Aarts, Ruys, Veling, Ruys, Renes & de Groot et al., 2010). In terms of the GAM, high trait aggression scorers would become more aroused, experience greater anger related affect and be more likely to prime aggression related cognitions than low-trait scorers (see Bushman, 1995). The present results suggest that such effects may translate to the attitudinal level to the extent that they are sufficient to shift attitudes towards being supportive of violence.

The results from the response time analyses of the Counting Stroop task may appear suggestive of acute exposure to scenes of real, sport related violence, compromising executive abilities. However, the 4% rise in response accuracy scores in the incongruent condition of the task in the real violence treatment group post-treatment is suggestive of a speed-accuracy trade-off as opposed to any genuine effect of violent media imagery on executive functioning.

Experiment 2

Experiment 2 was a replication of experiment 1 but with more graphic, violent video stimuli, in the real violence group. As stated in the discussion section of experiment 1, this was to ascertain whether such stimuli would have a significant effect on perceptions of the consequences of violence. Also, it was hypothesised that the use of a more graphic, violent video may increase the likelihood of detecting changes in executive functioning. An additional covariate of psychopathy was also included. This is because previous research has shown psychopathy to be associated with in an increase in both instrumental and reactive aggression and predicts aggression in subclinical, non-forensic populations (Reidy et al., 2007; Miller & Lynam, 2003). In addition, individuals scoring highly on psychoticism – a personality trait conceptualised as being related to and lying on the same continuum of the psychopathy construct (Corr, 2010c) – have been shown to be more accepting of violence as an acceptable form of conflict resolution after viewing scenes of gratuitous violence, than low psychoticism scorers (Zillman & Weaver, 1997). Such individuals are also attracted to media portrayals of violence and rate violence as more enjoyable, humourous and less frightening than low psychoticism scorers (Bruggemann & Barry, 2002). The following hypotheses were examined:

Hypothesis 1: Attitudes to violence would increase in the real violence group post-treatment.

Hypothesis 2: Acute exposure to scenes of graphic, real violence will result in diminished perceptions of the consequences of violence scores post-treatment.

Hypothesis 3: Changes in mean attitudes to violence scores post-treatment would be mediated by the trait aggression covariate.

Hypothesis 4: Changes in post-treatment scores on the perceptions measure would be mediated by the trait aggression covariate.

Hypothesis 5: Changes in post-treatment scores on the attitudes measure would be mediated by the psychopathy covariate.

Hypothesis 6: Changes in post-treatment scores on the perceptions measure would be mediated by the psychopathy covariate.

Hypothesis 7: Acute exposure to scenes of graphic, real violence will decrease frontal functioning, as measured by the Stroop task.

Participants

Sixty-nine undergraduate students of psychology (9 male; mean age 20.03; SD 2.50) volunteered to participate for course credit using the university's RPS.

Stimuli

Videos for the fantasy violence and control conditions were the same as experiment 1. The real violence video was changed to one which depicted scenes of real, non-sporting violence.

Street fights

A graphic 8 minute compilation of street fights.

<u>Measures</u>

Measures in experiment 2 were identical to those used in experiment 1. However, experiment 2 also had an additional measure of psychopathy as a covariate.

Levenson Self-report Psychopathy Scale (Levenson, Kiehl & Fitzpatrick, 1995; Appendix 6). The Self-report Psychopathy Scale is a 26-tem self-report measure of subclinical psychopathy. It comprises of two factors: Primary psychopathy (Factor 1) and secondary psychopathy (Factor 2). Factor 1 consists of 16 items measuring a callous/manipulative interpersonal style ("I tell other people what they want to hear so they will do what I want them to do"). Factor 2 contains 10 items related to poor behavioural controls and failure to learn from mistakes (eg; "When I get frustrated I often "let off steam" by blowing my top"). Respondents are required to read item statements and endorse them on a four-point scale (*1 = disagree strongly, 2 =disagree somewhat, 3 = agree somewhat, 4 = agree strongly*). Some items are reverse scored in order to control for response sets. Levenson et al., report a robust alpha coefficient of **.**82 for the primary scale and an alpha of **.**63 for the secondary scale..

<u>Procedure</u>

The procedure was identical to that of experiment 1 except that participants filled in the measure of psychopathy just prior to completing the trait aggression questionnaire.

Questionnaire scores

Summary statistics for questionnaire responses are reported in Table 11. Table 11 shows that mean pre – post-treatment attitudes to violence scores remained stable in the two violence treatment groups and the control group. The largest increase in attitudes to violence scores was shown in the real violence group, with an increase of 0.9. Mean scores on the perceptions measure decreased slightly in the fantasy violence and control groups but generally remained stable. In the real violence treatment group the mean score on the perceptions measure increased by 2.5.

Table 11: Means, standard deviations and effect sizes (Cohen's *d*) for questionnaire responses by treatment group.

	N	Attitudes to Violence Scale		*d*	Perceptions of the Consequences of Violence		*d*
		Pre	Post		Pre	Post	
Real violence	23	24.6 ± 7.3	25.5 ± 5.7	**- .**16	55.7 ± 7.8	58.2 ± 6.5	**- .**60
Fantasy violence	23	26.7 ± 4.9	27.0 ± 6.5	**- .** 07	58.1 ± 4.9	57.1 ± 7.4	.22
Control	23	23.3 ± 5.1	23.6 ± 6.6	**- .**09	52.9 ± 8.6	51.4 ± 6.5	.27

Results in the table are presented as mean ± standard deviation.

Multivariate analyses

Questionnaire responses were analysed using a two-way (3*2) mixed MANCOVA (Group*Treatment) with covariates of trait aggression and psychopathy. The main effect of Group was marginally non-significant (Pillai's trace = .14, F (4, 128) = 2**.**31, $p > $ **.**05 (actual p = .06)). The main effect of Treatment was non-significant (Pillai's trace = .007, F (2, 63) = **.**23, $p > $ **.**05, partial η2 = **.**007**),** as were the interactions for Treatment*Psychopathy and Treatment*Trait aggression (Pillai's trace = .04, F (2, 63) = 1**.**34, $p > $ **.**05, partial η2 = **.**04**;** Pillai's trace = .03, F (2, 63) = 1**.**01, $p > $ **.**05 partial η2 = **.**03). However, a significant Treatment*Group interaction was calculated (Pillai's trace = .18, F (4, 128) = 3.16, $p < $ **.**05, partial η2 = .90). A post-hoc power analysis revealed an achieved power calculation of **.**6 (Power 1 – beta = **.**638; Critical F (130) = 2**.**17; Non-centrality parameter = 10**.**39; Pillai's trace = **.**14). A sample size of 94 would be required to attain a power calculation of **.**8.

Follow-up analyses

ANCOVA was carried out to ascertain whether the significance of the Treatment*Group interaction calculated in the multivariate statistics resulted from significant changes in one or both of the outcome variables. Results from the univariate analyses are reported in Table 12.

Table 12 Follow-up ANCOVA analyses of questionnaire responses

Source	Attitudes to Violence Scale				Perceptions of the Consequences of Violence			
	df	*F*	*p*	*Partial* $\eta2$	*df*	*F*	*p*	*Partial* $\eta2$
Treatment*Group	2(64)	.17		.01	2(64)	6.04	.005	.16

Only *p* values of .05 or less are reported.

Test of Hypothesis 1

Hypothesis 1 stated that acute exposure to scenes of visual violence will result in elevation of pro-violent attitudes within the real violence treatment group but not the fantasy violence or non-violence control group. The descriptive statistics reported in Table 11, alongside the non-significant multivariate and univariate analyses illustrates that this hypothesis failed to be supported. In addition, Cohen's *d* effect sizes for each group were small with regards to pre - post-treatment changes in attitudes to violence scores, as was the partial η2 effect size statistic for the Treatment*Group interaction. A post-hoc power analysis carried out on the attitudes to violence ANCOVA revealed the relevant statistical test had virtually no power to detect a small difference between the groups (Power 1 – beta = .104; Critical *F* (64) = 3.14; Non-centrality parameter = .69), and would require a sample size of 957 to attain a power calculation of .8

Test of Hypothesis 2

Hypothesis 2 stated that acute exposure to scenes of visual violence will result in diminished, perceptions of the consequences of violence scores within the real violence treatment group post-treatment compared to the fantasy violence and non-violence viewing control group. The mean scores illustrated in Table 11, alongside the univariate analyses listed in Table 12, indicates that this hypothesis failed to be supported. However, Tables 11 and 12, show a significant increase in perceptions scores was calculated in the real violence group which showed acute exposure to scenes of extreme real violence increased perceptions of the consequences of violence. Score change in the fantasy and control groups was minimal, as supported by the small Cohen's *d* statistics. The mean score increase of 2.5 in the real violence group was associated with a *d* effect size measure of **.**60, which is representative of a moderate effect. Similarly, the partial η2 of **.**16 is representative of a large effect for this particular effect size however, as stated previously, partial η2 has a tendency to overestimate the magnitude of a given effect and should therefore be interpreted with caution (Ferguson, 2009).

All other hypotheses failed to be supported. Consequently, no follow-up statistics are reported.

Correlations between trait aggression and outcome variables

Table 13 lists the inter-scale correlations for trait aggression, psychopathy, pre / post-treatment attitudes to violence and perceptions of the consequences of violence, and the difference score for the aforementioned outcome variables.

Table 13 Inter-scale correlations between pre / post-treatment outcome variables and the trait aggression and psychopathy covariates.

	BPAQ	LPSPS	Pre-ATV	Pre-PCV	Post-ATV	Post-PCV	Diff-ATV	Diff-PCV
BPAQ	-	.68**	.69**	.01	.52 **	.01	- .06	- .01
LPSPS			.51**	.08	.48**	.12	.01	.06
Pre-ATV				.10	.72**	.09	- .30*	- .03
Pre-PCV					.07	.79**	- .04	- .35
Post-ATV						- .03	.45**	- .15
Post-PCV							- .15	.30*
Diff-ATV								- .17

All tests calculated are one-tailed Pearson's correlation coefficients (r). Difference scores were calculated by post – pre for the outcome variables. BPAQ, Buss-Perry Aggression Scale; LPSPS, Levenson Primary Secondary Psychopathy Scale; Pre-ATV, Pre-treatment Attitudes To Violence; Pre-PCV, Pre-treatment Perceptions of The Consequences of Violence; Post-ATV, Post-treatment Attitudes To Violence; Post-PCV, Post-treatment Perceptions of The Consequences of Violence; Diff-ATV, Difference score for Attitudes To Violence; Diff-PCV, Difference score for the Perceptions of The Consequences of Violence.
**Significant at $p < .001$ level.
* Significant at $p < .01$ level.

Analyses revealed a strong positive correlation between trait aggression and psychopathy. Attitudes to violence scores were positively correlated with trait aggression both pre and post-treatment, as was the difference score for the measure Pre and post-treatment scores on the perceptions of the consequences of violence measure failed to correlate significantly with pre / post-treatment attitudes to violence scores or the psychopathy and trait aggression covariates (all $p > .05$).

Executive functioning as measured by the counting Stroop task

Response times

Mean pre-treatment counting Stroop response times for the three experimental treatment groups are shown in Figure 4.

Fig 4 Pre-treatment group response times in the congruent and incongruent conditions of the counting stroop task.
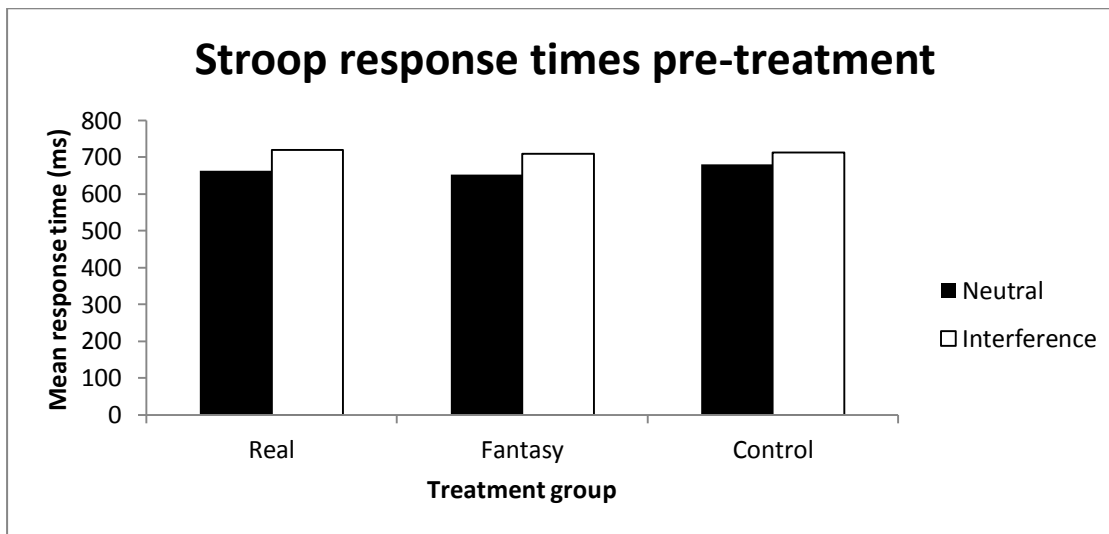
Results show pre-treatment response times were comparable across all three groups. There was no significant difference between group response times in either condition of the stroop task pre-treatment.

Response times were analysed using a three-way mixed ANOVA (Group*Treatment*Stroop Condition). Results from the 3*2*2 ANOVA analyses are reported in Table 14.

Table 14 Results of ANOVA on counting Stroop response times.

Source	df	F	p	Partial η^2
Between subjects				
Group	2/66	.28		.01
Within subjects				
Treatment	1/66	112.12	.0005	6.29
Stroop condition	1/66	48.55	.0005	.42
Treatment*Group	2/66	.84		.03
Stroop Condition*Group	2/66	.65		.02
Stroop Condition*Treatment	1/66	.27		.004
Stroop Condition*Treatment*Group	2/66	.44		.01

Only *p* values of .05 or less are reported.

The table shows that two sources produced significant effects: Treatment and Stroop Condition. Planned comparisons carried out on post-treatment reaction times showed that acute exposure to scenes of violence did not differentiate the violence treatment groups from a control group in either the congruent or incongruent conditions of the Stroop task (t (66) = -.41, p > .05; t (66) = -.10, p > .05). No difference between real and fantasy violence groups

was calculated in either congruent or incongruent conditions (t (66) = 1.28, $p > .05$; t (66) = .97, $p > .05$).

Fig 5 Post-treatment group response times in the congruent and incongruent conditions of the counting stroop task
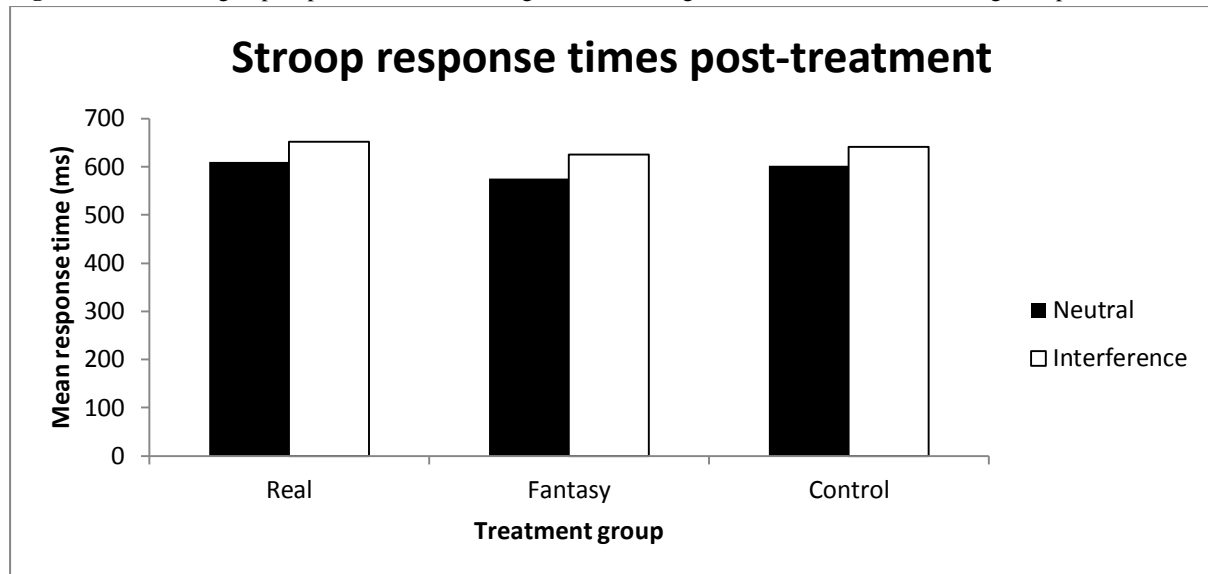
Results show post-treatment response times were comparable across all three groups. There was no significant difference between group response times in either condition of the stroop task post-treatment.

Response accuracy

Descriptive statistics for the response accuracy data are presented in Table 15.

Table 15 Response accuracy scores by group pre-treatment and post-treatment.

	Response accuracy rate (%)					
	Pre			Post		
	Congruent Condition	Incongruent Condition	d	Congruent Condition	Incongruent Condition	d
Real violence	98.91± 1.66	98.13± 1.63	.28	98.91 ± 1.66	97.19 ± 3.11	.60
Fantasy violence	99.09 ± 1.25	97.09 ± 2.27	.99	98.10 ± 2.34	96.96 ± 2.79	.38
Control	98.60 ± 1.69	96.97 ± 3.36	.47	98.70 ±1.83	96.41 ± 3.58	.96

Results in the table are presented as mean ± standard deviation

Table 15 shows that the pre-treatment response accuracy rate in the incongruent condition of the counting Stroop task was compromised by 2% in the fantasy violence group and 1.63% in the control group. Response accuracy performance remained stable in both conditions for the

real violence group, with a drop of 0.78% evidenced in the incongruent condition. Mean

scores were similar across all three groups with no overtly large between or within-group

differences pre or post-treatment. Response accuracy scores were subject to a 3*2*2 ANOVA

(Group*Treatment*Stroop Condition). Results from the response accuracy ANOVA analysis

are shown in Table 16.

Table 16 Results of 3*2*2 ANOVA on counting Stroop response accuracy scores.

Source	df	F	p	Partial η^2
Between subjects				
Group	2/66	1.61		.06
Within subjects				
Treatment†	1/66	3.54		.05
Stroop condition	1/66	34.56	.0005	.34
Treatment*Group	2/66	.19		.006
Stroop Condition*Group	2/66	.57		.02
Stroop Condition*Treatment	1/66	.24		.004
Stroop Condition*Treatment*Group	2/66	1.27		.04

Only *p* values of .05 or less are reported.
†Treatment marginally *ns* (*p* = .06)

Table 16 shows that one source produced a significant effect: Stroop Condition. Planned

comparisons carried out on post-treatment accuracy scores failed to reveal that acute

exposure to scenes of violence compromised response accuracy performance compared to a

control group in either the congruent (*t* (47.82) = - .39, *p* > .05), or incongruent condition (*t*

(66) = - .48, *p* > .05). Similarly, no significant differences in post-treatment response

accuracy performance were found between the real and fantasy violence groups in either the

congruent or incongruent condition of the Stroop task (*t* (39.26) = 1.35, *p* > .05; *t* (66) = 1.29,

p > .05).

Hypothesis 7

Hypothesis 7 predicted that executive functioning would be compromised in the violence

treatment groups' post-treatment compared to the non-violence treatment control group. The

analyses reported above revealed that acute exposure to scenes of visual violence did not compromise response accuracy or increase response times in the counting Stroop task.

<u>Discussion</u>

The results of experiment 2 failed to support any of the experimental hypotheses. However, of interest was the finding that acute exposure to scenes of real, graphic violence, in the form of a street fights video, enhanced participant's perceptions of the consequences of violence as opposed to desensitising them. One explanation for this is identical to the one espoused in the discussion section for experiment 1 – context. Whereas experiment 1 used stimuli which promoted violence within a sporting contest, the stimuli in experiment 2 showed graphic scenes of unregulated, bare knuckle fighting ranging from schools, open fields and toilet facilities, where the 'rules' of engagement associated with sporting events did not apply. In addition to this the stimuli itself differed to the boxing video by virtue of the fact it was a compilation of clips as opposed to one boxing match. Consequently, repeated exposure to scenes of graphic violence may have sensitised subjects to the effects of violence as opposed to desensitising them, as is postulated in much of the literature. However, the overwhelming majority of participants in this study were female undergraduate, psychology students. As a result of this the effect of sensitisation may be fairly gender specific. Further study is required on a mainly male sample, who are generally more aggressive than females, to ascertain whether such effects are gender specific. It must also be noted that participants in the present study were intelligent, successful individuals studying for a psychology degree. One therefore may expect such individuals to have an awareness of the consequences of violent actions.

The failure of the stimuli to compromise executive functioning suggests violent media imagery does not alter executive functioning at the behavioural level, in normal healthy adults (eg Kronenberger et at., 2005; Wang et al., 2000). This in part may be mediated by

using a student sample, who, may be expected to evidence a relatively high level of executive functioning. The significant effects of Stroop condition and Treatment were merely representative of a normal Stroop / interference effect and a practice effect (performance improved post-treatment). A potential limitation of both the present and previous experiment was the lack of *a priori* power analysis prior to study commencement. It must also be noted that the validity of the Perceptions of the Consequences of Violence may not be overly robust. Parallel analysis may have yielded a more parsimonious factor structure, however, this is not available on SPSS, and the total scale alpha was acceptable.

Experiment 3

Hypothesis 1: Overt and covert narcissism will be negatively correlated.

Hypothesis 2: Overt narcissism will be positively correlated with self-esteem.

Hypothesis 3: Covert narcissism will be negatively correlated with self-esteem.

Hypothesis 4: Overt narcissism will be positively correlated with social desirability bias and its facets.

Hypothesis 5: Covert narcissism will be negatively correlated with social desirability bias and its facets.

Hypothesis 6: Overt narcissism will correlate positively with narcissistic content of SNS features and online activity.

Hypothesis 7: Covert narcissism will correlate positively with narcissistic content of SNS features and online activity.

Hypothesis 8: Covert narcissism will correlate negatively with amount of friends

Method

Design

The present study used a correlational design.

Participants

Sixty Facebook profile owners from the student population were recruited from the University of Birmingham (52 female; mean age = 19.72; range = 9; SD = 1.90). Participants comprised of both undergraduate and postgraduate students and received course credit for research participation.

Rater

The rater of participant's profile pages was the author of the study. Features of Facebook profiles were rated for narcissistic content on a five-point Likert scale (*1 = not at all, 2 = not much, 3 = neutral, 4 = somewhat, 5 = very much*) using the following dimensions: Clever; Entertaining; Self-promoting; Self-absorbed. A mean score was then calculated for each bit of data followed by a mean score for each section. The following features of the profiles were rated: 1.) About Me section, 2.) the Main Photo, 3.) the first 10 pictures on the Photo section, 4.) Status updates (limited to last seven days or last ten updates - whichever was first). Ideally, profile ratings should have occurred at least twice in order to measure intra-rater reliability, however, time constraints meant all ratings were taken only once. Objective measures of Facebook were the number of Friends and Activity evident on the profile (limited to past seven days). Activity was the number of comments, likes, updates or posts provided by the profile owner evident on the profile.

Materials

Overt narcissism

The Narcissistic Personality Inventory-16 Item Version (NPI-16; Ames, Rose & Anderson, 2006; Appendix 7) is a unidimensional measure of subclinical narcissism consisting of 16 true-false items (e.g. "Everyone likes to hear my stories"). Participants rate each statement as either true or false and are given a score of 0 for non-narcissistic response and a score of 1 if they endorse a narcissistic item. Scores can range from 0-16 with higher score being reflective of inflated levels of overt narcissism. The measure has been shown to have meaningful face, internal, discriminant and predictive validity (Ames et al., 2006)

Covert narcissism

The Hypersensitive Narcissism Scale (Wink & Cheek, 1998; Appendix 8) consists of 10 items assessing covert narcissism (e.g., ''My feelings are easily hurt by ridicule or the slighting remarks of others''). Respondents are required to rate statements on a five-point scale (*1 = very uncharacteristic of me, 5 = very characteristic of me).* Internal consistency has been reported as high as **.**78 (Arble, 2008).

Self-esteem

The Rosenberg Self-esteem Scale (RSE; Rosenberg, 1965; Appendix 9) is a 10-item Likert scale with items answered on a 4-point scale (*1 = strongly agree, 4 = strongly disagree*). Example items include " On the whole I am satisfied with my life". The original reliability of the scale was reported as **.**72 (Rosenberg, 1965).

Self-deception / Image management

The Paulhus Deception Scales (PDS; Paulhus, 1998; Appendix 10) are a 40-item questionnaire that measures the tendency to give socially desirable responses. Respondents rate 40 statements on a five-point scale (*1 = not true, 5 = very true*). The PDS comprises of two subscales, image management (IM) and self-deceptive enhancement (SDE). The SDE subscale measures unconscious favourability bias, which is related to narcissism (e.g. "My first impressions of people usually turn out to be right") Respondents scoring highly on this subscale tend to be seen as hostile, domineering and arrogant.

Image management questions require respondents to rate the degree to which they perform common but socially undesirable behaviours (e.g. "I never swear") and measure the degree to which a person is consciously self-enhancing or faking. High scores on this subscale indicate a conscious effort to impress. Internal reliability on student groups for all scales, SDE = .70, IM = .81, and Total PDS = .86.

Procedure

Participants signed up to the study 'Online Social Networks and Personality' through the research participation scheme at the University of Birmingham. Upon agreeing to participate participants were required to sign a form which showed they consented to being added to a profile set up by the researcher for the purpose of this study. Participants were then added to the profile page set up by the researcher and required to fill out the questionnaires. Participants were then debriefed as to the purpose of the present study on completion of their questionnaire online. Participants were provided with course credit for their participation.

Results

Skewness values for all variables were converted in to z-scores by dividing the skewness statistic by their standard error. Resulting scores > 1.96 indicated variables which were highly skewed and therefore significantly non-normal ($p < .05$; Field, 2010). This revealed that the skewed distributions of the variables Facebook checks, Updates, About me, Friends, Activity and Time per session violated the assumptions of normality. Consequently, the median is reported in the summary statistics table below, alongside the mean and standard deviation for each measure. The same calculations were performed on kurtosis values. However, this failed to yield any more values which significantly differed from normality. Summary statistics are reported in table 17.

Table 17 Summary statistics for Age, overt and covert narcissism, self-esteem, social desirability and SNS features.

	Median	Mean	Std deviation
Age	19.00	19.72	1.90
Narcissistic Personality Inventory-16 item version	3.00	3.48	2.34
Hypersensitive Narcissism Scale	30.50	30.70	4.80
Rosenberg Self-esteem Scale	19.00	19.80	4.66
Total Paulhus Deception Scales	114.50	114.98	14.99
Self-deceptive Enhancement	58.00	58.42	8.11
Image Management	56.50	56.85	10.59
Facebook checks	5.00	6.22	4.51
Time per session (mins)	10.00	13.97	9.11
Friends	417.00	464.88	231.18
Activity	6.00	7.35	5.37
Main photo	3.00	2.84	.69
Pictures	2.74	2.73	.48
Updates	3.00	2.95	.43
About me	3.00	3.14	.34

As a result of non-normality, data were analysed non-parametrically using the Spearman's Rho correlation statistic (see table 18).

Table 18 Spearman's correlations for SNS features, narcissism, self-esteem and PDS measure of social desirability (total score and individual subscales).

	Facebook checks	Session time	RSE	NPI-16	SDE	IM	PDS	HSNS	Friends	Activity	Main pic	Pics	Updates
Session time	-.26*												
RSE	-.14	-.22*											
NPI-16	.03	-.07	.46**										
SDE	.12	-.30**	.56**	.36**									
IM	.03	-.20	.17	-.10	.29*								
PDS	.11	-.35**	.36**	.11	.69**	.86**							
HSNS	.002	.22*	- .33**	-.01	-.41**	-.26*	- .38**						
Friends	.05	.31**	.11	.27*	-.06	.007	-.06	.04					
Activity	-.07	.23*	-.09	.27*	-.10	-.009	-.07	.07	.24*				
Main pic	.09	.06	.05	-.03	.17	.08	.13	-.14	.20	.18			
Pics	.25*	.27*	-.16	.02	-.11	.06	-.02	.04	.34**	.17	.29*		
Updates	.02	-.19	.08	.04	.02	.16	.17	-.13	-.05	-.14	.07	.16	
About me	.03	.14	.05	-.01	-.01	-.03	-.06	-.07	.25*	.01	.14	.27*	.1

NPI-16, Narcissistic Personality Inventory 16-item version (overt narcissism); HSNS, Hypersensitivity Narcissism Scale (covert narcissism); RSE, Rosenberg Self-esteem Scale; PDS, Paulhus Deception Scales; SDE, Self-deceptive Enhancement (of the PDS); IM, Image Management (of the PDS); Pics, Pictures. All tests calculated are one-tailed Spearman's Rho correlation coefficients (ρ).
*Correlation significant at the 0,05 level (1-tailed).
**Correlation significant at the 0.01 level (1-tailed).

The most germane findings in relation to the specific hypotheses tested are outlined below.

Hypothesis 1: Overt and covert narcissism will be negatively correlated.

Overt narcissism, characterised by grandiosity, exhibitionism, extraversion, high self-esteem and self-efficacy, and covert narcissism, characterised by shyness, timidity, anxiousness, introversion, low self-efficacy and low self-esteem, were predicted to correlate negatively. However, a non-significant inverse relationship between the two types of narcissism was calculated.

Hypothesis 2: Overt narcissism will be positively correlated with self-esteem.

A highly significant moderate, positive correlation was calculated between NPI-16 scores and RSE scores, thus indicating that as overt narcissism increased, so too did self-esteem.

Hypothesis 3: Covert narcissism will be negatively correlated with self-esteem.

HSNS and RSE shared a significant moderate, negative relationship. That is, as covert narcissism increased, self-esteem decreased.

Hypothesis 4: Overt narcissism will be positively correlated with social desirability bias and its facets.

A highly significant moderate, positive correlation between NPI-16 scores and SDE was calculated. This showed that elevated levels of overt narcissism were related to increased levels of self-deception. However, because the correlation between NPI-16 and Image Management was negative and non-significant, and the correlation between NPI-16 and total PDS was non-significant, prediction 3 was only partially supported.

Hypothesis 5: Covert narcissism will be negatively correlated with social desirability bias and its facets.

HSNS correlated negatively with social desirability and the constituent factors of the construct, thus showing that social desirability and its constituent factors were diminished when covert narcissism increased. All correlations were in the small to moderate range ($\leq$ .41).

Hypothesis 6: Overt narcissism will correlate positively with narcissistic content of SNS features and online activity.

As expected, NPI scores correlated positively and significantly with SNS features: Friends, and Activity. More specifically, as levels of overt narcissism increased, so too did the amount of activity evident on the personal profile and the amount of friends. However, all other correlations were non-significant and negative relationships between overt narcissism and the Main photo, and About Me measures were revealed.

Hypothesis 7: Covert narcissism will correlate positively with narcissistic content of SNS features and online activity.

All correlations between HSNS and SNS were non-significant. Whilst some correlations were in the expected direction (Activity and Pictures), others were in the opposite direction (Main Pic, Updates). A small, positive significant correlation with Session Time and a positive non-significant relationship with Facebook Checks were revealed. That is, as covert narcissism levels increased, so did the amount of time spent on Facebook per session.

Hypothesis 8: Covert narcissism will correlate negatively with amount of friends

The correlation between HSNS and Friends was non-significant but positive.

SNS features correlations

A number of correlations were not part of formal hypotheses expressed prior to statistical analysis but are of interest in terms of the validity of the SNS data. The significant negative correlation between Facebook checks and Session Time showed that the more participants checked their SNS profile the less time was spent on the SNS per session ($< .3$). Significant positive correlations were calculated between Friends and Session Time, Activity and Session Time, and Activity and Friends (all $< .35$). That is, the greater the amount of friends the greater the amount of time spent on Facebook per session, and, activity increased as the amount of time per session and number of friends increased. Small-to-moderate positive correlations ($< .4$) were also revealed between Pictures and Facebook checks, Pictures and Session Time, Main Picture and number of friends. This indicated that, as the authors rating

of the ictures increased so too did Session Time, the narcissistic content of the main profile picture, number of friends, and the amount of times participants checked their personal profile. The narcissistic content of the About Me section had small positive correlations (< **.**3) with the number of friends and the narcissistic content of the pictures section.

Correlations between questionnaires and SNS features

Self-deception had significant negative correlations with Session Time and Covert Narcissism, and Covert Narcissism had an inverse relationship with Image Management. All correlations were in the small-to-moderate range ($\leq$ **.**41). A negative, moderate relationship between total PDS scores and Session Time was also yielded (rho = **.**35). Positive relationships were calculated between Self-deception and Self-esteem, Self-deception and Overt Narcissism, Image Management and Self-deception, total PDS scores and Self-esteem, and Covert Narcissism and Session Time. The strength of these relationships ranged from strong-to-weak ($\leq$ **.**56). Total PDS scores correlated strongly and positively with Self-deception (**.**69) and Image Management (**.**86) however, it must be noted that the strength of these relationships arose out of the fact that each individual subscale of the PDS was being partially correlated with itself in the calculation of the statistic. Also of interest was the correlation between Self-esteem and Activity. Whilst no predictions were made concerning this relationship, it is of note that RSE had a significant negative relationship with Session Time, and a negative relationship with Facebook checks. This indicates that as self-esteem increased, online activity decreased.

Mediation Analysis

Variables which were found to be normally distributed were subject to a mediation analysis using the PROCESS software plug-in for SPSS (Hayes, 2013). Separate analyses were run as narcissistic subtype as a predictor and self-esteem as an outcome variable. For a mediating relationship to be claimed, significant relationships between the predictor and mediating variable, mediator and outcome variable, and predictor and outcome variable are required (Baron & Kenny, 1986). These assumptions can be tested by looking at the simple correlations between variables (Howell, 2010). Of the remaining, normally distributed variables (Self-deception, Image Management, PDS Total, Main photo and Pictures), overt narcissism had a significant relationship with Self-deception only . As self-deception shared a significant relationship with self-esteem, and overt narcissism had a significant relationship with self-esteem, these variables were included in a mediation analysis. Consequently, the first mediation analysis concerned whether self-deception mediated the relationship between overt narcissism and self-esteem. The second mediation analysis concerned whether self-deception mediated the relationship between covert narcissism and self-esteem. This decision was based on the significance of the relationships between variables, as advised by Baron & Kenny (1986). Regression models using PROCESS are calculated as unstandardized R^2 as opposed to the slightly more conservative standardised Adjusted R^2. As a result the R^2 statistic is reported.

Although the correlation table shows significant relationships between covert narcissism and PDS scores, and PDS and self-esteem, it was decided against the use of PDS scores as a potential mediating variable of self-esteem. This is because 50% of the PDS scores were made up of the self-deception subscale. Therefore, the variance accounted for in the outcome variable was being calculated twice, which, makes it difficult to ascertain which of the two

has the most important influence on the outcome variable. As image management did not share a significant relationship with self-esteem the main influence on RSE would arise from self-deception scores. Indeed, part of the rationale for including PDS Total as a variable was to ascertain whether the social desirability construct had significant relationships with other variables if its constituent factors did not. Consequently, it was decided to drop total PDS scores from the mediation analysis.

Figure 6 Scatterplot for NPI-16 and SDE scores

Scatterplot showing the relationship between overt narcissism and self-deception.
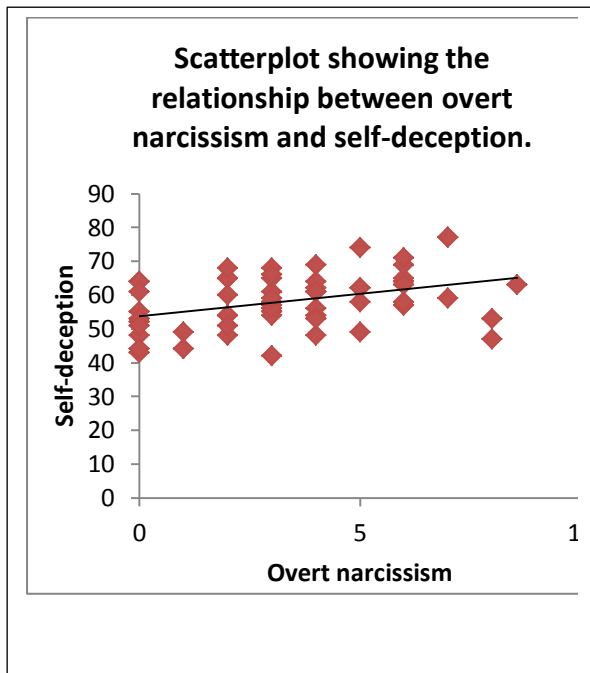
Figure 7 Scatterplot for HSNS and SDE scores

Scatterplot showing the relationship between self-deception and covert narcissism
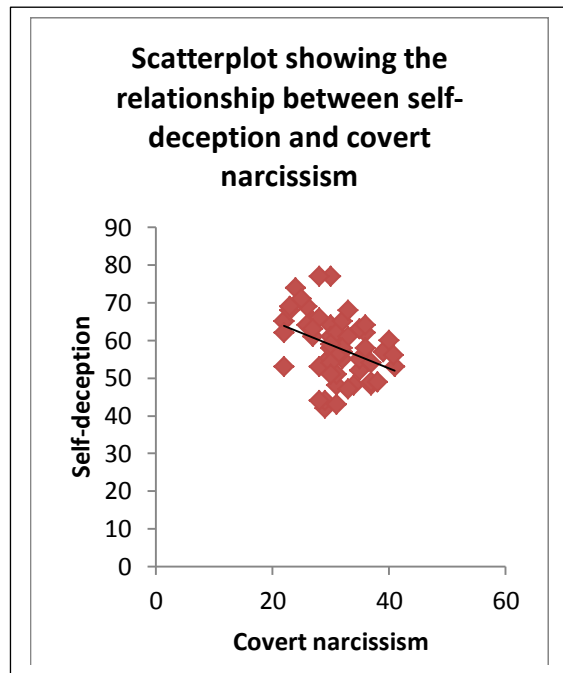
Table 19 Regression statistics for predictor (NPI-16 and HSNS) and outcome variables (mediators), 95% confidence intervals indicate the parameters within which the population regression line would be situated.

	NPI-16				HSNS			
	R^2	*F*	*df*	*p*	R^2	*F*	*df*	*p*
SDE	.15	9.95	1/58	.003	.14	9.40	1/58	.003

	NPI-16					HSNS				
	Coeff β	*SE*	*t*	*p*	*95% CI*	*Coeff* β	*SE*	*t*	*p*	*95% CI*
SDE	1.33	.42	3.15	.003	.48 - 2.17	-.63	.21	-3.10	.003	-1.04 - -.22

Only p values < .05 are reported. Coeff, Coefficient; SE, Standard Error

The R^2 value in table above shows that 15% of the variation in self-deception scores was predicted by NPI-16 scores. The coefficient statistic shows that NPI-16 significantly predicted SDE and that for every unit increase in overt narcissism (on the questionnaire), self-deception increased by 1.33 units. Covert narcissism also significantly predicted SDE scores, with 14% of the variance in scores being attributable to HSNS. For every unit increase in HSNS scores, SDE scores were diminished by **.63** (-**.63**) units.

Regression statistics were also calculated with self-esteem (RSE) as the outcome variable. Regression models and coefficients for these calculations are illustrated in table 20.

Table 20 Regression statistics for predictor (NPI-16 and HSNS) where RSE is the outcome.

	NPI-16					HSNS			
	R^2	F	df	p		R^2	F	df	p
RSE	.44	22.10	2/57	< .00005		.40	18.71	2/57	< .00005
	NPI-16					HSNS			
	Coeff β	SE	t	p	95% CI	Coeff β	SE	t	p	95% CI
SDE	.30	.06	4.90	< .00005	.17 - .43	.33	.06	5.20	< .00005	.20 - .50
NPI-16	.50	.21	2.31	.02	.06 - .93	–	–	–	–	–
HSNS	–	–	–	–	–	-.12	.10	-1.10	-	-.33 - .10

Only p values < .05 reported.

The R^2 values show that overt narcissism accounted for 44% of the variation in self-esteem, whereas, covert narcissism accounted for 40% of the variation in self-esteem. The highly significant *p*-values associated with the regression models indicate that it is highly unlikely that the *F*-ratios associated with each would be calculated if no relationship existed. Consequently, the regression models predict self-esteem well. The coefficient statistics show that, in both models, self-deception was a highly significant predictor of self-esteem, and that both models have similar values. Differences in each set of statistics were moderated by

narcissistic subtype (i.e., the relationship between self-deception and image management was the same in each calculation).

In the overt narcissism model, both self-deception and overt narcissism significantly predicted self-esteem. The coefficient statistics indicate that a unit increase in self-deception would be associated with an increase of 0.3 units on self-esteem score. Furthermore, as NPI-16 scores increased by one unit, self-esteem increased by half-a-unit (**.**50). In the HSNS (covert narcissism) model, the coefficient statistics show that as self-deception increased by one unit self-esteem increased by 0.33 units. However, although the coefficient statistic shows covert narcissism had an inverse relationship with self-esteem, covert narcissism was not a significant predictor of self-esteem. As a result, HSNS scores were excluded from further analyses.

Figure 8 Scatterplot for HSNS and RSE scores

Figure 9 Scatterplot for NPI-16 and RSE scores

Scatterpot showing the relationship between covert narcissism and self-esteem

Scatterplot showing the relationship between self-esteem and overt narcissism
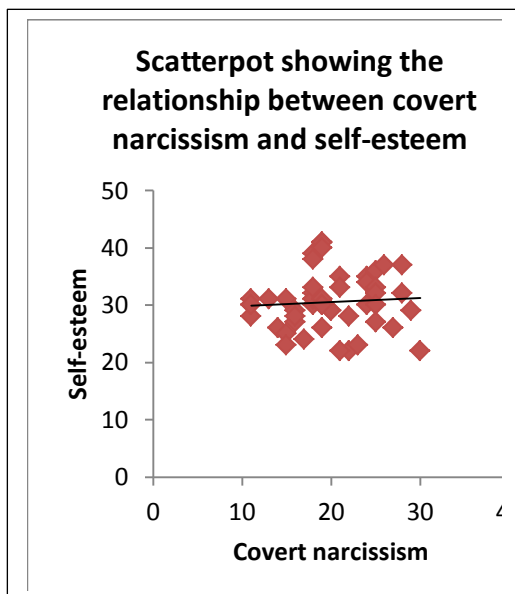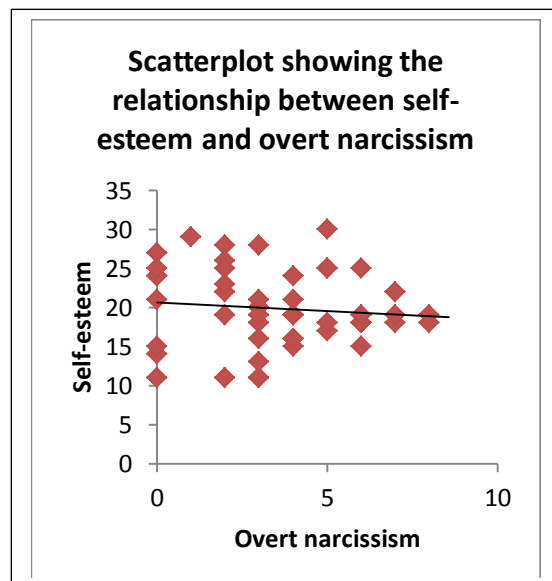
The scatterplot depicts a positive relationship between self-esteem and overt narcissism. However, because of difference in the scoring method used on the NPI-16 (forced choice with scores ranging between 0-16 vs 5-point Likert scale) the visual representation of the data is not a true reflection of the underlying relationship between the two variables.

The total effect model of the PROCESS output refers to the total effect of the predictor on the outcome variable when the mediator is not present in the model. When self-deception was absent from the model overt narcissism accounted for 20% ($R^2 = .20$) of the variance in self-esteem (Coeff = .90, Std error = .23, $t = 3.83$, $p < .0005$, 95% BCa CI [.43, 1.40]). The direct effect statistics are reported in the coefficient section of table 20 above. Indirect effect statistics show whether there was a significant mediating effect: whether overt narcissism exerted an effect on self-esteem via self-deception. Results supported this mediating effect by showing a significant indirect effect of overt narcissism on self-esteem through self-deception (Coeff = .40, Std error = .16, Bootstrapped 95% BCa CI [.14 – .80]). This was supported further by the significance of the Sobel test statistic (Coeff .40, Std error = .15, $z = 2.61$, $p < .01$), Kappa-squared effect size ($K^2 = .21$, 95% BCa CI [.07, .35).

Moderation Analysis

Moderation analysis was carried out to ascertain whether the relationship between overt narcissism and self-esteem changed as a function of self-deception. However, in the present sample, no significant interaction between NPI-16 and SDE was yielded (Coeff = .01, Std error = .03, t = .36, $p > .05$, 95% BCa CI [.04 – .06]). The influence of self-deception on self-esteem at medium and high levels was marginally non-significant ($p = .051$ and $p = .070$, respectively). Consequently, non-significance of the interaction may be absolved with a slightly larger sample than the present one. Therefore, despite the lack of statistical significance, results may still be of psychological significance.

<u>Discussion</u>

The present study sought to explore how the overt and covert forms of narcissism are manifested on the personal web pages of the social networking site (SNS) Facebook and how this relates to self-reported levels of self-esteem. It was predicted overt and covert narcissism would share an inverse relationship with one another, that both types of narcissism would have positive relationships with self-presentational content on the SNS and online activity, and that both types of narcissism would show different relationships with self-esteem, number of friends, and social desirability and its facets (positive overt vs negative covert). Some hypotheses were refuted and some hypotheses were supported. Explanations for these findings are discussed below.

Evidence for the inverse relationship between covert and overt narcissism is mixed. For example, Holdren (2004) and Cha, Ra & Hyun (2009) report significant negative correlations between the Narcissistic Personality Inventory (NPI; overt narcissism) and the Hypersensitive Narcissism Scale (HSNS; covert narcissism). This is in line with the different relationships each subtype shares with indices of well-being (positive overt vs negative covert), such as self-esteem and happiness (e.g., Rose, 2002). However, previous studies also report a lack of correlation between the NPI and the HSNS, and other measures of covert narcissism (e.g., Arble, 2008; Wink, 1991; Hendin & Cheek, 1997). This may arise out of the facets underpinning each type of narcissism. Narcissism is a complex personality trait, and, the differential relationships each subtype shares with indices of well-being may be only reflecting one, or, a small subset of the facets driving each personality style. Similarly, both types of narcissism share a common factor of exploitativeness / entitlement (Emmons, 1987; Rose 2002) which may negate the potential negative relationship(s) each subtype shares with other facets associated with each subtype.

The lack of a significant negative correlation between the NPI-16 and HSNS in the

present study supports Wink (1991) in his conceptualization of the "two faces of narcissism" which can be tapped by two different sets of uncorrelated scales (Wink, 1991). It also supports the construct and discriminant validity of the HSNS as a measure of covert narcissism (also see Arble, 2008; Holdren, 2004). However, in their sample of South Korean undergraduates, Cha et al., (2009) report covert narcissism - as measured by the Covert Narcissism Scale (CNS; Gang & Chung, 2002) - correlated negatively with the NPI. The discrepancy of their results with the present ones may arise out of cultural differences in the self-reporting of covert narcissism between more collectivist oriented cultures vs individualist oriented cultures, such as those which predominate in the western world. Although Holdren (2004) reports a significant negative relationship between the HSNS and NPI it must be noted the sample size in that study was large (n = 900). It is therefore unsurprising a highly significant result was reported between the two measures ($p < .01$) because small effects are more readily detected when sample sizes are large. Moreover, the HSNS is a ten-item, unitary measure of the construct, which emphasises hypersensitivity and vulnerability. However, covert narcissism is a complex personality trait associated with overt avoidant, depressive tendencies, hidden desires of grandiosity, selfishness and lack of empathy, a tendency to experience shame, and, disturbed object relations (Arble, 2008). The CNS is a 45-item scale comprising of three subscales (hypersensitive/vulnerable, unstable goal seeking and timid/lack of confidence scales). Consequently, the CNS may more adequately tap a broader spectrum of behaviours consistent with theoretical and clinical conceptualisations of covert narcissism, as opposed to the emphasis on the hypersensitive/vulnerable aspects of the trait measured by the HSNS. In light of the present results, it may be that overt narcissism does not share an inverse relationship with the hypersensitive/vulnerable factor of covert narcissism, yet may do with one or more of the other scales on the CNS. It may therefore be prudent for researchers to ignore unidimensional measures of narcissism, such as the HSNS

and NPI-16, in favour of more complete measures of the construct which capture the complexity of each narcissistic subtype. This would allow the relationships between the constituent factors of each subtype to be examined empirically.

The significant negative correlations of covert narcissism (HSNS) with self-esteem (RSE) and social desirability (PDS), and its facets (SDE, self-deception; IM, image management) confirm that covert narcissists have negative self-evaluations, are aware of their inadequacies, and have less inclination to project their social images in a positive manner. Such findings support Cooper (1998) who describes the covert narcissist as being characterised by ineffective functioning and low self-efficacy, plagued by unworthiness and self-doubt, and incapable of pursuing and sustaining ambitions and attainable goals (e.g., seeking the affirmation of others which they feel is due). Conversely, as expected, overt narcissism correlated positively with self-esteem. This replicates previous work showing a positive relationship between overt narcissism and self-esteem (Arble, 2008; Ames et al., 2006). This is congruent with the 'mask model' of overt narcissism in which surface level feelings of self-esteem are high in order to mask deep seated inferiorities (Boson et al., 2008). In line with theoretical accounts of overt narcissism, the present results show that self-deceptive enhancement mediates the relationship between overt narcissism and high self-esteem. For example, overt narcissists overestimate and exaggerate their positive qualities, such as attractiveness and their contribution to group tasks (Gabrielli, Critelli & Ee, 1994; John & Robins, 1994). Consequently, whilst narcissism can be construed as a maladaptive trait, the present results reinforce the idea that overt narcissism has more of an adaptive quality to it relative to its covert counterpart (also see Rose 2002; Arble, 2008). The lack of a significant positive correlation between overt narcissism and image management indicates that overt narcissistic esteem is more a product of self-deception than image management. This is supported by Paulhus (1998) who reported moderate correlations between the NPI and

Image Management scale (.18). As overt narcissists are self-deceived, and believe they are inherently superior, they rate themselves and their competencies highly, and therefore do not feel the need to engage in significant image management strategies in order to regulate their self-esteem via the approval of others. This results in robust positive self-evaluations resistant to dissuasion, even in the face of objective evidence, for example, remaining impervious to criticism in relation to task performance feedback (Atlas & Them, 2008).

The significant positive relationship between overt narcissism and the SNS features Friends and Activity is perhaps unsurprising given that overt narcissists are highly skilled at initiating relationships (e.g., Paulhus, 1998), and are energetic and highly extraverted (Raskin & Novacek, 1979), which is associated with a preference for social interaction (Witt et al., 2011). However, what is unclear is to the extent that such evidence is a 'spill over' from their 'offline' activity. The overt narcissists' propensity to initiate relationships in the real world would most probably be reflected in the amount of friends and activity evident on their SNS. It is therefore plausible that, given that extraverts have a preference for in-person interaction (Witt et al., 2011), the overt narcissist uses SNS to augment and maximise their offline social interactions / relationships, as opposed to merely using it as a compensatory tool for interpersonally oriented self-enhancement strategies. For example, Zywica & Danowski (2008) showed that extraverted individuals with higher self-esteem - such as overt narcissists - were more popular offline and on Facebook (as measured by asking respondents to rate their own popularity), and used the SNS to enhance offline relationships with their more extensive online social networks. Consequently, overt narcissists may not feel the need to so readily self-enhance on SNS as their needs are sated in face-to-face interactions and via self-deception. The non-significance of the correlation between overt narcissism and the narcissistic content of the main profile photo, pictures, updates and about me sections of the SNS is congruent with such a proposal. Whilst such findings contradict previous research

(e.g., Mehdizadeh, 2010), such results may have arisen out of a bias in the ratings of such items carried out by the author. Future research in the area may be improved reliability by using multiple raters to overcome response bias with regards to the interpretation of what constitutes narcissistic self-representation (i.e., evidence inter-rater reliability).

Also of note is the negative correlation between Agreeableness and activity on Facebook (back-and-forth conversations) reported in Ivcevic & Ambady (2013). Agreeableness is a moderator of interpersonal conflict (Jensen-Campbell & Graziano, 2001), shares a negative relationship with overt narcissism (Paulhus & Williams, 2002), and overt narcissism shares a positive relationship with online activity in the present study. Overt narcissism is also associated with other derogation (Boson et al., 2008) and domineering and vindictive interpersonal problems (Dickinson & Pincus, 2003). Consequently, whilst the qualitative nature of the interactions in Ivcevic & Ambady (2013) and the present work is not reported, it is plausible that one of the strategies of self-enhancement used by overt narcissists on SNS may be through vindictive, domineering and derogatory communications with others that serve to reinforce their perceived superiority and authority. Indeed, SNS may provide a platform for much downward social comparison of others: a marker of overt narcissism (e.g., Krizan & Bushman, 2011).

The lack of a significant correlation between covert narcissism and SNS content is at odds with the present hypotheses and previous work (e.g., Brailovskia & Bierhoff, 2012). However, it is reflective of the introverted, socially anxious nature of the covert narcissist who eschews grandiose exhibitionism due to feelings of shame and inadequacy, and lack of personal efficacy (Cooper, 1998). This point is particularly pertinent considering that real-world friends, which permeate online social networks, may influence and moderate the way the covert narcissist self-presents online. In order to minimise the probability of negative evaluation from others, both on SNS and offline, the covert narcissist refrains from overt self-

presentation. As such, there is congruence between the real world and online world in the way in which individuals presents themselves because one permeates the other.

Also of interest was the significant negative relationship between session time and self-esteem. The present results partially replicate Mehdizadeh (2010) who reported significant negative relationships between self-esteem and the amount of times Facebook was checked per day, and the amount of time per session. Whilst the present results for number of checks were non-significant they were in the same direction as Mehdizadeh (2010). It has been reported that positive feedback from friends in Facebook users' social network maximises the enhancement of social self-esteem, such as the establishment of close friendships, romantic appeal, and the perception of one's physical appearance (Valkenburg, Peter & Schouten, 2006). Similarly, Gonzales & Hancock (2011) report that viewing of one's personal profile positively impacts scores on the Rosenberg Self-esteem Scale. The authors also reported that self-esteem was highest in participants who viewed their own profile and not those of other users, and that self-presentation (profile editing) was associated with higher self-esteem. That is, in a similar vein to the legend of Narcissus, who gazed upon himself, self-worth may be enhanced by viewing and showcasing a version of the self that is attractive and successful, and embedded in a network of meaningful relationships (Toma & Hancock, 2013).

The negative relationship between session time and self-esteem yielded in the present study and Mehdizadeh (2010) may indicate that SNS users with diminished self-esteem may spend more time on such sites as a means of boosting positive self-worth. The positive relationships between the narcissistic content of the Pictures measure and the number of checks and time per session may be reflective of such a postulate. Site users may spend more time per session actively editing their profile (e.g., posting pictures which will maximise positive feedback from other site users) as well as increasing the amount of checks and time

per session, in order to seek affirmation of their positive qualities via positive feedback from others in their social network. Indeed, SNS may afford such individuals the capacity to meet their desire for approval from others and use social relationships to regulate self-esteem like their overt counterparts. The positive relationship between session time and covert narcissism in the present study is conducive with such a proposal. Such a strategy could be particularly attractive to introverted, socially anxious individuals, such as covert narcissists, who have increased need for control in social situations and prefer computer mediated communication (Sheeks & Birchmeier, 2007; Kramer & Winter, 2008; Hertel, Schroer, Batinic, Konradt & Naumann, 2005). This supports Oldmeadow, Quinn & Kowert (2013) who found individuals high in attachment anxiety - such as covert narcissists (Dickinson & Pincus, 2003) - used Facebook more frequently, particularly when experiencing negative emotions.

Low self-esteem is associated with an increased likelihood of accepting friend requests from strangers and number of friends on SNS profiles, and a connectedness to Facebook (Lee, Moore, Park & Park, 2012). Social connectedness on Facebook is associated with lower depression and anxiety, and greater satisfaction with life (Grieve, Indian, Witteveen, Tolan & Marrington, 2013). Consequently, for the covert narcissist, who experiences low social connectedness, depression, and diminished life satisfaction (Cooper, 1998), SNS provide a means to counteract the factors which underpin their dissatisfaction with the self. For example, Toma & Hancock (2013) reported that SNS users gravitated towards their SNS profile after negative evaluation of a public speaking performance. Possibly because focusing on a more idealised version of the self brings into conscious positive, personal attributes which antagonise ego threats (Toma & Hancock, 2013). However, whilst the covert narcissist looks upon the more ideal self and others to affirm their positive qualities, the overt narcissist may use SNS to boost self-deception and convince themselves of their positive qualities through other derogation and downward social

comparison.

Brailovskia & Bierhoff, (2012) reported covert narcissism was associated with a high degree of self-presentation on SNS. Similarly, survey research indicates individuals with less social skills report greater investment in SNS (Ellison, Steinfield & Lampe, 2007), and users with diminished self-esteem who are less popular offline, are more, and invest more effort into, looking popular on Facebook (Zywica & Danowski, 2008). Online environments such as SNS afford the covert narcissist an arena for social compensation in which grandiose fantasies of the ideal self can be constructed and manipulated with a high degree of control. However, an alternative interpretation is that, because covert narcissism is associated with a fear of negative evaluation (Arble, 2008) extra effort is invested in self-presentational strategies which minimise the probability of negative feedback from others in their social network. Similarly, attachment anxiety – a marker of covert narcissism (Dickinson & Pincus, 2003) - is associated with greater concern over how the self is perceived by others on Facebook (Oldmeadow, Quinn & Kowert, 2013). This point could also extend to the real world and those friends on the SNS that the covert narcissist shares an offline relationship with. This may help to explain the lack of significant correlations between covert narcissism with SNS features and online activity, such as commenting on others posts.

<u>Future research</u>

Media violence

The current studies found that media violence exposure failed to compromise participant's performance in the Counting Stroop Task. As such, it was concluded that viewing of media violence did not diminish executive functioning. Previous research in the area has used Stroop test variants to index executive function (Wang et al., 2009). However, future work

may benefit from using a number of neuropsychological measures sensitive to prefrontal dysfunction as opposed to just one measure. Such an approach may maximise the ability to detect an effect if one exists (i.e., that viewing media violence impacts upon executive functioning). Neuroimaging studies indicate that violent media down-regulates activity in the orbitofrontal cortex (e.g., Kelly et al., 2007; Strenziok et al., 2010). Consequently, use of neuropsychological measures which are known to tap this particular region may prove more fruitful in terms of effects than use of the Stroop alone. Potential measures include: smell identification tests; alternation tests; and, antisaccades (Spinella, White, Frank & Schiraldi, 2006). Previous work suggests that, in pathological groups, media violence attenuates executive functioning (Kronenberger eta al., 2005). Consequently, use of clinical groups which are prone to aggression and violence, would allow for the identification of populations which are more to prone to the effects of violent media on executive functioning. This is particular pertinent with regards to incarcerated criminals, who may have access to such media in prison, the effects of which are unknown.

A major caveat of media violence research is the emphasis on outcome measures relating to physically aggressive behaviours and cognitions. As females have a tendency to engage in indirect forms of aggression, it may be more appropriate to measure attitudinal and behavioural changes relating to indirect aggression. Females may have more highly developed cognitive associations relating to indirect aggression and may be more susceptible to media depictions of indirect aggression than their male counterparts. This is particularly important considering a content analysis of over 200 hours of British TV shows popular with adolescents' revealed that indirect aggression is the most prevalent form of aggression depicted on TV. Overall, indirect aggression was portrayed in 92 per cent of programmes surveyed, followed by 86 per cent for verbal aggression, and 55 per cent for physical aggression (Coyne & Archer, 2004). Additionally, the perpetrators of indirect aggression

were more likely to be female and displayed characteristics which are known to increase subsequent physical forms of aggression: realism, attractiveness, justification, and reward (Coyne, 2004).

Social network sites

One of the points raised in the discussion section concerned the way in which offline relationships permeated SNS and may moderate the extent to which an individual self-presents online. This point is particularly germane in relation to the way the covert narcissist may self-present. Future research may focus on the extent to which narcissistic dispositions influence identity construction, activity and behaviours in completely anonymous online environments, such as multiplayer online role playing games. Such games involve creating a digital character which communicates and interacts with others in a virtual world similar to that of the real world. Two of the factors yielded in Yee's (2006) factor analysis on motivations for using such environments have much relevance to narcissism: Relationship and Manipulation. That is, users use such games to build friendships of a comparable or superior nature of those in the real world. Such an environment may allow the covert narcissist greater opportunity to regulate their unfulfilled expectations (e.g., affirmation from others) via the creation of an actualised self because their real-world identity is completely absent from their online character. However, users also engage in such environments to scam, deceive, taunt and dominate other users (Yee, 2006). Consequently, the overt narcissist may use such an environment as a vehicle in which their domineering and vindictive interpersonal style can be embraced through the derogation and manipulation of others, in order to reiterate personal feelings of superiority. A related avenue for future research is the exploration of differences in the way that subtypes of narcissism are manifest in interactions with others on SNS. The present work only measured the amount of activity evident on profile pages and not

the nature of interactions with other SNS users. Future studies, may include the measurement of other derogation and downward social comparison evident in social interactions, and, evidence of affirmation seeking from others. This may then be related to the overt-covert distinction to ascertain how narcissistic subtypes use SNS in order to maintain or increase self-esteem.

CHAPTER 4: CONCLUSIONS

Conclusions

Scientists and clinicians invest significant effort in to understanding violence and aggression in society with a view to reducing levels of them. The role of violent media consumption as an explanatory variable for such behaviour has received much attention. When taken together, the results from the current studies show that personality traits are drivers of behaviour in relation to the way that individuals engage, interact and respond to different forms of media technology. The extent to which engagement with media is either positive or negative is contingent on such personality traits.

Firstly, in the initial media violence study, trait aggressiveness moderated responsiveness to scenes of real (sport-related) violence. As such, it can be seen that whilst viewing violent imagery in itself is not inherently bad, doing so when the violence portrayed is socially acceptable, and in the presence of elevated levels of trait aggressiveness, can result in attitudes being shifted to being more accepting of violence. This finding was not replicated in the second experiment where participants were shown scenes of real graphic violence. This suggests that trait aggression as a driver of media violence-aggression relationships may not be robust in normative, subclinical groups. Moreover, it does not moderate responsiveness to scenes of real, graphic violence in such groups. However, the fact that, in the first experiment, the result was yielded in a normative sample of undergraduates indicates that for those with elevated levels of trait aggression - for example clinical groups - the effects may be more marked.

The interaction between trait aggression and the experimental treatment (exposure to video violence) is unsurprising given that individuals high in trait aggression have more aggression-linked cognitive associations (Bushman, 1995). For individuals with elevated levels of trait aggression these may be more readily accessible (Bartholow & Anderson, 2002). Therefore, they are more likely to prime aggression related concepts after exposure to

violent stimuli. Such individuals have greater approach motivation towards aggressive stimuli, experience aggression related affect after exposure to aggression related stimuli, and, behave more aggressively towards others after such exposure (Bushman, 1995). However, because Stroop Task performance was not compromised after viewing of violent media, the present results indicate increases in aggression are not mediated by deficits in executive functioning arising from exposure to violent imagery. As such, the shift towards aggression occurs at the social-cognitive (attitudinal) level, independent of frontal functioning. This is supportive of The General Aggression Model (Anderson & Bushman, 2002), which posits that aggressive cognitions and expectations are primed after a single exposure to media violence. Interestingly, the present results showed the viewing of fantasy violence by subclinical groups is benign relative to that of real, sport-related violence. The inference being a large diet of fantasy violence will not result in increased attitudes supportive of violence, even in the presence of elevated levels of trait aggression. Similarly, in subclinical groups, when the violence viewed is real and graphic, attitudes do not shift to being more pro-violent, instead, viewers become sensitised to the consequences of violence. As such, there appears to be a ceiling effect which is moderated by the type of violence depicted and the context it occurs in

In conclusion, these studies indicated that the potential deleterious impact of violent media may be maximised in the presence of elevated levels of trait aggression. Moreover, this effect occurs when violence is given a degree of social acceptability. However, in subclinical samples the effect may be less consistent.

The social networking study demonstrates that an over reliance on Narcissistic Personality Inventory-oriented levels of overt narcissism as an explanatory variable for SNS use – as has been done previously (e.g., Buffardi & Campbell, 2008; Mehdizadeh, 2010; Ong et al., 2011) – is not only over simplistic with regards to the construct of narcissism (Holdren,

2004), but also how narcissism drives behaviour in online communities. Indeed, both overt and covert narcissism are important to address when considering activity and self-presentation in online social domains. This is because over reliance on measures associated with one subtype will not yield a complete understanding of the construct. Furthermore, the results herein suggest that these subtypes of narcissism are manifest in different online behaviours and relate differently to self-reported levels of explicit self-esteem.

Intriguingly, the present results only provide partial support for the types of behaviours characteristic of overt narcissism, at least in terms of online environments. Consistent with theoretical and empirical accounts of the construct (e.g., Boson et al., 2008; Paulhus, 1998a), overt narcissism was significantly and positively related to self-deception and self-esteem, and self-deception mediated the relationship between self-esteem and narcissism. However, with the exception of number of friends and online activity – products of extraversion (Ong et al., 2011) - markers of overt narcissism were conspicuously absent from the personal profiles of individuals with elevated levels of overt narcissism. Similarly, session time and number of checks did not relate to overt narcissism, thus suggesting overt narcissists may view SNS with a degree of ambivalence with regards to what it can offer them. Indeed, the benefits for such individuals may focus on maximising offline relationships and downward social comparison. Conversely, covert narcissism was associated with diminished self-esteem and an awareness of their feelings of inadequacies. This reiterates the characteristics of covert narcissists who experience depression and a lack of personal efficacy (Cooper, 1998). This was evidenced by the negative relationships it shared with self-deception and image management. Interestingly, covert narcissism shared a positive relationship with time per session. This may arise with a preoccupation with negative evaluation from others (Arble, 2008; Oldmeadow, Quinn & Kowert, 2013), or, from a drive to boost positive self-worth (e.g., Toma & Hancock, 2013). In conclusion, these studies show

previous work into the role of narcissism on social network sites may have been hindered by an over reliance on the Narcissistic Personality Inventory measure of overt narcissism. Indeed, when both subtypes of narcissism are considered in relation to SNS use, the paradoxical nature of the construct becomes clear, as both subtypes are associated with markedly different online behaviours. As such, both subtypes accrue some benefit from SNS use – maintaining feelings of superiority vs boosting positive self-evaluation – which may impact upon others in their social network very differently.

The general conclusion from all studies is that viewing violent media or use of SNS may not enhance antisocial acts. However, personality traits of forensic interest interacting with such media – narcissism and trait aggression – may result in violence / aggression to others and being subject to hostile and domineering relationships. However, for the covert narcissist, SNS use may accrue them a greater sense of self-worth.

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Appendices

Appendix 1; Ethical Approval

Appendix 2: The anglicised version of the Funk et al. (1999) Attitudes to Violence questionnaire

I could see myself committing a violent crime within the next 5 years.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

It is okay to use violence to get what you want.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

I try to stay away from places where violence is likely*.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

People who use violence get respect.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

Lots of people are out to get you.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

Carrying a knife or some other weapon would make me feel safer.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

If a person hits you, you should hit them back.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

It is okay to beat up a person for insulting my family or me.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

It is all right to carry a weapon, like a knife, if you live in a bad area.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

It is okay to do whatever it takes to protect myself.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

Parents should tell their children to use violence if necessary.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

If someone tries to start a fight with you, you should walk away*.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

I am afraid of getting hurt by violence*.

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

*Indicate items that were reverse coded.

Appendix 3: Perceptions of the Consequences of Violence

Participant code:

Age:

Sex:

Bruce and Phil are two fit, healthy young men, who stop off at a pub for a quick drink after work. After having had one pint they decide to leave the pub. Outside in the pub car park they encounter a group of other men and become involved in an angry and rowdy exchange. During the course of this exchange Bruce is struck by one of these men. He receives a single punch on the chin causing him to fall backwards and hit his head on the ground. The group of men quickly disperses leaving the fallen man and his friend. Bruce slowly picks himself up. He is confused and blood is coming from the back of his head. Phil believes that the cut will probably require stitches and decides to take Bruce to the accident and emergency department of the local hospital. For a few minutes during the journey to the hospital Bruce's legs shake uncontrollably. There is a long wait at the hospital to see the doctor and Bruce is still clearly confused when his head wound is stitched an hour later.

Listed below are the possible outcomes for Bruce. Consider each in turn and indicate how much you agree with each outcome on the five-point scale (1 = strongly disagree 5 = strongly agree).

Do you think that Bruce would:

1. **Require a brain scan?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

2. **Have a fracture to the front of his skull?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

3. **Have a fracture to the back of his skull?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

4. **Require ventilating?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

5. **Be able to drive the next day?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

6. **Be able to go to work the next day?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

7. **Have no more than two weeks sick leave?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

8. **Have no more than two months sick leave?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

9. **Retain his job?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

10. **Require brain surgery to remove a blood clot?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

11. Have an epileptic fit at the time of the assault?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

12. Suffer from epilepsy during the week following the assault?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

13. Suffer from epilepsy for the rest of his life?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

14. Show serious changes in his personality?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

15. Be inappropriately aggressive for the rest of his life?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

16. Have incontinence in the three months after the assault?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

17. Have memory problems in the three months following the incident?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

18. Have a persistent weakness in his legs?

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

19. **Have a long-term problem with his vision?**

1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

20. **Lose his sense of smell?**

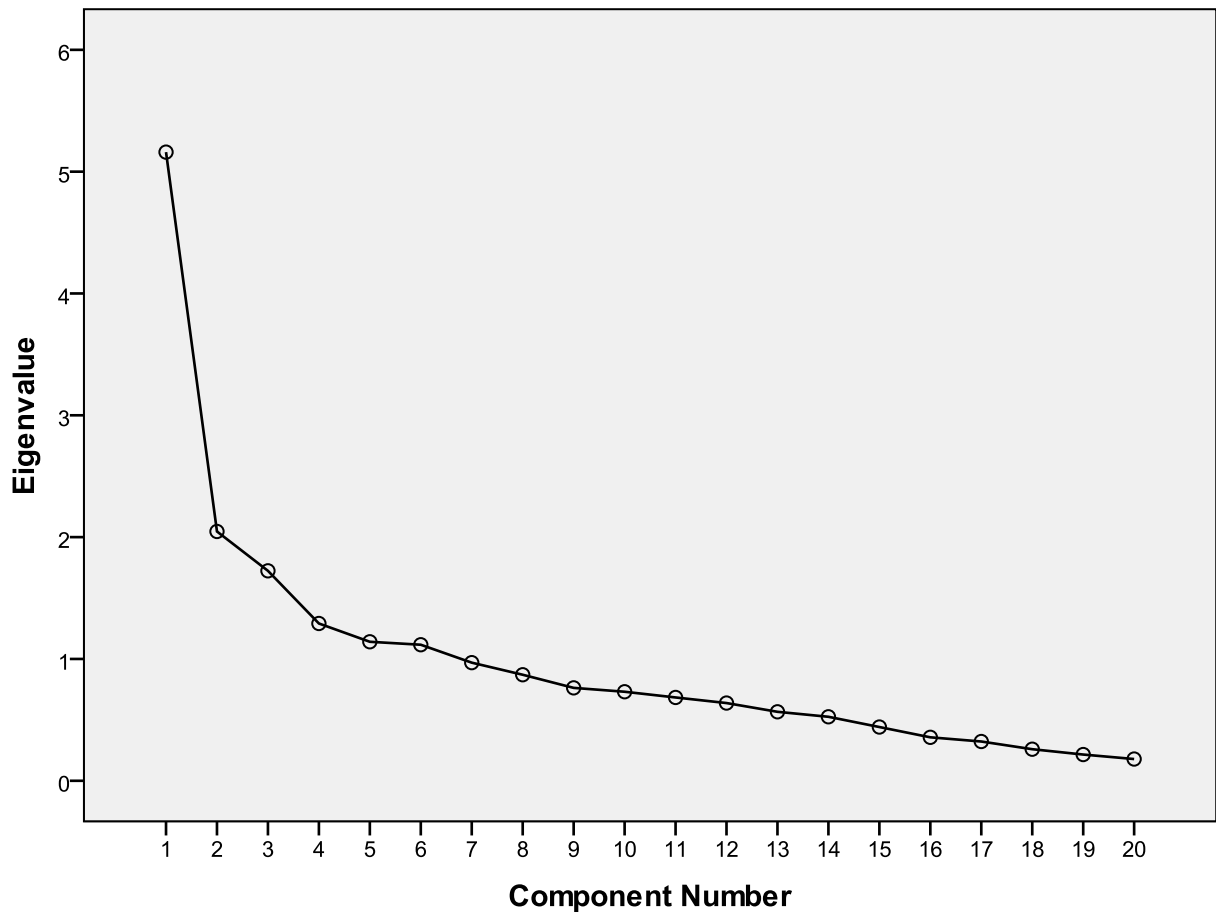| 1	2	3	4	5
Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree Strongly

Appendix 4: Principal components analysis of Perceptions of the consequences of violence measure

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation S	
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	
1	5.160	25.802	25.802	5.160	25.802	25.802	2.872	
2	2.046	10.232	36.034	2.046	10.232	36.034	2.676	
3	1.723	8.617	44.651	1.723	8.617	44.651	1.979	
4	1.291	6.456	51.107	1.291	6.456	51.107	1.776	
5	1.141	5.705	56.812	1.141	5.705	56.812	1.698	
6	1.117	5.584	62.396	1.117	5.584	62.396	1.478	
7	.970	4.849	67.244					
8	.870	4.352	71.596					
9	.763	3.814	75.410					
10	.731	3.654	79.064					
11	.684	3.420	82.484					
12	.638	3.191	85.675					
13	.566	2.831	88.506					
14	.525	2.627	91.132					
15	.441	2.206	93.339					
16	.357	1.784	95.122					
17	.322	1.612	96.734					
18	.259	1.296	98.031					
19	.215	1.077	99.107					
20	.179	.893	100.000					

Extraction Method: Principal Component Analysis.

Scree Plot

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
Show_serious_changes_in_his_personality	.763					
Be_innapropriately_aggressive_for_the_rest_of_his_life	.734	.402				
Have_a_long_term_problem_with_his_vision	.659		.506			

	1	2	3	4	5	6
Have_memory_problems_in_the_three_months_following_the_incident	.634					
Require_ventilating	.471					
Suffer_from_epilepsy_during_the_week_following_the_assault		.870				
Have_an_epileptic_fit_at_the_time_of_the_assault		.779				
Suffer_from_epilepsy_for_the_rest_of_his_life		.753				
Have_incontinence_for_the_three_months_following_the_assault		.423				
Have_a_fracture_to_the_back_of_his_skull			.664			
Have_a_persistent_weakness_in_his_legs			.535			
Require_a_brain_scan			.526			
Require_brain_surgery_to_remove_a_blood_clot			.497			
Lose_his_sense_of_smell	.473		.479			
Be_able_to_drive_the_next_day				.861		
Be_able_to_to_work_the_next_day				.854		
Have_no_more_than_two_weeks_sick_leave					.883	
Have_no_more_than_two_months_sick_leave					.825	
Have_a_fracture_to_the_front_of_his_skull						.754
Retain_his_job						-.680

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

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Participant code

<u>Buss-Perry Scale</u>

Please rate each of the following items in terms of how characteristic they are of you. Use the following scale for answering these items.

1	**2**	**3**	**4**	**5**
Extremely uncharacteristic of me	Fairly uncharacteristic of me	Neutral	Fairly characteristic of me	Extremely characteristic of me

1) Once in a while I can't control the urge to strike another person.

2) Given enough provocation, I may hit another person.

3) If somebody hits me, I hit back.

4) I get into fights a little more than the average person.

5) If I have to resort to violence to protect my rights, I will.

6) There are people who pushed me so far that we came to blows.

7) I can think of no good reason for ever hitting a person.

8) I have threatened people I know.

9) I have become so mad that I have broken things.

10) I tell my friends openly when I disagree with them.

11) I often find myself disagreeing with people.

12) When people annoy me, I may tell them what I think of them.

13) I can't help getting into arguments when people disagree with me.

14) My friends say that I'm somewhat argumentative.

15) I flare up quickly but get over it quickly.

16) When frustrated, I let my irritation show.

17) I sometimes feel like a powder keg ready to explode.

18) I am an even-tempered person.

19) Some of my friends think I'm a hothead.

20) Sometimes I fly off the handle for no good reason.

21) I have trouble controlling my temper.

22) I am sometimes eaten up with jealousy.

23) At times I feel I have gotten a raw deal out of life.

24) Other people always seem to get the breaks.

25) I wonder why sometimes I feel so bitter about things.

26) I know that "friends" talk about me behind my back.

27) I am suspicious of overly friendly strangers.

28) I sometimes feel that people are laughing at me behind me back.

29) When people are especially nice, I wonder what they want.

Appendix 6; Levenson Self-report Psychopathy Scale

	Disagree strongly	Disagree slightly	Agree slightly	Agree strongly
Success is based on survival of the fittest; I am not concerned about the losers.				
For me, what's right is whatever I can get away with.				
In todays world, I feel justified in doing anything I can get away with to succeed.				
My main purpose in life is getting as many goodies as I can.				
Making a lot of money is my most important goal.				
I let others worry about higher values; my main concern is the bottom line.				
People who are stupid enough to get ripped off usually deserve it.				
Looking out for myself is my top priority.				
I tell other people what they want to hear so they will do what I want them to do.				
I would be upset if my success came at someone else's expense.				
I often admire a really clever scam.				
I make a point of trying not to hurt others in pursuit of my own goals				
I enjoy manipulating other peoples feelings.				
I feel bad if my words or actions cause someone else to feel emotional pain.				
Even if I were trying very hard to sell something, I wouldn't lie about it.				
Cheating is not justified because it is unfair to others.				
I find myself in the same kind of trouble, time after time.				
I am often bored.				
I find I am unable to pursue one goal for a long time.				
I don't plan anything very far in advance.				
I quickly lose interest in tasks I start.				
Most of my problems are due to the fact that other people just don't understand me.				
Before I do anything, I carefully consider the possible consequences.				
I have been in a lot of shouting matches with other people.				
When I get frustrated I often "let off steam" by blowing my top.				
Love is overrated.				

Appendix 7; Narcissistic Personality Inventory 16-item version

Read each pair of statements below and place an "X" by the one that comes closest to describing your feelings and beliefs about yourself. You may feel that neither statement describes you well, but pick the one that comes closest. **Please complete all pairs**.

1.   ___   I really like to be the center of attention
      ___   It makes me uncomfortable to be the center of attention

2.   ___   I am no better or no worse than most people
      ___   I think I am a special person

3.   ___   Everybody likes to hear my stories
      ___   Sometimes I tell good stories

4.   ___   I usually get the respect that I deserve
      ___   I insist upon getting the respect that is due me

5.   ___   I don't mind following orders
      ___   I like having authority over people

6.   ___   I am going to be a great person
      ___   I hope I am going to be successful

7.   ___   People sometimes believe what I tell them
      ___   I can make anybody believe anything I want them to

8.   ___   I expect a great deal from other people
      ___   I like to do things for other people

9.   ___   I like to be the center of attention
      ___   I prefer to blend in with the crowd

10.   ___   I am much like everybody else
      ___   I am an extraordinary person

11.   ___   I always know what I am doing
      ___   Sometimes I am not sure of what I am doing

12.   ___   I don't like it when I find myself manipulating people
      ___   I find it easy to manipulate people

13.   ___   Being an authority doesn't mean that much to me
      ___   People always seem to recognize my authority

14.   ___   I know that I am good because everybody keeps telling me so
      ___   When people compliment me I sometimes get embarrassed

15.   ___   I try not to be a show off
      ___   I am apt to show off if I get the chance

16.   ___   I am more capable than other people
      ___   There is a lot that I can learn from other people

HSNS

Appendix 9; Rosenberg Self-Esteem Scale

Appendix 10; Paulhus Deception Scales (self-deceptive enhancement , image management)